

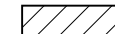


Texas Department of Transportation
TECHNICAL PROVISIONS

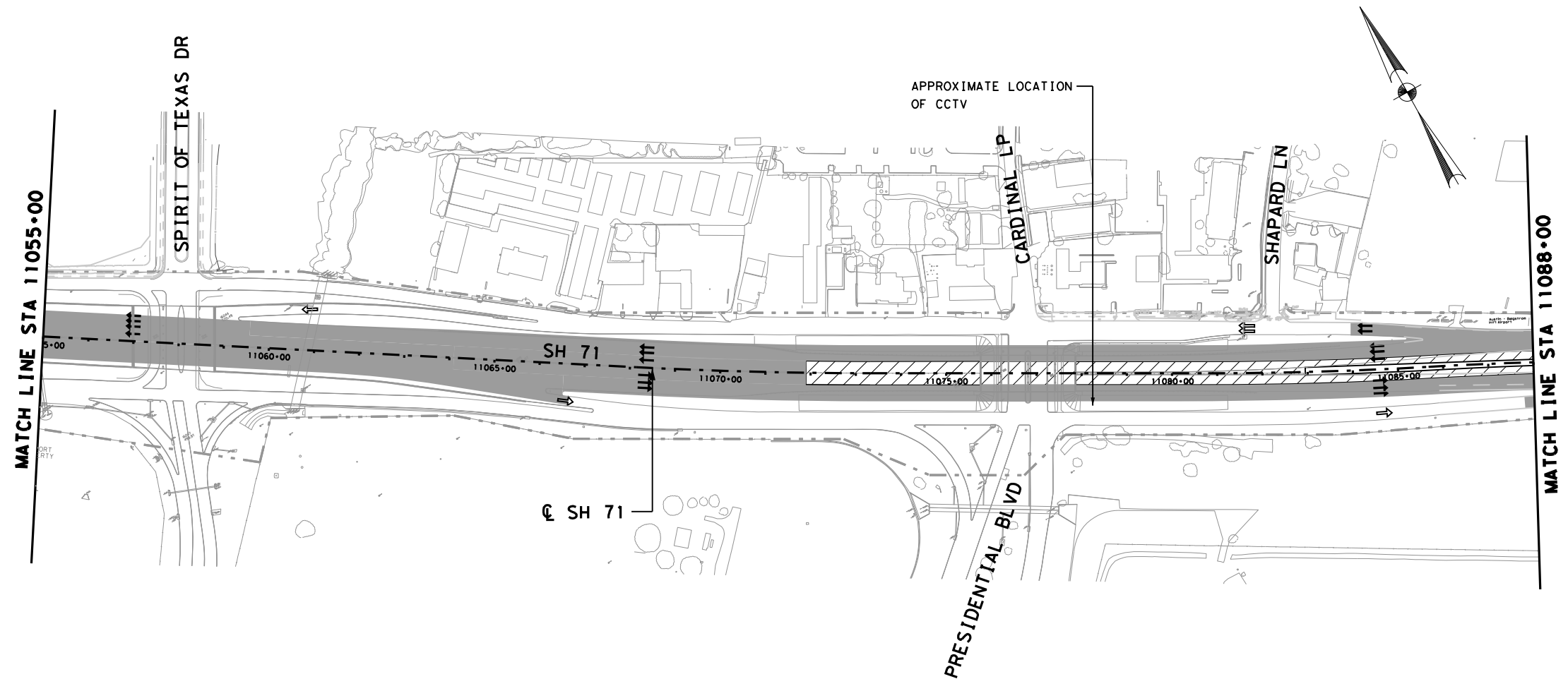
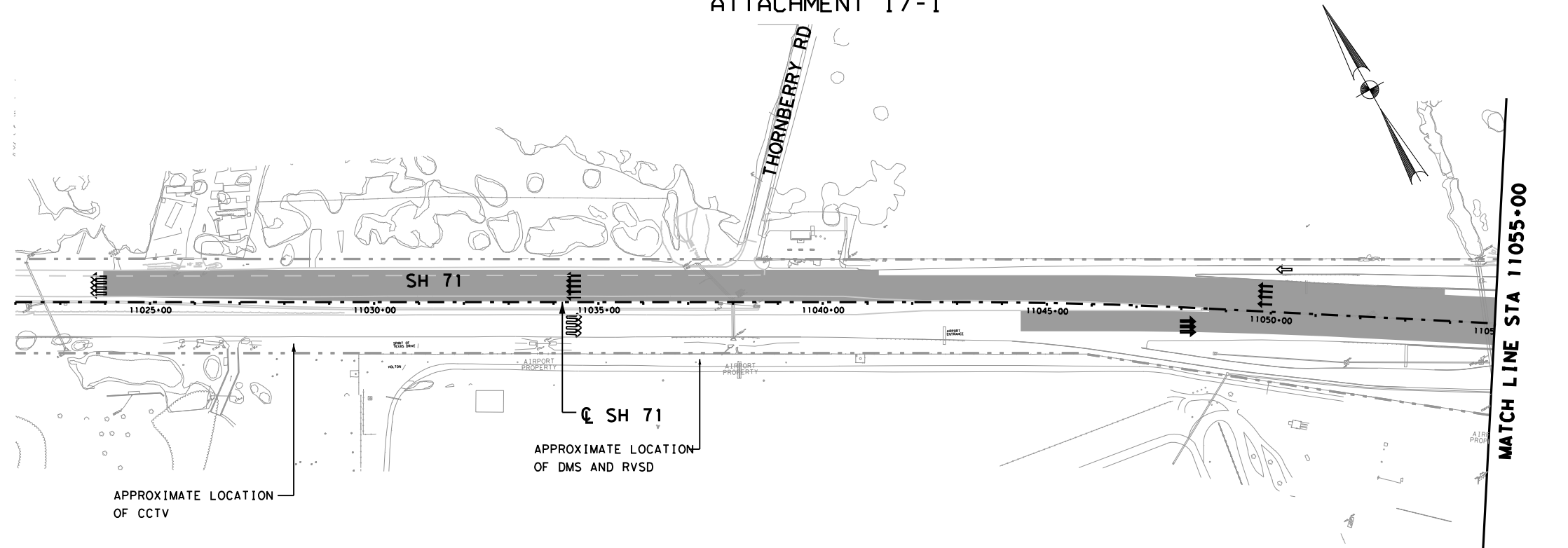
STATE HIGHWAY 71 TOLL LANES

Attachment 17-1
Conceptual ITS Layout
Addendum 1

STATE HIGHWAY 71
CONCEPTUAL ITS LAYOUT
ATTACHMENT 17-1

LEGEND

-  PROPOSED TOLL
-  PROPOSED NON-TOLL (SH 71 MAINLANES)
-  PROPOSED NON-TOLL (FM 973)



STATE HIGHWAY 71
CONCEPTUAL ITS LAYOUT
ATTACHMENT 17-1




SCALE: 1"=300'

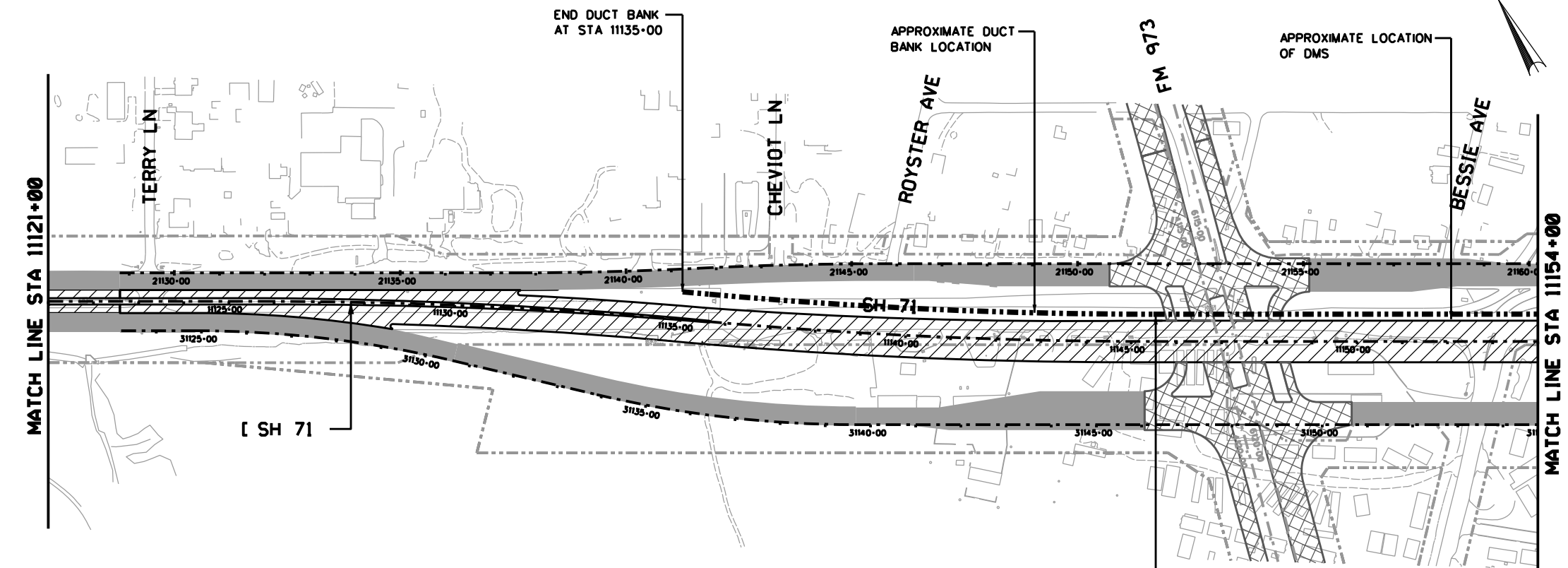
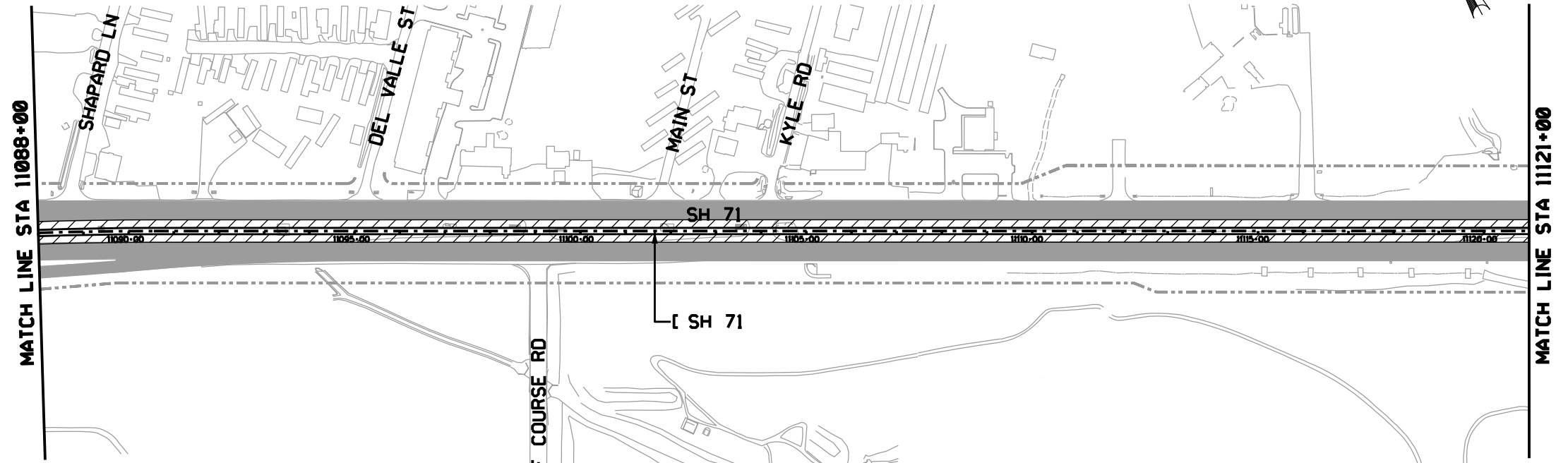
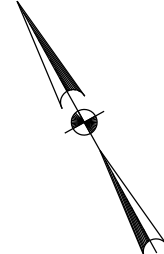
SHEET 1 OF 3

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LEGEND

-  PROPOSED TOLL
-  PROPOSED NON-TOLL (SH 71 MAINLANES)
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**SH 71 TOLL LANES
CONCEPTUAL ITS LAYOUT
ATTACHMENT 17-1**




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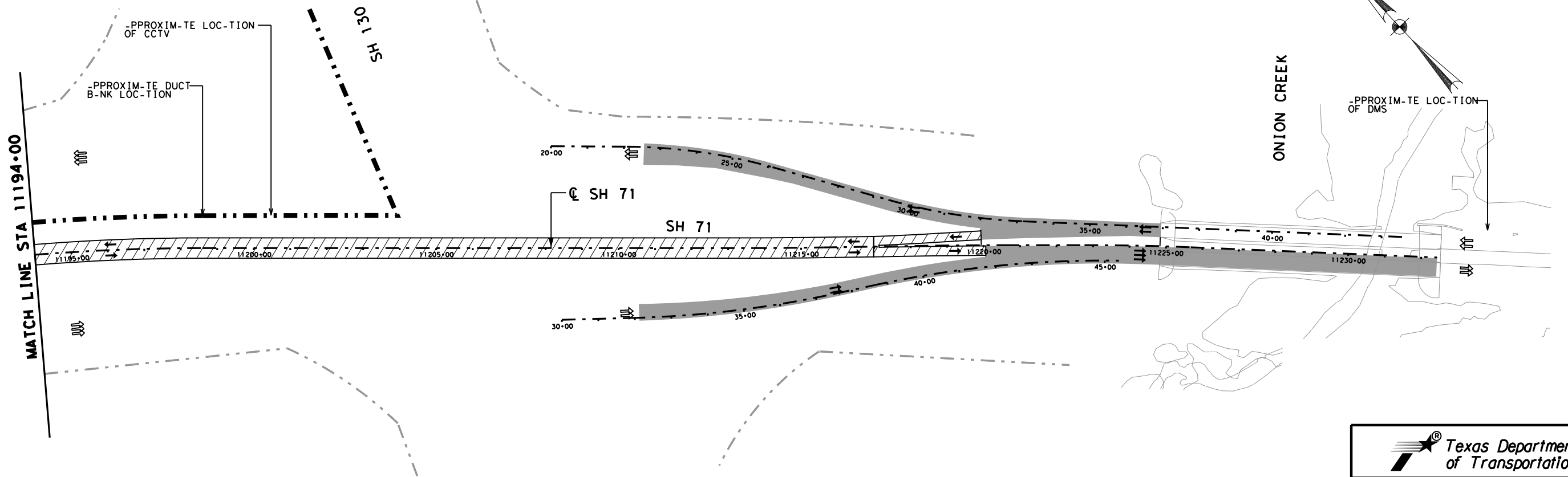
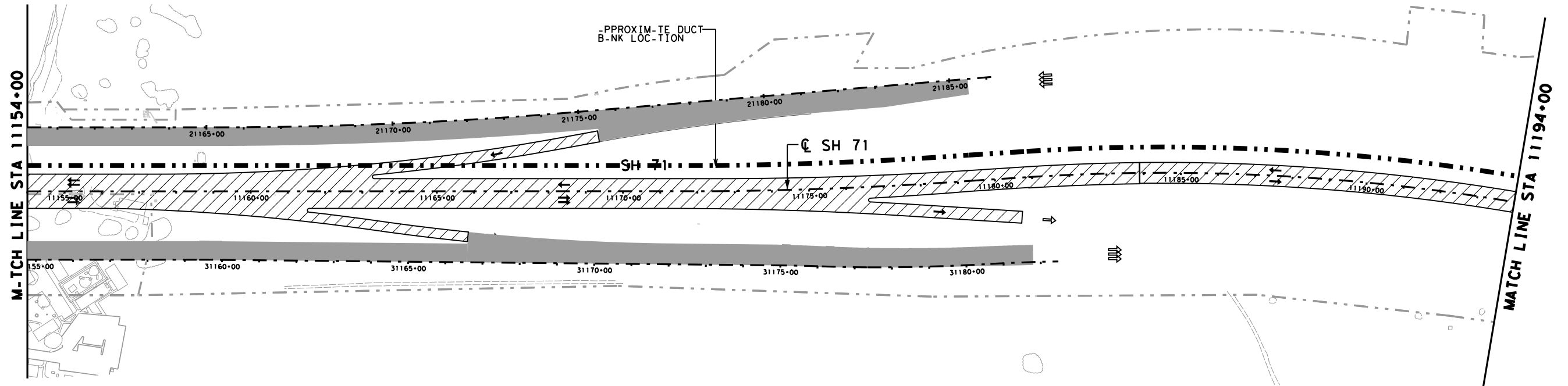
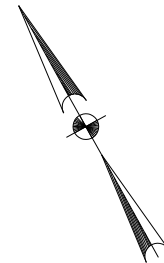
SHEET 2 OF 3


SDATES
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FILES

LEGEND

-  PROPOSED TOLL
-  PROPOSED NON-TOLL (SH 71 M-INL-NE)
-  PROPOSED NON-TOLL (FM 973)



 **Texas Department of Transportation**

STATE HIGHWAY 71
CONCEPTUAL ITS LAYOUT
ATTACHMENT 17-1

SCALE: 1"=300'

SHEET 3 OF 3

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Texas Department of Transportation
TECHNICAL PROVISIONS

SH 71 TOLL LANES

Attachment 19-1
Performance and Measurement Table Baseline
Addendum 1

Table 19-1: Performance and Measurement Table

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD*	MEASUREMENT RECORD*	TARGET
				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
1) ROADWAY									
							Unless stated otherwise, measurements shall be conducted using procedures, techniques, and measuring equipment consistent with TxDOT's <i>Pavement Management Information System Rater's Manual</i> .		
	1.1	Obstructions and debris	Roadway and clear zone free from obstructions and debris	2 hrs	N/A	N/A	Visual Inspection	Number of obstructions and debris	Nil
	1.2	Pavement	All roadways have a smooth surface course (including bridge decks, covers, gratings, frames and boxes) and free from Defects.	24 hrs	28 days	6 months	a) Ruts – Mainlanes, shoulders & ramps		
10ft straight edge used to measure rut depth for localized areas.							Depth of rut at any location greater than 0.5"	Nil	
b) Failures Instances of failures exceeding the failure criteria set forth in the TxDOT PMIS Rater's Manual, including potholes, base failures, punchouts and jointed concrete pavement failures							Occurrence of any failure	Nil	
c) Edge drop-offs Physical measurement of edge drop-off level compared to adjacent surface							Instances of edge drop-off greater than 2" (Number)	Nil	
	1.3	Crossovers and other paved areas	Crossovers and other paved areas are free of Defects	24 hrs	28 days	6 months	a) Potholes Visual Inspection	Potholes of low severity or higher (Number)	Nil

Table 19-1: Performance and Measurement Table

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD*	MEASUREMENT RECORD*	TARGET
				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	1.3 con't.						b) Base failures	Base failures of low severity or higher (Number)	Nil
	1.4	Joints in concrete	Joints in concrete paving are sealed and watertight	24 hrs	28 days	6 months	Visual inspection of joints	Length unsealed joints greater than 1/4"	Nil
			Longitudinal joint separation				Measurement of joint width and level difference of two sides of joints	Joint width more than 1" or faulting more than 1/4"	Nil
	1.5	Curbs	Curbs are free of defects	24 hrs	28 days	6 months	Visual inspection	Length out of alignment	Less than 1" deflection out of alignment over 10'
2) DRAINAGE									
	2.1	Travel Way	The travel way is free from water to the extent that such water would represent a hazard by virtue of its position and depth.	24 hrs	28 days	6 months	Visual inspection of water on surface	Instances of hazardous water build-up	Nil
3) STRUCTURES									
	3.1	Structures having an opening measured along the center of the roadway of more than 20 feet between undercopings of abutments or springlines of	Substructures and superstructures are free of: <ul style="list-style-type: none"> • graffiti • undesirable vegetation • debris and bird droppings • blocked drains, weep pipes manholes and chambers • blocked drainage holes 	24 hrs	28 days	6 months	Visual inspection.	Instances of defect.	Nil 100%

Table 19-1: Performance and Measurement Table

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD*	MEASUREMENT RECORD*	TARGET
				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	3.1 con't.	arches or extreme ends of openings or multiple boxes	in structural components <ul style="list-style-type: none"> • defects in joint sealants • defects in pedestrian protection measure • scour damage • corrosion of rebar • paint system failures • impact damage 						

Table 19-1: Performance and Measurement Table

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD*	MEASUREMENT RECORD*	TARGET
				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	3.2	Structure components	i) Expansion joints are free of: <ul style="list-style-type: none"> • dirt debris and vegetation • defects in drainage systems • loose nuts and bolts • defects in gaskets ii) The deck drainage system is free of all and operates as intended. iii) Parapets are free of: <ul style="list-style-type: none"> • loose nuts or bolts • blockages of hollow section drain holes • graffiti • vegetation • accident damage iv) Bearings and bearing shelves are clean. v) 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.	24 hrs	28 days	6 months	Visual inspection	Instances of defect.	Nil 100%

Table 19-1: Performance and Measurement Table

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD*	MEASUREMENT RECORD*	TARGET
				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	3.2 con't.	Structure components	vi) Special finishes are clean and perform to the appropriate standards. vii) 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 is maintained.	24 hrs	28 days	6 months	Visual inspection	Instances of defect.	Nil 100%
	3.3	Non-bridge class culverts	Non-bridge-class culverts are free of: • defects in sealant to movement joints	24 hrs	28 days	6 months	Visual inspection	Number with defects in sealant and movement joints	Nil
4) PAVEMENT MARKINGS, OBJECT MARKERS, BARRIER MARKERS AND DELINEATORS									
	4.1	Pavement markings	Pavement markings are: • clean and visible during the day and at night • whole and complete and of the correct color, type, width and length • placed to meet the TMUTCD and TxDOT's Pavement Marking Standard Sheets	24 hrs	28 days	6 months	a) Markings - Visual inspection	Length found defective.	100%
							Physical measurement	Length with more than 5% loss of area of material at any point	Nil
								Length with spread more than 10% of specified dimensions.	Nil
							b) Profile Markings Visual inspection	Length performing its intended function and	100%

Table 19-1: Performance and Measurement Table

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD*	MEASUREMENT RECORD*	TARGET
				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
5) GUARDRAILS, SAFETY BARRIERS AND IMPACT ATTENUATORS									
	5.1	Guard rails and safety barriers	All guardrails, safety barriers, concrete barriers, etc. are 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.	24 hrs	28 days	6 months	Visual inspection	Length of road restraint systems correctly installed Length free from defects Length at correct height Length at correct distance from roadway and obstacle	100% 100% 100% 100%
	5.2	Impact attenuators	All impact attenuators are appropriately placed and correctly installed	24 hrs	7 days	6 months	Visual inspection	Number correctly placed and installed	100%
6) TRAFFIC SIGNS									
	6.1	General – All Signs	i) Signs are clean, correctly located, clearly visible, legible, reflective, at the correct height and free from structural and electrical defects	24 hrs	28 days	6 months	a) Retroreflectivity Coefficient of retro reflectivity	Number of signs with reflectivity below the requirements of TxDOT’s TMUTCD	Nil
ii) Identification markers are provided, correctly located, visible, clean and legible			b) Face damage Visual inspection				Number of signs with face damage greater than 5% of area	Nil	
iii) Sign mounting posts are vertical, structurally sound and rust free			c) Placement Visual inspection				Signs are placed in accordance with TxDOT’s Sign Crew Field Book including not twisted or leaning	100%	

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ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD*	MEASUREMENT RECORD*	TARGET
				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	6.1 con't		iv) All break-away sign mounts are clear of silt or other debris that could impede break-away features and shall have correct stub heights v) Obsolete and redundant signs are removed or replaced as appropriate vi) Visibility distances meet the stated requirements vii) Sign information is of the correct size, location, type and wording to meet its intended purpose and any statutory requirements viii) All structures and elements of the signing system are kept clean and free from debris and have clear access provided. ix) All replacement and repair materials and equipment are in accordance with the				d) Obsolete signs Visual inspection	Number of obsolete signs	Nil
							e) Sign Information Visual inspection	Sign information is of the correct size, location, type and wording to meet its intended purpose	100%
							f) Dynamic Message Signs Visual inspection	Dynamic message signs are fully functioning	100%
	6.2	General - Safety critical signs	i) Requirements of the TMUTCD ii) Dynamic message signs are in an operational condition	2hrs	1 week	6 months	Visual inspection	Number of damaged Safety critical signs	Nil
7) TRAFFIC SIGNALS									

Table 19-1: Performance and Measurement Table

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD*	MEASUREMENT RECORD*	TARGET
				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	7.1	General	i) Traffic Signals and their associated equipment are: <ul style="list-style-type: none"> • clean and visible • correctly aligned and operational • free from damage caused by accident or vandalism • correctly aligned and operational ii) Signal timing and operation is correct iii) Contingency plans are in place to rectify Category 1 defects not immediately repairable to assure alternative traffic control is provided during a period of failure	2 hrs	24 hrs	6 months	a) General condition Visual inspection b) Damage Visual inspection c) Signal timing Timed measurements d) Contingency plans Records review	Signals are clean and visible Signals are undamaged Installations have correct signal timings Full contingency plans are in place	100% 100% 100% 100%
	7.2	Soundness	Traffic signals are structurally and electrically sound	24 hrs	28 days	6 months	a) Structural soundness Visual inspection		
							b) Electrical soundness Testing to meet NEC regulations	Inspection records showing safe installation and maintenance	100%

Table 19-1: Performance and Measurement Table

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD*	MEASUREMENT RECORD*	TARGET
				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	7.3	Identification marking	Signals have identification markers and the telephone number for reporting faults are correctly located, clearly visible, clean and legible	N/A	28 days	6 months	Visual inspection	Inspection records showing identification markers and other information are easily readable	100%
	7.4	Pedestrian Elements and vehicle detectors	All pedestrian Elements and vehicle detectors are correctly positioned and fully functional at all times	24 hrs	28 days	6 months	Visual Inspection	Inspection records showing compliance	100%
8) LIGHTING									
	8.1	Roadway lighting – General	i) All lighting is free from defects and provides acceptable uniform lighting quality ii) Lanterns are clean and correctly positioned iii) Lighting units are free from accidental damage or vandalism iv) Columns are upright, correctly founded, visually acceptable and structurally sound	24 hrs	28 days	6 months	a) Mainlane lights operable Night time inspection or automated logs b) Mainlane lights out of action Night time inspection or automated logs	Number of sections with less than 90% of lights functioning correctly at all times Instances of more than two consecutive lights out of action	Nil Nil
	8.2	Sign lighting	Sign lighting is fully operational	24 hrs	28 days	6 months	Night time inspection or automated logs	Instances of more than one bulb per sign not working	Nil

Table 19-1: Performance and Measurement Table

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD*	MEASUREMENT RECORD*	TARGET
				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	8.3	Electrical supply	Electricity supply, feeder pillars, cabinets, switches and fittings are electrically, mechanically and structurally sound and functioning	24 Hrs	7 Days	1 Month	Testing to meet NEC regulations, visual inspection	Inspection records showing safe installation and maintenance	100%
	8.4	Access panels	All access panels in place at all times.	24 Hrs	7 Days	1 Month	Visual inspection	Instances of missing access panels	Nil
	8.5	High mast lighting	i) All high mast luminaires functioning on each pole ii) All obstruction lights are present and working (if required) iii) Compartment door is secure with all bolts in place iv) All winch and safety equipment is correctly functioning and maintained without rusting or corrosion (for structural requirements refer to Element Category 3)	24 hrs	48 hrs	1 Month	Yearly inspection and night time inspections or automated logs	Instances of two or more lamps not working per high mast pole Identification of other defects	Nil Nil
9) FENCES, WALLS AND SOUND ABATEMENT									

Table 19-1: Performance and Measurement Table

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD*	MEASUREMENT RECORD*	TARGET
				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	9.1	Design and location	Fences and walls act as designed and serve the purpose for which they were intended	24 hrs	28 days	6 months	Visual Inspection	Inspection records showing compliance	100%
	9.2	Construction	Integrity and structural condition of the fence is maintained	24 hrs	28 days	6 months	Structural assessment if visual inspection warrants	Inspection records showing compliance	100%
10) ROADSIDE MANAGEMENT									
	10.1	Vegetated Areas – Except landscaped areas – General	Vegetation is maintained so that: i) Height of grass and weeds is kept within the limits described for urban and rural areas. Mowing begins before vegetation reaches the maximum height. ii) Spot mowing at intersections, ramps or other areas maintains visibility of appurtenances and sight distance. iii) Grass or vegetation does not encroach into or on paved shoulders, main lanes, sidewalks, islands, riprap, traffic barrier or curbs.	24 hrs	7 days	28 days	a) Urban areas Physical measurement of height of grass and weeds	Individual measurement areas to have 95% of height of grass and weeds between 5 in. and 18 in	100%
b) Rural areas Physical measurement of height of grass and weeds							Individual measurement areas to have 95% of height of grass and weeds between 5 in. and 30 in	100%	
c) Encroachment Visual inspection of instances of encroachment of vegetation							Occurrences of vegetation encroachment in each auditable section	Nil	

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ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD*	MEASUREMENT RECORD*	TARGET
				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
			iv) A herbicide program is undertaken in accordance with the TxDOT Herbicide Manual to control noxious weeds and to eliminate grass in pavement or concrete. v) A full width mowing cycle is completed after the first frost. vi) Wildflowers are preserved utilizing the guidelines in the mowing specifications				d) Wildflowers Visual Inspection with audit of process.	Adherence to vegetation management manuals	100%
							e) Sight lines Visual inspection	Instances of impairment of sight lines or sight distance to signs	Nil
	10.1 con't.	Vegetated Areas – Except landscaped areas – General	and TXDOT <i>Roadside Vegetation Manual</i> .	24 hrs	7 days	28 days			
11) EARTHWORKS, EMBANKMENTS AND CUTTINGS									
	11.1	Slope Failure	All structural or natural failures of the embankment and cut slopes of the Facility are repaired	24 hrs	28 days	6 months	Visual inspection by geotechnical specialist and further tests as recommended by the specialist	Recorded instances of slope failure	Nil

Table 19-1: Performance and Measurement Table

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD*	MEASUREMENT RECORD*	TARGET
				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	11.2	Slopes - General	Slopes are maintained in general conformance to the original graded cross-sections, the replacement of landscaping materials, reseeding and re-vegetation for erosion control purposes and removal and disposal of all eroded materials from the roadway and shoulders	24 hrs	28 days	6 months	Inspection records showing compliance	100%	

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				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
12) AMENITY									
	12.1	Graffiti	Graffiti is removed in a manner and using materials that restore the surface to a like appearance similar to adjoining surfaces	24 hrs	28 days	6 months	All graffiti is considered a Category 1 defect	Inspection records showing compliance	100%
	12.2	Animals	All dead or injured animals are removed from the ROW	2 hrs	N/A	N/A	Visual inspection	No dead or injured animals are present on ROW	100%
	12.3	Abandoned vehicles and equipment	All abandoned vehicles and equipment are removed from the ROW.	1 hr	24 hrs	N/A	Visual inspection	No abandoned vehicles or equipment present	100%
13) SNOW AND ICE CONTROL									
	13.1	Travel lanes	Maintain travel way free from snow and ice	2 hrs	N/A	N/A	Maximum 1hr response time to complete manning and loading of spreading vehicles Maximum 2hrs from departure from loading point to complete treatment and return to loading point Maximum 1hr response time for snow and ice clearance vehicles to depart from base	Inspection records showing compliance	100%
	13.2	Weather forecasting	weather forecast information is obtained and assessed and appropriate precautionary treatment is carried out to prevent ice forming on the travel way	2hrs	N/A	N/A	Operations plan details the process and procedures in place and followed	Inspection records showing compliance	100%

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ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD*	MEASUREMENT RECORD*	TARGET
				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
14) INCIDENT RESPONSE									
	14.1	General	Respond to Incidents in accordance with Section 22.	1 hr	N/A	N/A	Response times met for 98% of Incidents measured on a 1 year rolling basis. No complaints from Emergency Services.	Inspection records showing compliance	100%
	14.2	Hazardous Materials	For any Hazardous Materials spills, comply with the requirements of Section 22.	1 hr	N/A	N/A	MMP details the process and procedures in place and followed.	Inspection records showing compliance	100%
	14.3	Structural assessment	Evaluate structural damage to structures and liaise with Emergency Services to ensure safe working in clearing the Incident	1 hr	N/A	N/A	Inspections and surveys as required by Incident	Incident reports showing compliance	100%
	14.4	Temporary and permanent remedy	Propose and implement temporary measures or permanent repairs to Defects arising from the Incident. Ensure the structural safety of any structures affected by the Incident	24 hrs	28 days	N/A	Review and inspection of the Incident site	Auditable inspection records showing compliance	100%
15) SWEEPING AND CLEANING									

Table 19-1: Performance and Measurement Table

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD*	MEASUREMENT RECORD*	TARGET
				Cat 1	Cat 1	Cat 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	15.1	Sweeping	i) Keep all channels, hard shoulders, gore areas, ramps, intersections, islands and frontage roads swept clean.	24 hrs	28 days	6 months	Buildup of dirt, ice rock, debris, etc. on roadways and bridges not to accumulate greater than 24" wide or 1/2" deep	Inspection records showing compliance	100%
	15.1 con't.	Sweeping	ii) Clear and remove debris from traffic lanes, hard shoulders, verges and central reservations. footways and cycle ways iii) Remove all sweepings without stockpiling in the right of way and dispose of at approved tip.	24 hrs	28 days	6 months			
	15.2	Litter	i) Keep the right of way in a neat condition, remove litter regularly. ii) Pick up large litter items before mowing operations. iii) Dispose of all litter and debris collected at an approved solid waste site.	24 hrs	28 days	6 months	No more than 20 pieces of litter per roadside mile shall be visible when traveling at highway speed.	Inspection records showing compliance	100%