

**HERITAGE IMPACT ASSESSMENT
CHRISTINA STREET BRIDGE
OVER HIGHWAY 402, SARNIA**

**Highway 402 Widening
From the Blue Water Bridge Authority Plaza
Easterly 16km to Lambton Road 26 (Mandaumin Road)
City of Sarnia, County of Lambton, Ontario**

G.W.P.: 3038-03-00

Submitted to

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Prepared by

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ASI File 03MT-55

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Revised January 2006

1.0 INTRODUCTION

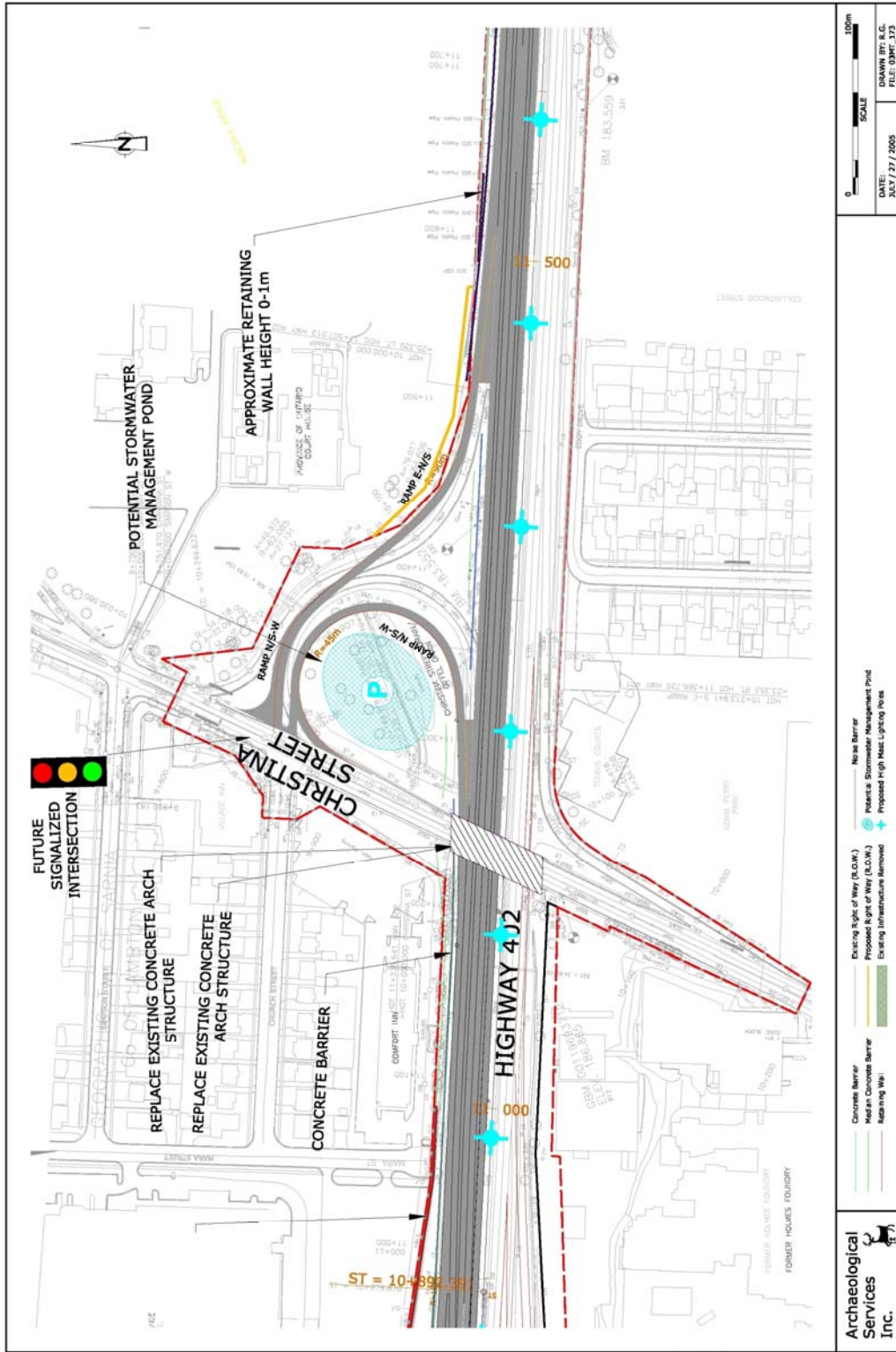
Archaeological Services Inc. (ASI) was contracted by URS Canada Inc. of Markham, Ontario, to conduct a built heritage and cultural landscape assessment of the Highway 402 widening in the City of Sarnia, County of Lambton, Ontario. The study corridor extends from the Blue Water Bridge Authority Plaza easterly 16 kilometres to Lambton Road 26 (Mandaumin Road).

Research and a field review were completed in July 2004 to identify any built heritage features and cultural landscapes within the study area and to assess the impact of proposed construction activities. This work was conducted under the project direction of Mary L. MacDonald who is a member of the Canadian Association of Professional Heritage Consultants. At the time of that report (November 2004) the age of the Christina Street Bridge (Plate 1, Figure 1) had not been determined. Recently, however, it was noted that the concrete slab bridge was listed on an internal MTO/Ministry of Culture study of potential heritage bridges, the “Heritage Bridges Identification and Assessment Guide, Ontario 1945-1965,” within which the 1951 Christina Street Bridge was included in the Class C (reserve) list of bridges, with a table identifying it as the first example of a slab concrete bridge in the region.

The widening of Highway 402 will necessitate the replacement of the bridge. Toward satisfying the requirement of a heritage bridge assessment, the following report describes the results of background historic research and existing conditions, identifies any heritage attributes associated with the bridge and outlines policy considerations within the province. Appropriate mitigation measures are suggested where adverse effects are anticipated.



Plate 1. Christina Street Bridge over Highway 402, Sarnia, Ontario.



2.0 BACKGROUND HISTORY

Highway 402 links the Bluewater Bridge in Sarnia to Highway 401 in London. Planning for this roadway began in 1938 during the construction of the new Bluewater Bridge. To help service the bridge and the border, The Department of Highways ordered that a new 6.4 km dual highway from Highway 7 (London Road) be built westerly to the new bridge, bypassing downtown Sarnia. The highway was originally known as the Bluewater Bridge Approach and its planning was also contemporaneous to other large scale provincial highway projects, such as the construction of Highway 400 between Barrie and Toronto.

Work began on the new highway in 1939, but World War II curtailed all major construction projects until 1946. The new highway included an interchange at Christina Street. The *Report* for the Minister of Public Works show that the survey for Highway 402 between Sarnia and Strathroy was undertaken in 1947 (pp. 74-75), while the highway itself was actively under construction during the 1952 season at which time \$177, 567.34 was expended on the work (p. 140.) In 1953, the Bluewater Bridge Approach was officially designated as King's Highway 402.

Over the years, the Bluewater Bridge has become increasingly important to economic trade and travel between Canada and the United States and traffic along the highway and approach have grown substantially. To accommodate these increases, Highway 402 has been lengthened and realigned with the most substantial construction extending Hwy 402 from Sarnia easterly to London starting in sections in February 1968. The final portion of construction was completed in 1982.

The Christina Street Underpass was built in 1951 in order to carry this original survey road over the new highway. The 1951 Report described it as a rigid concrete frame bridge. It was built as part of the proposed controlled access portion of the highway in the village of Point Edward, on part lot 23 Concession 7 Sarnia Township (Lambton County) division 39. (pp. 15 and 150.) The Archives of Ontario possesses two historic bridge photographs showing the Christina Street Underpass. The first view was taken July 14, 1960, which showed the underpass as well as the upper road surface. (negative 333.) The second set of negatives was taken in July 1970 which showed the same views (negative 0020.) No other information about the construction of the bridge is present within the provincial archives.

3.0 EXISTING CONDITIONS

The area surrounding the Christina Street interchange has been heavily disturbed by previous road and ramp construction. Although the Christina Street ROW is present on *Belden's 1880 Illustrated Historical Atlas of the County of Lambton, Ontario*, the current roadway has been entirely modified and altered in the twentieth century. The area where Highway 402 bisects Christina Street has not retained any elements of its historic form apart from following the same general alignment. The surrounding landscape has likewise been altered by postwar housing and motels and there are no significant viewsheds related to the bridge.

The Christina Street Bridge, County Site Number 14-37, is a four lane solid slab structure constructed in 1951 (original construction drawings are contained in Appendix A). It has two spans with a total deck length of 44.3 m and an overall structure width of 17.58. It carries

Christina Street north to south over Highway 402 in the City of Sarnia, Ontario (Plates 2, 3, 4, 5 and 6). There are concrete sidewalks on both sides of the bridge that have concrete posts and a steel railing over the spans with decorative concrete balustrading at either end. Each railing panel is 7 m long and 1.22 m high. The superstructure rests on cast in place concrete abutments (legs of rigid frame) and the deck has an asphalt wearing surface with a total deck area of 778.7 square metres. Steel guard rails have been added to each approach.

The Christina Street Bridge was rehabilitated in 1997-8 (rehabilitation construction drawings are contained in Appendix A). The restoration plan included the replacement of concrete at select locations on the bridge deck, curb face, sidewalk soffit, fascia, coping, abutment walls, wingwalls and on the concrete posts. In addition, the 20 steel railing panels were galvanized and replaced and the asphalt decking was replaced. The rehabilitation of the structure resulted in a minimal disturbance to the design of the structure, although the concrete patches are significantly lighter in colour.

The Christina Street Bridge currently has no performance deficiencies but the widening of Highway 402 at this location necessitates the removal of the bridge for geometric reasons.



Plate 2. Christina Street Bridge deck looking south.



Plate 3. Soffit and railing.



Plate 4. West elevation detail



Plate 5. East elevation



Plate 6. Looking north

4.0 HERITAGE EVALUATION

The Christina Street Bridge is listed on an internal MTO/Ministry of Culture study of potential heritage bridges, the “Heritage Bridges Identification and Assessment Guide, Ontario 1945-1965,” within which the 1951 bridge was included in the Class C (reserve) list of bridges, with a table identifying it as the first example of a slab concrete bridge in the region.

To address concerns related to the potential heritage significance of the bridge *Archaeological Services Inc.* evaluated the Christina Street Bridge and the structure received a moderately low overall heritage evaluation rating.

Following the proposed Ministry of Culture Ontario Heritage Bridge Program’s Guidelines for bridges built between 1945 and 1965, eleven criteria within four categories were used to evaluate bridges with maximum scores as follows:

Documentation:	Builder	6
Technology	Materials	8
	Design/Style	16
	Prototype	20
	Structural Preservation	10
	Visual Appeal	12
Bridge Aesthetics and Environment	Location	4
Environment	Landmark	6
	Gateway	4
	Character contribution	4
Historical	Historical Association	<u>10</u>
Total score		100

The Christina Street Bridge scored as follows:

Documentation:	Builder	4	Known, prolific Slab concrete Typical, not rare Early Minor modifications
	Materials	2	
	Design/Style	8	
	Prototype	16	
	Structural Preservation	8	
Bridge Aesthetics and Environment	Visual Appeal	6	Functional with some sculptured ornamentation on the handrails
Environment	Location	4	
	Landmark	0	
	Gateway	0	
	Character contribution	0	
Historical	Historical Association	<u>8</u>	<u>Highway 402</u>
Total score		56	

This confirms the lower classification of the structure within the assessment guide to bridges constructed from 1945 to 1965.

In Appendix F, the “Heritage Bridges: Identification and Assessment Guide, Ontario, 1945 to 1965” lists a total of 83 solid slab/slab bridges constructed by the province between 1947 and 1965. Of these, 13 were constructed prior to 1955 and three are in the southwestern region (the Christina Street Bridge, Black Creek Bridge on Highway 3 in Woodhouse and Hall’s Creek Highway 401 Bridge in Ingersol). The Black Creek Bridge was built the same year as the Christina Street structure (1951) while the Hall’s Creek Bridge was built in 1953. Between 1955 and 1965 a total of 13 more solid slab/slab bridges were erected in the southwestern region for a total of 16 bridges of this type in the region.

The only other solid slab bridge that has been identified as a potential candidate for the heritage bridge list is the Spadina Avenue Underpass in Toronto. Constructed in 1964, the Spadina Avenue Bridge is notable as the second longest example of a solid slab bridge in the province. Like the Christina Street Bridge it was listed as a Class C structure.

5.0 CONCLUSIONS AND MITIGATION RECOMMENDATIONS

5.1 Conclusions

In sum, *Archaeological Services Inc.* concurs with the province’s classification of the Christina Street Bridge as a Class C structure. It is a typical example of a recognizable form of concrete bridge building in the early post war period and it exhibits good overall heritage integrity. It has historic associations with the construction of the Blue Water Bridge Approach (Highway 402) and it is the first example of single slab bridge construction in the region. It is one of three solid slab bridges constructed in the southwestern region in 1951-53, and once of 16 bridges of similar type built between 1947 and 1965 out of a provincially owned total of 83.

Following the Ontario Heritage Bridge Program’s criteria for the evaluation of a heritage bridges, the Christina Street Bridge scored a moderately low 56 and therefore is it concluded that the structure is not of heritage significance.

There are no cultural landscape concerns and no important viewsheds or linkages that will be affected by the widening of the road and the bridge’s replacement.

However, since the Christina Street Bridge does possess merit as a well designed, structurally sound and early example of post-war concrete slab bridge construction its loss should still be mitigated. Recommendations in this regard are provided below.

5.2 Recommendations

1. This report (including construction drawing appendices for both 1950 and 1997) be filed as a documentation report to be supplemented by photo-documentation that captures the bridge, approaches and detailing from all compass points and from both the Christina Street and Highway 402 road elevations.

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2. Photo-documentation should be completed during detailed design.
 3. Original construction drawings should be placed in the Ontario Archives or another suitable repository.

6.0 REFERENCES

Bevers, Cameron

The King's Highway 400. The History of Ontario's King's Highways.
www.thekingshighway.ca/Hwy400 accessed July 2005.

Dirks, John.

Photographic Records from the Ministry of Transportation, Inventory 14 (Photographs.)
Toronto: Archives of Ontario, June 1994.

Gray, Carolyn and Donna Prystupa.

Inventory of the Cartographic Records of the Ministry of Transportation, Inventory 14 (Cartographic.) Toronto, Archives of Ontario, October 1993.

Ontario, Ministry of Culture and Ministry of Transportation

Heritage Bridges: Identification and Assessment Guide 1945-1965 prepared by the
Heritage Resources Centre, University of Waterloo.

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*Annual Report of the Department of Highways, Ontario, for the Fiscal Year Ending
March 31, 1952.* Sessional Paper 32. Toronto: printed by Baptist Johnston, 1952.

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Sarnia, Christina Street UP, Str. 1. 14 July 1960. Negative #333, Hwy 402, Chatham
District. *Christina Street Underpass*, July 1970, ("3.0 mi W of Hwy 7 Appr. E, Side N.")
negative #0020. Archives of Ontario RG14-151-4 container A1310.

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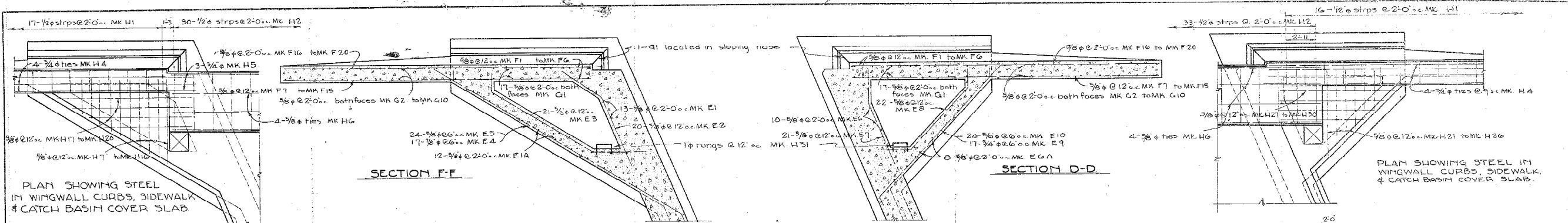
Township of Sarnia, Lambton County, January 31, 1961. Map 17-2, produced by the
Department of Highways showing the route of Highways 7 and 402. Archives of Ontario
RG14-121-0-0-790.

APPENDIX A1

Christina Street Overpass

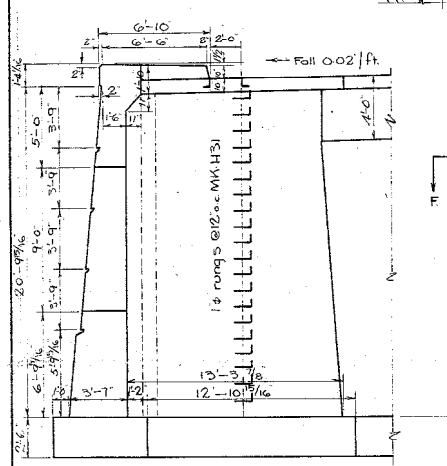
Original Construction Drawings (1951)

Rehabilitation Construction Drawings (1997)

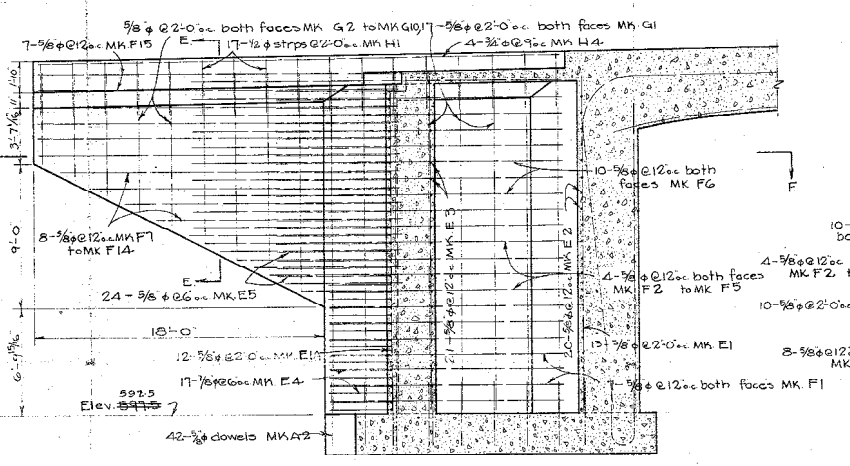


PLAN SHOWING STEEL IN WINGWALL CURBS, SIDEWALK & CATCH BASIN COVER SLAB

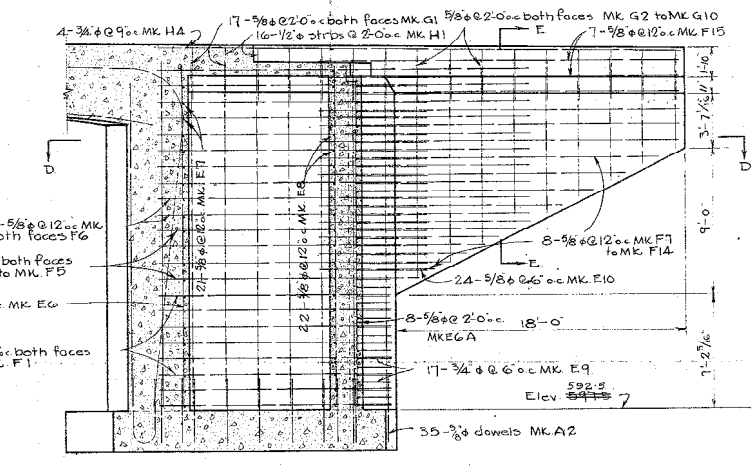
PLAN SHOWING STEEL IN WINGWALL CURBS, SIDEWALK & CATCH BASIN COVER SLAB



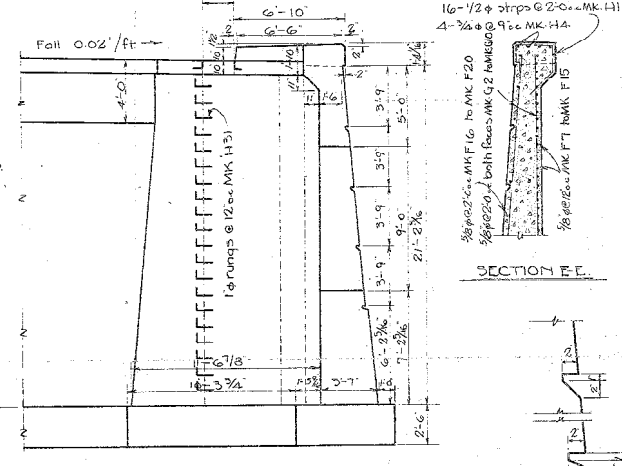
END VIEW OF N.E. & S.W. WINGS



INSIDE ELEVATION OF N.E. & S.W. WINGS

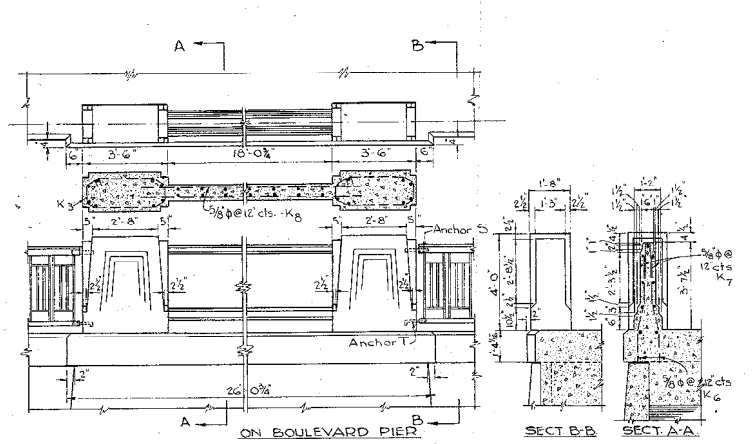


INSIDE ELEVATION OF N.W. & S.E. WINGS

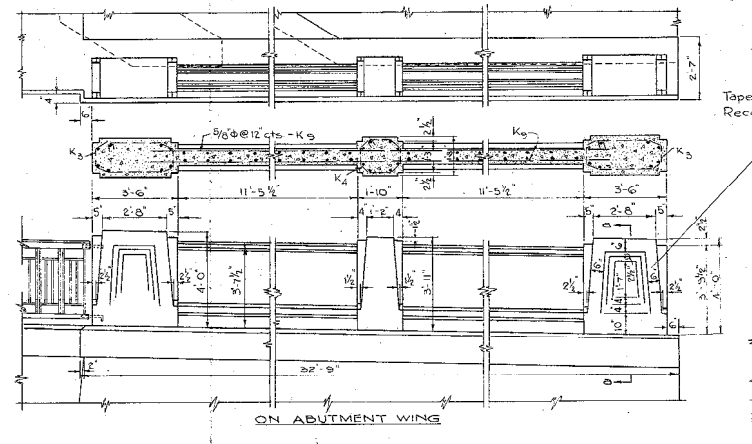
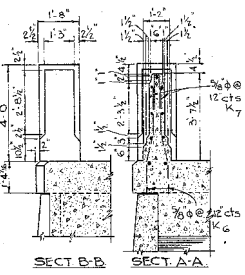


END VIEW OF N.W. & S.E. WINGS

NOTE: Location of catch basin outlets to be determined by Division Engineer



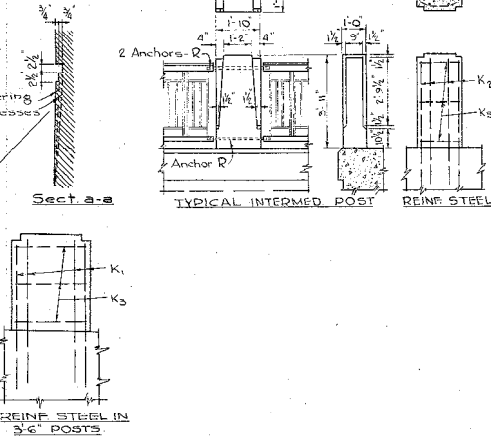
ON BOULEVARD PIER



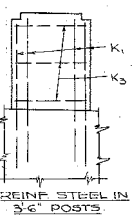
ON ABUTMENT WING

HANDRAIL AND POST DETAILS

Scale: 3/8"=1'-0"



TYPICAL INTERMED. POST



REIN. STEEL IN 3/6" POSTS

DETAIL OF HORIZONTAL RECESSES

Scale: 1/8"=1'-0"

NO.	REV.	DATE	BY	CHKD.
1	DELL	12-2-29		
2	DELL	1-14-30		

NO.	REV.	DATE	DESCRIPTION
1	DELL	12-2-29	Elevations lowered 3'-0"

DEPARTMENT OF HIGHWAYS, ONTARIO			
BRIDGE OFFICE - TORONTO			
PROPOSED OVERPASS			
CONTROLLED ACCESS HIGHWAY			
UNDER CHRISTINA STREET			
THE KING'S HIGHWAY NO. 1		DIV. NO. 1	
CO. LAMBTON		VILLAGE OF POINT EDWARD	
TWP. SARNIA		LOT 30N	
WINGWALL DETAILS			
APPROVED			
CHIEF BRIDGE ENGINEER		CHIEF ENGINEER	
DESIGN	B.D.	CHECK	CSG
DRAWING	B.D.	CHECK	AEM
TRACING	B.D.	CHECK	AEM
DATE	AUG. 29, 1930	SCALE	AS SHOWN
PROJECT NO.		50-25	
DRAWING NO.		D-3163-2	

MARK	No.	SIZE	LENGTH	DETAILS	REMARKS
A1	114	3/8" φ	10'-9 1/4"		Footing dowels in abut legs @ 12" o.c.
A2	154	3/8" φ	4'-0"	Straight	Footing dowels in abut haunches @ 2'-0" o.c. as shown.
A3	114	3/8" φ	10'-0"		Footing dowels in pier legs @ 12" o.c.
A4	112	3/8" φ	20'-0"		Do.
A5	60	3/8" φ	7'-9 7/8"		Footing dowels in pier retaining walls @ 12" o.c.
A6	12	5/8" φ	31'-0"	Straight	Ties for A1, A3 & A4 as shown lap 1'-6"
A7	60	3/8" φ	4'-0"	Do.	In top of retaining wall footing @ 12" o.c. as shown.
A8	10	5/8" φ	30'-0"	Do.	Ties for A5 & A7 as shown.
B1	226	3/8" φ	20'-0"	Do.	Verticals in legs @ 12" o.c. Lap with A1 & A3.
B2	56	1" φ	31'-2 1/2"		Extrados steel @ knee of abut @ 2'-0" o.c. Do @ 2'-0" o.c. Do @ 12" o.c.
B3	56	1" φ	30'-2 1/2"		
B4	114	1" φ	30'-4 1/2"		
B5	58	1/2" φ	29'-1"		Extrados steel @ knee of pier @ 2'-0" o.c. as shown. Do @ 2'-0" o.c.
B6	56	1/2" φ	27'-4"		
B7	58	1" φ	28'-2"	Straight	Extrados steel in roadway span @ 2'-0" o.c. as shown.
B8	58	1/2" φ	24'-3 3/8"	Straight	Do in blvd span as shown.
B9	56	1/2" φ	18'-9 3/8"	Do.	Do.
B10	29	1/2" φ	10'-0"	Do.	Do.
B11	58	1" φ	38'-7"	Straight	Intrados steel in roadway span @ 2'-0" o.c. as shown. Do lap 2'-6" with B11.
B12	58	1" φ	19'-1"	Do.	Do.
B13	112	1" φ	30'-6"	Do.	Do @ 12" o.c.
B14	56	1" φ	23'-0"	Do.	Do @ 2'-0" o.c.
B15	29	1" φ	27'-0 3/4"	Do.	Do in blvd span.
B16	8	1/2" φ	25'-0"	Do.	Ties for B17 lap 1'-6"
B17	46	1/2" φ	5'-10"		Straps in knee of abut legs @ 2'-0" as shown.
B18	436	3/8" φ	31'-0"	Straight	Ties for B7 to B15 @ 2'-0" o.c. as shown.
S1	319	3/8" φ	3'-5"		Verticals in NE & SW haunches @ 2'-0" o.c. as shown.
S2	522	"	3'-9"		
S3	290	"	4'-1"		
S4	290	"	4'-5"		
S5	174	"	4'-9"		
S6	174	"	5'-1"		
S7	174	"	5'-5"		
E1	26	3/8" φ	21'-0"	Straight	Verticals in NE & SW haunches @ 2'-0" o.c. as shown.
E1A	24	3/8" φ	22'-0"		Verticals in NE & SW haunches @ 2'-0" o.c. as shown.

MARK	No.	SIZE	LENGTH	DETAILS	REMARKS
E2	40	3/8" φ	15'-0"		Horizontals around NE & SW catch basins @ 12" o.c. as shown.
E3	42	3/8" φ	20'-0"		Do.
E4	34	7/8" φ	30'-0"		Do @ 6" o.c.
E5	48	3/8" φ	32'-0"		Do @ 6" o.c. (extends into wing wall.)
E6	20	3/8" φ	21'-3"	Straight	Verticals in NW & SE catch basins @ 12" o.c. as shown.
E6A	16	3/8" φ	21'-10"		
E7	42	3/8" φ	10'-0"		Horizontals around NW & SE catch basins @ 12" o.c. as shown.
E8	44	3/8" φ	14'-0"		Do.
E9	34	3/8" φ	19'-3"		Do @ 6" o.c.
F10	48	3/8" φ	21'-0"		Do @ 6" o.c. (extends into wing wall)
F1	60	3/8" φ	15'-6"	Straight	Horizontal in both faces of wingwalls @ 12" o.c. as shown.
F2	32	3/8" φ	17'-0"	Straight	Do.
F5	40	3/8" φ	22'-9"		
F6	80	3/8" φ	23'-3"	Straight	Do.
F7	32	3/8" φ	7'-3"	Straight	Horizontal in back face of wingwalls @ 12" o.c. as shown.
F10	40	3/8" φ	15'-3"		
F14	21	3/8" φ	21'-3"		
F15	25	3/8" φ	22'-6"		
F16	16	3/8" φ	9'-3"	Do.	Horizontal in front face of wingwalls @ 2'-0" o.c.
F19	10	3/8" φ	21'-3"		
F20	12	3/8" φ	22'-6"	Do.	Do.
G1	68	3/8" φ	21'-0"	Do.	Verticals in back & front face of wingwalls @ 2'-0" o.c. as shown.
G2	72	3/8" φ	5'-6"	Do.	Do in cantilever wingwalls.
G5	60	3/8" φ	13'-6"		
G9	60	3/8" φ	13'-6"		
G10	60	3/8" φ	13'-6"		
H1	66	1/2" φ	8'-2"		Curb strips over cantilever wing @ 2'-0" o.c.
H2	126	1/2" φ	10'-7"		Sidewalk strips over haunches & roadway slab @ 2'-0" o.c. as shown.
H3	24	1/2" φ	11'-9"		Do over blvd span.
H4	10	3/8" φ	32'-0"	Straight	Ties for H1 as shown.

PRINT RECORD	FOR	DATE
20	O.R.E.L.D.	12-8-50
3	O.T.A.	12-8-50

WEIGHT OF STEEL - 69.9 TONS (approx.)

NOTE: ALL STEEL TO BE HARD GRADE EXCEPT WHERE NOTED.
HI-BOND STEEL TO BE SUPPLIED.

REQUISITION NO. 7777 71843

DEPARTMENT OF HIGHWAYS-ONTARIO.
BRIDGE DIVISION-OTTAWA

REINFORCING STEEL TABLE FOR CONTROLLED ACCESS HIGHWAY UNDER CHRISTINA STREET

THE KING'S HIGHWAY NO. 100
VILLAGE OF POINT EDWARD
TWP. BARNIA

APPROVED: _____ CONTRACT NUMBER 50-25

DRAWN BY M.S. CHECKED BY L.E.M. BRIDGE NUMBER D-3165-5
DATE BY DESCRIPTION DATE

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

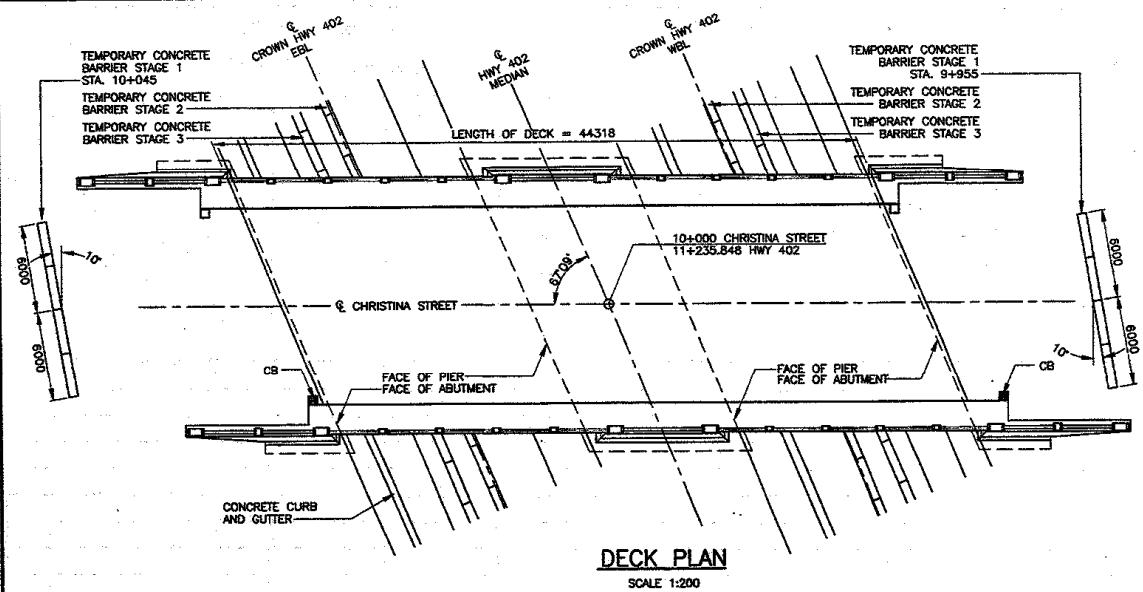
DIST. 32 HWY. 402
CONT NO 97-45
WP NO 71-96-01



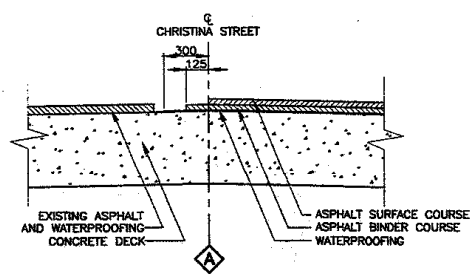
CHRISTINA STREET UNDERPASS
STRUCTURE REHABILITATION
GENERAL ARRANGEMENT

SHEET
154

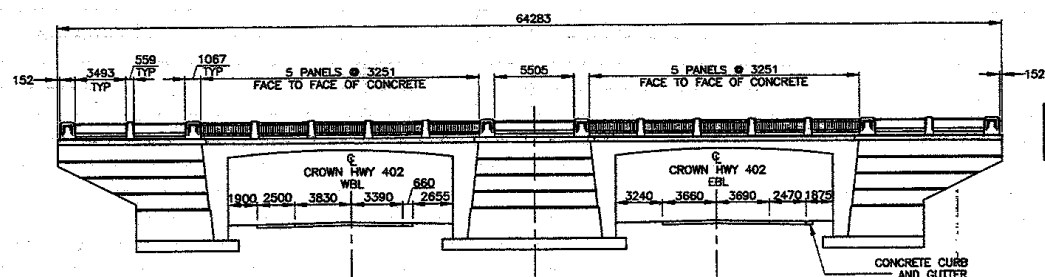
DELCAN ENGINEERS
PLANNERS



DECK PLAN
SCALE 1:200

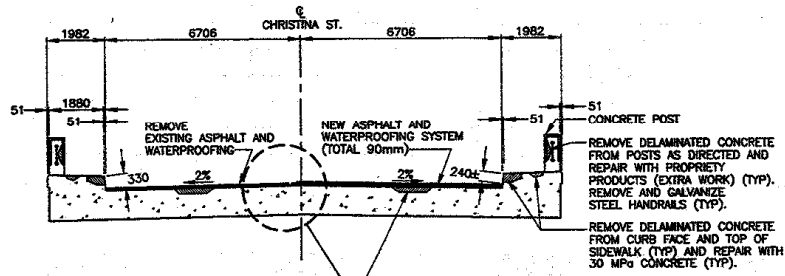


DETAIL A
N.T.S.



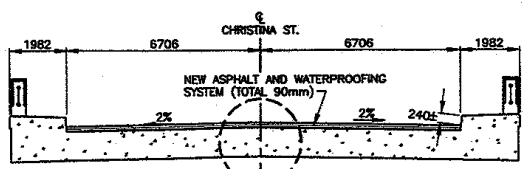
WEST ELEVATION
SCALE 1:200

REMOVE, GALVANIZE AND
REINSTALL HANDRAIL PANELS.
(SEE DWG. NO. 2 FOR DETAILS)



STAGE 1 CONSTRUCTION
SCALE 1:100

NOTE
REMOVE EXISTING ASPHALT
AND WATERPROOFING
DEPTH VARIES (80-160mm)
(AVERAGE 110mm)



STAGE 1A CONSTRUCTION
SCALE 1:100

GENERAL NOTES

- CLASS OF CONCRETE SHALL BE 30 MPa UNLESS OTHERWISE SPECIFIED.
- REINFORCING STEEL SHALL BE GRADE 400 UNLESS OTHERWISE SPECIFIED. BAR MARKS WITH THE SUFFIX 'C' DENOTES COATED BARS.
- TYPICAL AREAS OF REPAIR ARE INDICATED ON DRAWINGS. WHERE REPAIR LIMITS ARE NOT SHOWN, LIMITS SHALL BE IDENTIFIED BY THE CONTRACT ADMINISTRATOR.
- AREAS OF CONCRETE REMOVAL SHALL BE DELINEATED BY A 25mm SQUARE EDGE.
- WHERE INDICATED ON THE DRAWINGS THAT A SAWCUT IS REQUIRED TO DELINEATE AREAS OF CONCRETE REMOVAL, THE SAWCUT SHALL BE 25mm DEEP OR TO FIRST LAYER OF REINFORCING STEEL, WHICHEVER IS LESS.
- THE EXISTING STRUCTURE IS WATERPROOFED WITH RUBBERIZED ASPHALT AND PROTECTION BOARD.
- THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF THE PROPOSED WORK AND ALL DETAILS ON SITE AND REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE PROCEEDING WITH THE REPAIR WORK.

CONSTRUCTION STAGING

- NOTE: (i) NO WORK SHALL START ON THE TOP OF THE BRIDGE UNTIL THE DETOUR ON THE LOCAL ROADS IS IN FULL OPERATION.
(ii) NO WORK SHALL BE CARRIED OUT ON THE UNDERSIDE OF THE STRUCTURE UNTIL THE WORK ON TOP OF THE BRIDGE IS COMPLETE.

STAGE 1 (CHRISTINA STREET)

- DETOUR CHRISTINA STREET TRAFFIC BY PLACING TEMPORARY CONCRETE BARRIERS AND CLOSE THE BRIDGE TO TRAFFIC.
- REMOVE EXISTING ASPHALT AND WATERPROOFING FROM THE BRIDGE DECK.
- REMOVE AND GALVANIZE STEEL HANDRAIL PANELS, CLEAN AND COAT ANCHOR IN CONCRETE POSTS WITH EPOXY-ZINC/VINYL SYSTEM.
- REMOVE CONCRETE ON BRIDGE DECK, CURB FACE, SIDEWALK AND CONCRETE POSTS (POSTS BY EXTRA WORK) ON AREAS THAT REQUIRE RESTORATION.
- ABRASIVE BLAST CLEAN CONCRETE AND EXPOSED REINFORCING STEEL ON AREAS WHERE CONCRETE HAS BEEN REMOVED.
- PLACE CONCRETE IN DECK, CURB FACE AND SIDEWALK AREAS THAT ARE TO BE REPAIRED.
- REPAIR CONCRETE POSTS WHERE CONCRETE HAS BEEN REMOVED WITH AN APPROVED PROPRIETARY PRODUCT (EXTRA WORK).
- WATERPROOF AND PAVE.
- REINSTALL NEWLY GALVANIZED STEEL HANDRAIL PANELS.
- REMOVE TEMPORARY CONCRETE BARRIERS AND OPEN TOTAL BRIDGE TO TRAFFIC.

STAGE 2 (HWY 402)

- REDUCE TRAFFIC TO ONE LANE IN BOTH EASTBOUND AND WESTBOUND DIRECTIONS AND PLACE TEMPORARY CONCRETE BARRIERS FOR STAGE 2 CONSTRUCTION.
- REMOVE CONCRETE FROM SOFFIT, FASCIA, COPING, ABUTMENT WALLS, AND WINDWALLS ON AREAS REQUIRING RESTORATION ON CLOSED PORTION OF BRIDGE.
- ABRASIVE BLAST CLEAN CONCRETE AND EXPOSED REINFORCING STEEL ON AREAS WHERE CONCRETE HAS BEEN REMOVED.
- REPAIR AREAS WHERE CONCRETE HAS BEEN REMOVED WITH SILICA FUME SHOTCRETE.

STAGE 3 (HWY 402)

- RELOCATE TRAFFIC ON HWY 402 EASTBOUND AND WESTBOUND TO COMPLETED PORTION OF THE STRUCTURE AND RELOCATE TEMPORARY CONCRETE BARRIERS FOR STAGE 3 CONSTRUCTION.
- REMOVE CONCRETE FROM SOFFIT, FASCIA, COPING, PIER SHAFT, AND ABUTMENT WALLS ON AREAS REQUIRING RESTORATION ON CLOSED PORTION OF BRIDGE.
- REPEAT STEPS 13-14 FOR STAGE 3 CONSTRUCTION.
- REMOVE TEMPORARY CONCRETE BARRIERS AND OPEN ALL LANES ON HWY 402 TO TRAFFIC.

- LIST OF DRAWINGS**
- GENERAL ARRANGEMENT
 - REMOVALS & HANDRAIL COATING DETAILS
 - QUANTITIES SHEET



DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

REVISIONS	DATE	BY	DESCRIPTION

DESIGN	G.C.I	CHK	T.W	CODE	—	LOAD	—	DATE	JAN 97
DRAWN	P.S.	CHK	G.C.	SITE	14-37	STRUCT	—	SCHEME	DWG 1

2-DATA113409.MCD\000505148 Thu Apr 10 12:54:08 1997 Ministry of Transportation of Ontario

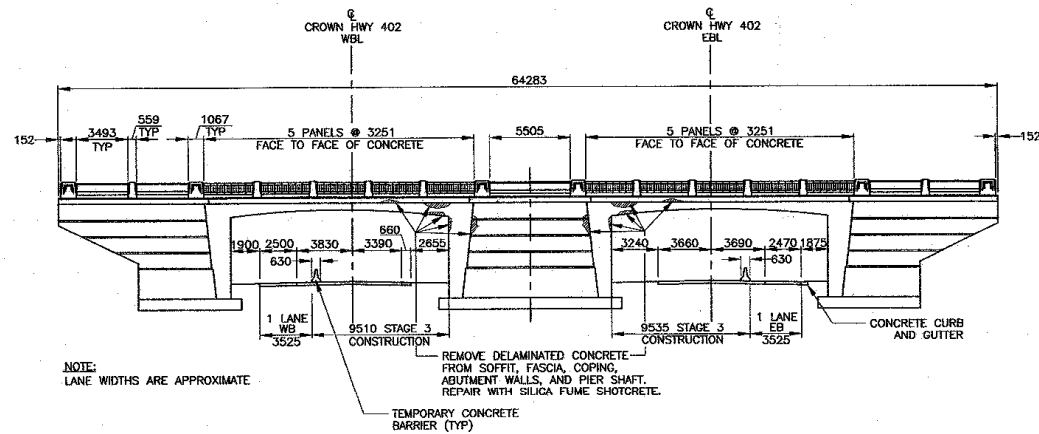
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AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

DIST. 32 HWY. 402
CONT NO 97-45
WP NO 71-96-01

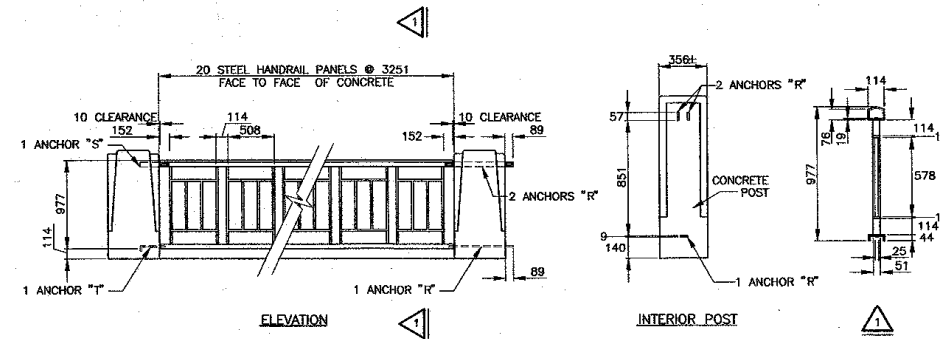
CHRISTINA STREET UNDERPASS
STRUCTURE REHABILITATION
REMOVALS & HANDRAIL
COATING DETAILS

SHEET
155

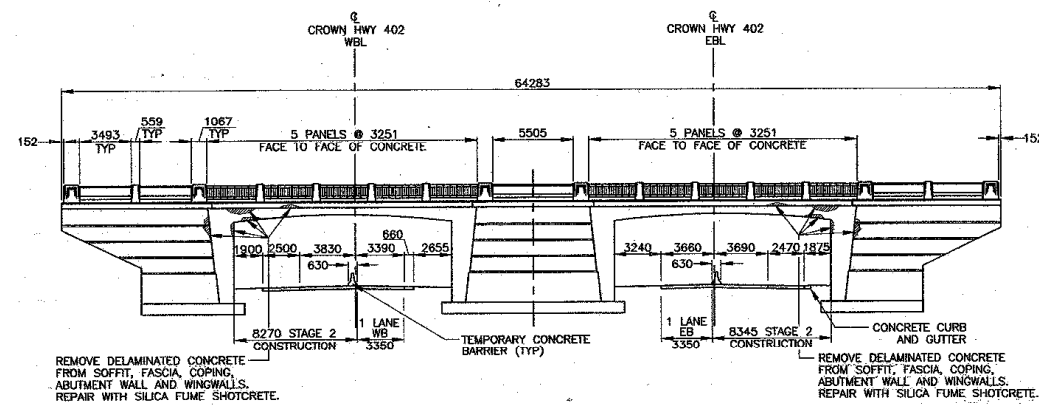
DELCAN ENGINEERS
PLANNERS



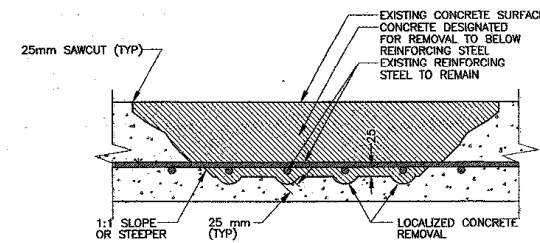
WEST ELEVATION STAGE 3
SCALE 1:200



STEEL HANDRAIL DETAIL
N.T.S.



WEST ELEVATION STAGE 2
SCALE 1:200



CONCRETE REMOVAL DETAIL
N.T.S.



DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

REVISIONS	DATE	BY	DESCRIPTION

DESIGN	G.C.	CHK	T.W.	CODE	-	LOAD	-	DATE	JAN 97
DRAWN	P.S.	CHK	G.C.	SITE	14-37	STRUCT	SCHEME	DWG	2

