Appendix A
Existing Utilities

Summary of Existing Utilities

Utilities along Huron Church/Talbot Corridor	ALTERNATIVE 1A/1B										
	Length (m)	Howard to Cousineau	Cousineau Crossing (m)	Length (m)	Cousineau to Cabana	Cabana Crossing (m)	Length (m)	Cabana to Lambton	Lambton Crossing (m)	Length (m)	Lambton to E.C. Row
TELECOM											
Bell Canada - Underground	520	South	670	480	Existing Huron/Church	850	1030	North	450	300	North
							1400	South		630	South
							1780	Crossing		840	Crossing
Bell Canada - Overhead	1420	North		950	North	490	200	Crossing		180	Crossing
	850	South		350	South						
				100	Existing Huron/Church						
GAS											
Union Gas - Major	950	North	300	930	North	685	1260	North	750	880	Crossing
	1200	South		200	Crossing		270	South		980	North
	400	Crossing		740	Existing Huron/Church		940	Crossing			
Union Gas - Minor	350	Crossing	50	120	Existing Huron/Church	100	150	Crossing	20	200	Crossing
				150	Crossing						
E.L.K. Energy - Major											
E.L.K. Energy - Minor											
BP Gas - Major											
BP Gas - Minor											
MUNICIPAL											
City of Windsor - Storm											
375 DIA.									260	115	Crossing
										120	North
450 DIA.										81	Crossing
										67	North
525 DIA.										175	Crossing
											North
600 DIA.				110	North		43	Crossing			Crossing
							62	North			North
							103	South			
675 DIA.							127	North		121	Crossing
							91	South		27	North
750 DIA.							122	North			Crossing
							224	South		86	North
900 DIA.							414	North			Crossing
							324	South		91	North
1050 DIA.							33	Crossing		146	Crossing
										89	North
1200 DIA.							111	North			
							152	South			
1350 DIA.							95	North			
City of Windsor - Sanitary											
200 DIA.							140	South			
250 DIA.	130	North		290	North		145	North		33	Crossing
300 DIA.									245		
375 DIA.							196	Crossing		120	Crossing
										730	South
City of Windsor - Watermain											
100 DIA.											
150 DIA.											
200 DIA.	1252	North		166	North		120	Crossing	100	530	Crossing
	330	South									
250 DIA.							1350	South		710	South
										78	Crossing
300 DIA.									240		
400 DIA.				200	Crossing					390	Crossing
600 DIA.				200	Crossing					390	Crossing
HYDRO											
Enwin- Overhead			200				1200	South	600	900	South
							600	Crossing			
Enwin - Underground	1600	North in		2100	North in	600	90	Crossing			
	1400	North out		2100	North out						
Hydro One - Major											
Hydro One - Minor			370								
Hydro One - Transmission			1743								
Essex Power - Major	1000	South		1420	South	400					
Essex Power - Minor											
OTHERS											
District Energy - Windsor Utilities											
MaXess Networks - Fibre Optics - Major							750	South	400		
							265	Crossing			
MaXess Networks - Fibre Optics - Minor											
Detriot and Canada Tunnel											
Canadian Transit Corporation											
Total Length of Utility moved (km)	11.4		3.3	10.6		3.1	13.8		3.1	9.0	

Summary of Existing Utilities

Utilities along Huron Church/Talbot Corridor	ALTERNATIVE 2A/2B										
	Length (m)	Howard to Cousineau	Cousineau Crossing (m)	Length (m)	Cousineau to Cabana	Cabana Crossing (m)	Length (m)	Cabana to Lambton	Lambton Crossing (m)	Length (m)	Lambton to E.C. Row
TELECOM											
Bell Canada - Underground	523	South	670	480	Existing Huron/Church	850	0	North	450	0	North
							0	South		0	South
							600	Crossing		780	Crossing
Bell Canada - Overhead	1420	North		350	North	800	200	Crossing		180	Crossing
	850	South		100	Existing Huron/Church						
GAS											
Union Gas - Major	950	North	300	225	North	600	660	Crossing	750	880	Crossing
	1200	South		740	Existing Huron/Church					330	North
	400	Crossing									
Union Gas - Minor	350	Crossing	50	100	Existing Huron/Church	350	120	Crossing	20	200	Crossing
				30	Crossing						
E.L.K. Energy - Major											
E.L.K. Energy - Minor											
BP Gas - Major											
BP Gas - Minor											
MUNICIPAL											
City of Windsor - Storm											
300 DIA.	65	North									
375 DIA.	108	North							260	115	Crossing
450 DIA.	47	North								81	Crossing
525 DIA.										175	Crossing
600 DIA.							43	Crossing			Crossing
675 DIA.										121	Crossing
750 DIA.											Crossing
900 DIA.											Crossing
1050 DIA.							33	Crossing		146	Crossing
1200 DIA.											
1350 DIA.											
City of Windsor - Sanitary											
200 DIA.							140	North			
250 DIA.	130	North								33	Crossing
300 DIA.									130		
375 DIA.							32	Crossing		120	Crossing
City of Windsor - Watermain											
100 DIA.											
150 DIA.											
200 DIA.	1252	North					120	Crossing	100	350	Crossing
	330	South									
250 DIA.							1350	North		710	North
										78	Crossing
300 DIA.									240		
400 DIA.				200	Crossing					390	Crossing
600 DIA.				200	Crossing					390	Crossing
HYDRO											
Enwin- Overhead							600	Crossing	600	500	North
Enwin - Underground						1200	90	Crossing			
Hydro One - Major											
Hydro One - Minor											
Hydro One - Transmission											
Essex Power - Major	1000	South		1420	North	400					
Essex Power - Minor											
OTHERS											
District Energy - Windsor Utilities											
MaXess Networks - Fibre Optics - Major							265	Crossing	400		
MaXess Networks - Fibre Optics - Minor											
Detriot and Canada Tunnel											
Canadian Transit Corporation											
Total Length of Utility moved	8.6	0	1.0	3.8		4.2	4.3		3.0	5.6	

Summary of Existing Utilities

Utilities along Huron Church/Talbot Corridor	ALTERNATIVE 3										
	Length (m)	Howard to Cousineau	Cousineau Crossing (m)	Length (m)	Cousineau to Cabana	Cabana Crossing (m)	Length (m)	Cabana to Lambton	Lambton Crossing (m)	Length (m)	Lambton to E.C. Row
TELECOM											
Bell Canada - Underground	523	South	670	480	Existing Huron/Church	850	1030	North	450	300	North
							1400	South		630	South
							1780	Crossing		840	Crossing
Bell Canada - Overhead	1420	North		950	North	490	200	Crossing		180	Crossing
	850	South		350	South						
				100	Existing Huron/Church						
GAS											
Union Gas - Major	1200	North	260	930	North	685	1260	North	750	880	Crossing
	450	Crossing		200	Crossing		270	South		980	North
				740	Existing Huron/Church		940	Crossing			
Union Gas - Minor	350	Crossing	50	120	Existing Huron/Church	100	150	Crossing	20	200	Crossing
				150	Crossing						
E.L.K. Energy - Major											
E.L.K. Energy - Minor											
BP Gas - Major											
BP Gas - Minor											
MUNICIPAL											
City of Windsor - Storm											
375 DIA.									260	115	Crossing
										120	North
450 DIA.										81	Crossing
										67	North
525 DIA.										175	Crossing
											North
600 DIA.				110	North		43	Crossing			Crossing
							62	North			North
							103	South			
675 DIA.							127	North		121	Crossing
							91	South		27	North
750 DIA.							122	North			Crossing
							224	South		86	North
900 DIA.							414	North			Crossing
							324	South		91	North
1050 DIA.							33	Crossing		146	Crossing
										89	North
1200 DIA.							111	North			
							152	South			
1350 DIA.							95	North			
City of Windsor - Sanitary											
200 DIA.							140	South			
250 DIA.				290	North		145	North		33	Crossing
300 DIA.									245		
375 DIA.							196	Crossing		120	Crossing
										730	South
City of Windsor - Watermain											
100 DIA.											
150 DIA.											
200 DIA.	1252	North		166	North		120	Crossing	100	530	Crossing
	330	South		66	Crossing						
250 DIA.							1350	South		710	South
										78	Crossing
300 DIA.									240		
400 DIA.				200	Crossing					390	Crossing
600 DIA.				200	Crossing					390	Crossing
HYDRO											
Enwin- Overhead			200				1200	South	600	900	South
							600	Crossing			
Enwin - Underground	1600	North in		2100	North in	600	90	Crossing			
				1140	North out						
Hydro One - Major											
Hydro One - Minor											
Hydro One - Transmission											
Essex Power - Major	1000	South		1420	South	400					
Essex Power - Minor											
OTHERS											
District Energy - Windsor Utilities											
MaXess Networks - Fibre Optics - Major							750	South	400		
							265	Crossing			
MaXess Networks - Fibre Optics - Minor											
Detriot and Canada Tunnel											
Canadian Transit Corporation											
Total Length of Utility moved	9.0		1.2	9.7		3.1	13.8		3.1	9.0	

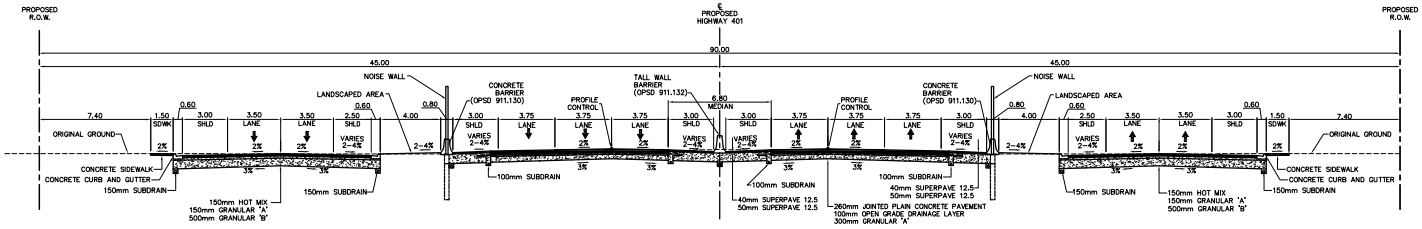
Appendix B
Typical Cross-Sections

METRIC

PLATE No	
CONT No XXXX–XXXX WP No XXX–XX–XX	
TYPICAL SECTIONS Survey _____ Revised _____	SHEET XXX

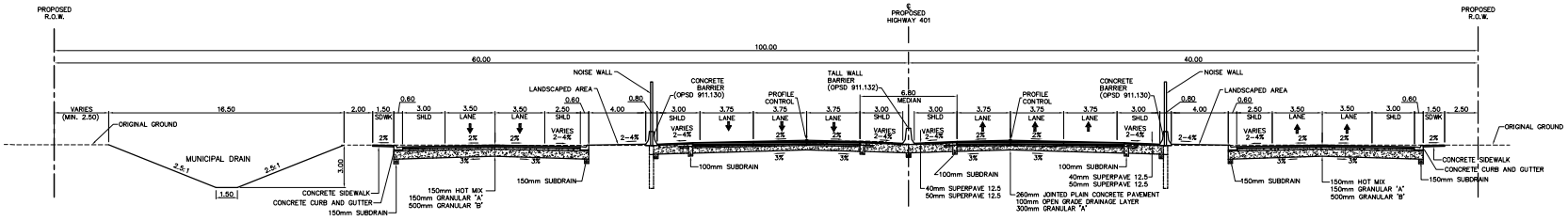
DETROIT RIVER INTERNATIONAL CROSSING
TYPICAL SECTIONS
HIGHWAY 3/HURON CHURCH ROAD CORRIDOR

TYPICAL 6–LANE URBAN FREEWAY SECTION WITH 2–LANE SERVICE ROADS ON BOTH SIDES



CONCEPTUAL

TYPICAL 6–LANE URBAN FREEWAY SECTION WITH 2–LANE SERVICE ROADS ON BOTH SIDES WITH MUNICIPAL DRAIN



ALTERNATIVE 1A

SCALE

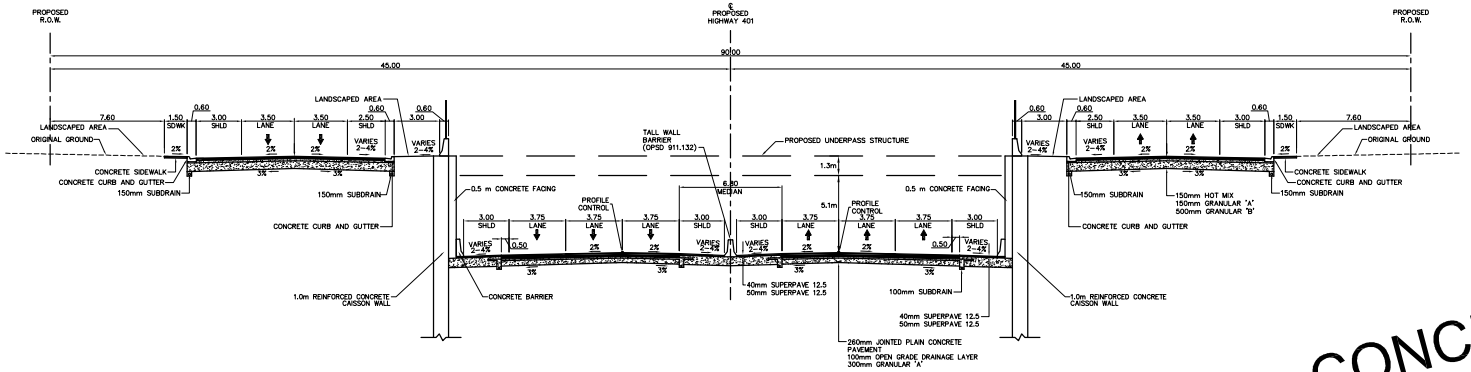
1.5m 0 3.0m
Horizontal

METRIC

PLATE No	
CONT No XXXX–XXXX WP No XXX–XX–XX	
TYPICAL SECTIONS Survey _____ Revised _____	SHEET XXX

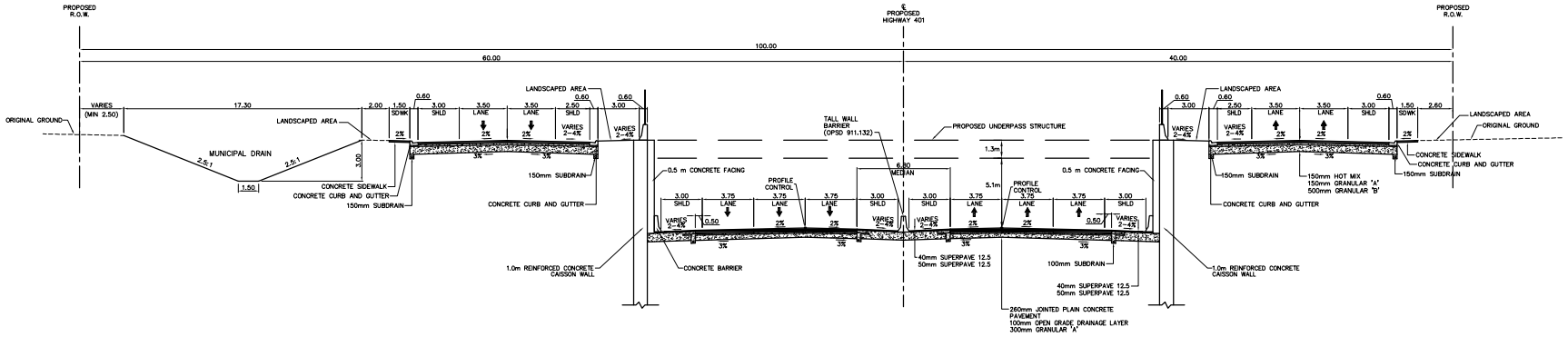
DETROIT RIVER INTERNATIONAL CROSSING
TYPICAL SECTIONS
HIGHWAY 3/HURON CHURCH ROAD CORRIDOR

TYPICAL BELOW–GRADE 6–LANE URBAN FREEWAY SECTION WITH ONE–WAY SERVICE ROADS



CONCEPTUAL

TYPICAL BELOW–GRADE 6–LANE URBAN FREEWAY SECTION WITH ONE–WAY SERVICE ROADS AND MUNICIPAL DRAIN



ALTERNATIVE 1B

SCALE

1.5m 0 3.0m
Horizontal

METRIC

PLATE No
CONT No XXXX–XXXX
WP No XXX–XX–XX

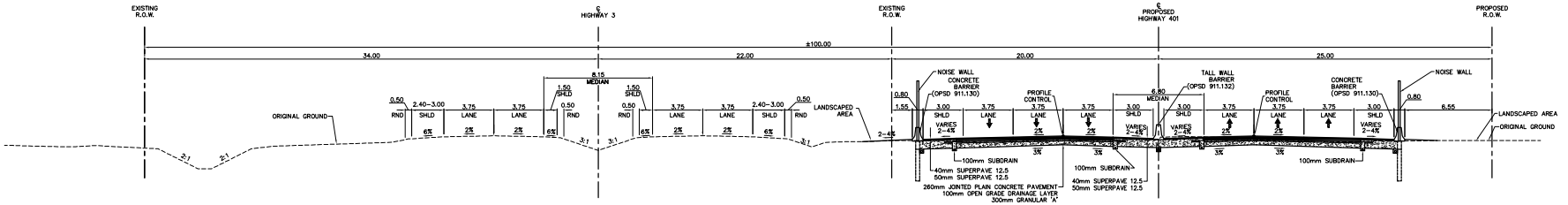
TYPICAL SECTIONS

Survey _____ Revised _____

SHEET XXX

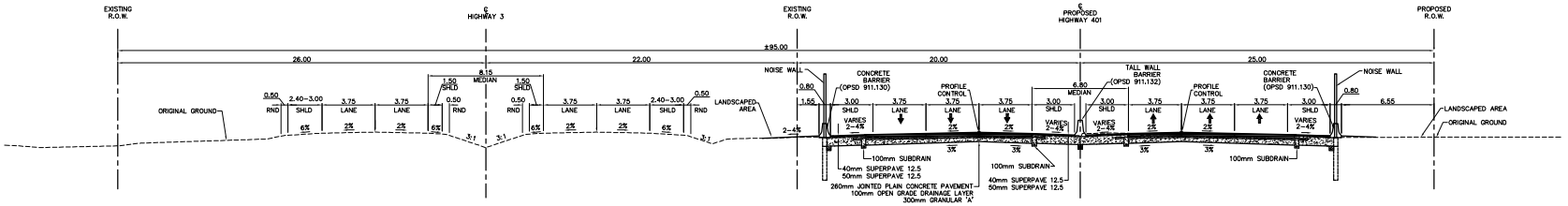
DETROIT RIVER INTERNATIONAL CROSSING
TYPICAL SECTIONS
HIGHWAY 3/HURON CHURCH ROAD CORRIDOR

TYPICAL 6–LANE URBAN FREEWAY SECTION ADJACENT TO HIGHWAY 3
NOISE BARRIER ON NORTH SIDE WITH NO SERVICE ROAD ON SOUTH SIDE OF URBAN FREEWAY

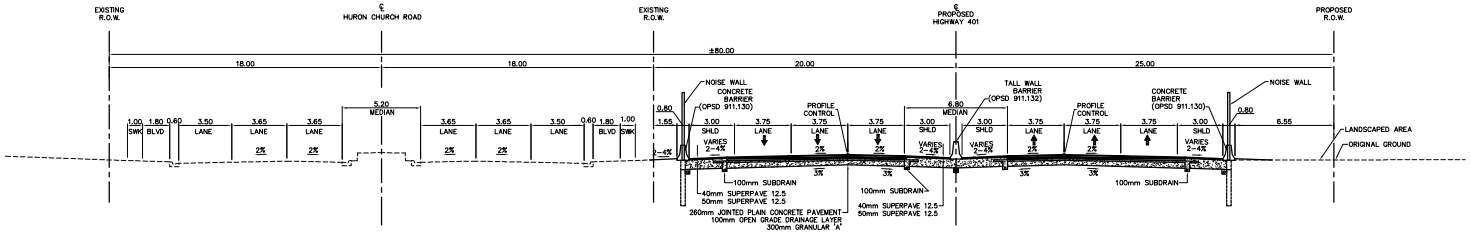


CONCEPTUAL

TYPICAL 6–LANE URBAN FREEWAY SECTION ADJACENT TO HIGHWAY 3
NOISE BARRIER ON NORTH SIDE WITH NO SERVICE ROAD ON SOUTH SIDE OF URBAN FREEWAY



TYPICAL 6–LANE URBAN FREEWAY SECTION ADJACENT TO HURON CHURCH ROAD
NOISE BARRIER ON NORTH SIDE WITH NO SERVICE ROAD ON SOUTH SIDE OF URBAN FREEWAY



ALTERNATIVE 2A

SCALE

1.5m 0 3.0m
Horizontal

METRIC

PLATE No
CONT No XXXX–XXXX
WP No XXX–XX–XX

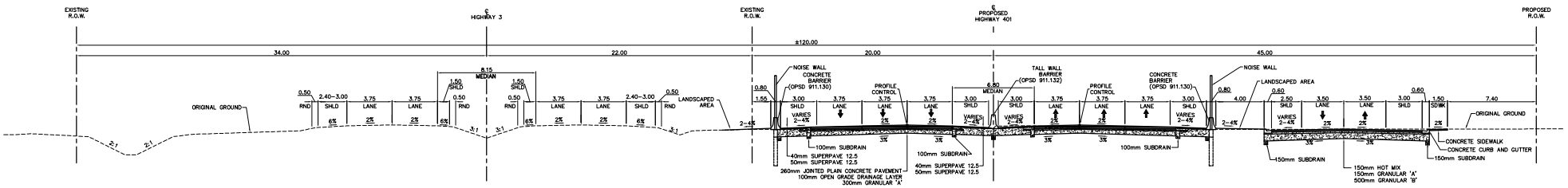
TYPICAL SECTIONS

Survey _____ Revised _____

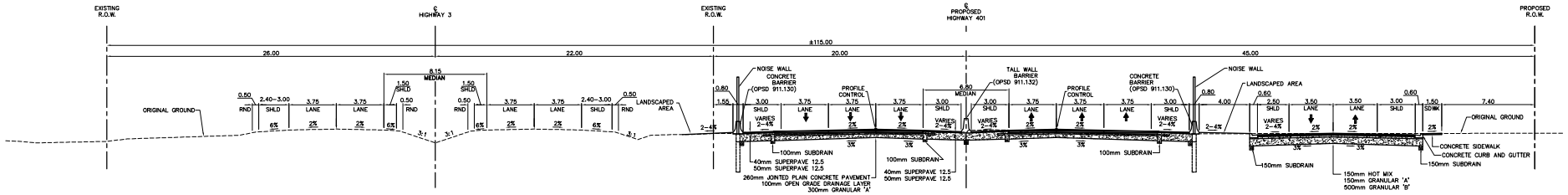
SHEET XXX

DETROIT RIVER INTERNATIONAL CROSSING
TYPICAL SECTIONS
HIGHWAY 3/HURON CHURCH ROAD CORRIDOR

TYPICAL 6–LANE URBAN FREEWAY SECTION ADJACENT TO HIGHWAY 3
NOISE BARRIER ON NORTH SIDE WITH TWO–WAY SERVICE ROAD ON SOUTH SIDE OF URBAN FREEWAY

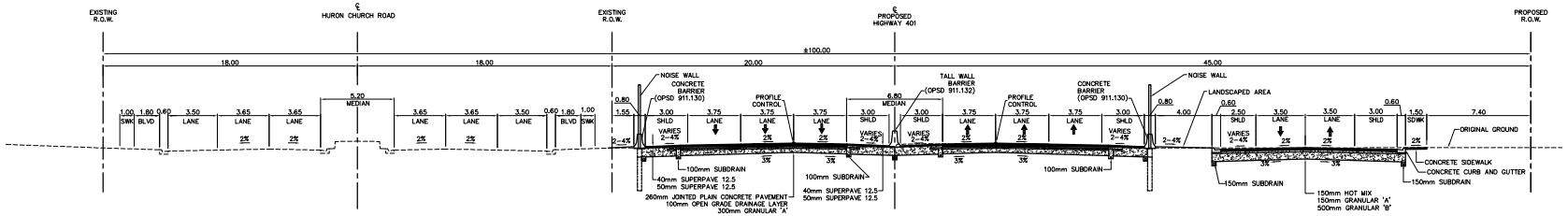


TYPICAL 6–LANE URBAN FREEWAY SECTION ADJACENT TO HIGHWAY 3
NOISE BARRIER ON NORTH SIDE WITH TWO–WAY SERVICE ROAD ON SOUTH SIDE OF URBAN FREEWAY



CONCEPTUAL

TYPICAL 6–LANE URBAN FREEWAY SECTION ADJACENT TO HURON CHURCH ROAD
NOISE BARRIER ON NORTH SIDE WITH TWO–WAY SERVICE ROAD ON SOUTH SIDE OF URBAN FREEWAY



ALTERNATIVE 2A

SCALE

1.5m 0 3.0m
Horizontal

DETROIT RIVER INTERNATIONAL CROSSING
TYPICAL SECTIONS
HIGHWAY 3/HURON CHURCH ROAD CORRIDOR

METRIC

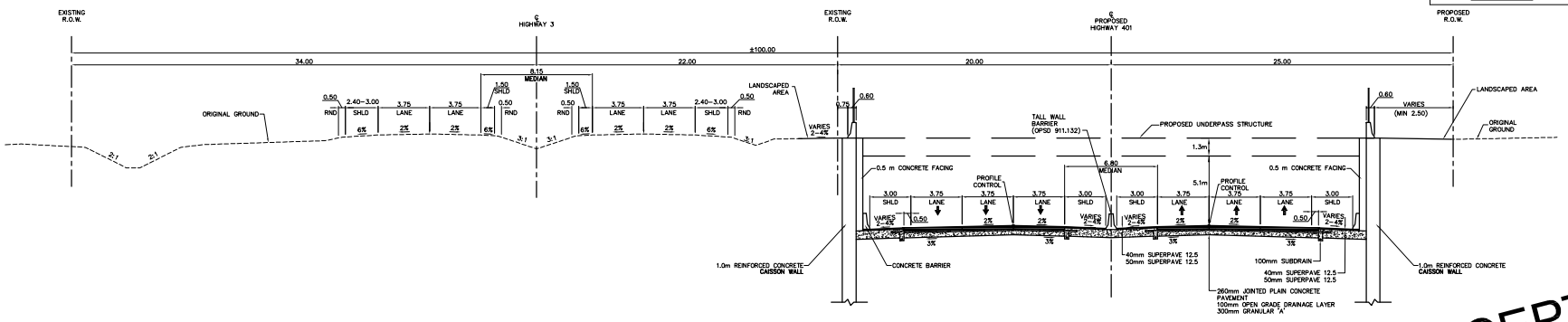
PLATE No
CONT No XXXX–XXXX
WP No XXX–XX–XX

TYPICAL SECTIONS

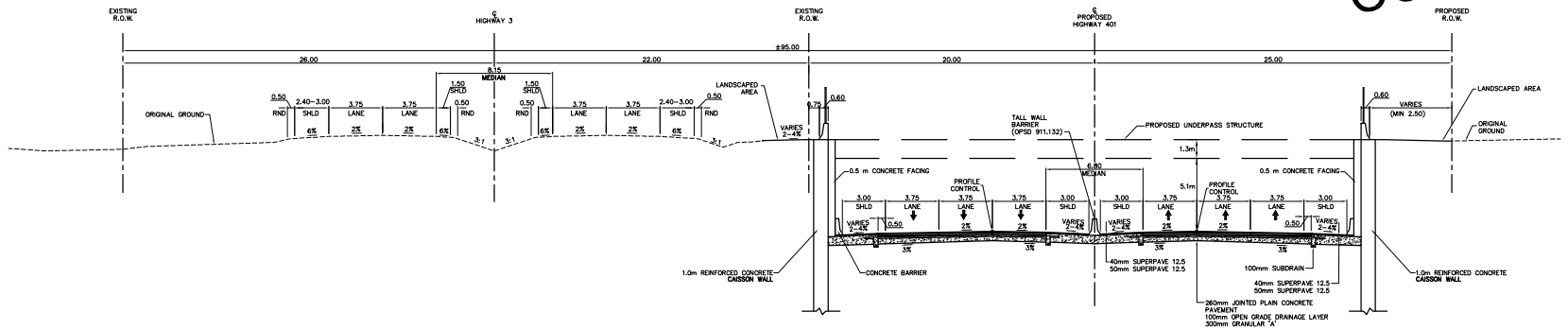
Survey _____ Revised _____

SHEET XXX

TYPICAL BELOW GRADE 6–LANE URBAN FREEWAY SECTION ADJACENT TO HIGHWAY 3
NOISE BARRIER ON NORTH SIDE WITH NO SERVICE ROAD ON SOUTH SIDE OF URBAN FREEWAY

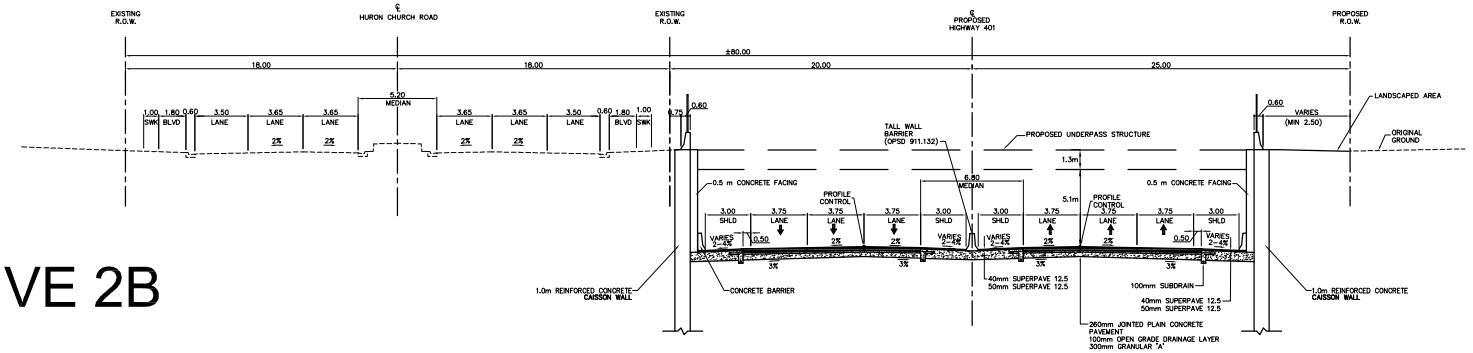


TYPICAL BELOW GRADE 6–LANE URBAN FREEWAY SECTION ADJACENT TO HIGHWAY 3
NOISE BARRIER ON NORTH SIDE WITH NO SERVICE ROAD ON SOUTH SIDE OF URBAN FREEWAY



CONCEPTUAL

TYPICAL BELOW GRADE 6–LANE URBAN FREEWAY SECTION ADJACENT TO HURON CHURCH ROAD
NOISE BARRIER ON NORTH SIDE WITH NO SERVICE ROAD ON SOUTH SIDE OF URBAN FREEWAY



ALTERNATIVE 2B

SCALE

1.5m 0 3.0m
Horizontal

DETROIT RIVER INTERNATIONAL CROSSING
TYPICAL SECTIONS
HIGHWAY 3/HURON CHURCH ROAD CORRIDOR

METRIC

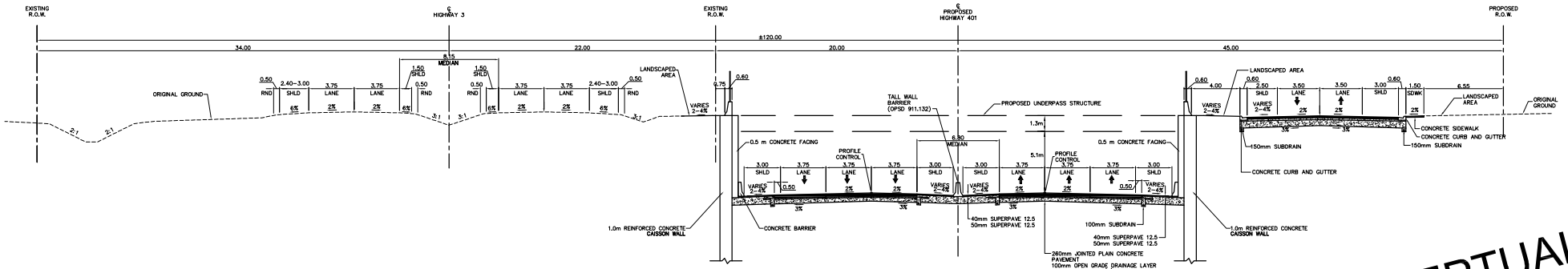
PLATE No
CONT No XXXX–XXXX
WP No XXX–XX–XX

TYPICAL SECTIONS

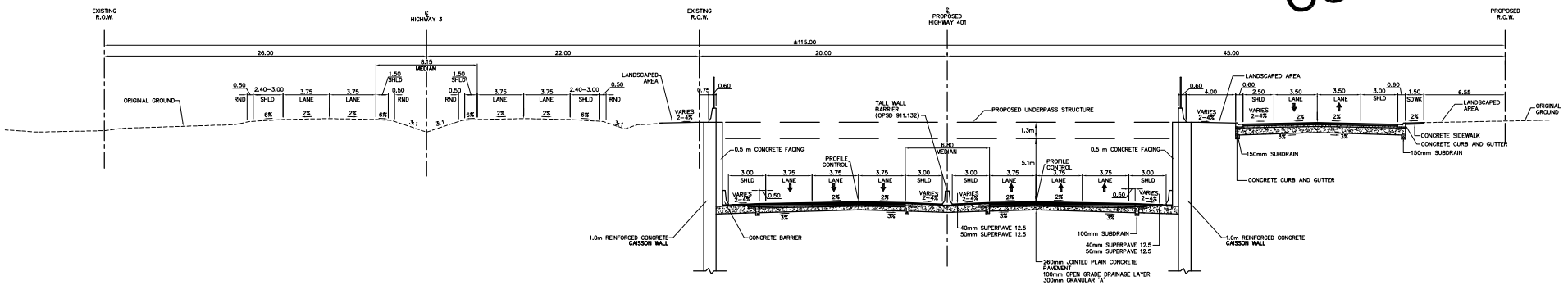
Survey _____ Revised _____

SHEET XXX

TYPICAL BELOW GRADE 6–LANE URBAN FREEWAY SECTION ADJACENT TO HIGHWAY 3
NOISE BARRIER ON NORTH SIDE WITH TWO–WAY SERVICE ROAD ON SOUTH SIDE OF URBAN FREEWAY

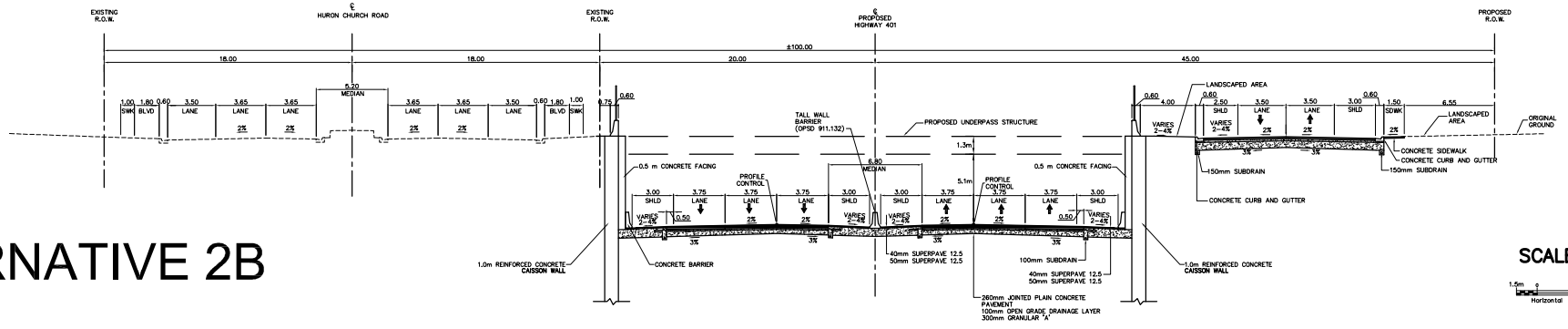


TYPICAL BELOW GRADE 6–LANE URBAN FREEWAY SECTION ADJACENT TO HIGHWAY 3
NOISE BARRIER ON NORTH SIDE WITH TWO–WAY SERVICE ROAD ON SOUTH SIDE OF URBAN FREEWAY



CONCEPTUAL

TYPICAL BELOW GRADE 6–LANE URBAN FREEWAY SECTION ADJACENT TO HURON CHURCH ROAD
NOISE BARRIER ON NORTH SIDE WITH TWO–WAY SERVICE ROAD ON SOUTH SIDE OF URBAN FREEWAY



ALTERNATIVE 2B

SCALE

1.5m 0 3.0m
Horizontal

METRIC

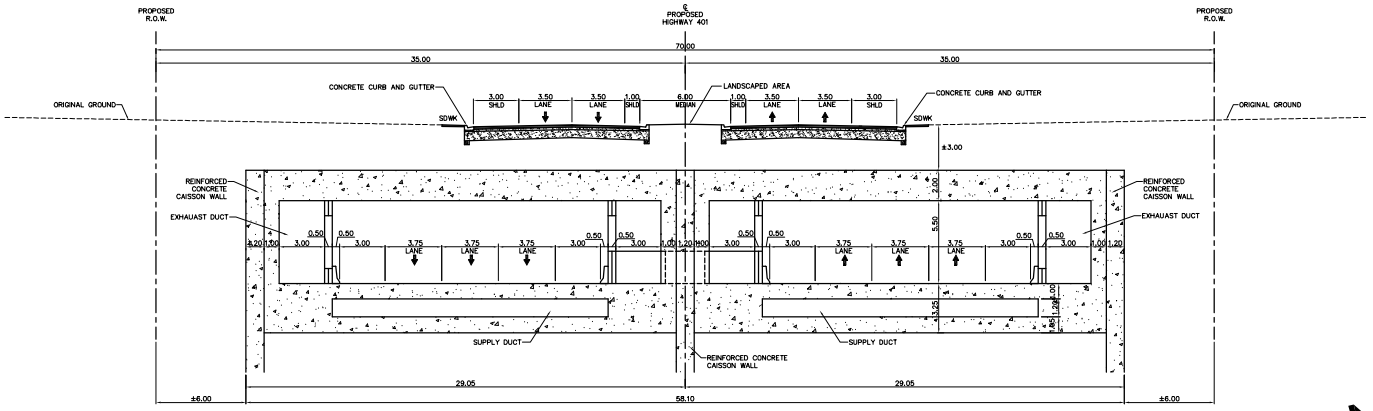
PLATE No
CONT No XXXX–XXXX
WP No XXX–XX–XX

TYPICAL SECTIONS
Survey _____ Revised _____

SHEET XXX

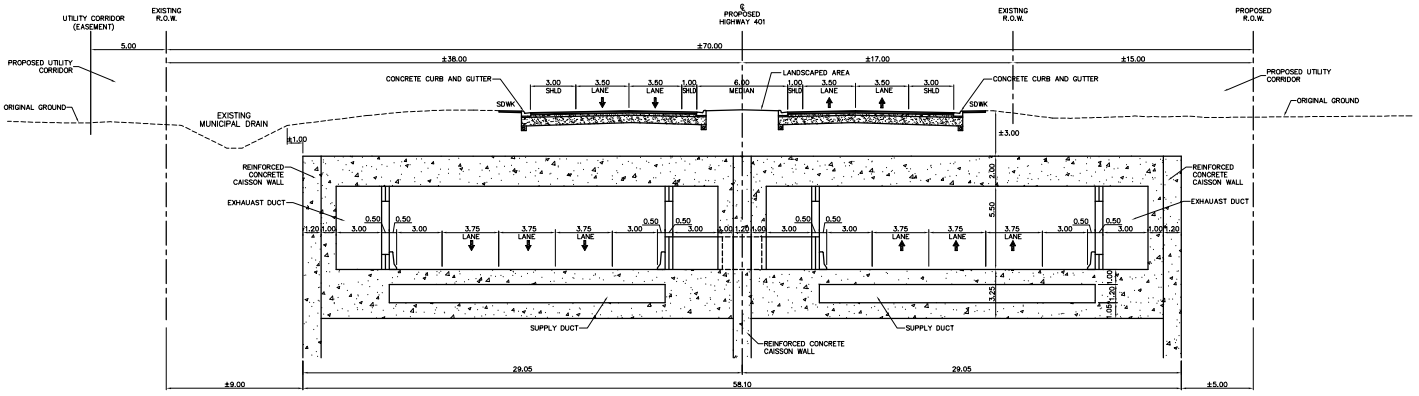
DETROIT RIVER INTERNATIONAL CROSSING
TYPICAL SECTIONS
HIGHWAY 3/HURON CHURCH ROAD CORRIDOR

CUT AND COVER TUNNEL SECTION



CONCEPTUAL

CUT AND COVER TUNNEL SECTION WITH MUNICIPAL DRAIN



ALTERNATIVE 3

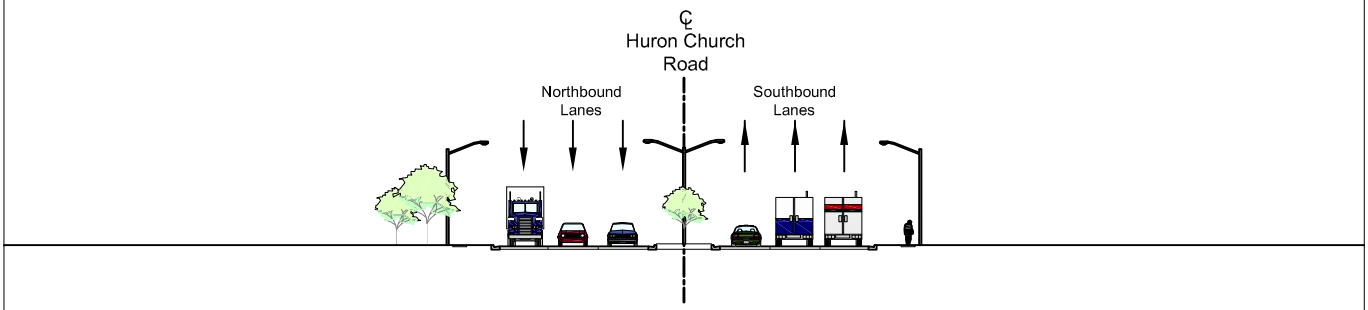
SCALE

1.5m 0 3.0m
Horizontal

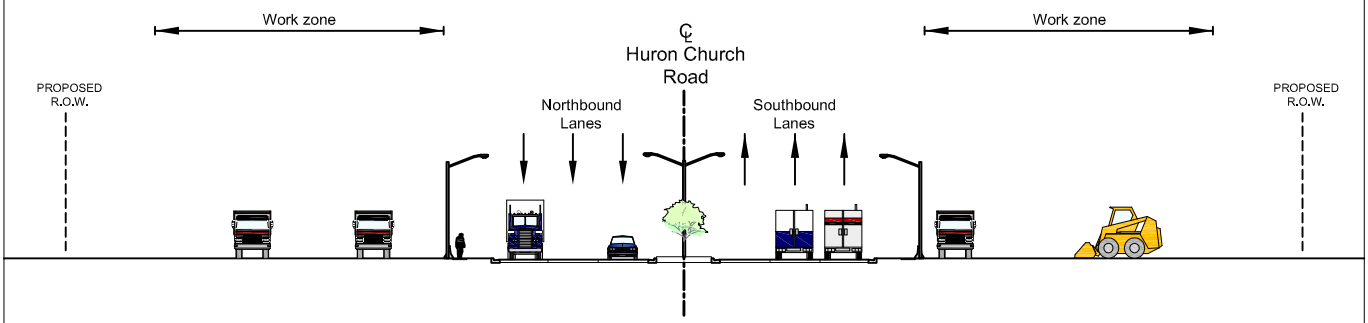
Appendix C
Construction Methods

ALTERNATIVE 1A

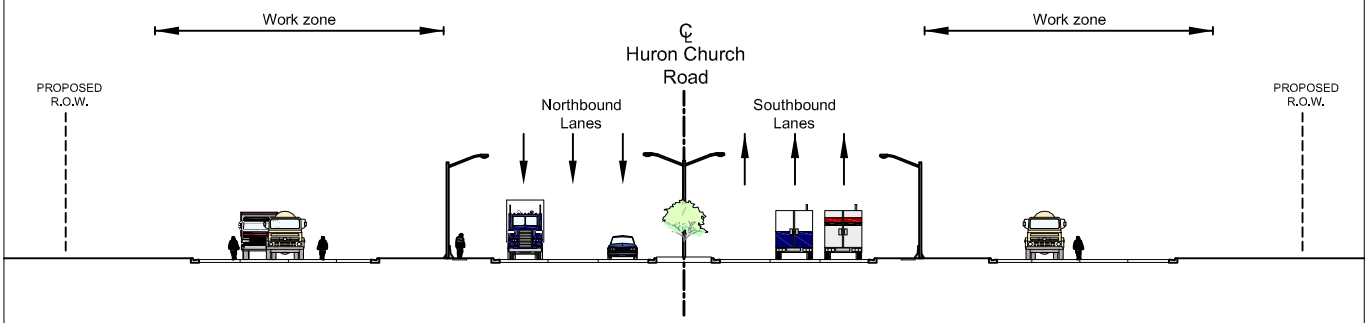
Existing Conditions



Clear Land Within Proposed R.O.W.

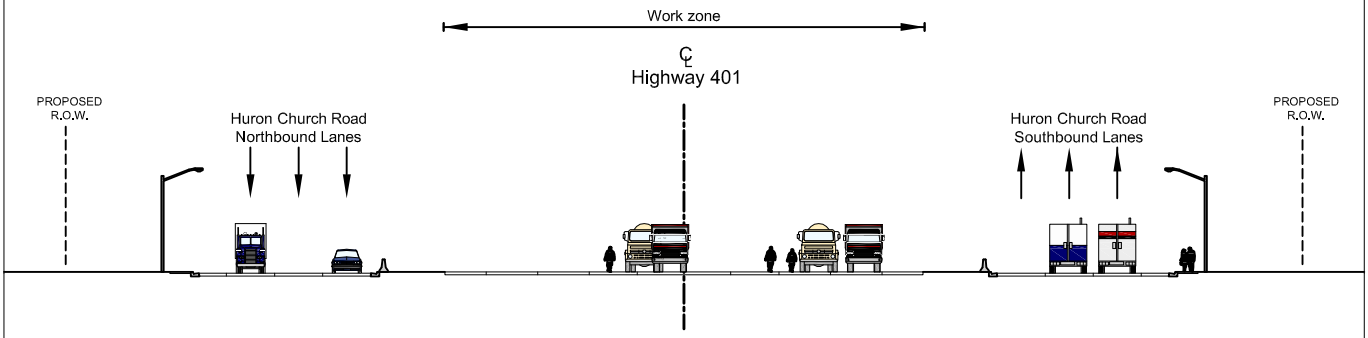


Construct New Huron Church Road

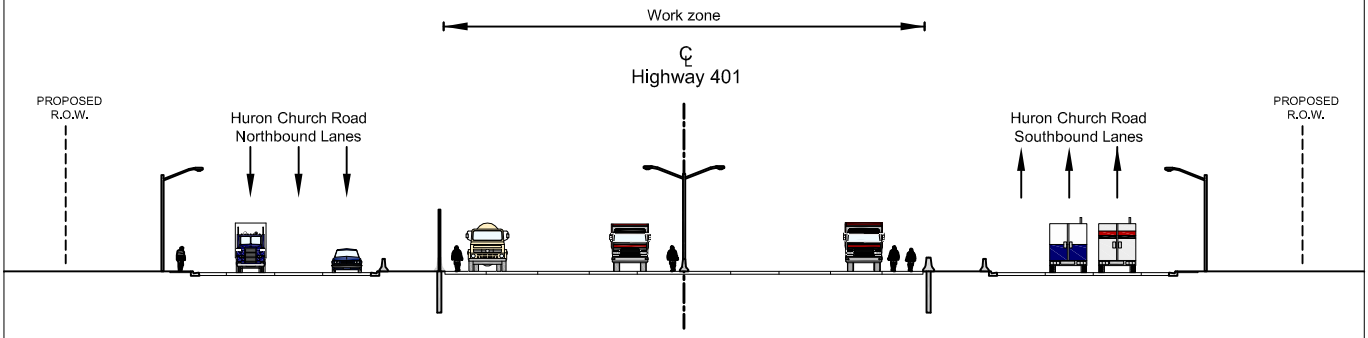


ALTERNATIVE 1A (CON'T)

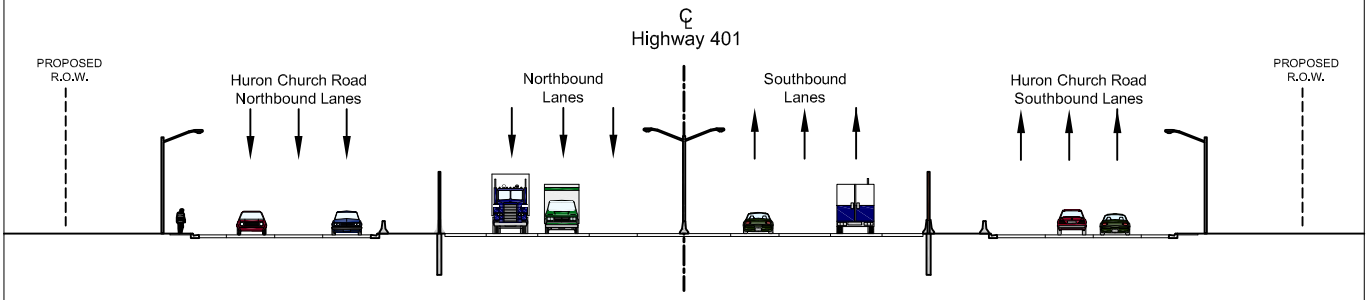
Relocate Traffic to New Huron Church Road & Construct Highway 401



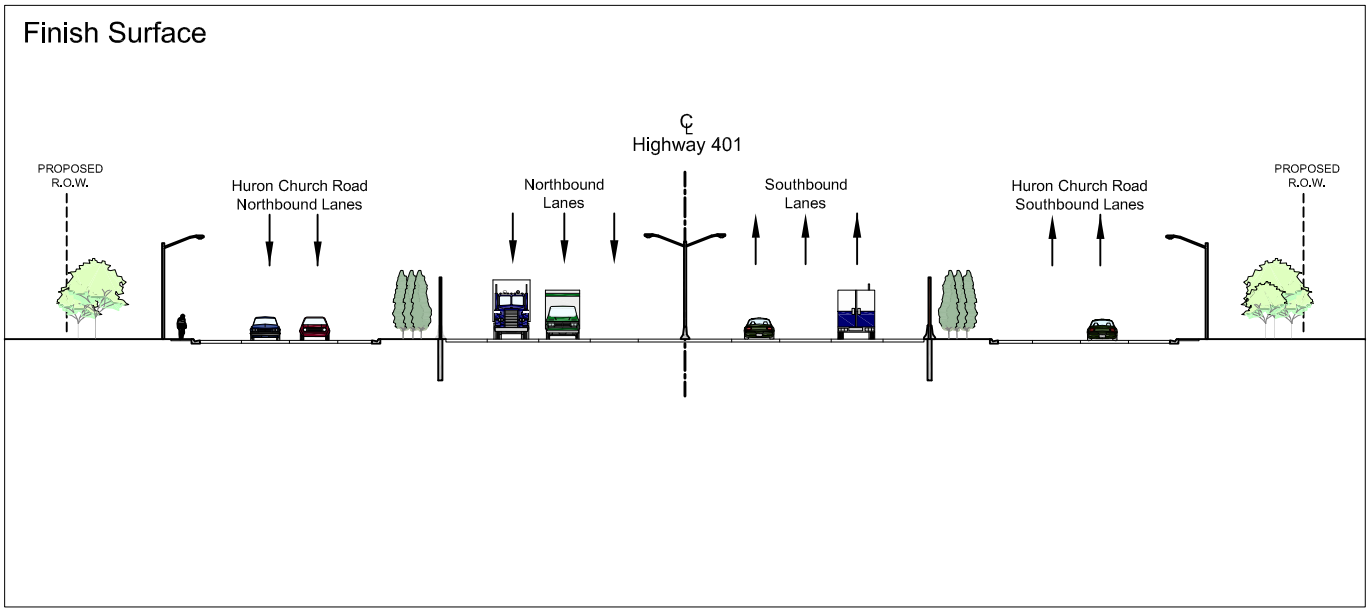
Install Noise Walls & Barriers



Open Traffic on Highway 401

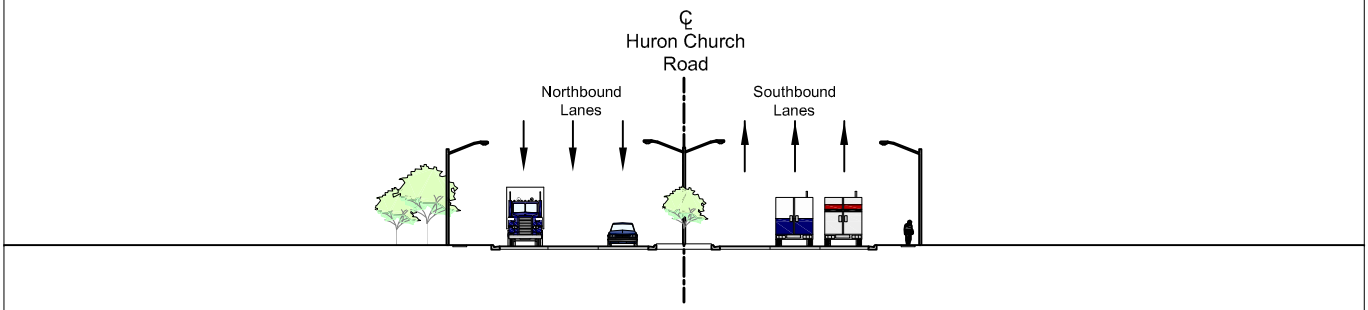


ALTERNATIVE 1A (CON'T)

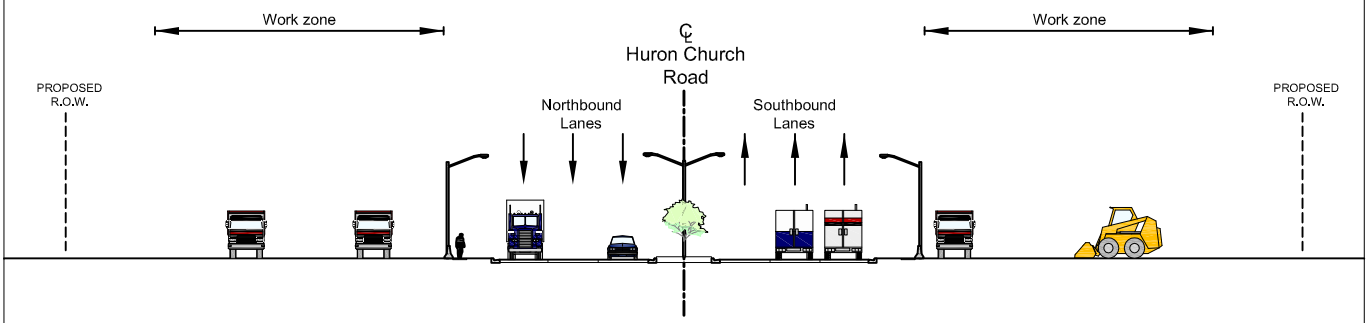


ALTERNATIVE 1B

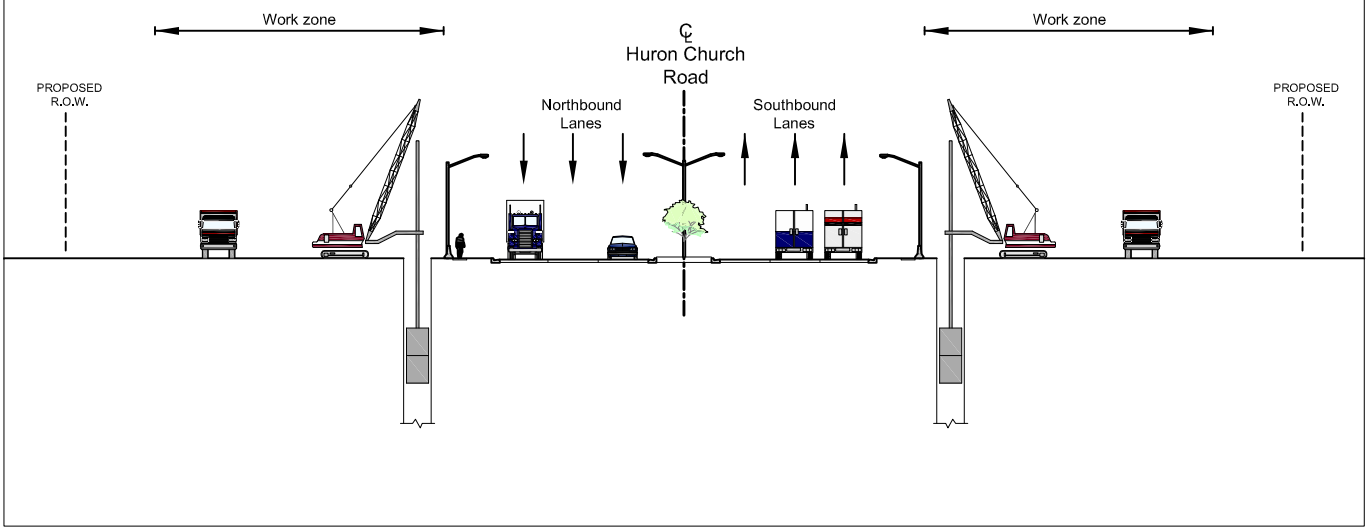
Existing Conditions



Clear Land Within Proposed R.O.W.

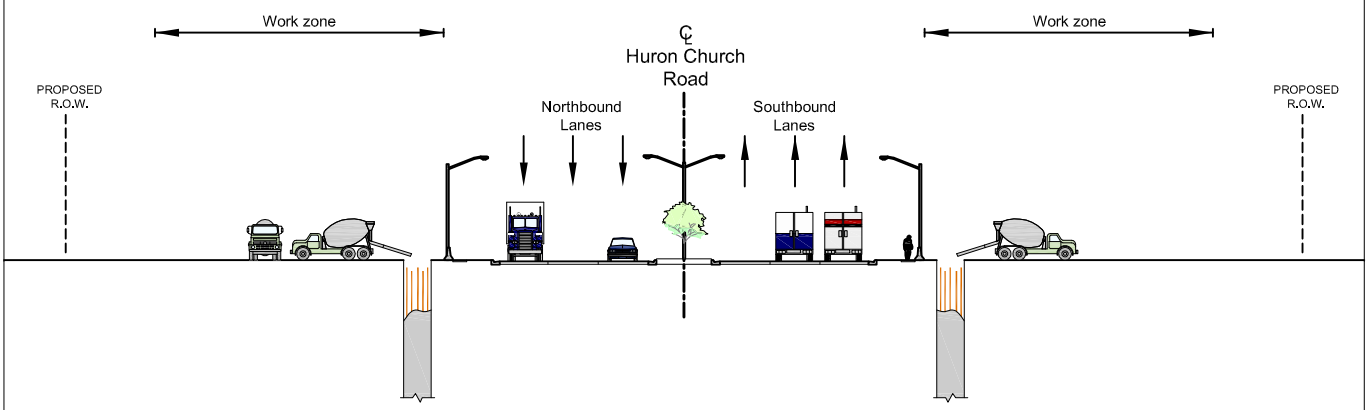


Excavate Trenchs for Retaining Walls

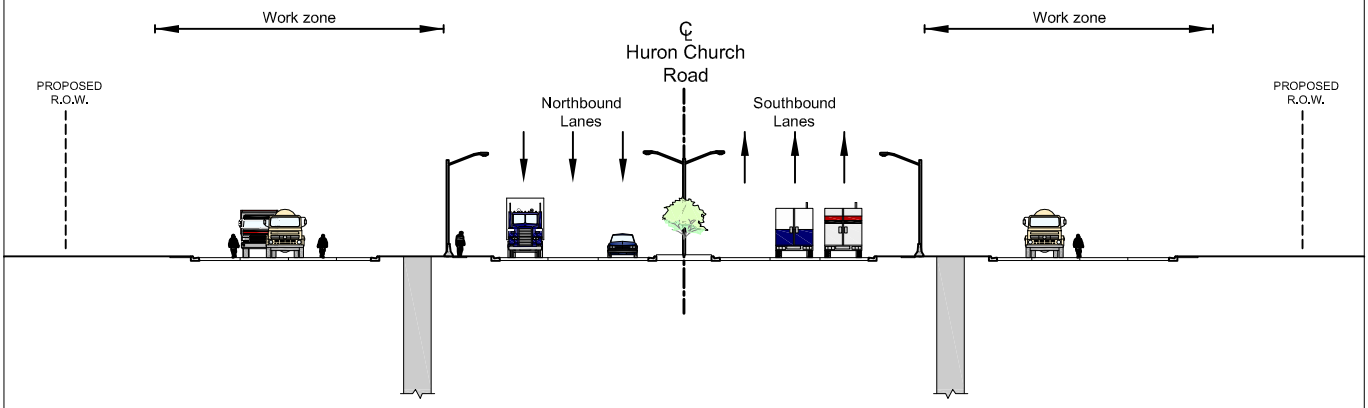


ALTERNATIVE 1B (CON'T)

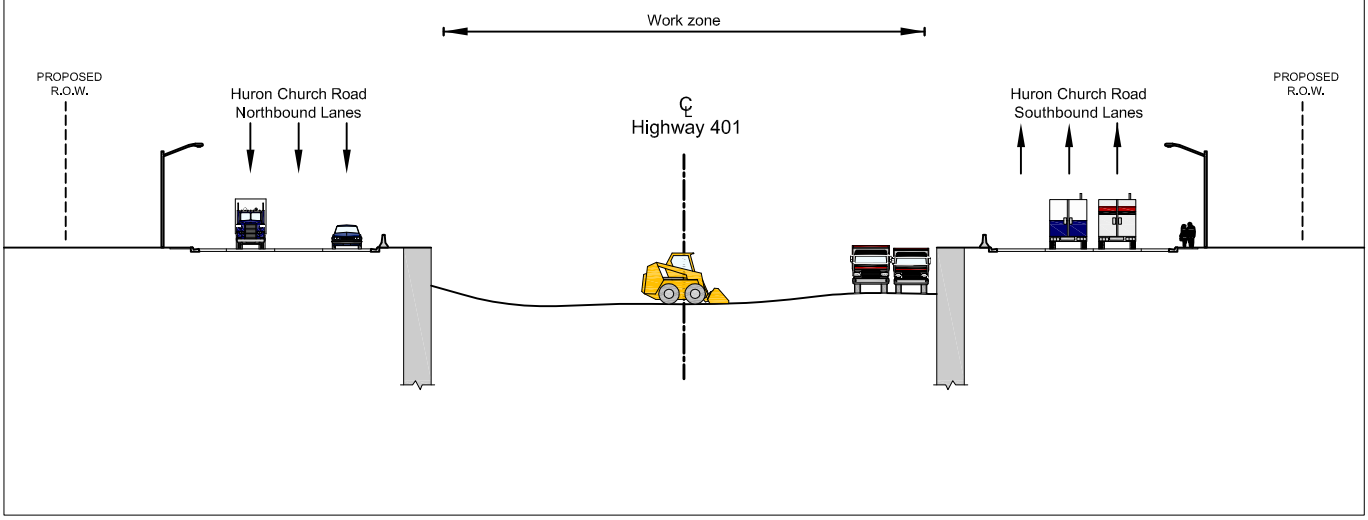
Place Reinforcement & Pour Concrete for Retaining Walls



Construct New Huron Church Road

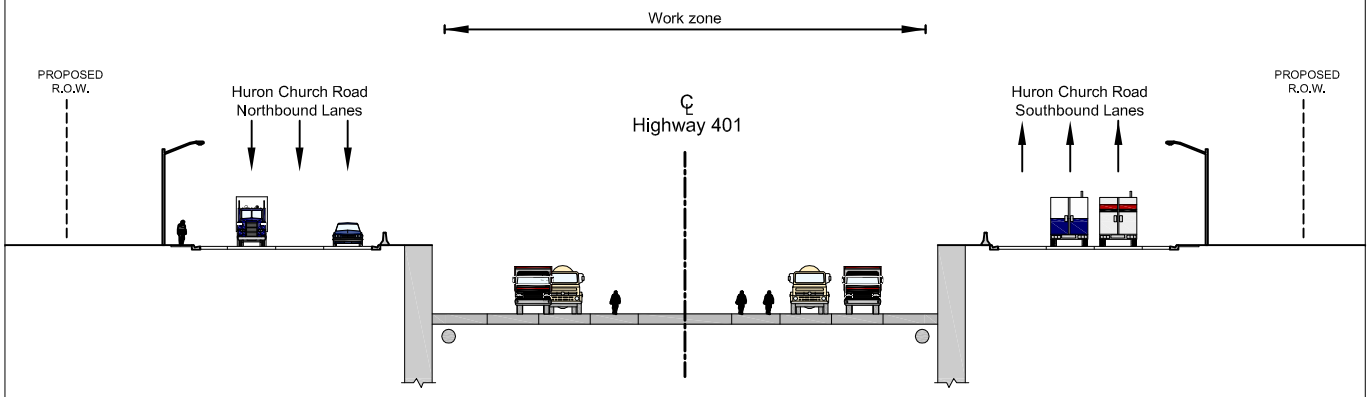


Relocate Traffic to New Huron Church Road & Excavate

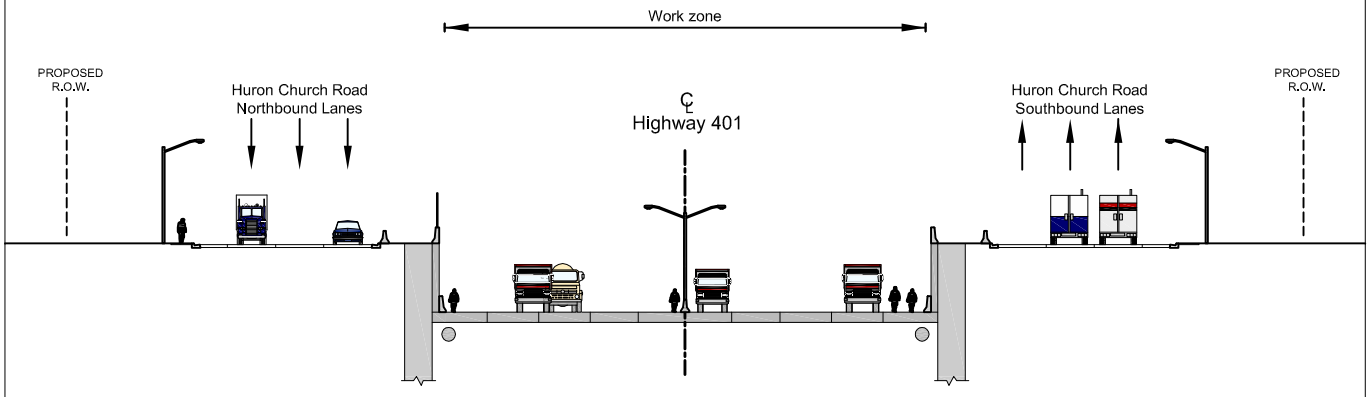


ALTERNATIVE 1B (CON'T)

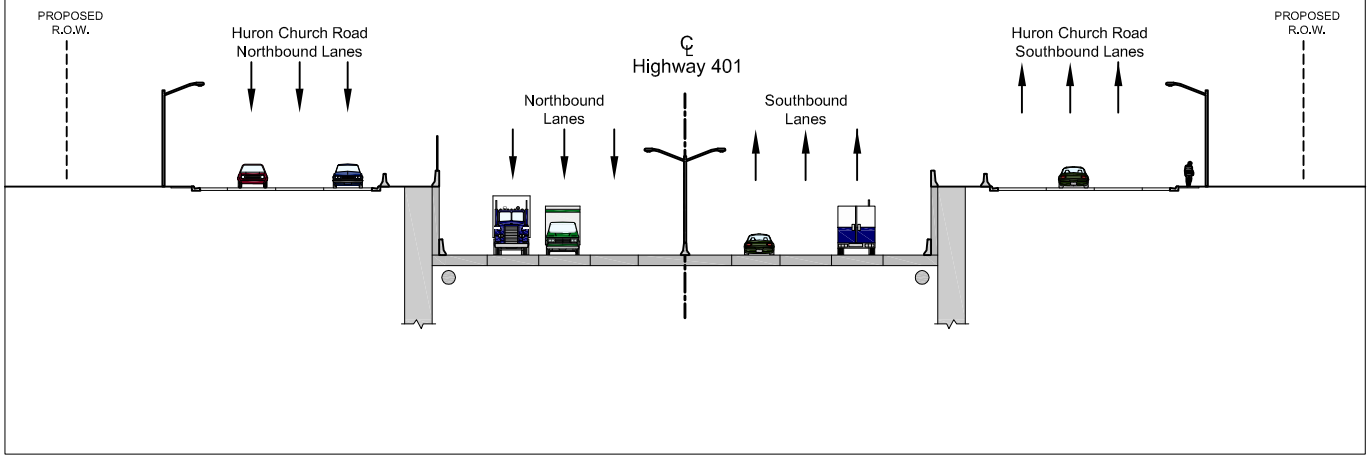
Install Drainage & Construct Highway 401



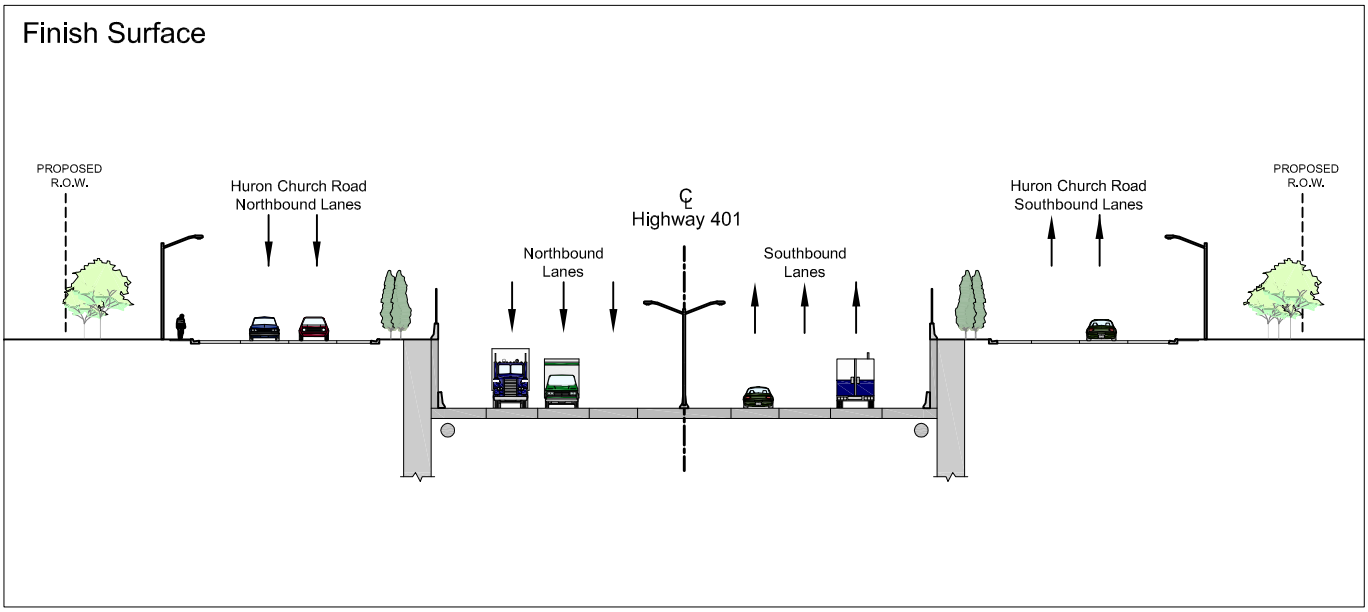
Install Barriers & Complete Finishes



Open Traffic on Highway 401

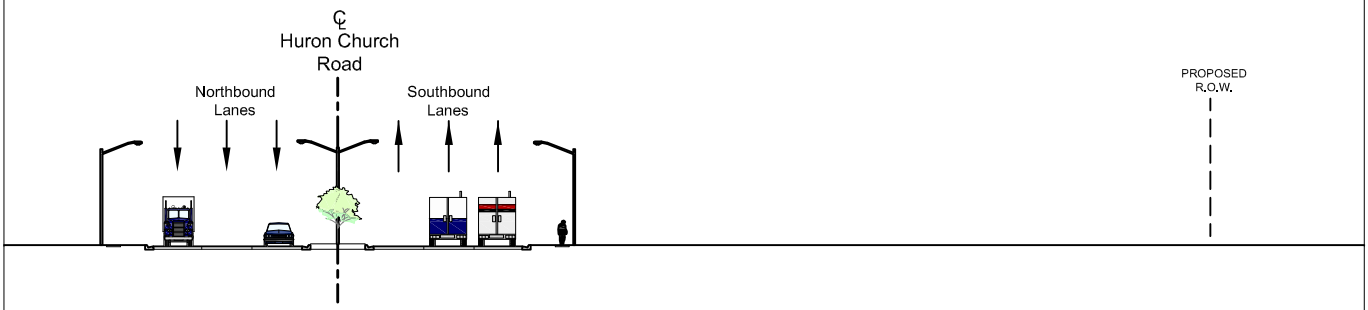


ALTERNATIVE 1B (CON'T)

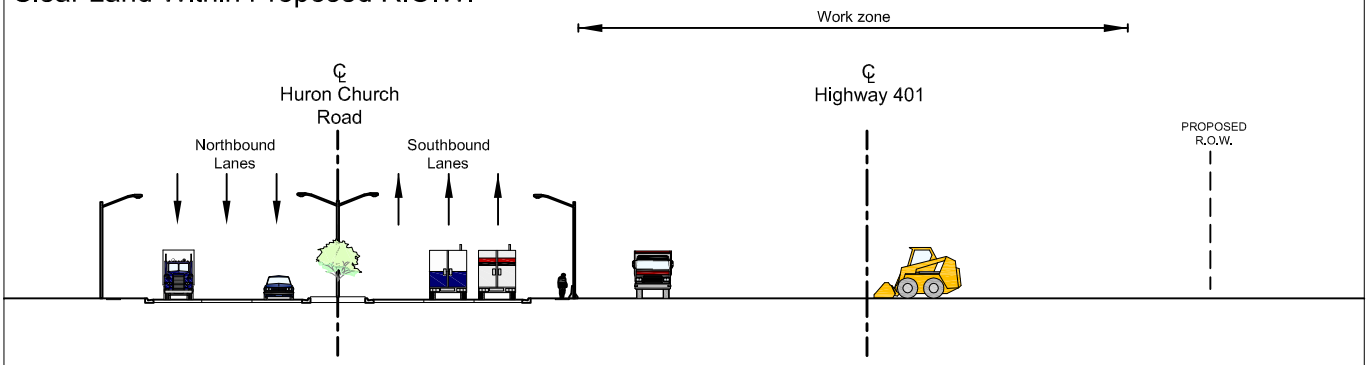


ALTERNATIVE 2A

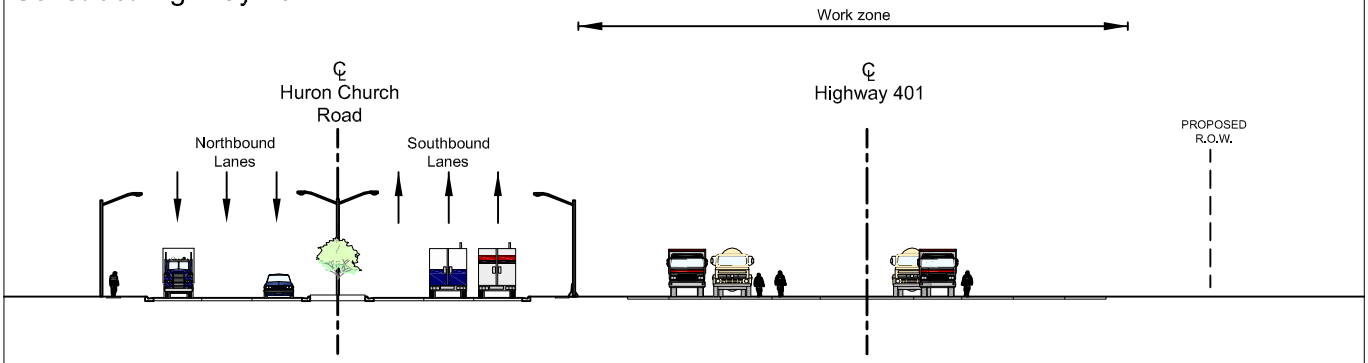
Existing Conditions



Clear Land Within Proposed R.O.W.

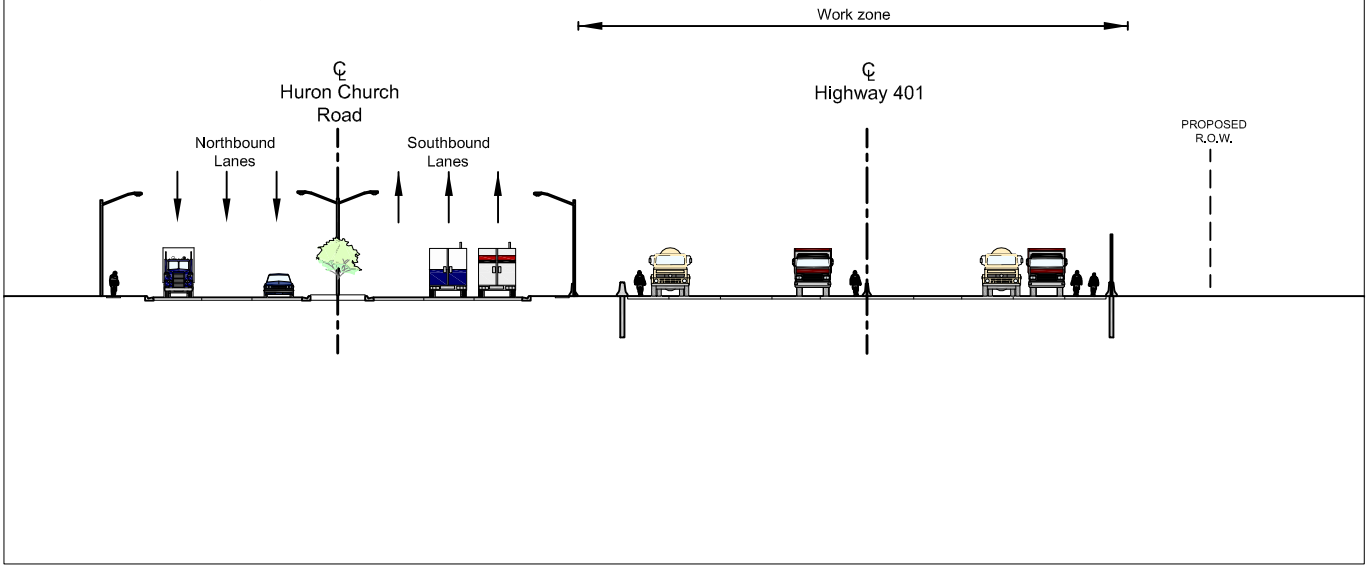


Construct Highway 401

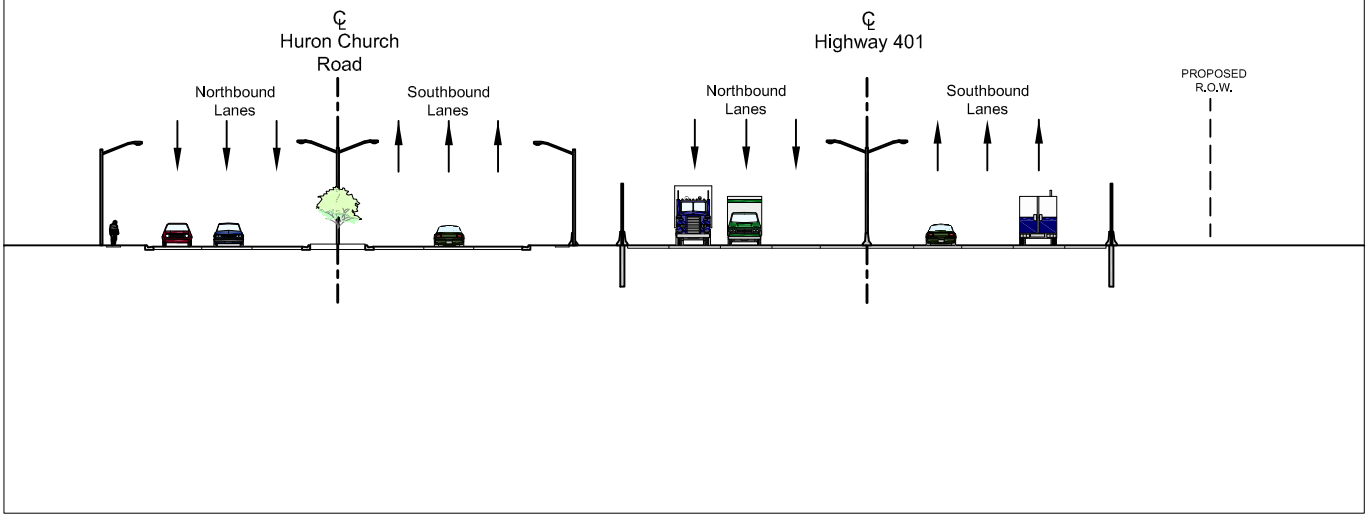


ALTERNATIVE 2A (CON'T)

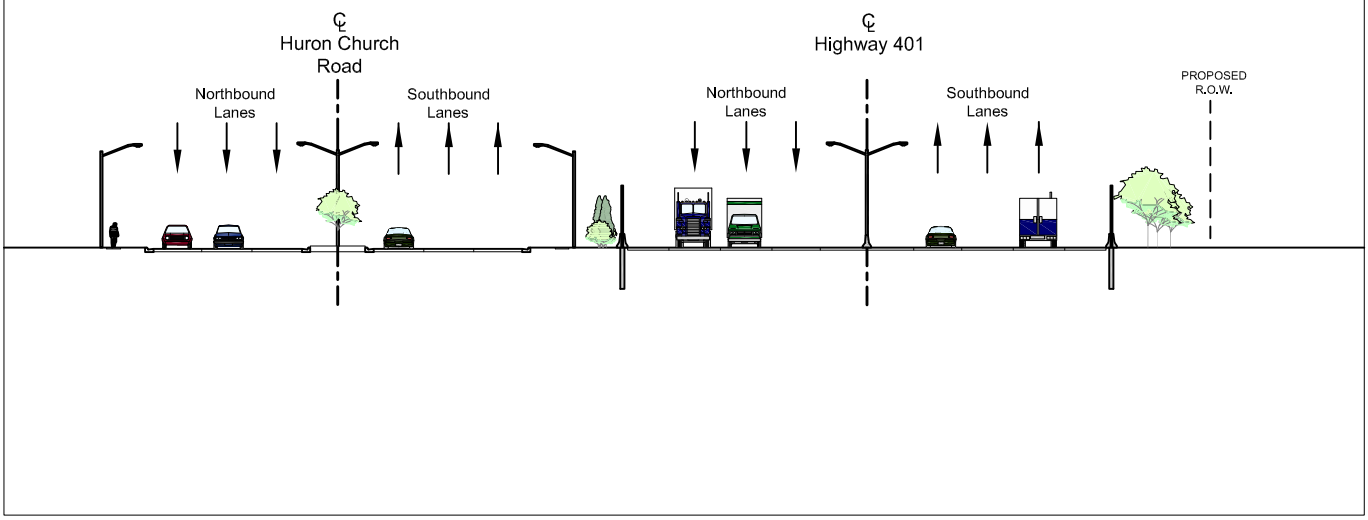
Install Noise Walls & Barriers



Open Traffic on Highway 401

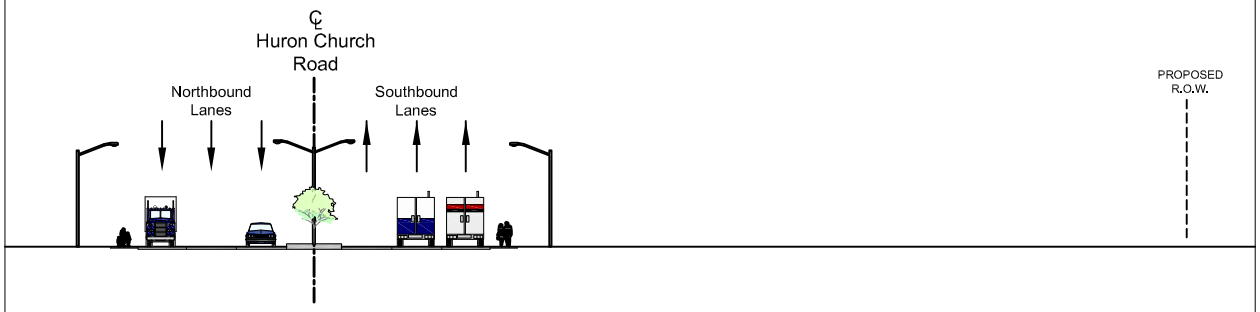


Finish Surface

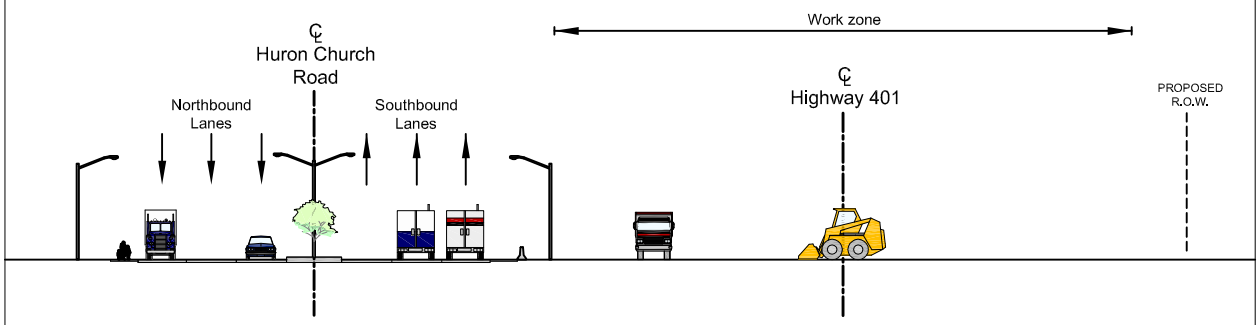


ALTERNATIVE 2B

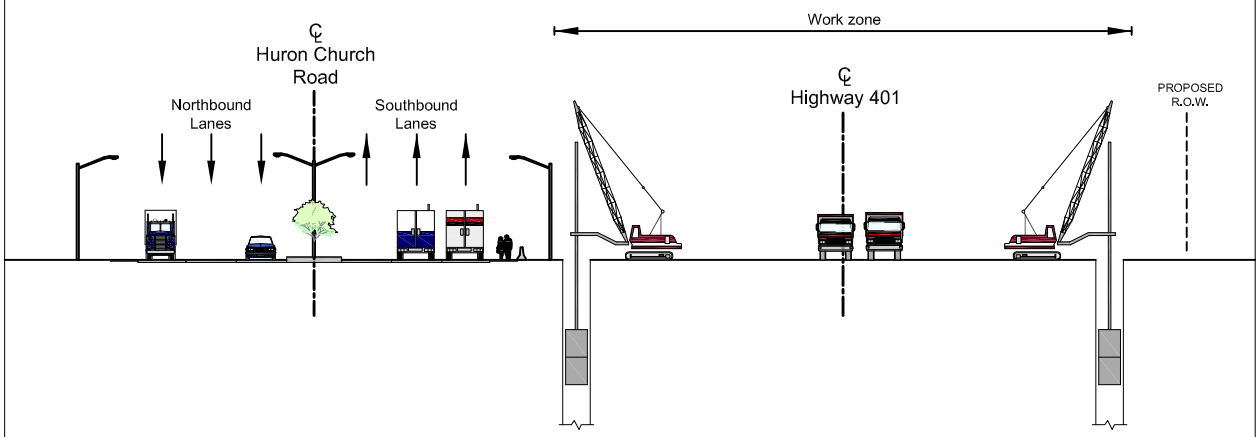
Existing Conditions



Clear Land Within Proposed R.O.W.

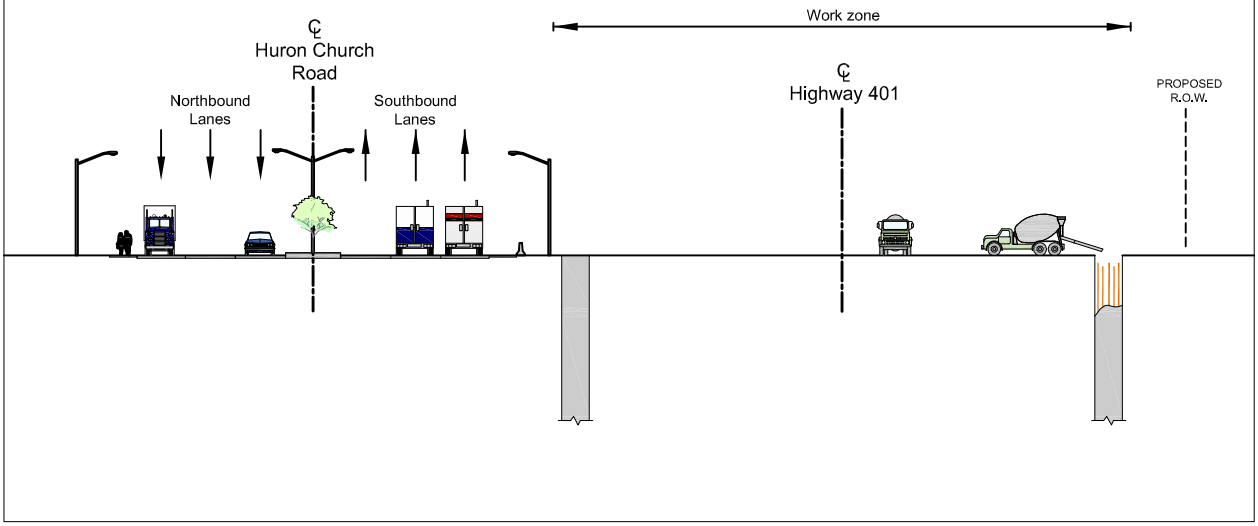


Excavate Trenchs for Retaining Walls

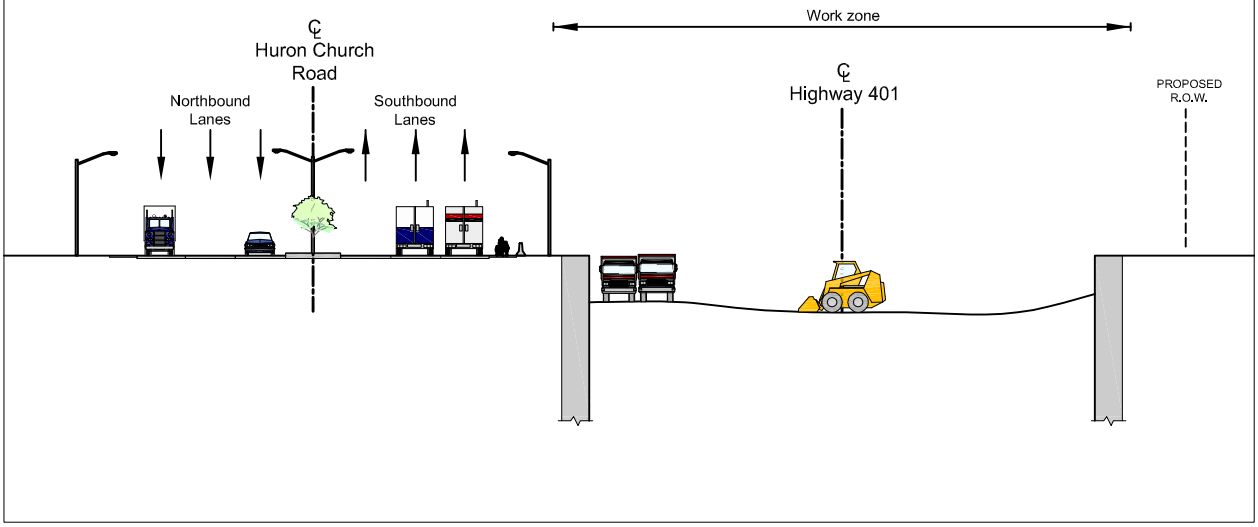


ALTERNATIVE 2B (CON'T)

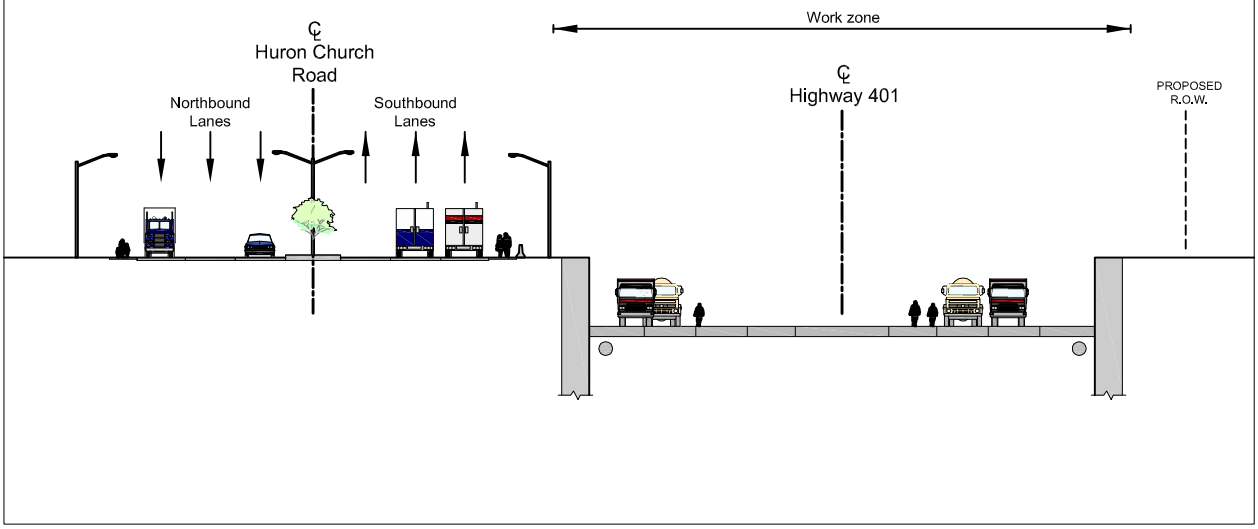
Place Reinforcement & Pour Concrete for Retaining Wall



Excavate

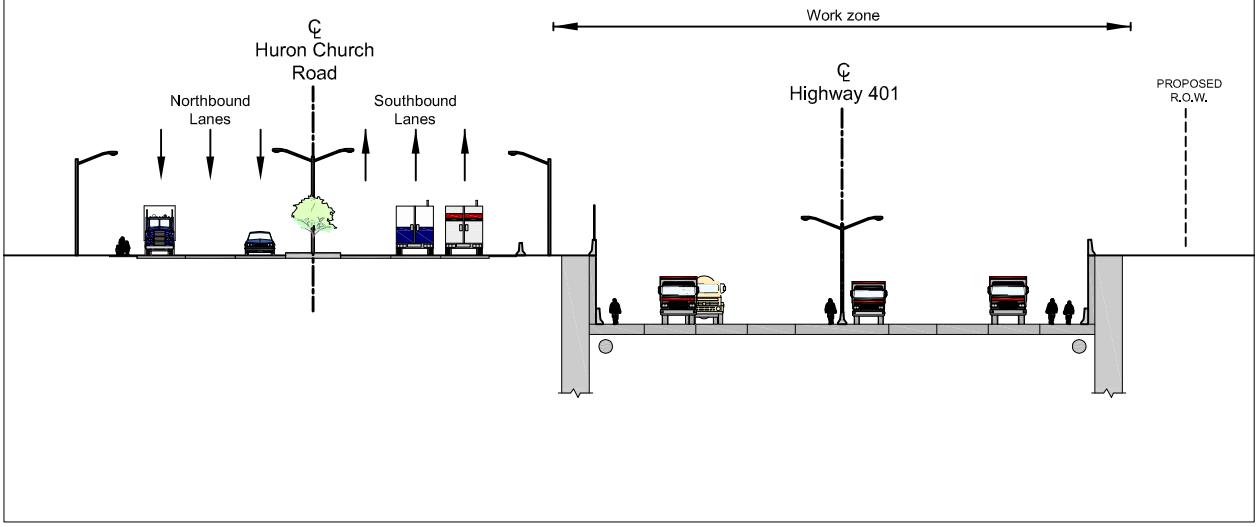


Install Drainage & Construct Highway 401

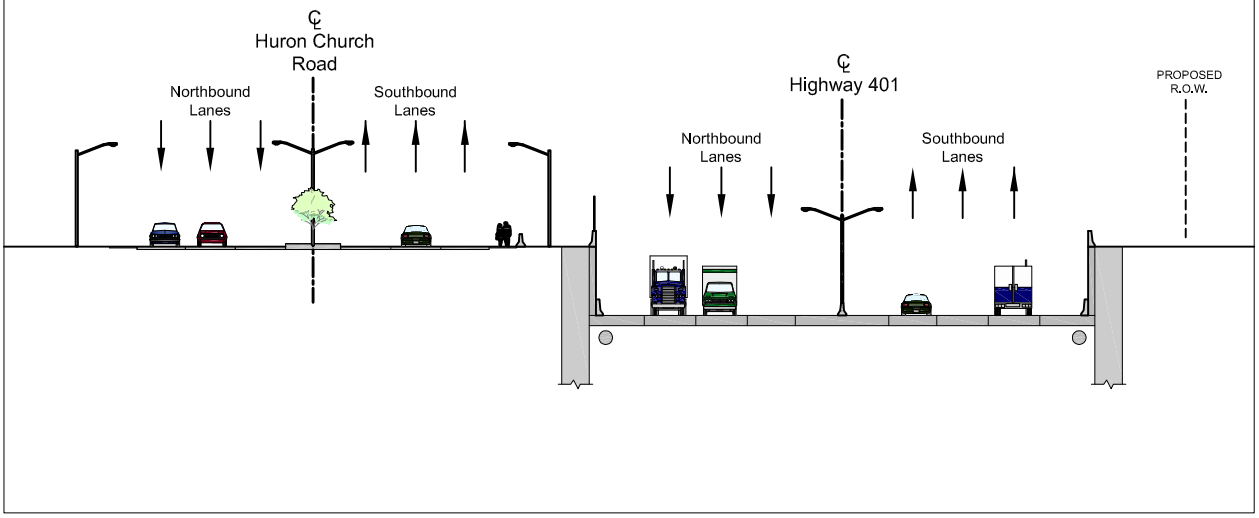


ALTERNATIVE 2B (CON'T)

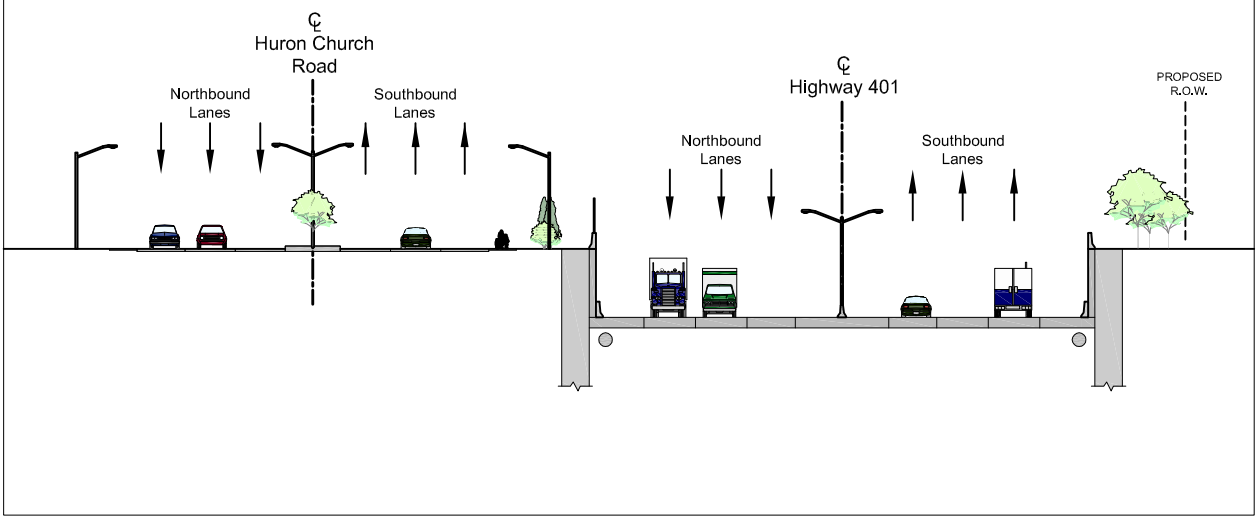
Install Barriers & Complete Finishes



Open Traffic on Highway 401

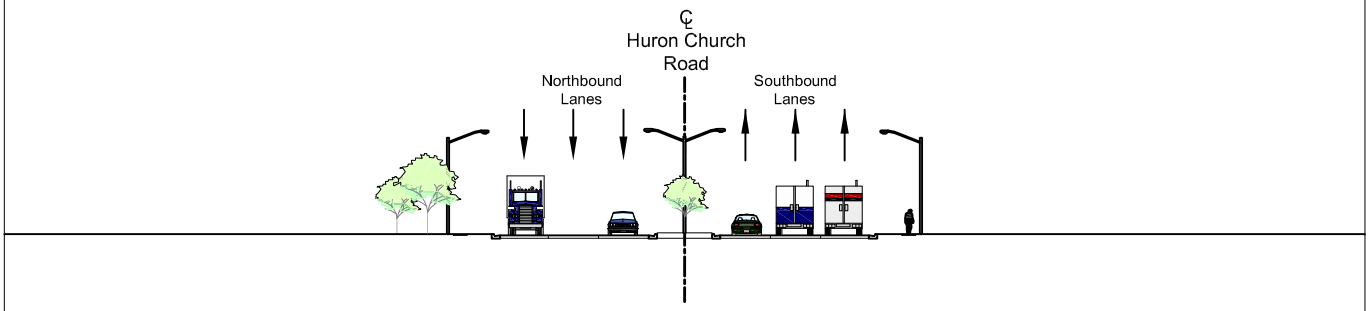


Finish Surface

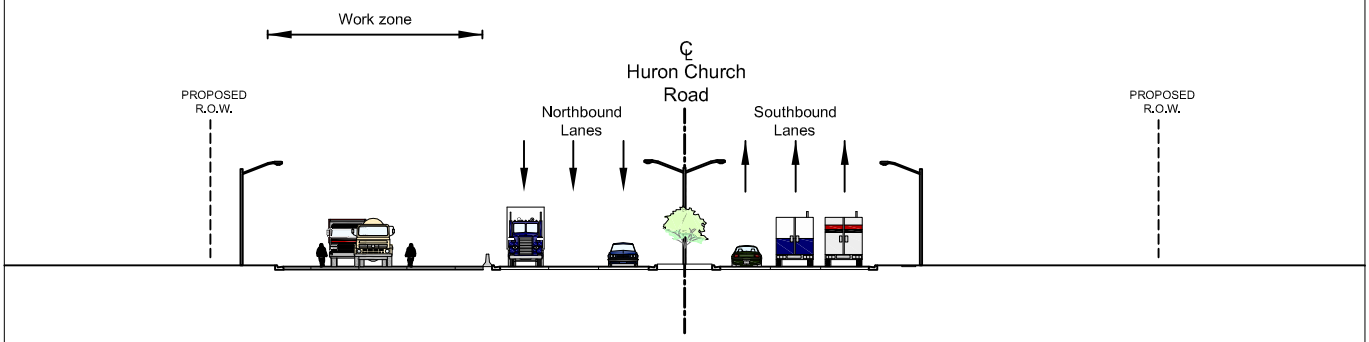


ALTERNATIVE 3

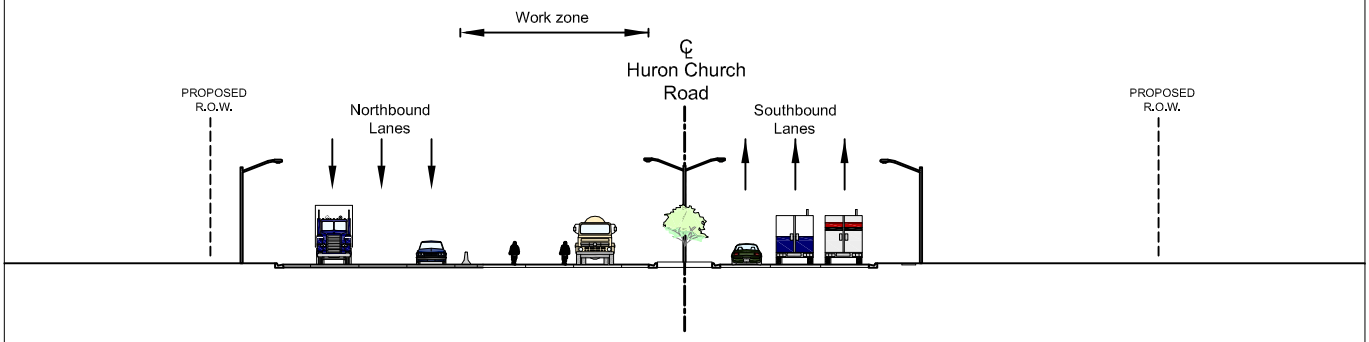
Existing Conditions



Temporary Paving

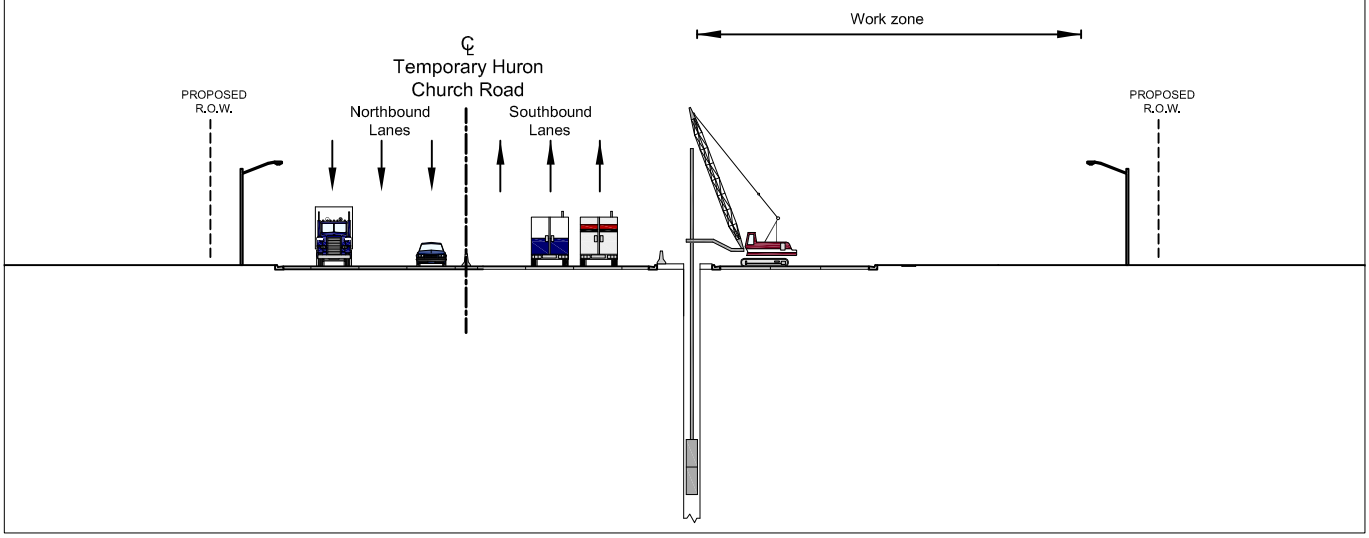


Relocate NB Traffic & Adjust Existing Roadway

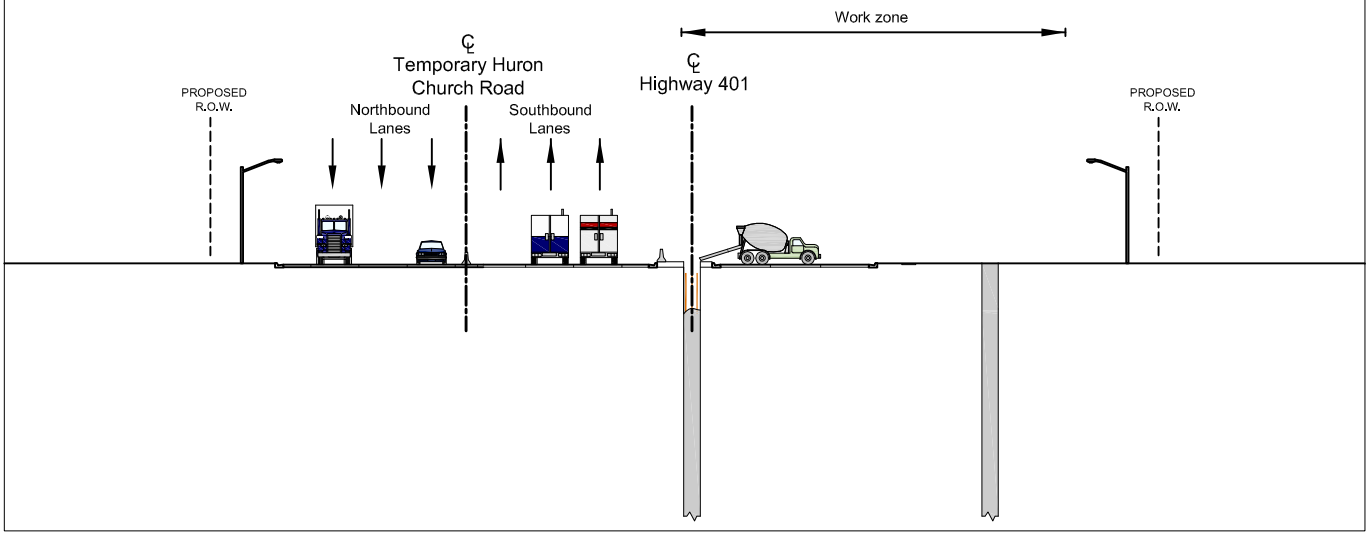


ALTERNATIVE 3 (CON'T)

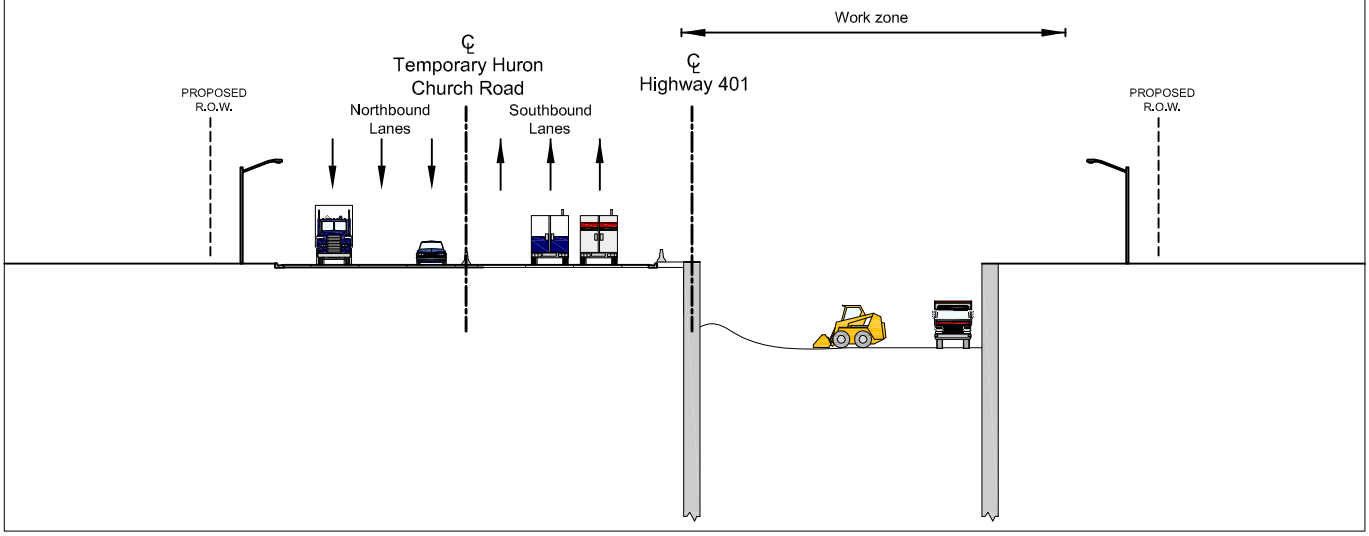
Relocate SB Traffic & Excavate Trenchs for Retaining Walls for SB Tunnel



Place Reinforcement & Pour Concrete for Retaining Walls

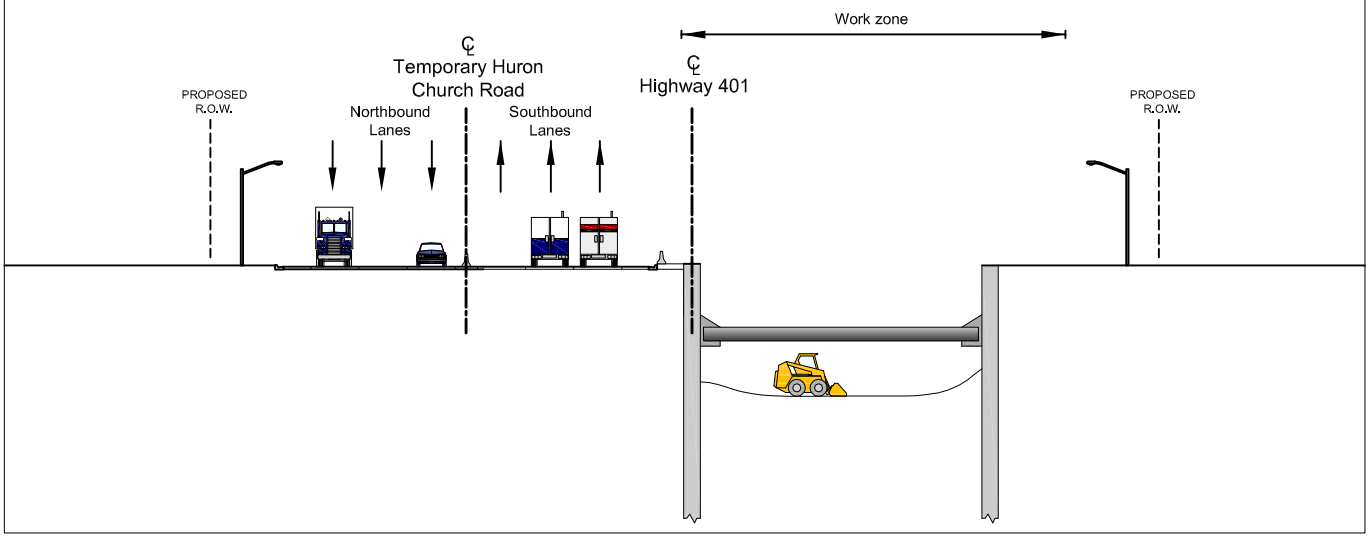


Excavate 1st Level

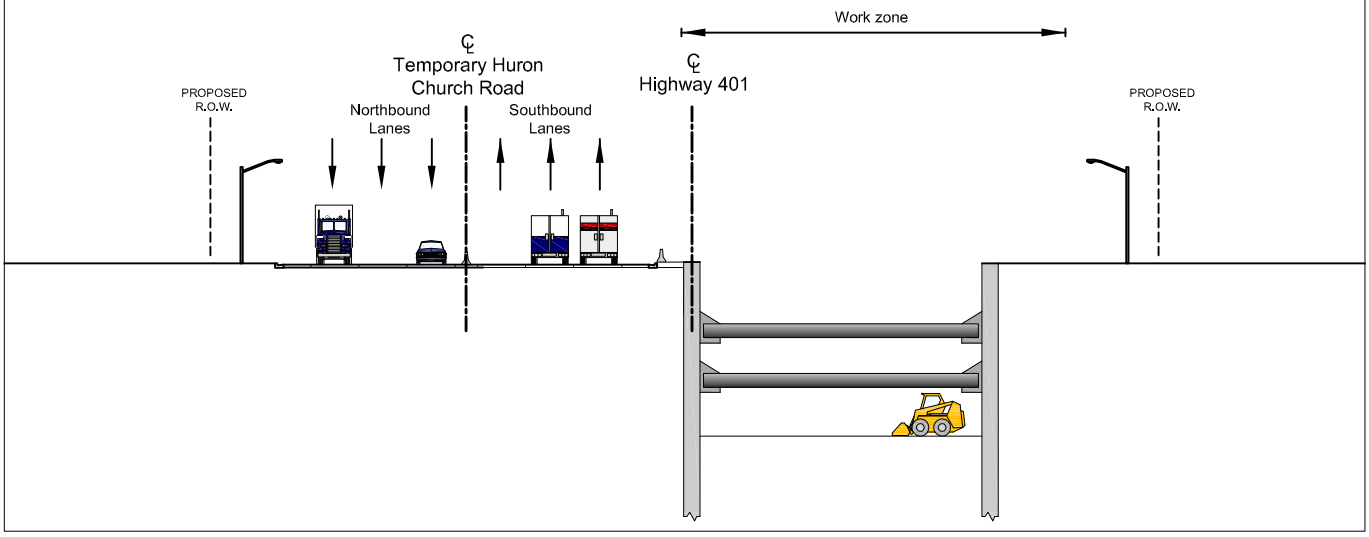


ALTERNATIVE 3 (CON'T)

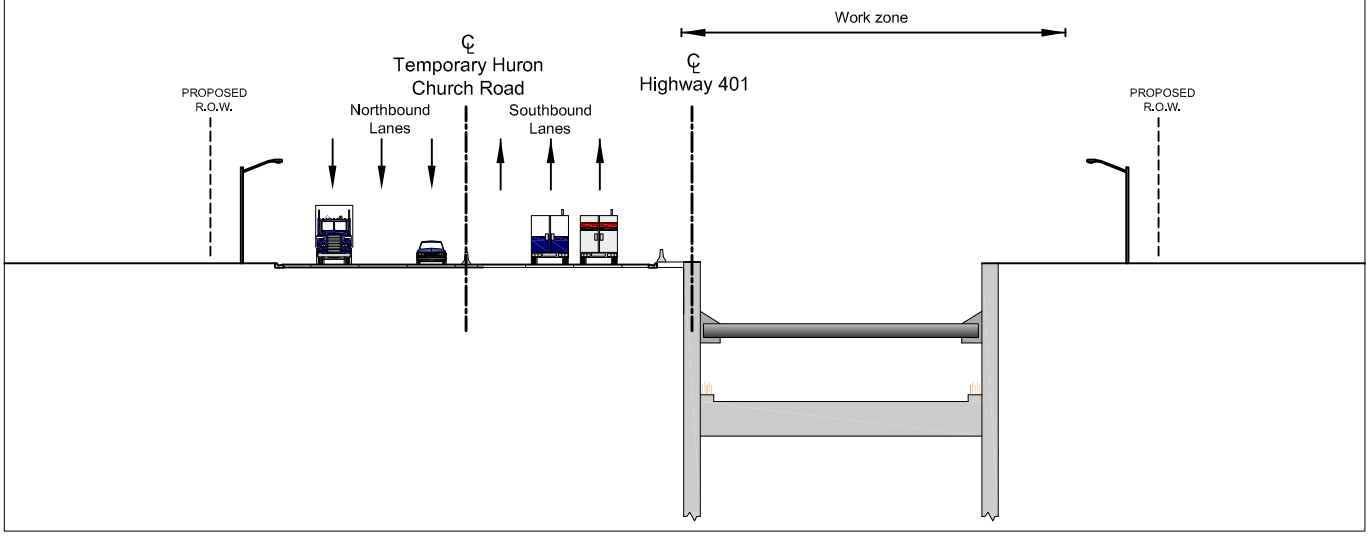
1st Level Struts & Excavate 2nd Level



2nd Level Struts & Excavate 3rd Level

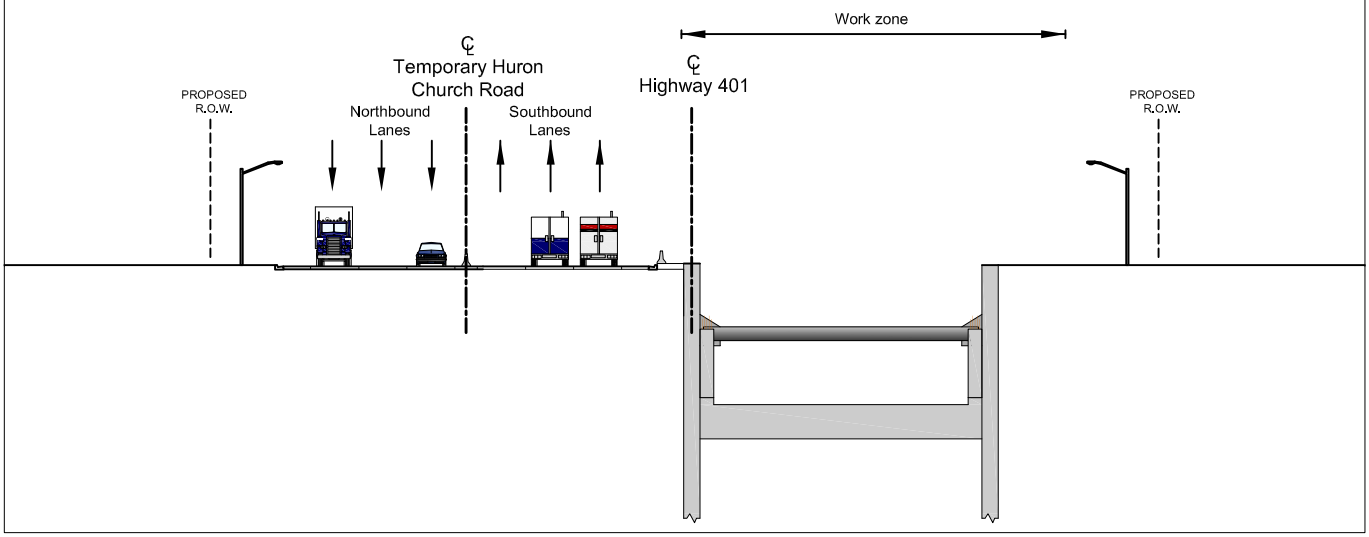


Construct Base & Remove 2nd Level Struts

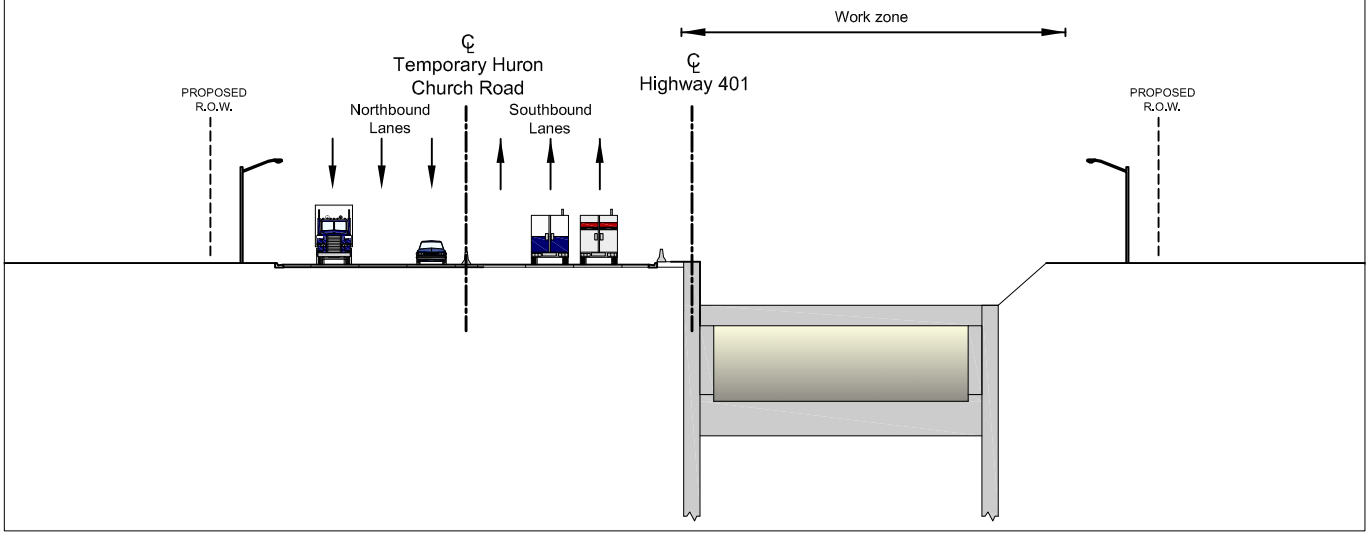


ALTERNATIVE 3 (CON'T)

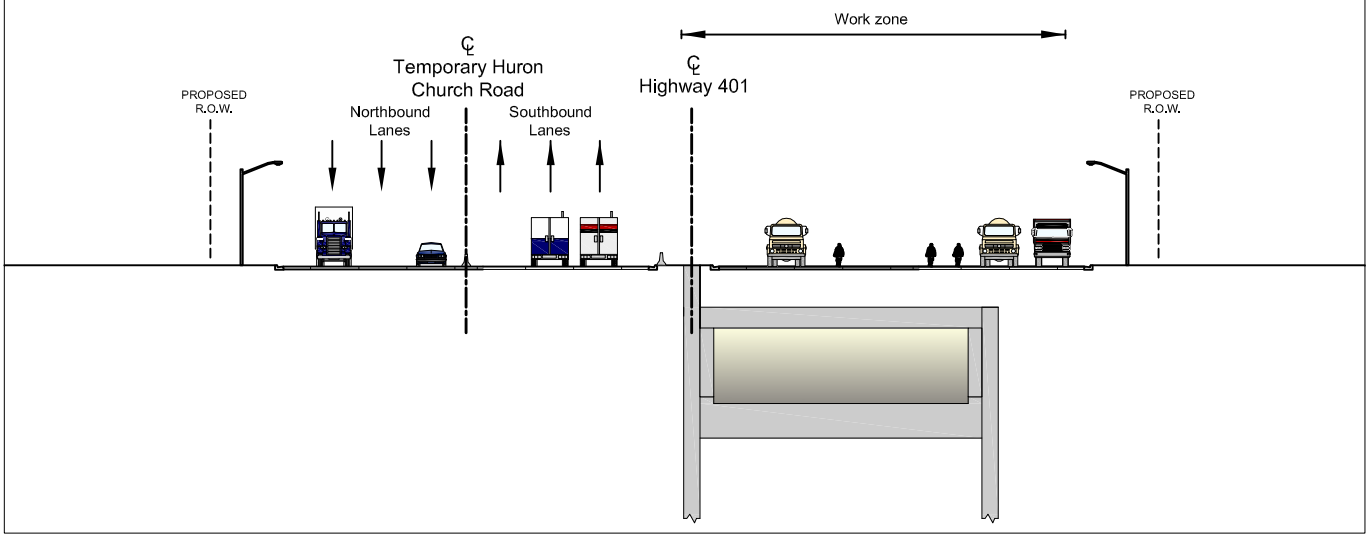
Construct Side Walls



Construct Roof & Remove 1st Level Struts

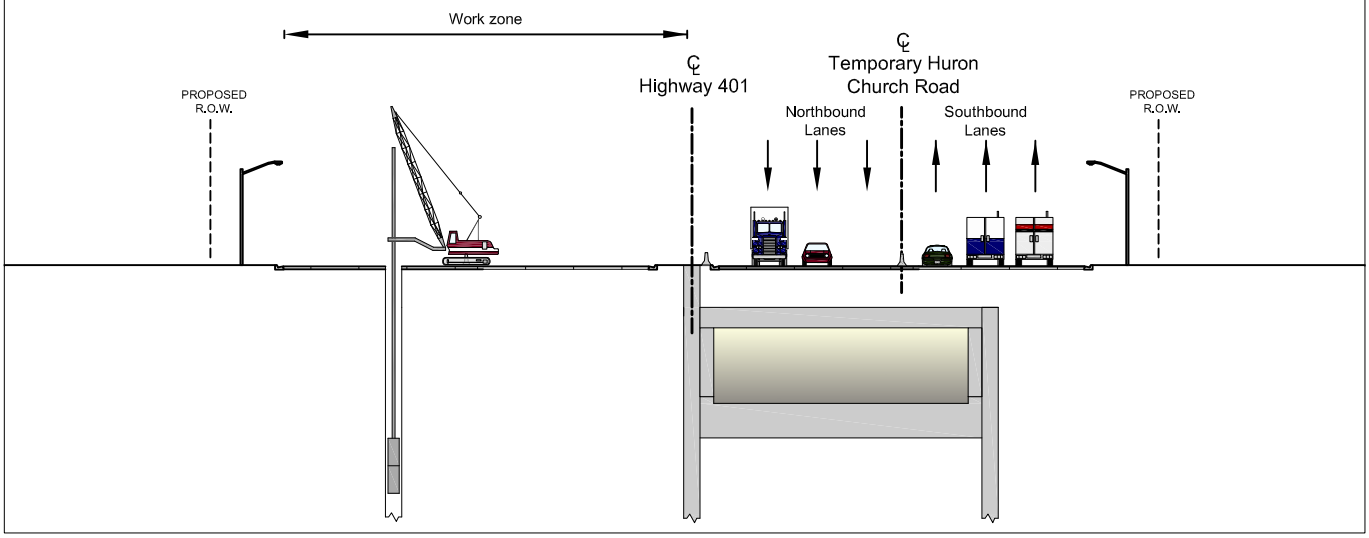


Backfill & Temporary Paving

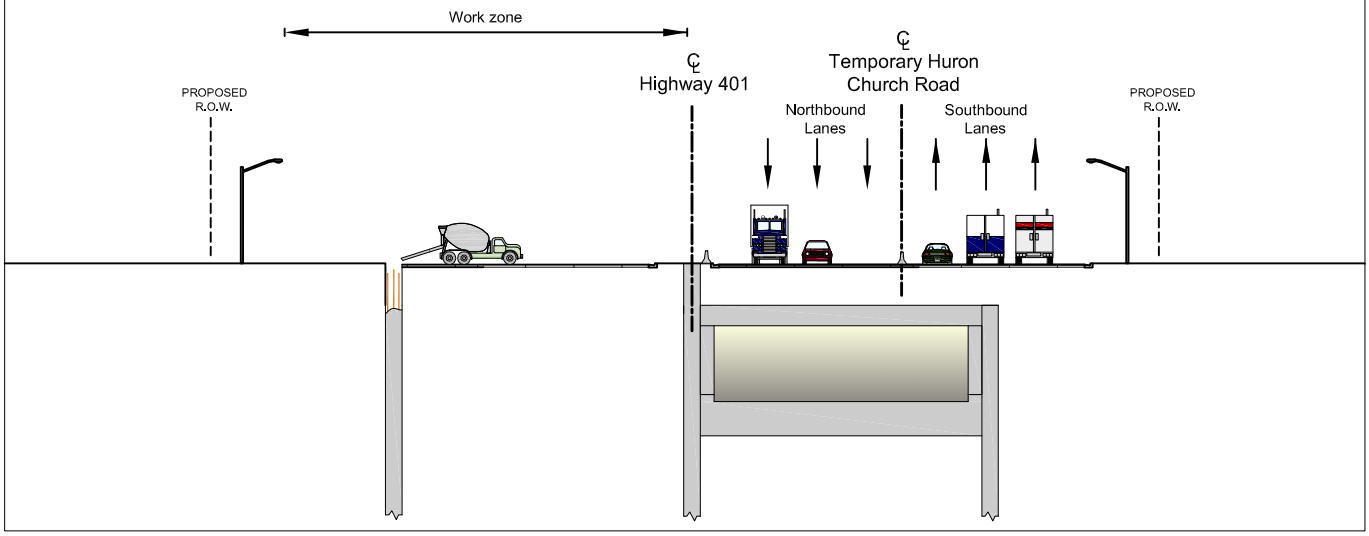


ALTERNATIVE 3 (CON'T)

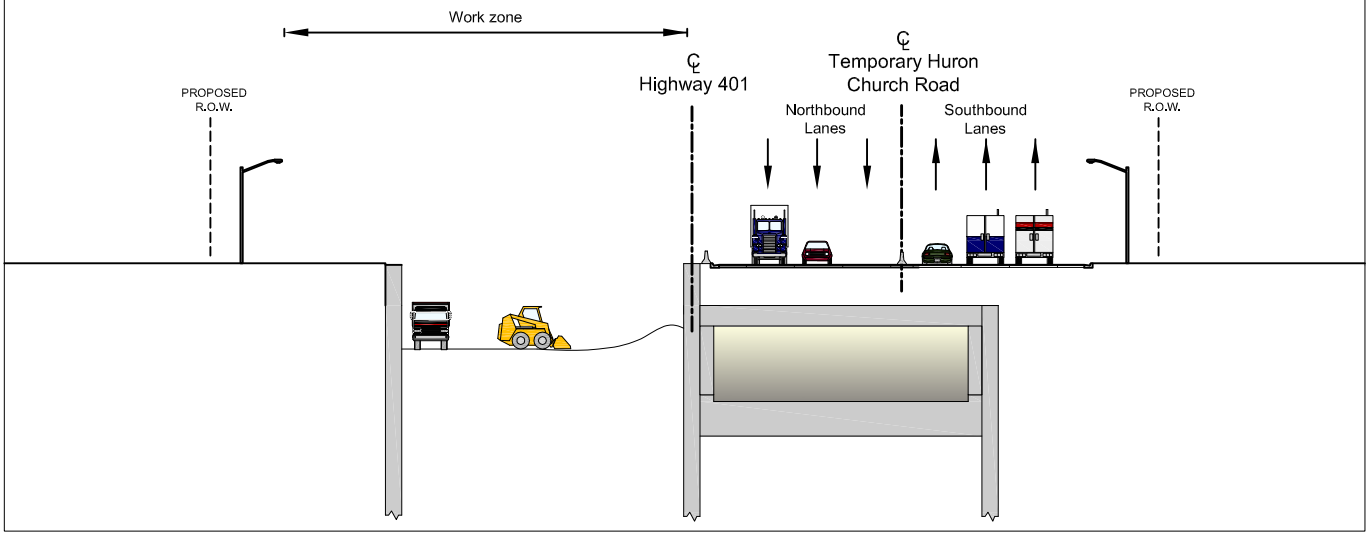
Relocate Traffic & Excavate Trench for Retaining Wall for NB Tunnel



Place Reinforcement & Pour Concrete for Retaining Wall

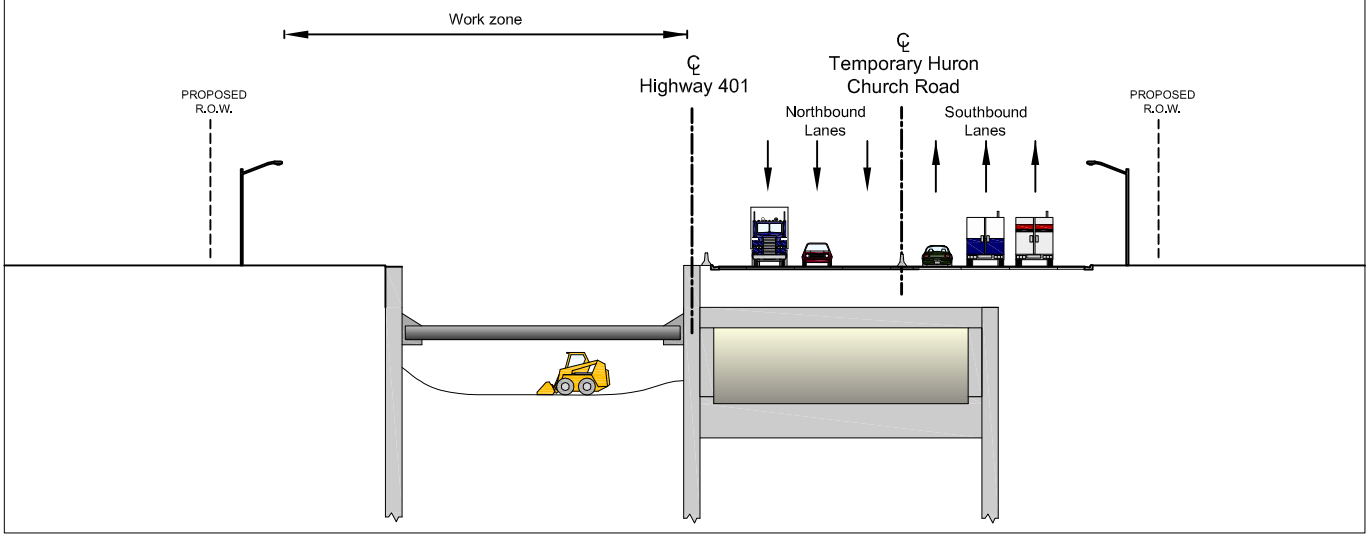


Excavate 1st Level

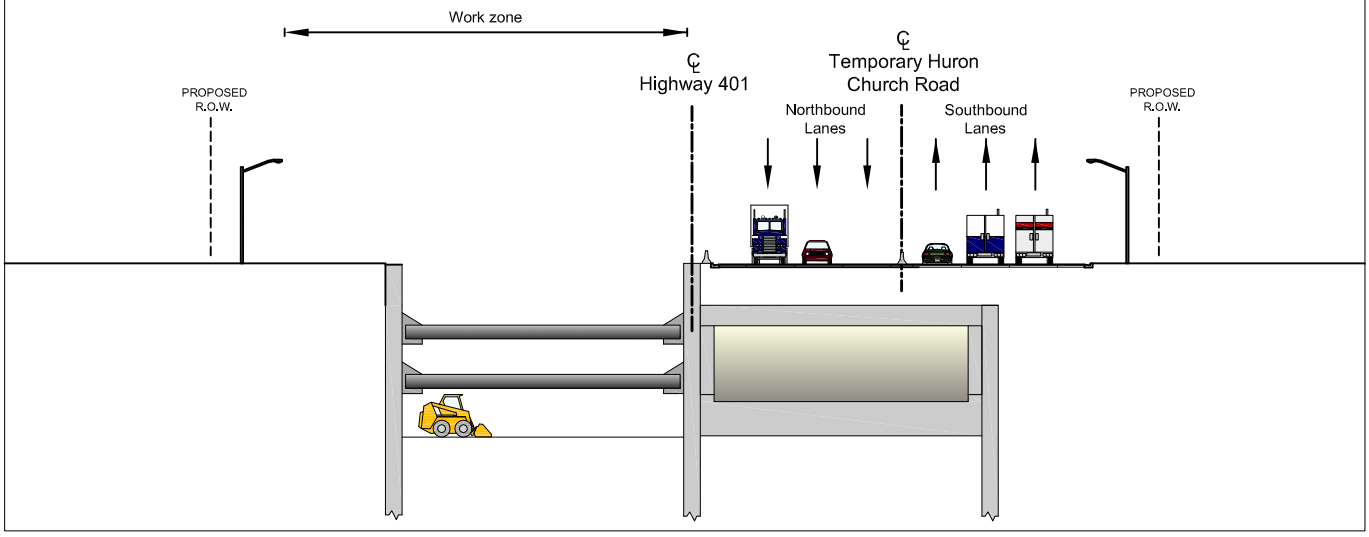


ALTERNATIVE 3 (CON'T)

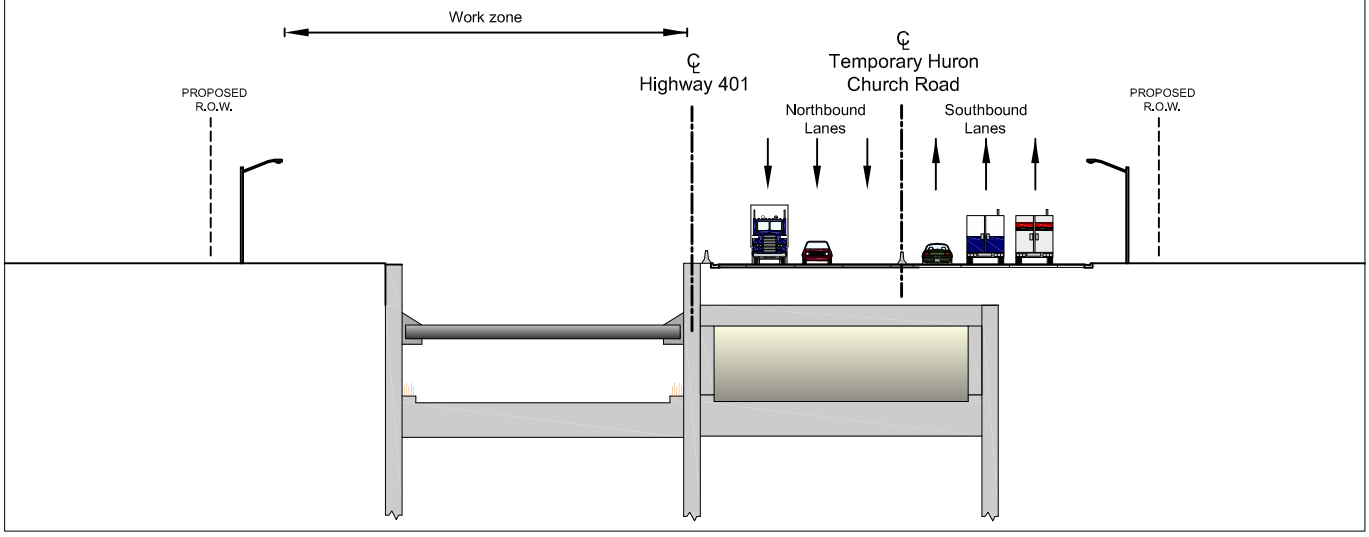
1st Level Struts & Excavate 2nd Level



2nd Level Struts & Excavate 3rd Level

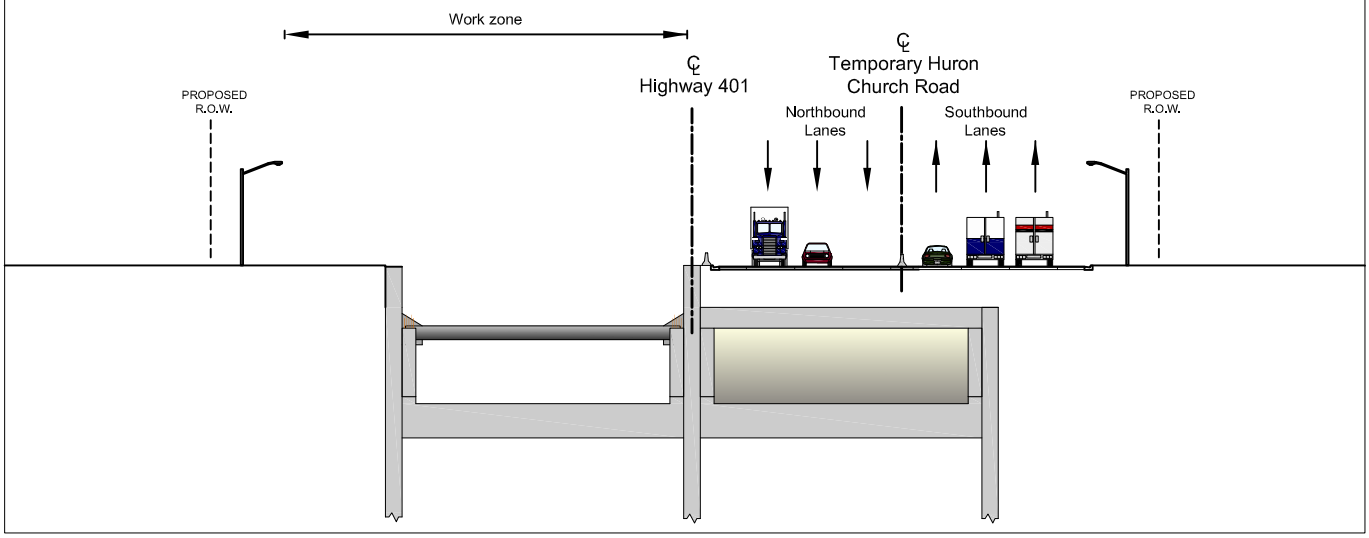


Construct Base & Remove 2nd Level Struts

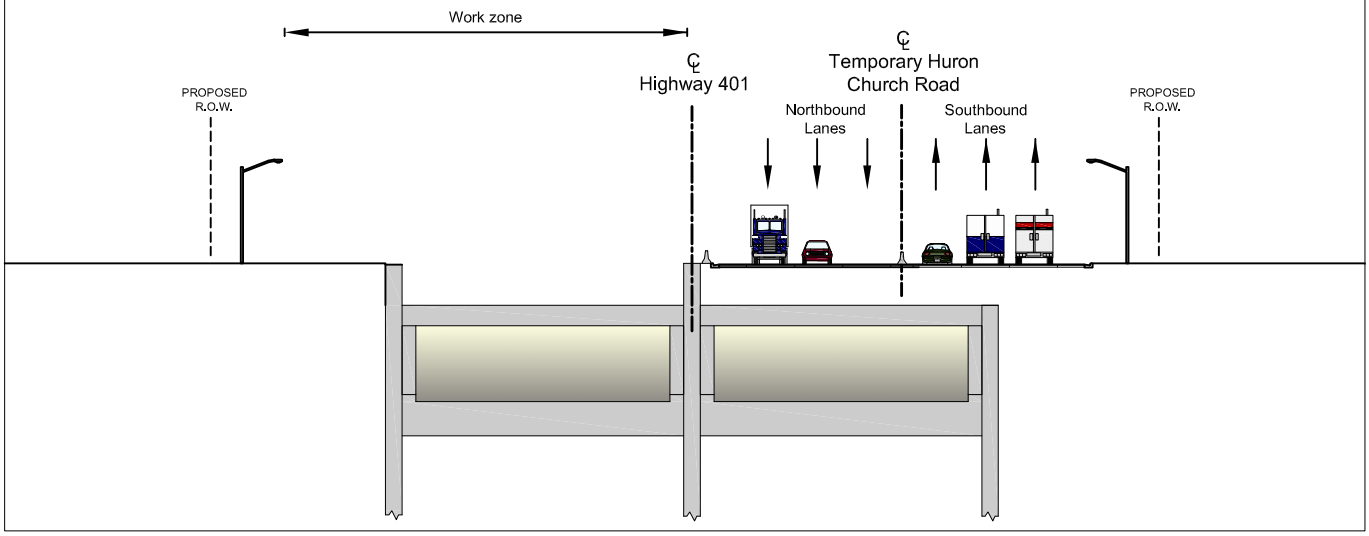


ALTERNATIVE 3 (CON'T)

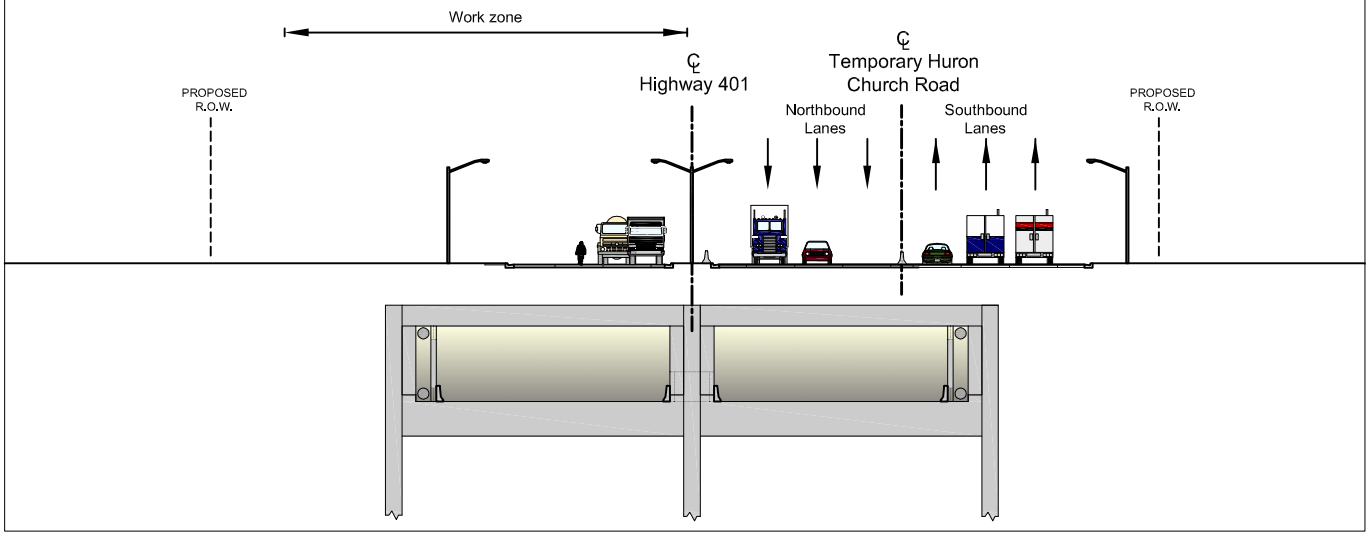
Construct Side Walls



Construct Roof & Remove 1st Level Struts

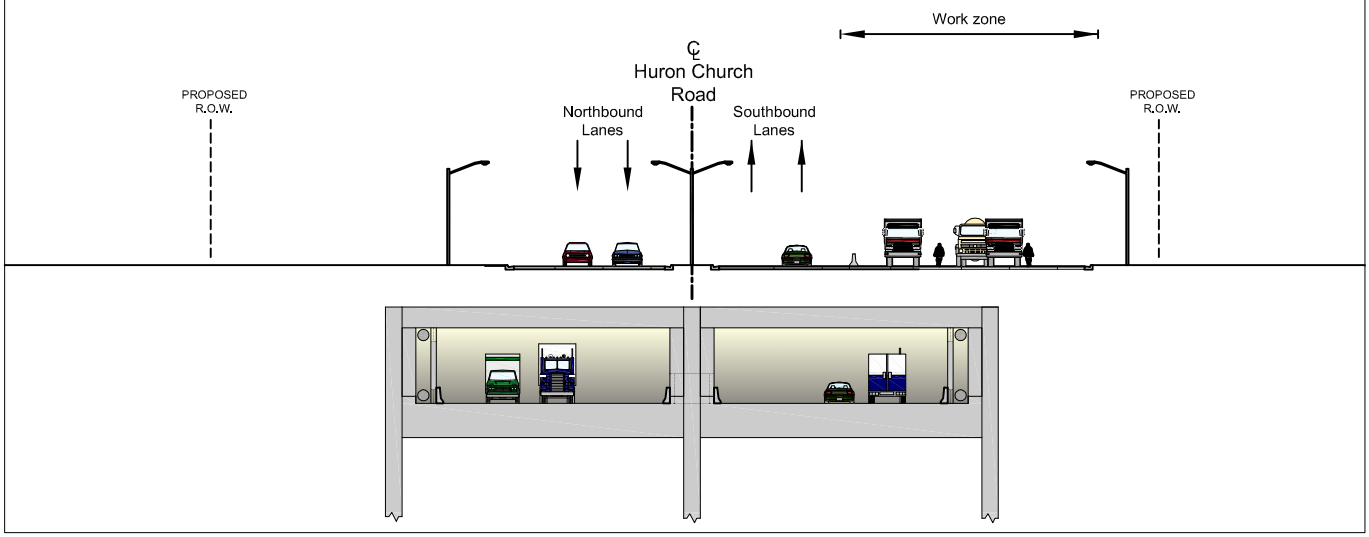


Backfill, Paving & Complete In-Tunnel Finishes & Systems

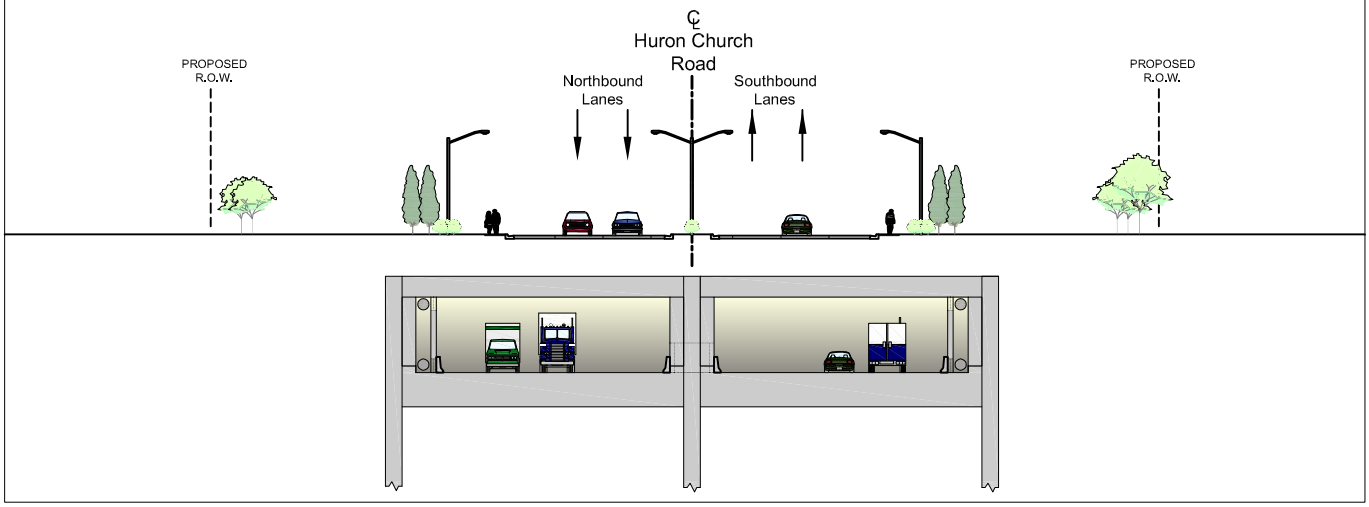


ALTERNATIVE 3 (CON'T)

Relocate Traffic & Adjust SB Roadway



Finish Surface



Appendix D

Conceptual Construction Staging Cross-Sections

METRIC

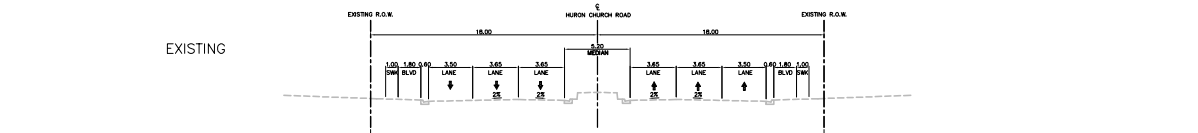
PLATE No CONT No XXXX–XXXX WP No XXX–XX–XX	
TYPICAL SECTIONS Survey _____ Revised _____	SHEET XXX

DETROIT RIVER INTERNATIONAL CROSSING
CONCEPTUAL CONSTRUCTION
STAGING CROSS–SECTIONS
HURON CHUCH ROAD CORRIDOR

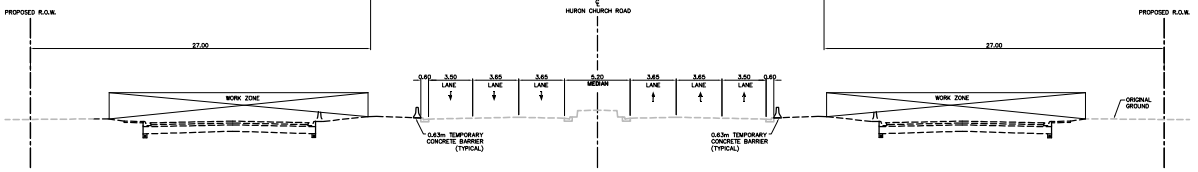
WIDEN EQUALLY ON BOTH SIDES

ALTERNATIVE 1A

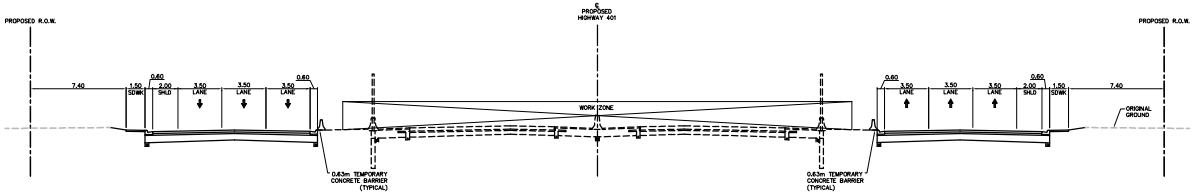
EXISTING



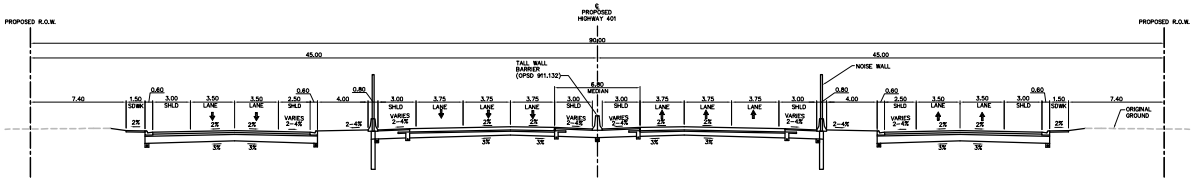
STAGE 1



STAGE 2



COMPLETE



CONCEPTUAL

SCALE

1.5m 0 3.0m
Horizontal

METRIC

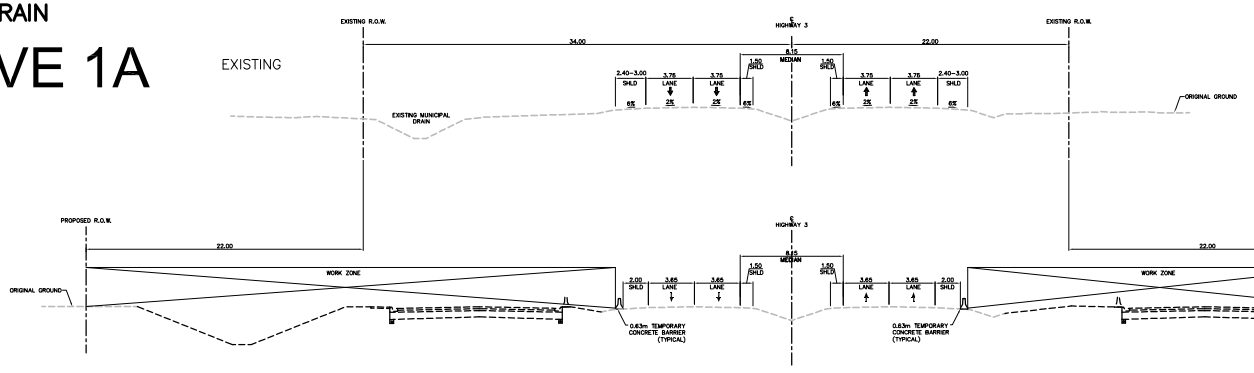
PLATE No	
CONT No XXXX–XXXX WP No XXX–XX–XX	
TYPICAL SECTIONS Survey _____ Revised _____	SHEET XXX

DETROIT RIVER INTERNATIONAL CROSSING
CONCEPTUAL CONSTRUCTION
STAGING CROSS–SECTIONS
HIGHWAY 3 CORRIDOR

WIDEN EQUALLY ON BOTH SIDES
REALIGN MUNICIPAL DRAIN

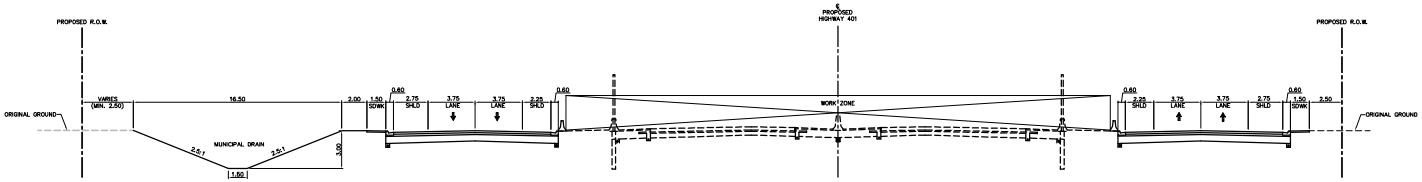
ALTERNATIVE 1A

EXISTING

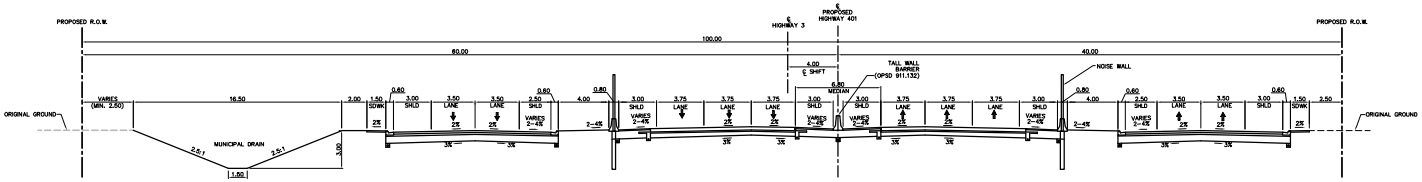


STAGE 1

STAGE 2



COMPLETE



CONCEPTUAL

SCALE

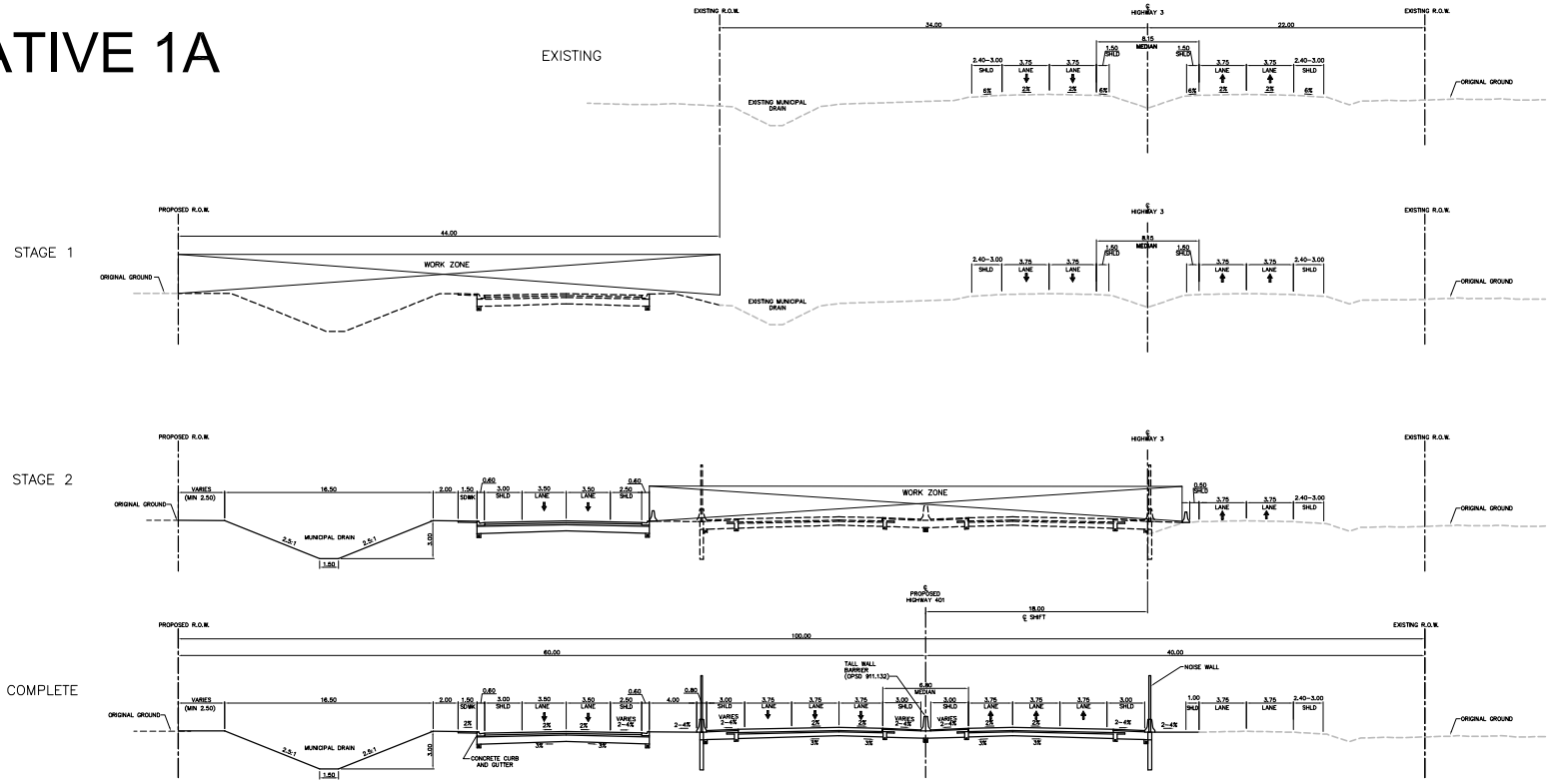
1.5m 0 3.0m
Horizontal

METRIC

PLATE No CONT No XXXX–XXXX WP No XXX–XX–XX	
TYPICAL SECTIONS Survey _____ Revised _____	SHEET XXX

DETROIT RIVER INTERNATIONAL CROSSING
CONCEPTUAL CONSTRUCTION
STAGING CROSS–SECTIONS
HIGHWAY 3 CORRIDOR
WIDEN MINIMUM TO NORTH
REALIGN MUNICIPAL DRAIN

ALTERNATIVE 1A



CONCEPTUAL

SCALE
1.5m 0 3.0m
Horizontal

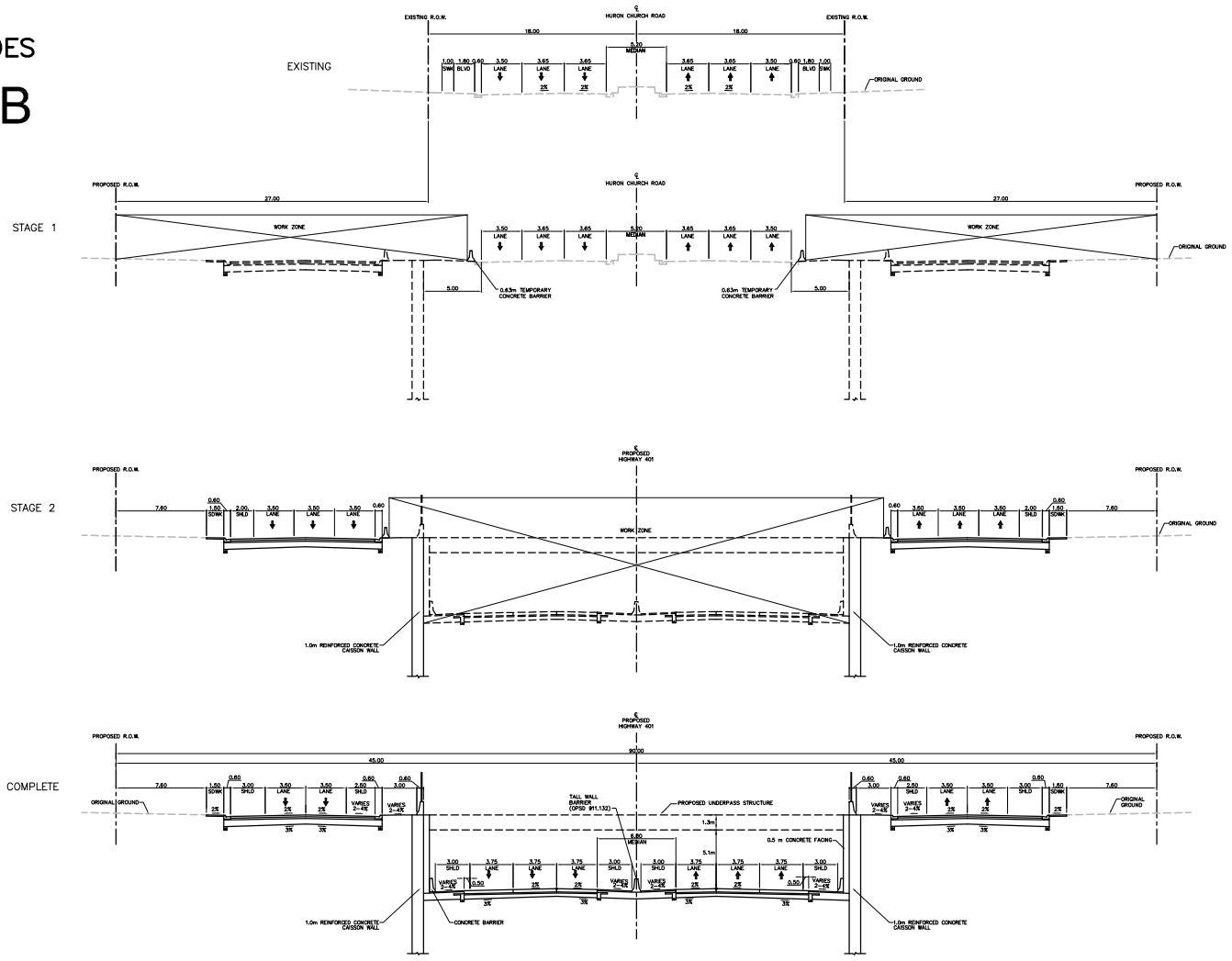
METRIC

PLATE No	
CONT No XXXX–XXXX WP No XXX–XX–XX	
TYPICAL SECTIONS Survey _____ Revised _____	SHEET XXX

DETROIT RIVER INTERNATIONAL CROSSING
CONCEPTUAL CONSTRUCTION
STAGING CROSS–SECTIONS
HURON CHURCH ROAD CORRIDOR

WIDEN EQUALLY ON BOTH SIDES

ALTERNATIVE 1B



CONCEPTUAL

SCALE

1.0m 0 3.0m
Horizontal

METRIC

PLATE No
CONT No XXXX–XXXX
WP No XXX–XX–XX

TYPICAL SECTIONS

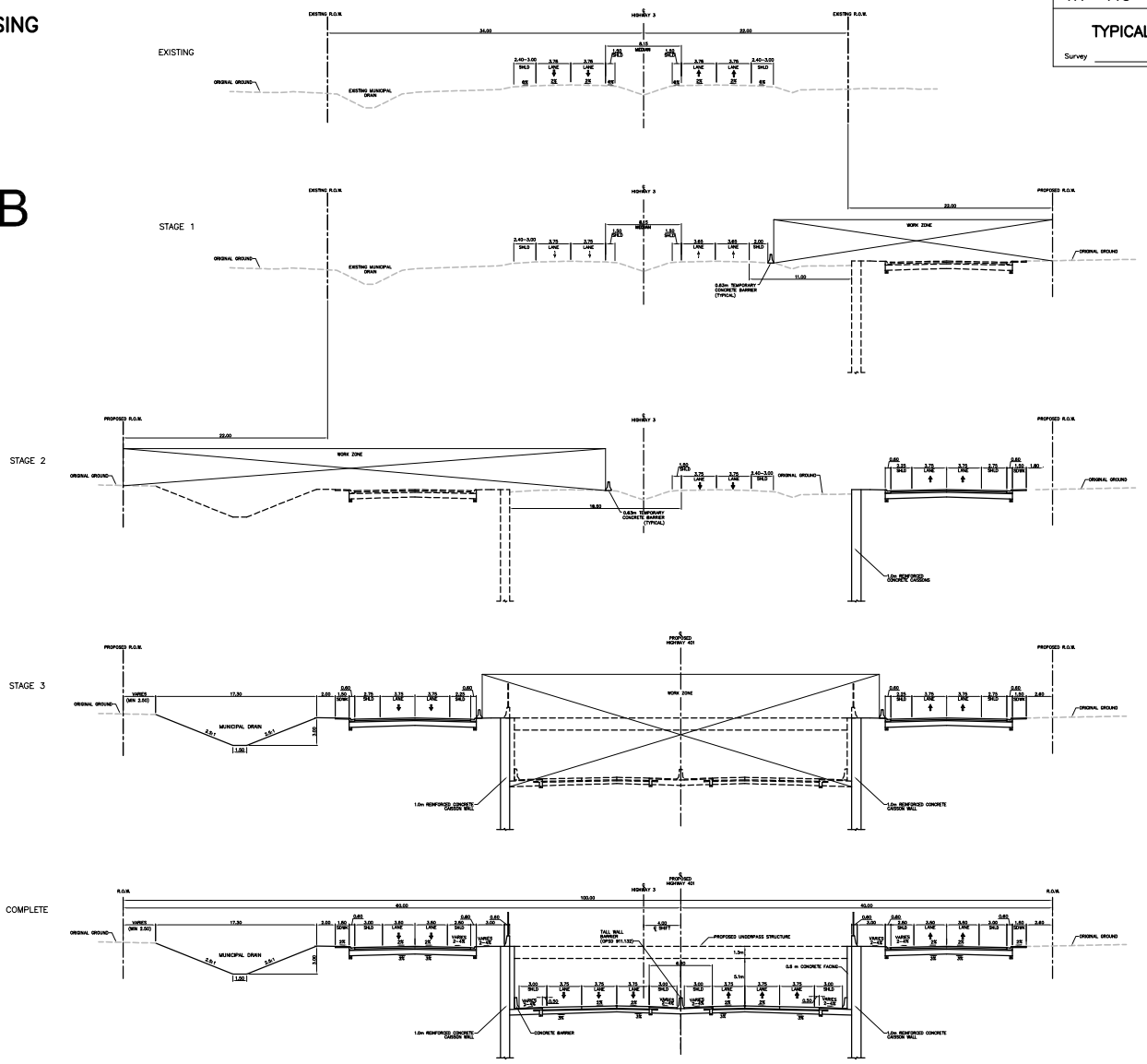
Survey _____ Revised _____

SHEET XXX

DETROIT RIVER INTERNATIONAL CROSSING
CONCEPTUAL CONSTRUCTION
STAGING CROSS–SECTIONS
HIGHWAY 3 CORRIDOR

WIDEN EQUALLY ON BOTH SIDES
REALIGN MUNICIPAL DRAIN

ALTERNATIVE 1B



CONCEPTUAL

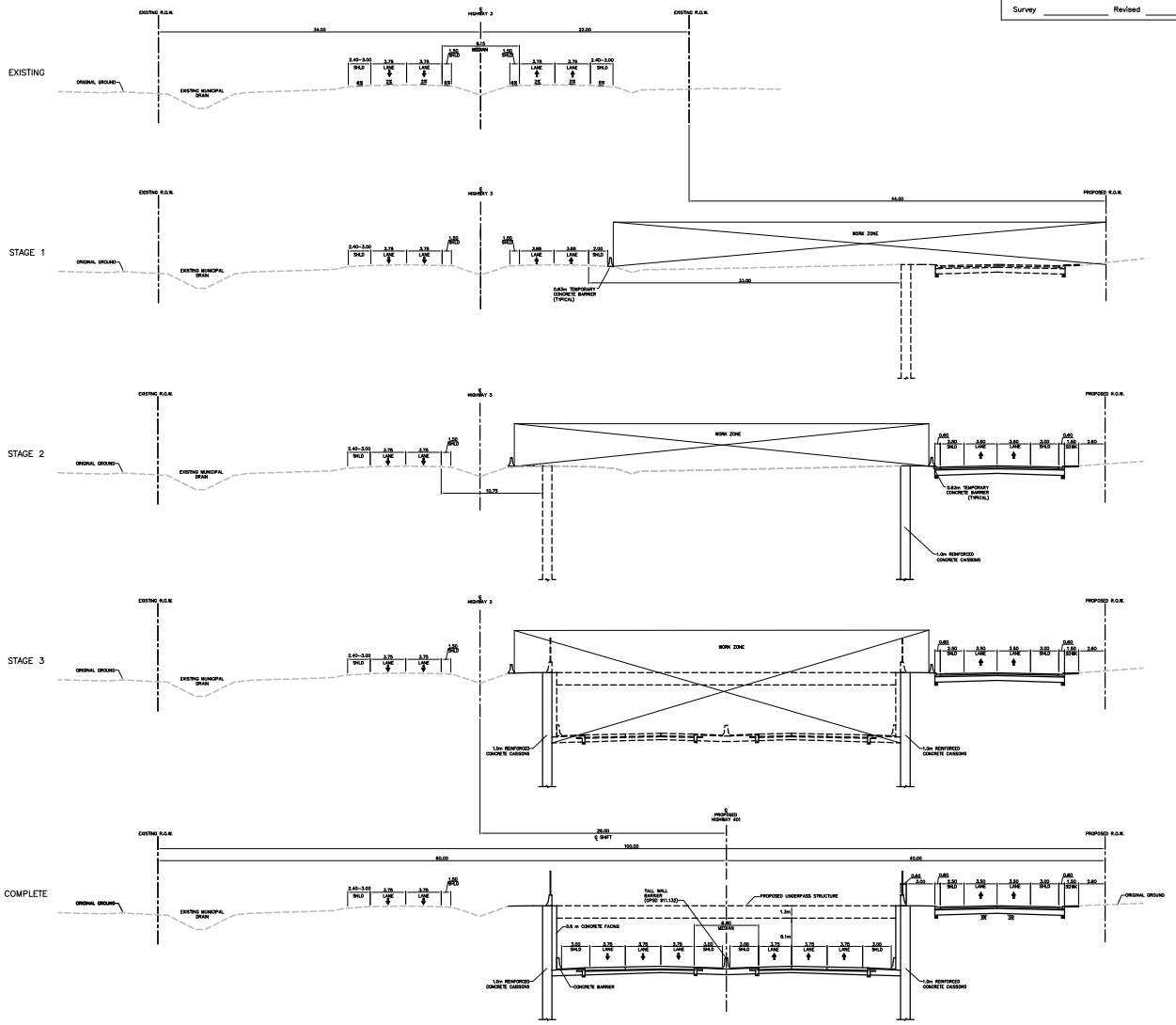
METRIC

PLATE No	
CONT No XXXX–XXXX WP No XXX–XX–XX	
TYPICAL SECTIONS Survey _____ Revised _____	SHEET XXX

DETROIT RIVER INTERNATIONAL CROSSING
CONCEPTUAL CONSTRUCTION
STAGING CROSS–SECTIONS
HIGHWAY 3 CORRIDOR

WIDEN MINIMUM TO SOUTH
MAINTAIN EXISTING DRAIN

ALTERNATIVE 1B



CONCEPTUAL

SCALE
1.0m 3.0m
Horizontal

METRIC

PLATE No
CONT No XXXX–XXXX
WP No XXX–XX–XX

TYPICAL SECTIONS

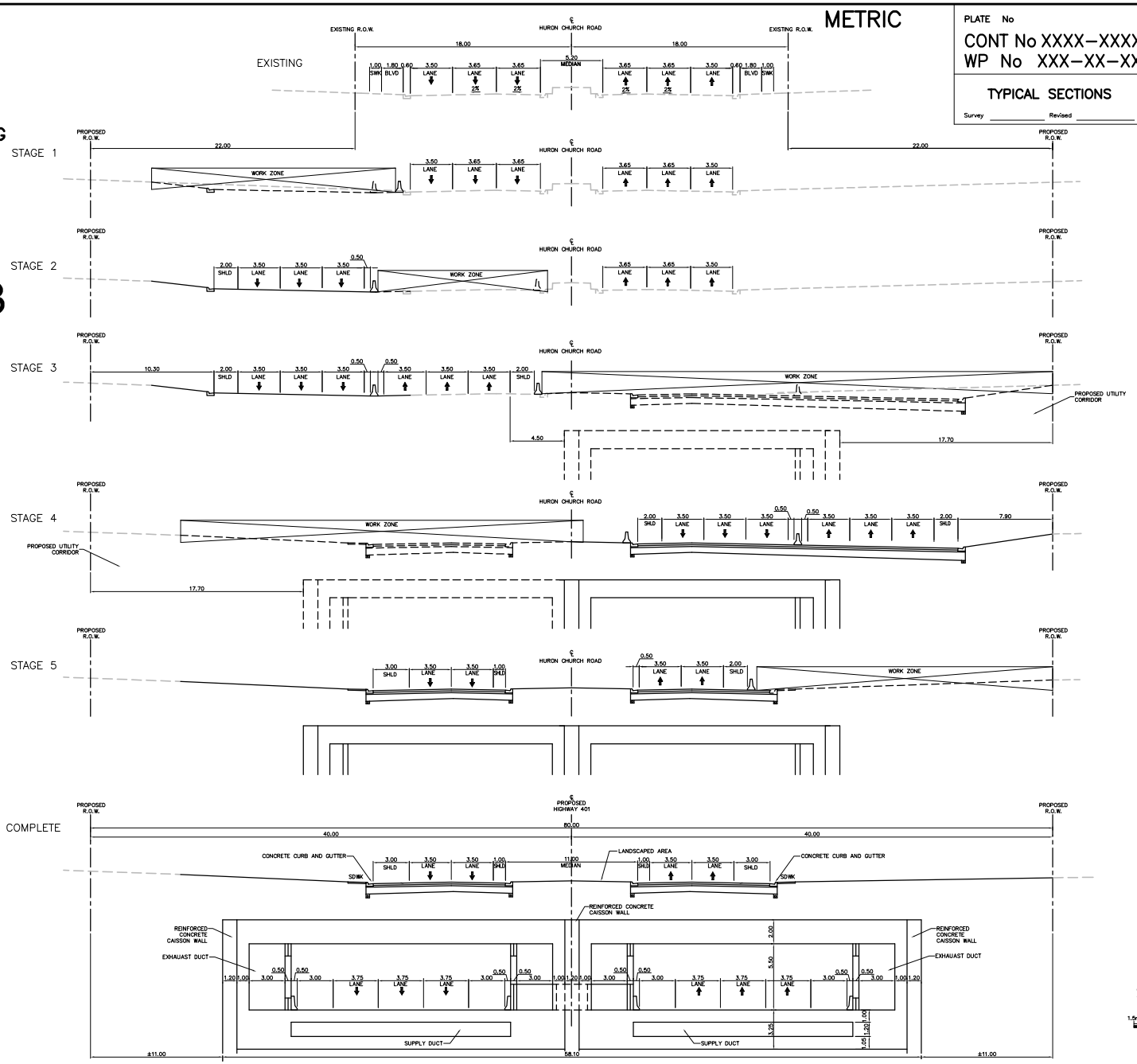
Survey _____ Revised _____

SHEET XXX

DETROIT RIVER INTERNATIONAL CROSSING
CONCEPTUAL CONSTRUCTION
STAGING CROSS–SECTIONS
HURON CHURCH ROAD CORRIDOR

WIDEN EQUALLY ON BOTH SIDES

ALTERNATIVE 3



CONCEPTUAL

SCALE

1.5m 0 3.0m
Horizontal

METRIC

PLATE No
CONT No XXXX–XXXX
WP No XXX–XX–XX

TYPICAL SECTIONS

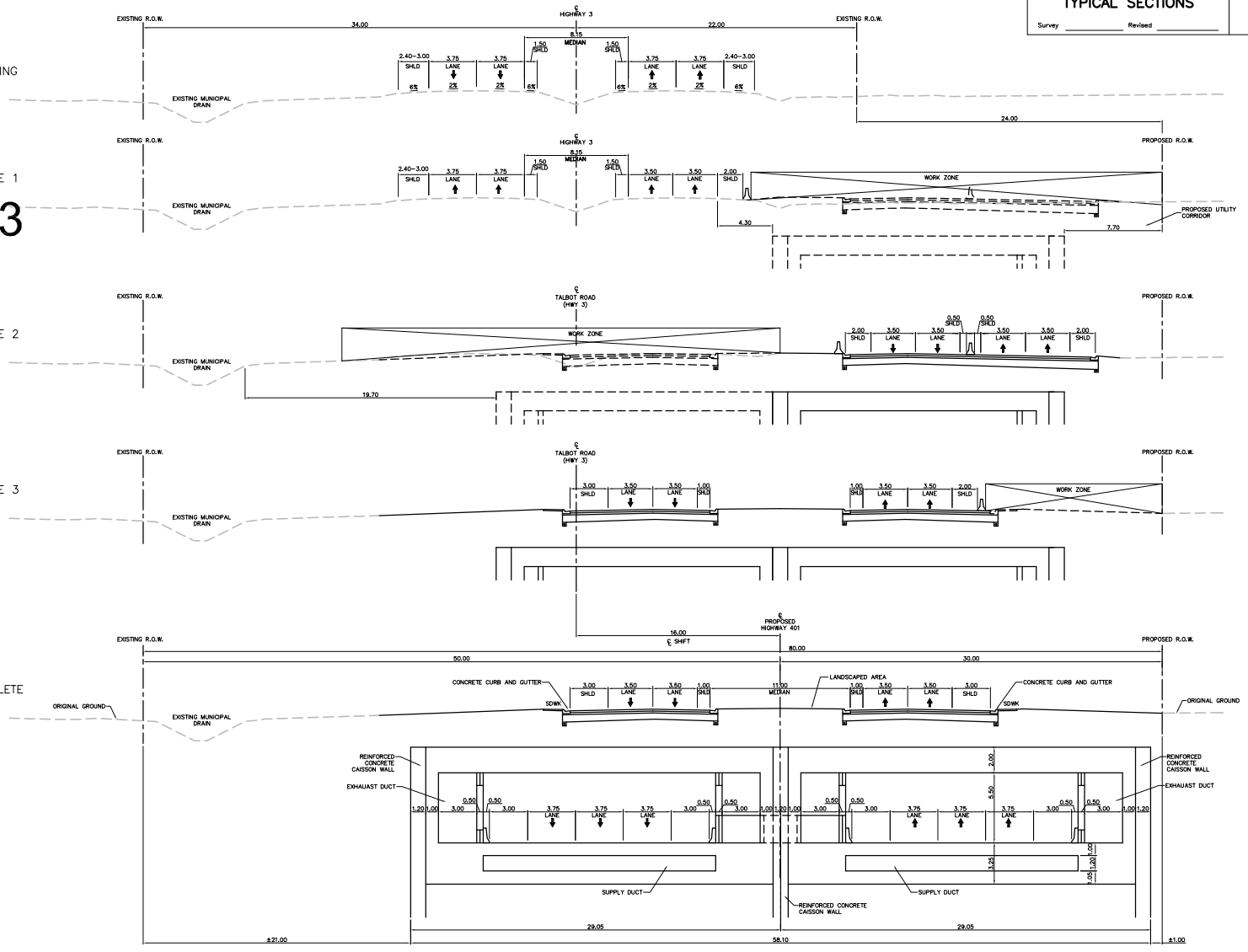
Survey _____ Revised _____

SHEET XXX

DETROIT RIVER INTERNATIONAL CROSSING
CONCEPTUAL CONSTRUCTION
STAGING CROSS–SECTIONS
HIGHWAY 3 CORRIDOR

WIDEN TO SOUTH
MAINTAIN EXISTING DRAIN

ALTERNATIVE 3



CONCEPTUAL

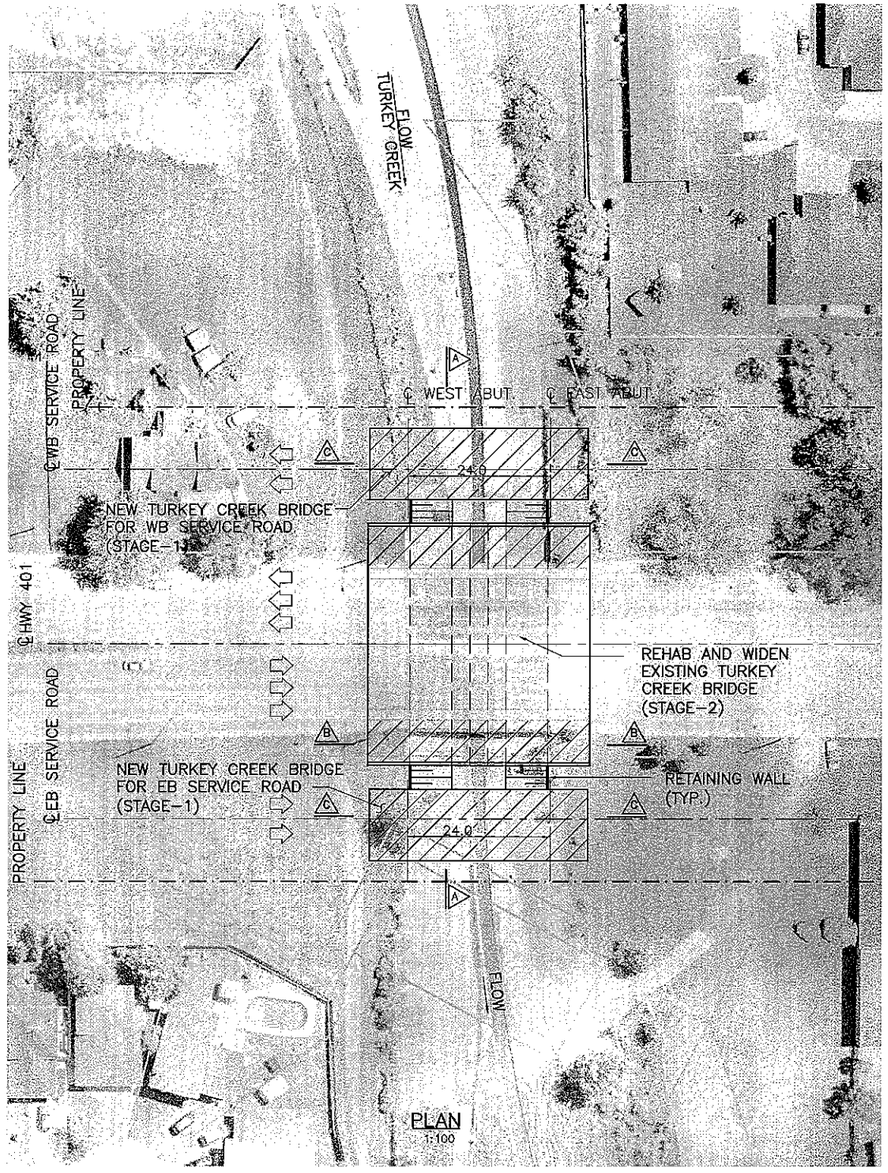
SCALE

1.5m 0 3.0m
Horizontal

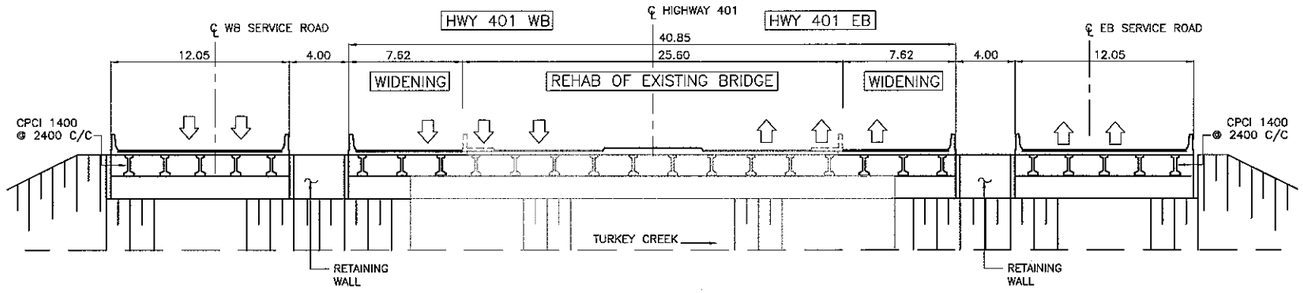
Appendix E

Concepts at Municipal Drain Crossings

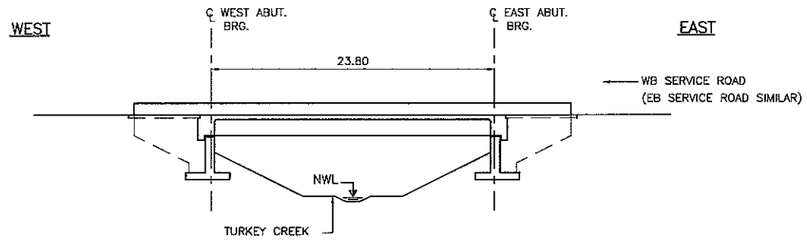
NORTH FOR CONSTRUCTION



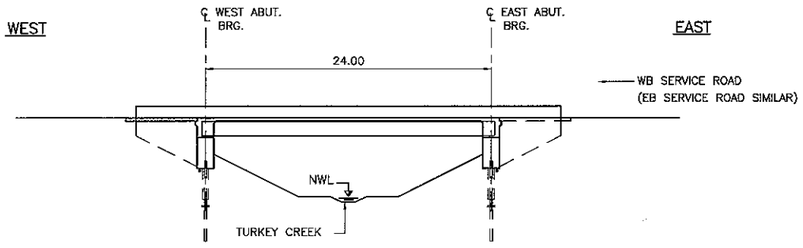
PLAN
1:100



SECTION "A–A"
1:40



SECTION "B–B"
1:50



SECTION "C–C"
1:50

URS

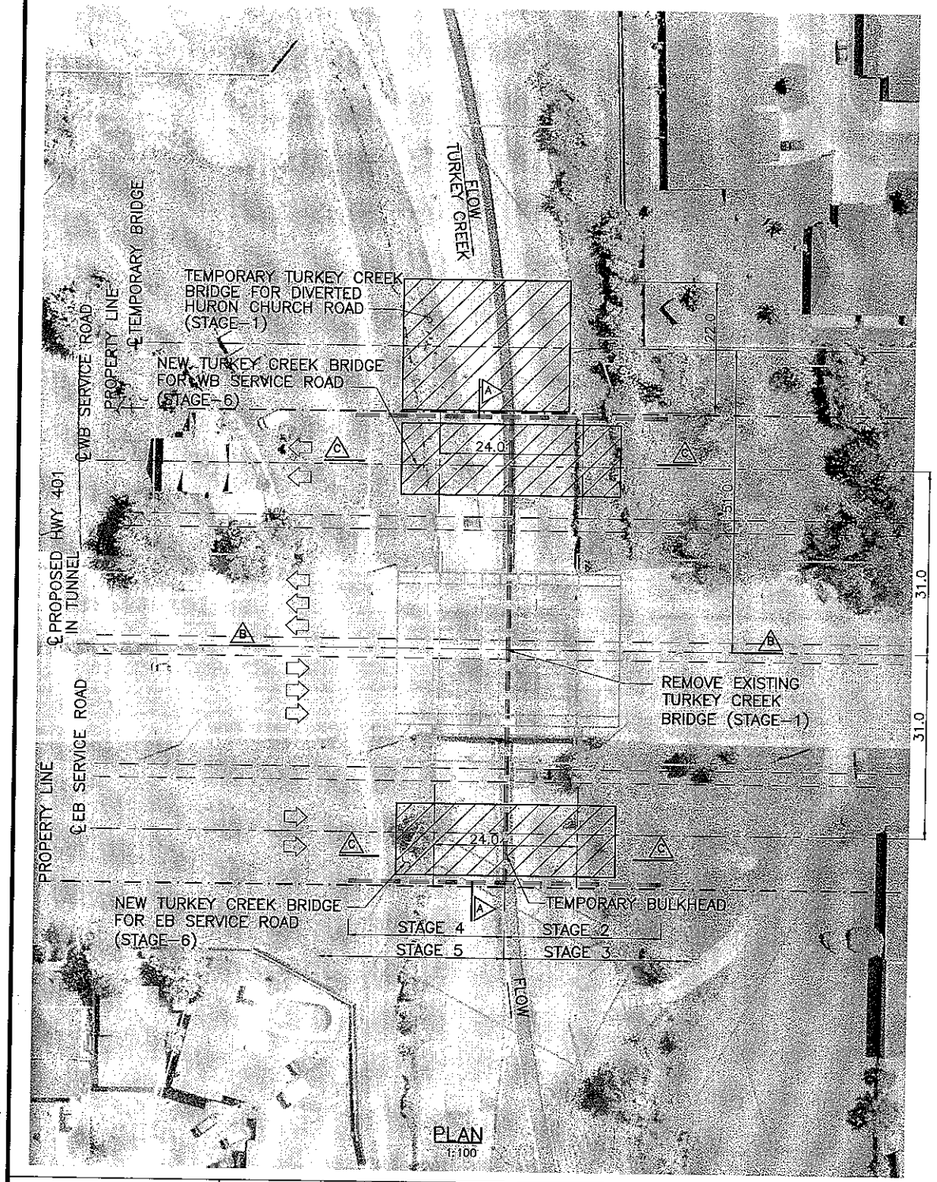
DRIC–PRACTICAL ALTERNATIVES
ALTERNATIVE "1A" – HIGHWAY 401 AT GRADE AT TURKEY CREEK
WITH WB AND EB SERVICE ROADS ON THE SIDES RESPECTIVELY

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

SKETCH 1

FILENAME:G:\DRIC\16_Structural\CADD\Turkey Creek Bridge\Sketch1-Alt 1A.dwg
PLOTDATE:Feb 05, 2007 - 4:24pm

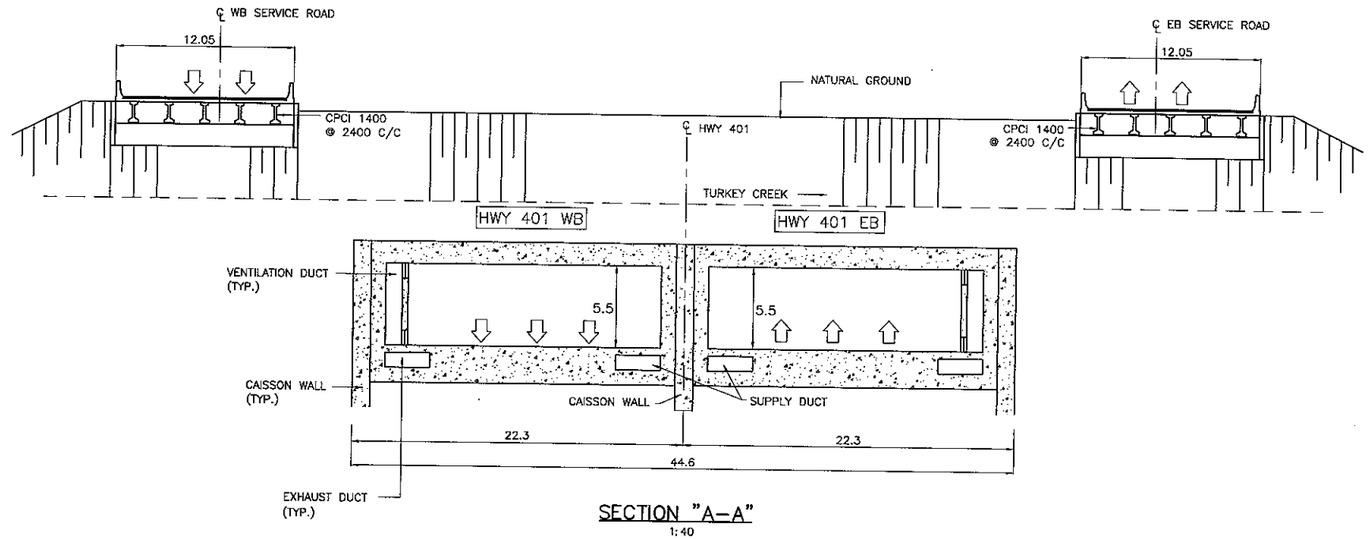
NORTH FOR CONSTRUCTION



PLAN
1:100

NORTH

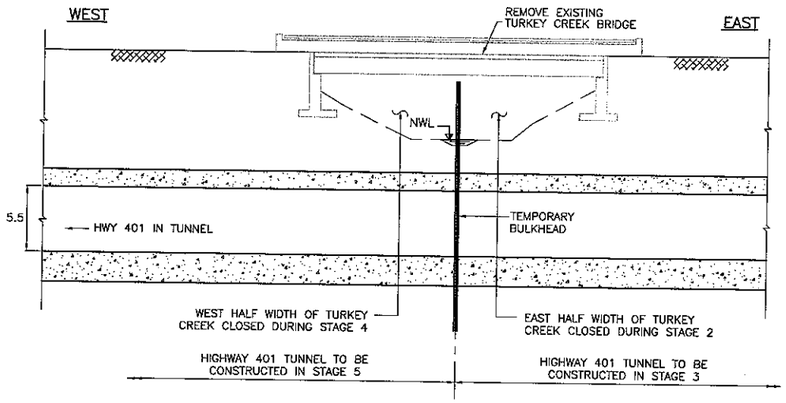
SOUTH



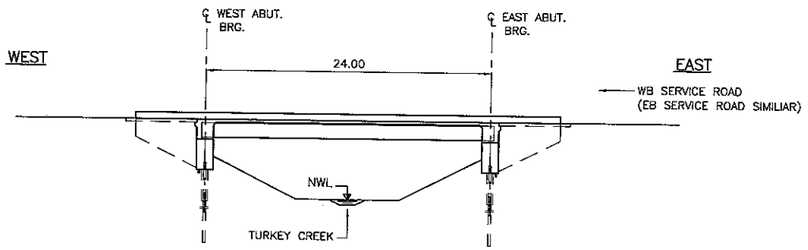
SECTION "A–A"
1:40

WEST

EAST



SECTION "B–B"
1:50



SECTION "C–C"
1:50

FLOWMEGA\DRIC\16_Structural\CADD\Turkey Creek Bridge\Sketch2-Alt 1B.dwg
PLOTTED: Feb 05, 2007 - 4:25pm

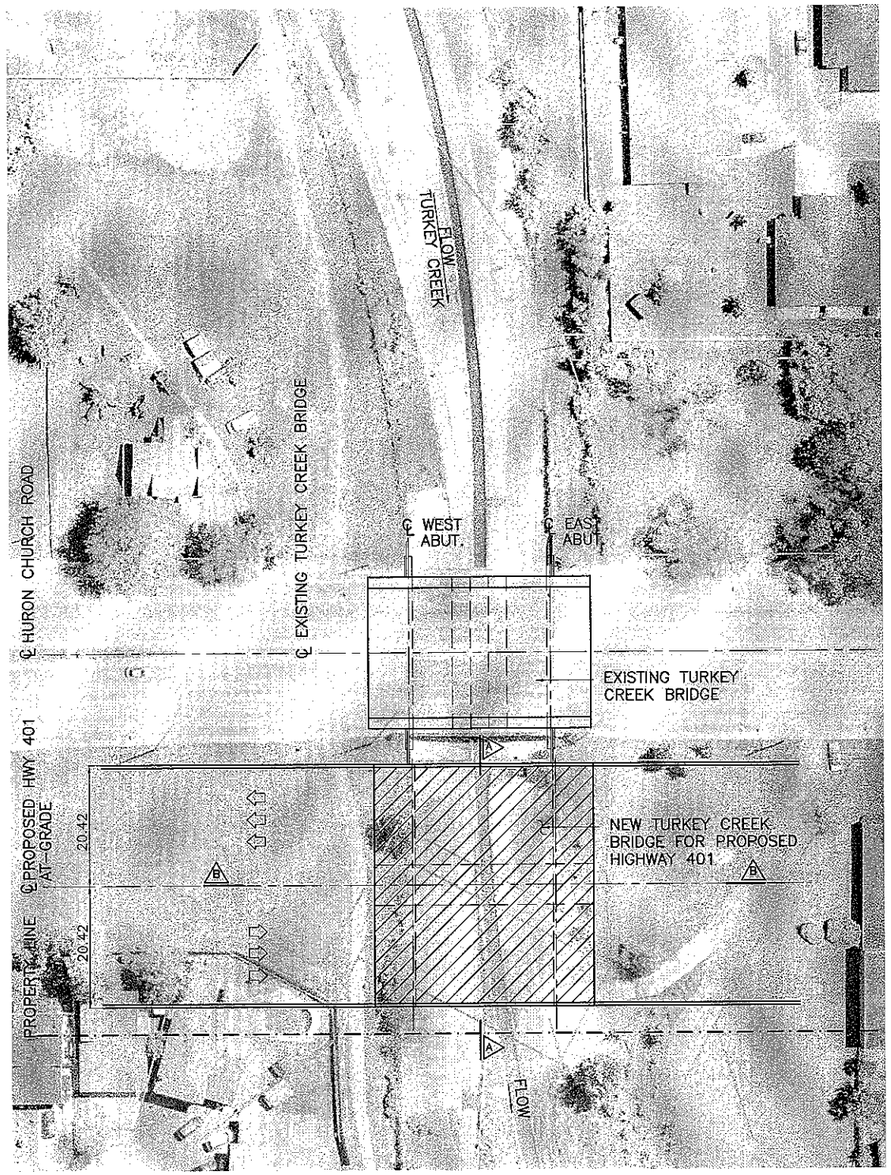
URS

DRIC–PRACTICAL ALTERNATIVES
ALTERNATIVE "1B" – HIGHWAY 401 IN TUNNEL UNDER TURKEY CREEK
WITH WB AND EB SERVICE ROADS ON THE SIDES RESPECTIVELY

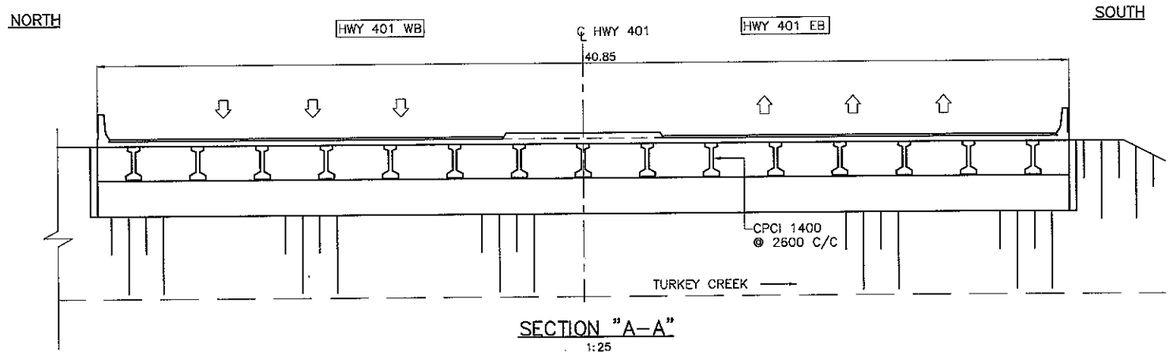
METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES

SKETCH 2

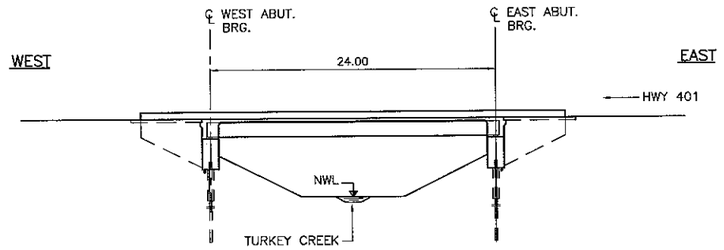
NORTH FOR CONSTRUCTION



PLAN
1:100



SECTION "A–A"
1:25



SECTION "B–B"
1:50

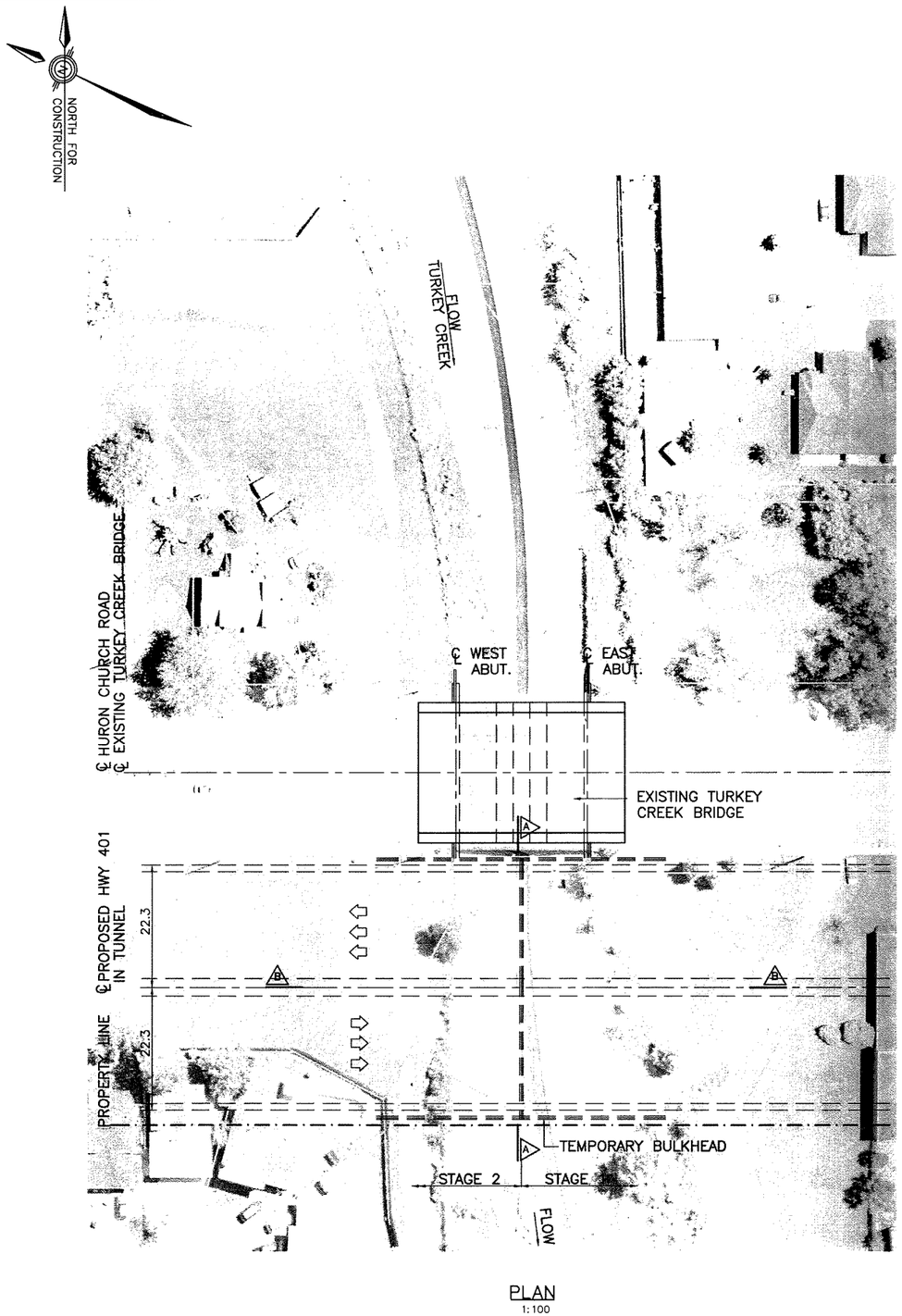
URS

DRIC–PRACTICAL ALTERNATIVES
ALTERNATIVE "2A" – HIGHWAY 401 AT GRADE AT TURKEY CREEK, SOUTH OF HWY 3 (TALBOT ROAD/HURON CHURCH ROAD)

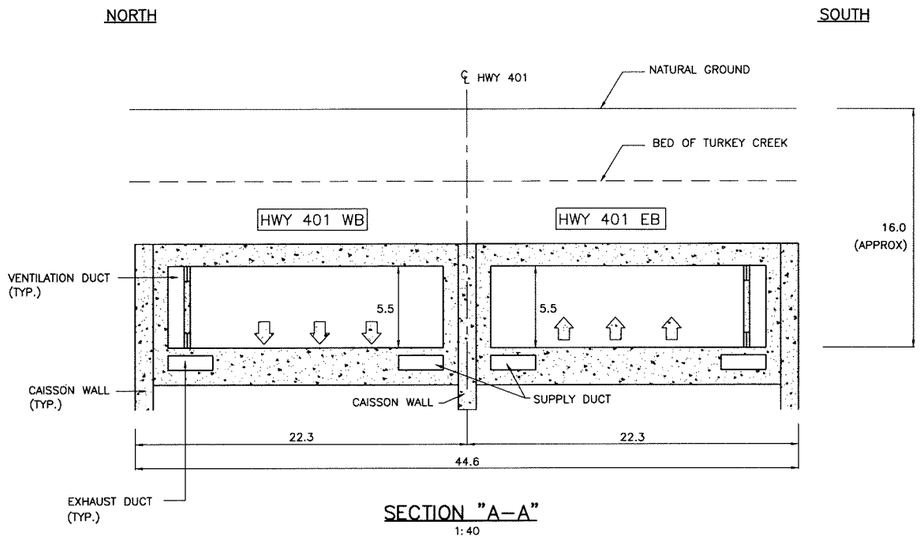
METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

SKETCH 3

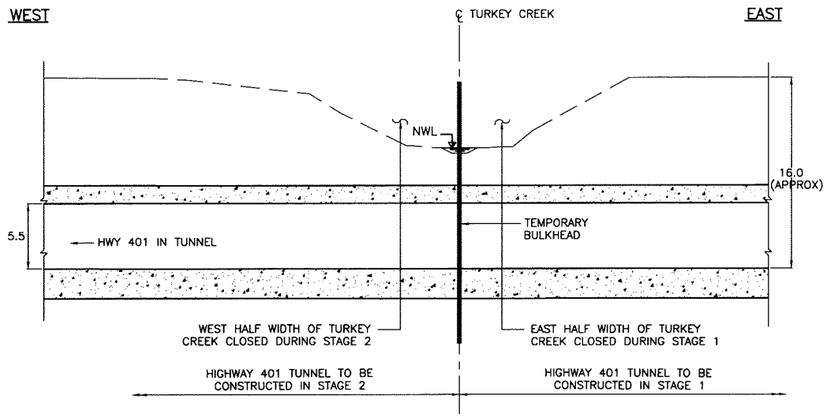
FILENAME:D:\ORIG\16_Structural\CADD\Turkey Creek Bridge\Sketch3-Alt 2A.dwg
PLOTDATE:Feb 05, 2007 - 4:28pm



PLAN
1:100



SECTION "A–A"
1:40



SECTION "B–B"
1:50

URS

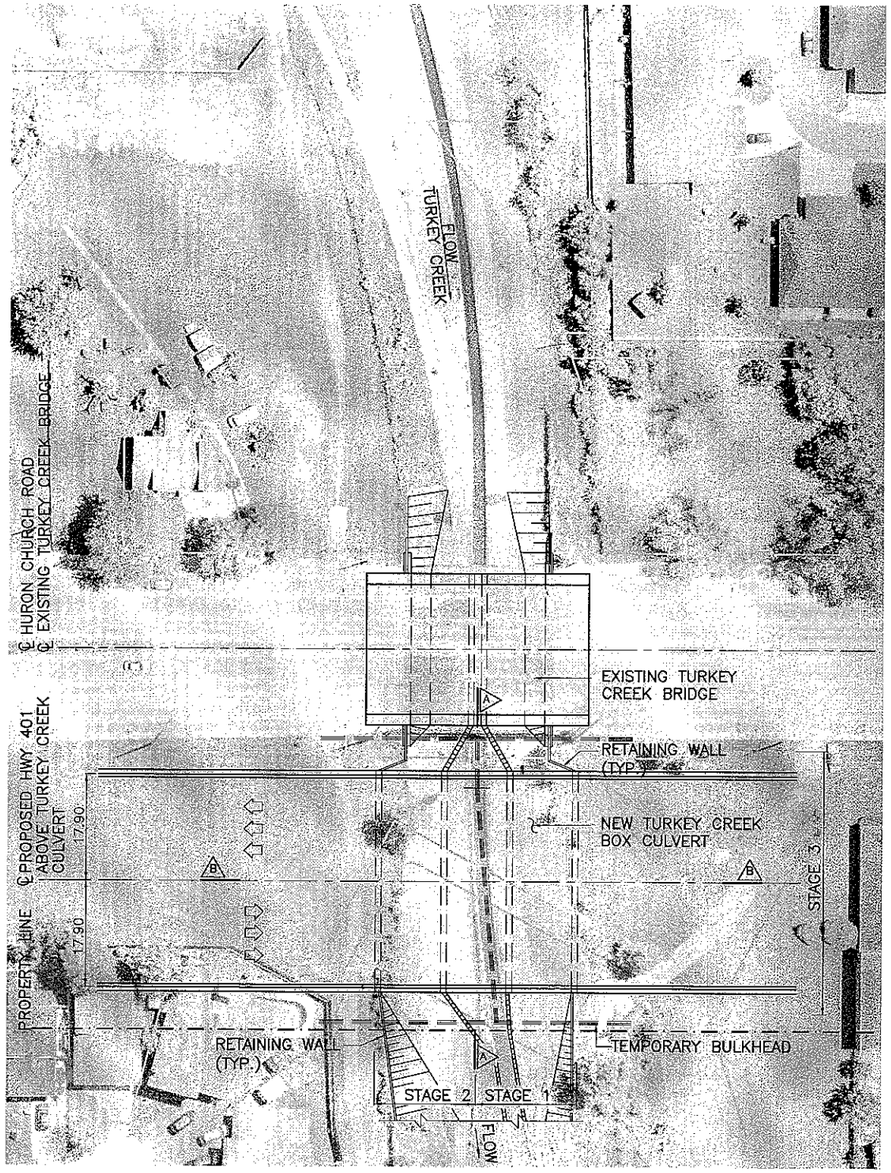
DRIC–PRACTICAL ALTERNATIVES
ALTERNATIVE "2B" – HIGHWAY 401 IN TUNNEL UNDER TURKEY CREEK, SOUTH OF HWY 3 (TALBOT ROAD/HURON CHURCH ROAD)

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

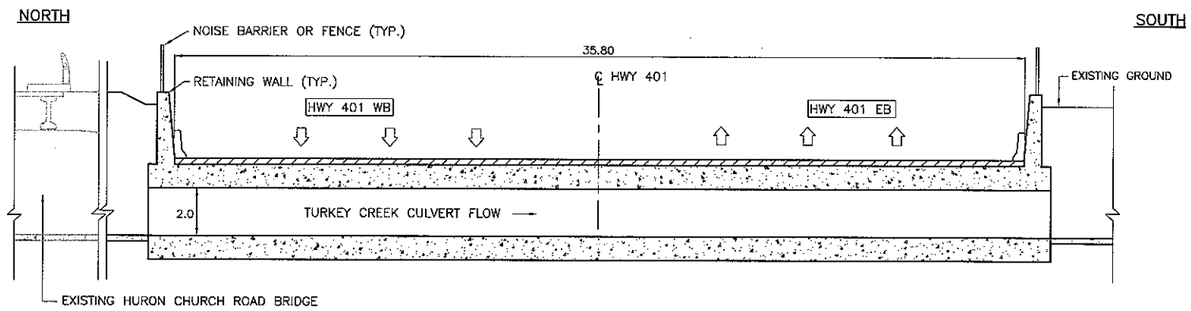
SKETCH 4

FILENAME:O:\DRIC\16_Structural\CADD\Turkey Creek Bridge\Sketch4-Alt 2B.dwg
PLOTDATE:Feb 05, 2007 - 2:12pm

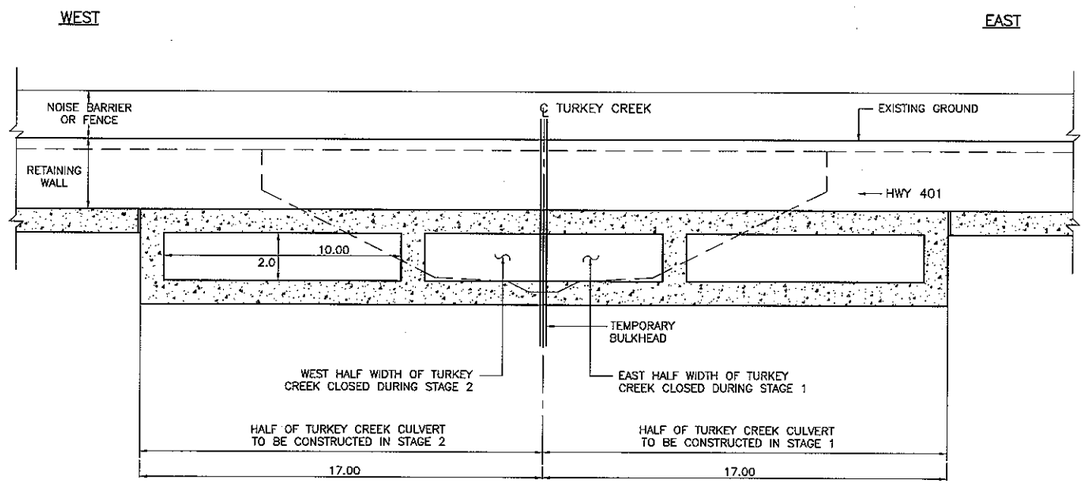
NORTH FOR CONSTRUCTION



PLAN
1:100



SECTION "A–A"
1:25



SECTION "B–B"
1:25

FILENAME:C:\DRIC\16_Structural\CADD\Turkey Creek Bridge\Sketch5-Alt 2B-MODIFIED.dwg
PLOTDATE:Feb 05, 2007 - 4:31pm

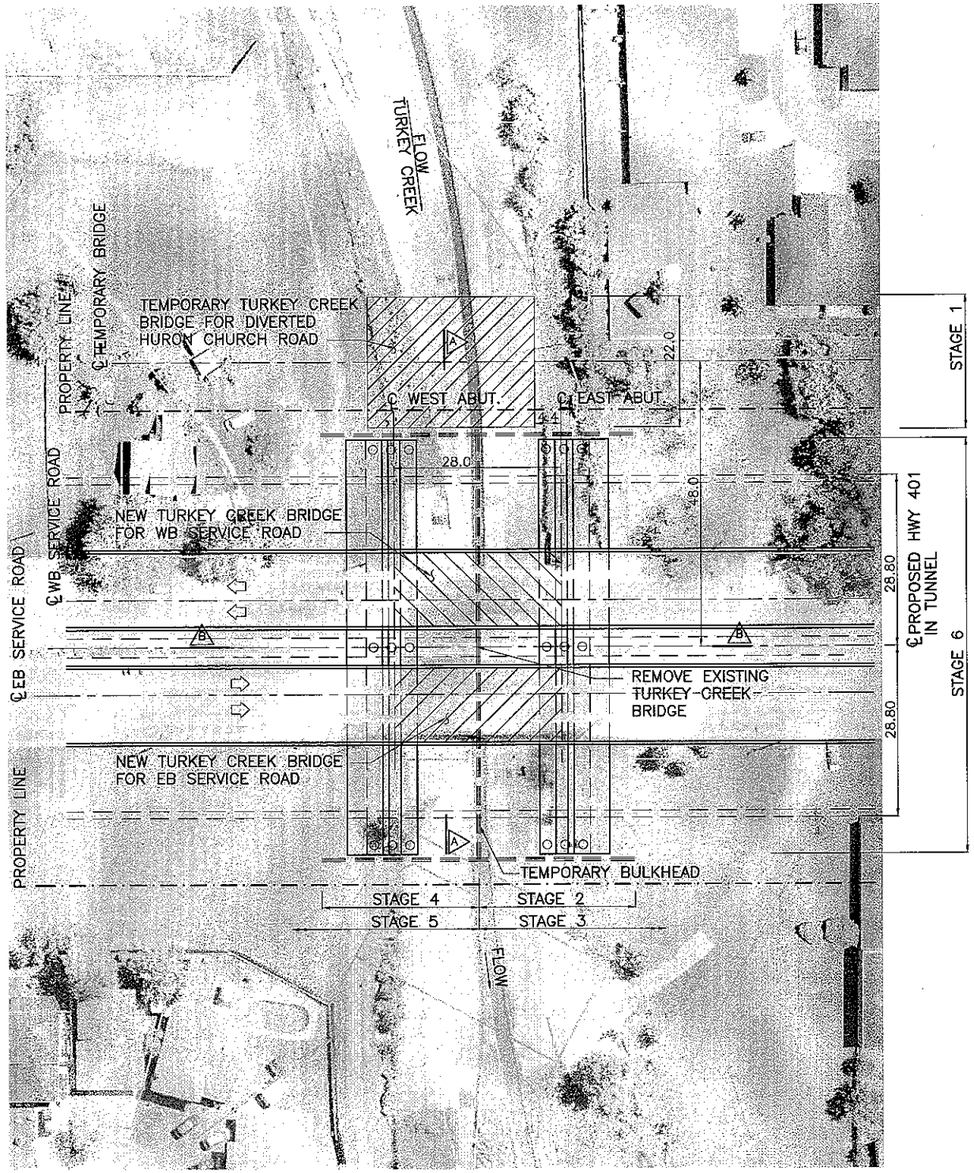
URS

DRIC–PRACTICAL ALTERNATIVES
ALTERNATIVE "2B–MODIFIED" – HWY 401 ABOVE TURKEY CREEK CULVERT, SOUTH OF HEY 3 (TALBOT ROAD AND HURON CHURCH ROAD)

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

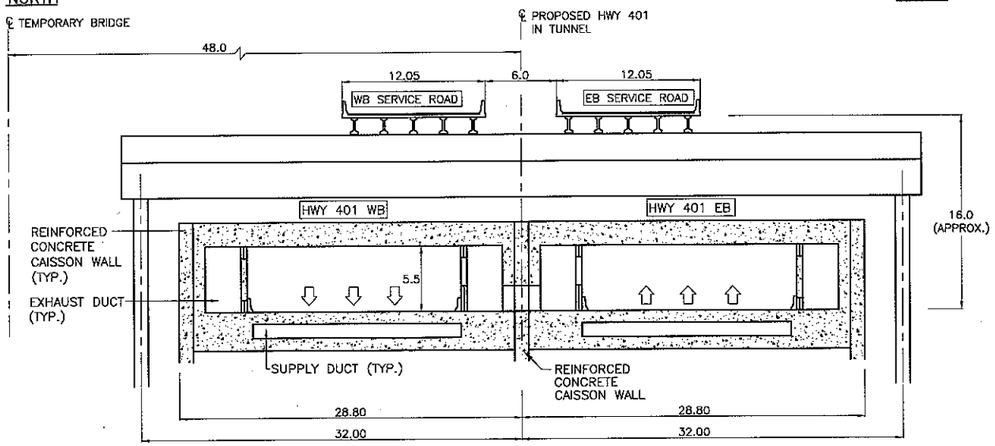
SKETCH 5

NORTH FOR CONSTRUCTION



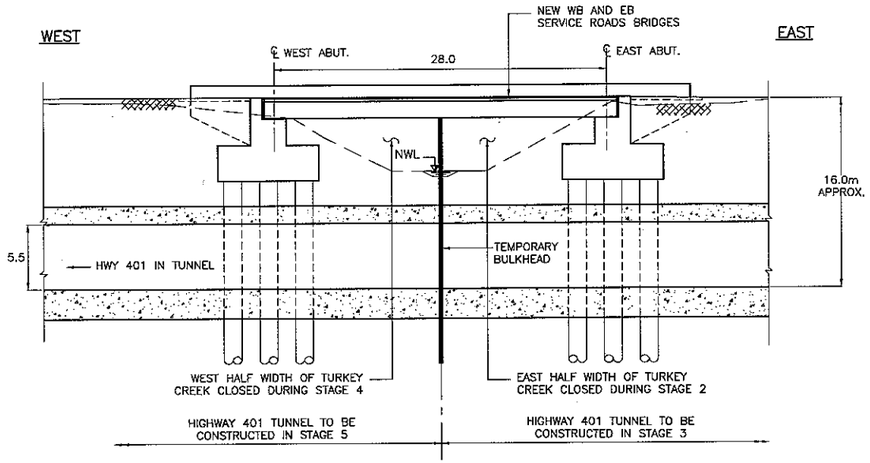
PLAN
1:100

NORTH SOUTH



SECTION "A–A"
1:50

WEST EAST



SECTION "B–B"
1:50

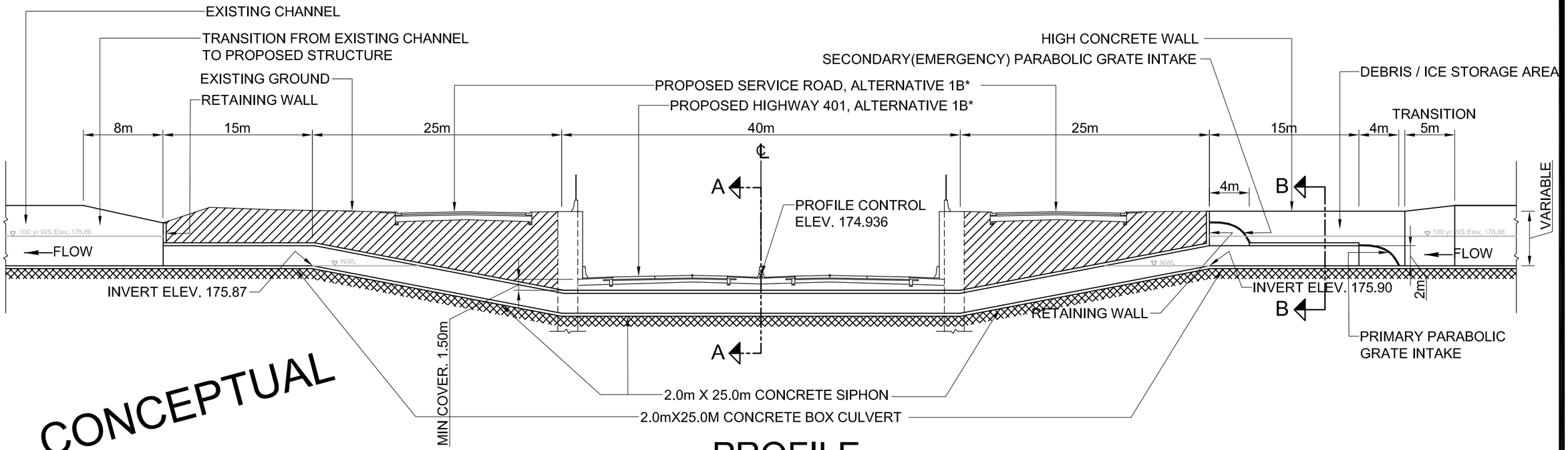
FILENAME:C:\DRIC\16_Structural\CADD\Turkey Creek Bridge\Sketch6-Alt 3.dwg
PLOTDATE:Feb 05, 2007 - 2:29pm

URS

DRIC–PRACTICAL ALTERNATIVES
ALTERNATIVE "3" – HIGHWAY 401 IN TUNNEL UNDER TURKEY CREEK WITH WB AND EB SERVICE ROADS ABOVE THE TUNNEL

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

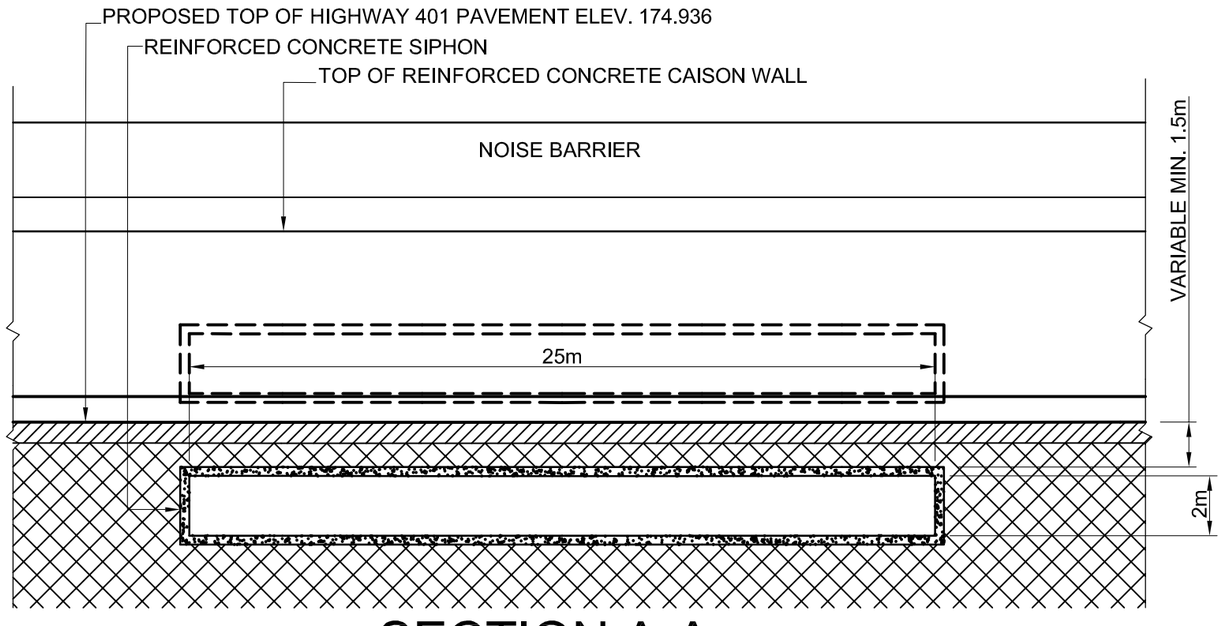
SKETCH 6



PROFILE

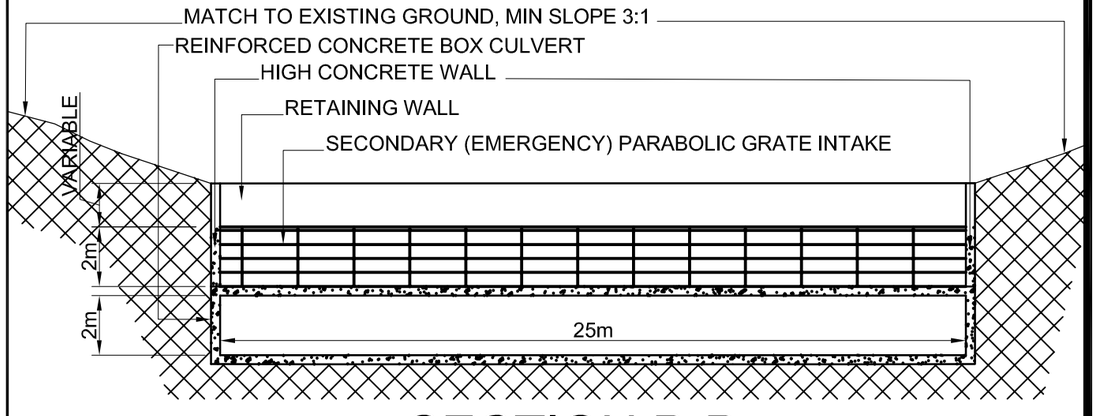
SCALE 1:400

* ROADWAY CROSSS SECTION VARIES WITH ROADWAY ALTERNATIVE



SECTION A-A

SCALE 1:200



SECTION B-B

SCALE 1:200

DETROIT RIVER INTERNATIONAL CROSSING
STORMWATER MANAGEMENT STUDY
SIPHON OPTION

FIGURE 5-1
JANUARY 2007
AS INDICATED

Canada · U.S. Department of Transportation Federal Highway Administration · Ontario · MDOT Michigan Department of Transportation · URS

FILENAME: O:\DRIC\19_WaterResources\Cadd\Siphon_Profile_Typical.dwg
PLOTDATE: Feb 13, 2007 - 1:03pm
PLOTTED BY: sxdrumm0

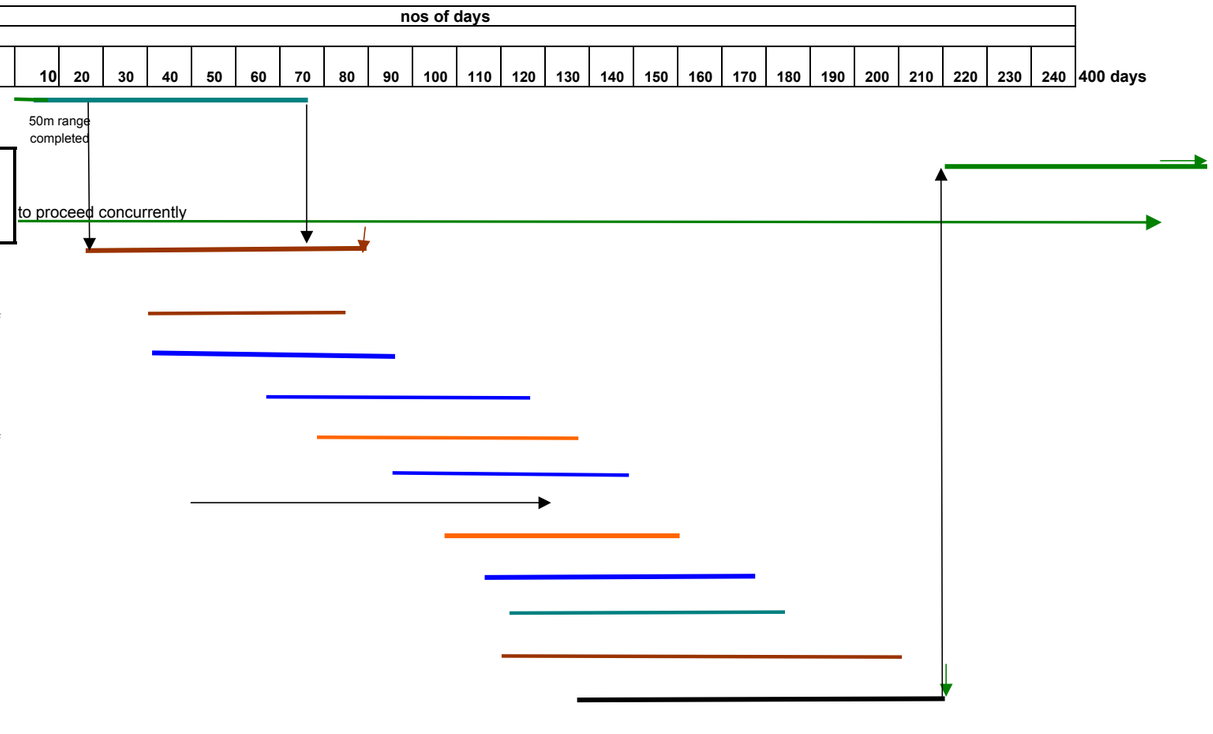
Appendix F

Construction Duration and Resource Requirements

Basic Tunnel Civil Structural Works (Caisson Wall System)
Schedule Estimation

Cycle time for a tunnel -half twin box 200 m modular length item 2-12

Stage #	Activity Items	Quantity	unit	Production rate/day	Duration days	Resources	Trades
1	Caisson-External&Mid Walls	400	m	6	66	6 rigs/shift	30 rigs
	(whole 1 km range, first half of twin Box						
1a	2 nd -half twin box ext wall only	200	m	3	66	3 rigs/shift	15rigs
1b	On & off ramps Box tunnels/ below grade transition @ 3 locations	2400	m	6	400	6 rigs/shift	6 rigs
		(200m x2x2 x3)					
2	Excavation for Base Slab	55000	m3	1000	55	2 crew	*Excavators*
	200m long modular section						
3	Install 3 layers of struts and walers	600	m	30	20	1 crew	*Steel workers*
							riggers
4	Base Slab-Rebar&Conc. Pour	4800	m2	100	48	1 crew	*re-bar /labor*
	(25m bay length/6days)						
5	Interior seal walls-1 st lift	400	m	10	40	1 crew	*re-bar /labor*
6	re-strutting-2 layers	400	m	10	40	1 crew	*Steel workers*
							riggers
7	Interior seal wall-upper lift	400	m	10	40	1crew	*re-bar /labor*
8	Roof Slab Scaffold and Formwork	4800	m2	100	48	1set-crew	*carpenters*
	(25m bay length/6days)						
9	Roof Slab-Rebar &Conc. Pour	4800	m2	100	48	1 crew	*re-bar /labor*
10	Curing and Waterproofing layer	4800	m2	80	60	1 crew	*labor*
11	Backfill and compact	14400	m3	480	30	1 crew	*Excavators*
							Compactros
12	Road Work/restoration	200	m	7	30	1 crew	*Excavators*
							paving



Schedule Allow the construction of the ramps concurrently with the box tunnel section construction within the 3 year time frame(750 working days)

Method Assume 4m or less below grade using no caison wall, by open cut method for shallow grade transition

Design Propose to use caisson wall as permanent wall integrating with concrete wall for the entire tunnel and ramp sections

Design Propose to allow the caisson to a deeper toe level to achieve lateral resistance and water level cut off .Thus omitting the use slab footing for the retaining wall. Space ,time and cost saving can be achieved

0

210 net working days for 1 st cycle of 200m half-twin box
thus, 1000m(1 km) it need 5 X 200m section-crews
210+ 85x 5 = 635 net workingdays,ie 2.6 years for 1st half 6km
635+210=845 working days ie 3.4 years for the 2 nd half 6 km
To complete within 4.7 years,including all Civil /M&E works
Propose to use 51 caisson drilling rigs
for full swing construction period
10 crew /10 hour day shift for both twin section, North &South bounds.

10 hour day shift
51 caisson drilling rigs /day shift Detail breakdown:
30 (6# drill rigs/200m-section) x 5 sections/1 km x 1half-twin box section
15 drill rigs for the 6km 2nd -half twin box
6 drill rigs for 6 ramp-tunnels
30 Excavator CAT320 Front end loader/dozers (500m3/day/equipment)
15 Cranes (50 ton)
120 Tri-axle Trucks(20 ton) (10 loads /truck/day)

Overall Construction Schedule Estimation

Basic tunnel and Ramp Structures and at grade roadworks	3.4 years
M& E supply and installation	1 year
Testing and commissioning	0.3 year
Target Total Required Time	**4.7 years**

Concrete Pour Estimation

Caisson Wall	51x 16= 820 m3/day	92 truck-round trips/day	
Slabs	24x25x1.5x2=1800m3/day	200 truck-round trips/day	
roof,/ base crew@2 half twinbox zone, ie 4 pours/day			
Peak period Total	**2620m3/day**	**292 truck-round trips/day**	6 round -trip/truck
		49 trucks/day	

Excavation Estimation at peak period

base Slab	10k m3/day	5 x 2 x half twin box section	1000m3/crew
ramp	2k m3/day		
	12k m3/day	Total Volume /day	
		1200 truck-round trips/	10 loads/truck/day
		120 trucks/day	

Reference Caisson production rate project records:

DVP high mast light, 2001	1m dia	12-18 m deep	1#/rig/ day shift by Anchor Shoring
Kennedy/Morningside	1.2m-dia	9m deep	1#/night shift
Singapore MRT Yishun Line 1986	1m dia	20-25m deep	1#/rig/day shift by GTM-Coignet/Trevi 960# in 10months, with no casing, using bentonite slurry to stabilise borehole

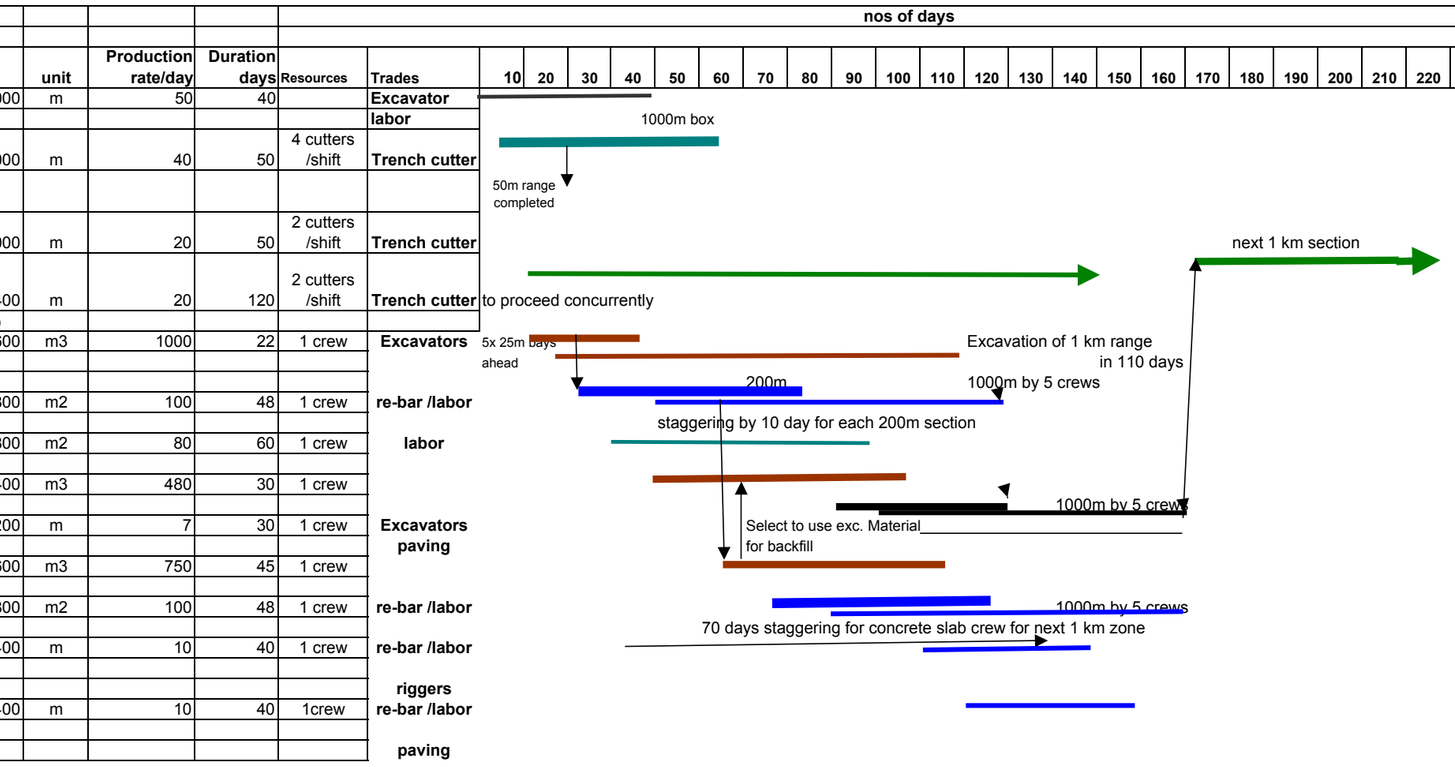
Prepared by:
Eric So
Rev June 2006

Detroit River International Crossing
Canada Approach Tunnel

Basic Tunnel Civil Structural Works(Diaphragm Wall System Alternative)
Schedule Estimation

Cycle time for a tunnel -half twin box 200 m modular length item 2-12

Stage #	Activity Items	Quantity	unit	Production rate/day	Duration days	Resources	Trades
1	Guide walls	2000	m	50	40		Excavator
							labor
1	Diaphragm-External&Mid Walls	2000	m	40	50	4 cutters /shift	Trench cutter
	(whole 1 km range, first half of twin Box						
1a	2 nd -half twin box ext wall only	1000	m	20	50	2 cutters /shift	Trench cutter
1b	On & off ramps Box tunnels/ below grade transition @ 3 locations	2400	m	20	120	2 cutters /shift	Trench cutter
		(200m x2x2 x3)					
2	Excavation for Roof Slab	21600	m3	1000	22	1 crew	Excavators
	200m						
3	Roof Slab-Rebar &Conc. Pour	4800	m2	100	48	1 crew	re-bar /labor
4	Curing and Waterproofing layer	4800	m2	80	60	1 crew	labor
5	Backfill and compact	14400	m3	480	30	1 crew	
6	Road Work/restoration	200	m	7	30	1 crew	Excavators paving
7	Excavate for Base Slab	33600	m3	750	45	1 crew	
4	Base Slab-Rebar&Conc. Pour	4800	m2	100	48	1 crew	re-bar /labor
	(25m bay length/6days)						
5	Interior seal walls-1 st lift	400	m	10	40	1 crew	re-bar /labor
							riggers
7	Interior seal wall-upper lift	400	m	10	40	1crew	re-bar /labor
							paving



Schedule Allow the construction of the ramps concurrently with the box tunnel section construction within the 3 year time frame(750 working days)

Method Assume 4m or less below grade using no daiphragm wall, by open cut method for shallow grade transition

Design Propose to use diaphragm wall as permanent wall integrating with concrete wall for the entire tunnel and ramp sections

Design Propose to allow the daiphragm wall to a deeper toe level to achieve lateral resistance and water level cut off .Thus omitting the use slab footing for the retaining wall. Space ,time and cost saving can be achieved

160 net working days for 1 st cycle of 200m half-twin box
thus, 1000m(1 km) it need 5 X 200m section-crews
160+ 70x 5 = 510 net workingdays,ie 2.1 years for 1 st half
510+160=670 net workingdays, ie 2.7 years for the 2 nd half section
To complete within 3.7 years,including all Civil /M&E works
Propose to use 10 Trench Cutter rigs
for full swing construction period
10 crew /10 hour day shift for both twin section, North &South bounds.

10 hour day shift
10 Trench Cutter rigs /day shift **Detail breakdown:**
4 (4# l rigs/ 1half-twin box section)
2 rigs for the 6km 2nd -half twin box
4 rigs for 6 ramp-tunnels
25- Excavator CAT320 Front end loader/dozers (500m3/day/equipment)
15 Cranes (50 ton)
110- Tri-axle Trucks(20 ton) (10 loads /truck/day)

Excavation Estimation

Roof slab	2000 m3/day	2 x half twin box section
base slab	7500 m3/day	5x2 x half twin box section
ramps	1000 m3/day	
	10500 m3/day	Total Volume /day
(1100 truck round trips/dayloads)		10 loads/truck/day
	110 trucks	

Concrete Pour Estimation

Diaphragm Wall	80x 16= 1280 m3/day	130 truck-trips/day	
Slabs	24x25x1.5x2=1800m3/day	200 truck-trips/day	2 major pourslab/day
roof,/ base crew@2 half twinbox zone, ie 2 pours/day			
Peak period Total	6 round-trip/truck/day		
	6 round-trip/truck/ **345 truck- round trips/day**		6 round-trip/truck/day
	60 trucks/day		

Overall Construction Schedule Estimation

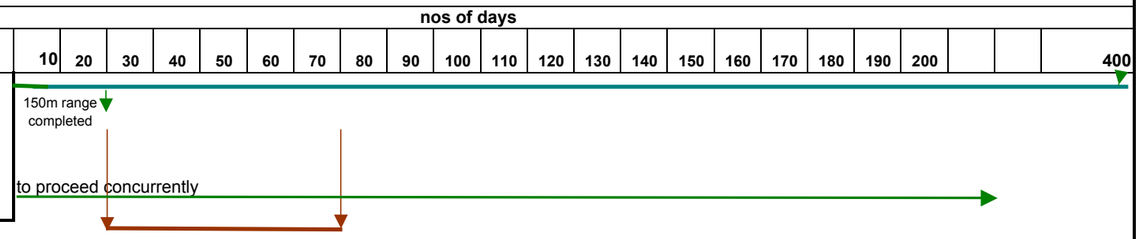
Basic tunnel and Ramp Structures and at grade roadworks	2.7years
M& E supply and installation	1 year
Testing and commissioning	0.3 year
Target Total Required Time	**4.0 years**

Prepared by:
Eric So
Rev. June 2006

Basic Civil Structural Works Depressed Road Alternative
Schedule Estimation

Cycle time for a Depressed Road Full Section 400 m modular length item 2-12

Stage #	Activity Items	Quantity	unit	Production rate/day	Duration days	Resources	Trades
1	Caisson-External Walls	6000	m	18	335	15 rigs/shift	
	(whole 3 km range full section)	all 1.2 m dia					
1b	On & off ramps Box tunnels/ below grade transition @ 3 locations	2400 (200m x2x2 x3)	m	7.2	335	6 rigs/shift	6 rigs
2	Excavation for Base Slab	93600	m3	2000	50	2 crew	*Excavators*
	400m,asume 6.5m deep average						
	x 36 m excavated width						
3	Road subbase layer/structure	400	m	25	16	1 crew	
4	Base Slab-Plain Conc.laying	400	m	25	16	1 crew	*labor*
5	Interior seal walls-1 st lift	800	m	20	40	2 crew	*re-bar /labor*
6	Interior seal wall-upper lift	800	m	20	40	2 crew	*re-bar /labor*
7	Paving	400	m	200	2	1 crew	*Compactros dozers pavers*
Schedule	Allow the construction of the ramps concurrently with the Depressed Road construction						
	within the 3 year time frame(750 working days)						
Method	Assume 4m or less below grade using no caison wall, by open cut method for shallow						
	grade transition						
Design	Propose to use caisson wall as permanent wall integrating with concrete wall						
	for the depressed road and ramp sections						
Design	Propose to allow the caisson to a deeper toe level to achieve lateral resistance						
	and water level cut off .Thus omitting the use slab footing for the retaining wall.						
	Space ,time and cost saving can be achieved						



135 net working days for 1 st cycle of 400m section length
thus , 3000m(3 km) it i it need
135+ 50 x6.5= 465 net workingdays,ie 2 years

To complete within 3 years,including all Civil /M&E works
Propose to use 36 caisson drilling rigs
for full swing construction period
6 crew per 10 hour day shift

10 hour day shift
36 caisson drilling rigs /day shift Detail breakdown:
allow 2 x 3km-sections to proceed concurrently
15 drill rigs for the 3km ,1 st -half length of depressed length
6 drill rigs for 6 ramp structures
10 Excavator CAT320 Front end loader/dozers (500m3/day/equipment)
10 Cranes (50 ton)
50 Tri-axle Trucks(20 ton) (10 loads /truck/day)

Earth moving say **5000m3max/day @peak period, ie 500 loads/day (500 truck-round trips/day)** **50 trucks/day** **10 trips/truck/day**
grade Road areas: **say 1500m3/day ie 150 loads/day (150 truck-trips/day)** **15 trucks/day**
Total 650 truck trips/day

road grading total say 40mx6kmx1m
240,000m3

Concrete caisson volume **36 #/day X14 m3/# = 550m3/day** **60 truck-trips/day**

Overall Construction Schedule Estimation

Basic Depressed Road and Ramp Structures	2years
M& E, sump pump supply and installation	1 year
Testing and commissioning	0.5 year
Target Total Required Time	**3.5 years**

Reference **Caisson production rate project records:**

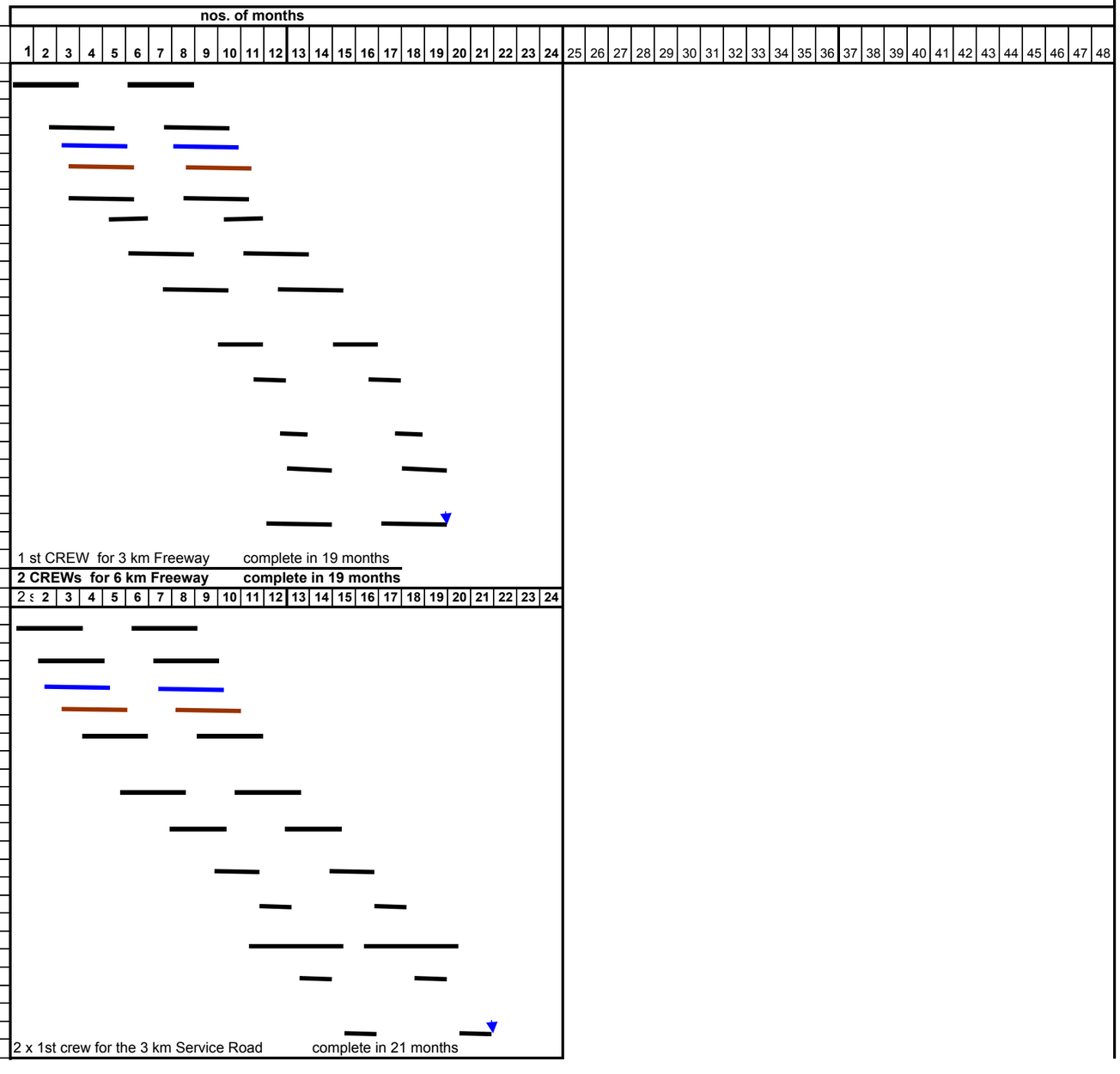
DVP high mast light	2001	1m dia	12 to 18 m deep	1#/rig/ day shift by Anchor Shoring w steel casing protection
Kennedy/Morningside		1.2m-dia	9m deep	1#/rig/night shift w steel casing protection
Singapore MRT Yishun Line 1986		1m dia	20-25m deep	1#/rig/day shift by GTM-Coignet/Tre without casing , by using slurry to stablise bore hole

Prepared by:
Eric So
Rev. June 2006

Basic Civil Works (At Grade Road Alternative)
Schedule Estimation -Use range approach

Cycle time for a modular range of 1500m (1.5 km)
(Exact Material Quantity To Be determined in cost estimate

Areas	Activity Items	Quantity	unit	Production rate/day	*Estimated* Duration days	Target months	Equipment
	Typical Items For the Expressway						
	site clearance/top soil removal		L.S.			3	excavator
							dozer, backhoe
	grading-cut and fill		L.S.			3	scraper
	underground services		L.S.				excavator
	subgrade compaction		L.S.			3	30 ton compactor
	Catch Basin						
	subdrain	10,500	m	400	27	1.5	
							truck
	Granular A 300mm thk.	15,000	m-lane	250	60	3	dozer
							front-end loader
	100 mm open grade Drainage Layer	15,000	m-lane	250	60	3	compactor
	260 mm thk. Plain Conc Pavement	9,000	m-lane	400	23	1.5	paving machine
							truck
	Shoulder Paving	6,000	m-lane	400	15	1	
	4 X 3m wide						
	Barrier Wall	4,500	m	300	15	1	crane
	Noise Wall	3,000	m	60	50	2	
	Light pole(High Mast)	15	ea		2	2	
	Typical Items For the Services Road(optional)						
	site clearance/top soil removal		L.S.			3	excavator
							dozer, backhoe
	grading-cut and fill		L.S.			3	scraper
	underground services		L.S.				excavator
	subgrade compaction		L.S.			2	30 ton compactor
	Catch Basin						
	subdrain	6,000	m	400	15	1	
	Granular B 500 mm thk	12,000	m-lane	200	60	3	truck
							dozer
	Granular A 300mm thk.	12,000	m-lane	250	50	2	front-end loader
							compactor
	Conc. Curb and Gutter	6,000	m	200	30	1.5	
	150 mm thk. Hot Mix	12,000	m-lane	400	30	1.5	paving machine
	Shoulder	3,000	m	400	75	4	
	Sidewalk	3,000	m	100	30	1.5	
	Landscape Area	12,000	m2	600	20	1	

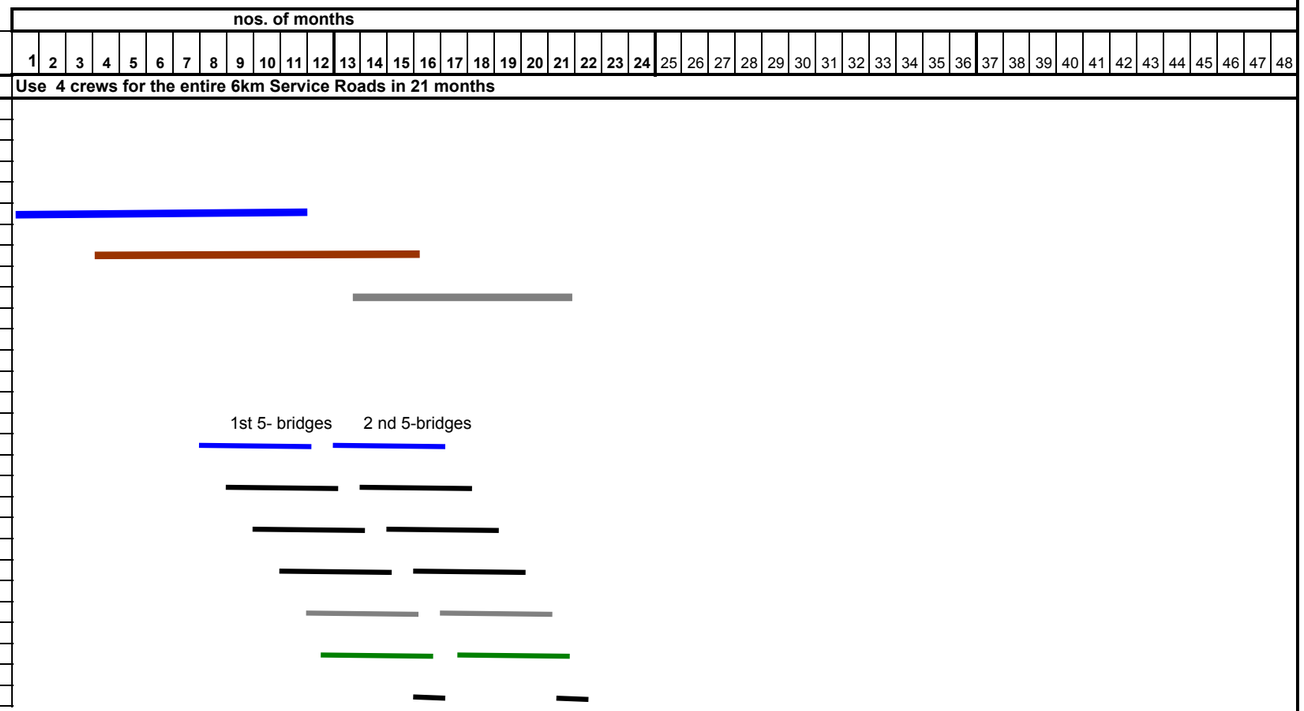


Prepared By Eric So
May 2006

Basic Civil Works (At Grade Road Alternative)
Schedule Estimation -Use range approach

Cycle time for a modular range of 1500m (1.5 km)
(Exact Material Quantity To Be determined in cost estimate

Areas	Activity Items	Quantity	unit	Production rate/day	*Estimated* Duration days	Target months	Equipment
	Light pole						
	Underpass for the entire 6km range, proceed in 2- 3km zones concurrently.						
	Caisson wall	6,400	m	28	230	11	14 Drill rigs/3km zone
	2x(1600+1600x2/2)=6400m						
	Excavation	750,000	m3	3000	250	12	8 excavators
	(1600+3200/2)x 6.5x 36						8 dozers/loaders
	Seal Wall	6,400	m	40	160	8	
	grading and road refer to the main road Schedule						
	Road/Bridge Crossings	10	Ea				2-3 crews, 1 crew /bridge
	and Creek Crossing						
	Caisson foundation						Drill rigs
	Foundation capping beam						
	Piers						
	Bridge Beam Placing						crane
							truck
	Bridge Deck						
	Bridge furniture						
	Paving						paving machine



Earth moving	**underpass:**	**3000m3max/day @peak period, ie 300 loads/day (300 truck-trips/day)**	**30 trucks/day**	10 loads/truck/day
	initial overall excavation/grading:	**300 loads/day (300 truck-trips/day)**	**30 trucks/day**	10 loads/truck/day
	road grading total	say 40mx6kmx1m		
		240,000m3		
	underpass total	750,000m3		
	overall total	**1,000,000m3** approx.		

Concrete caisson volume **28#x14 m3/# =400 m3/day**

Prepared By Eric So
May 2006