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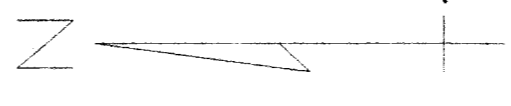
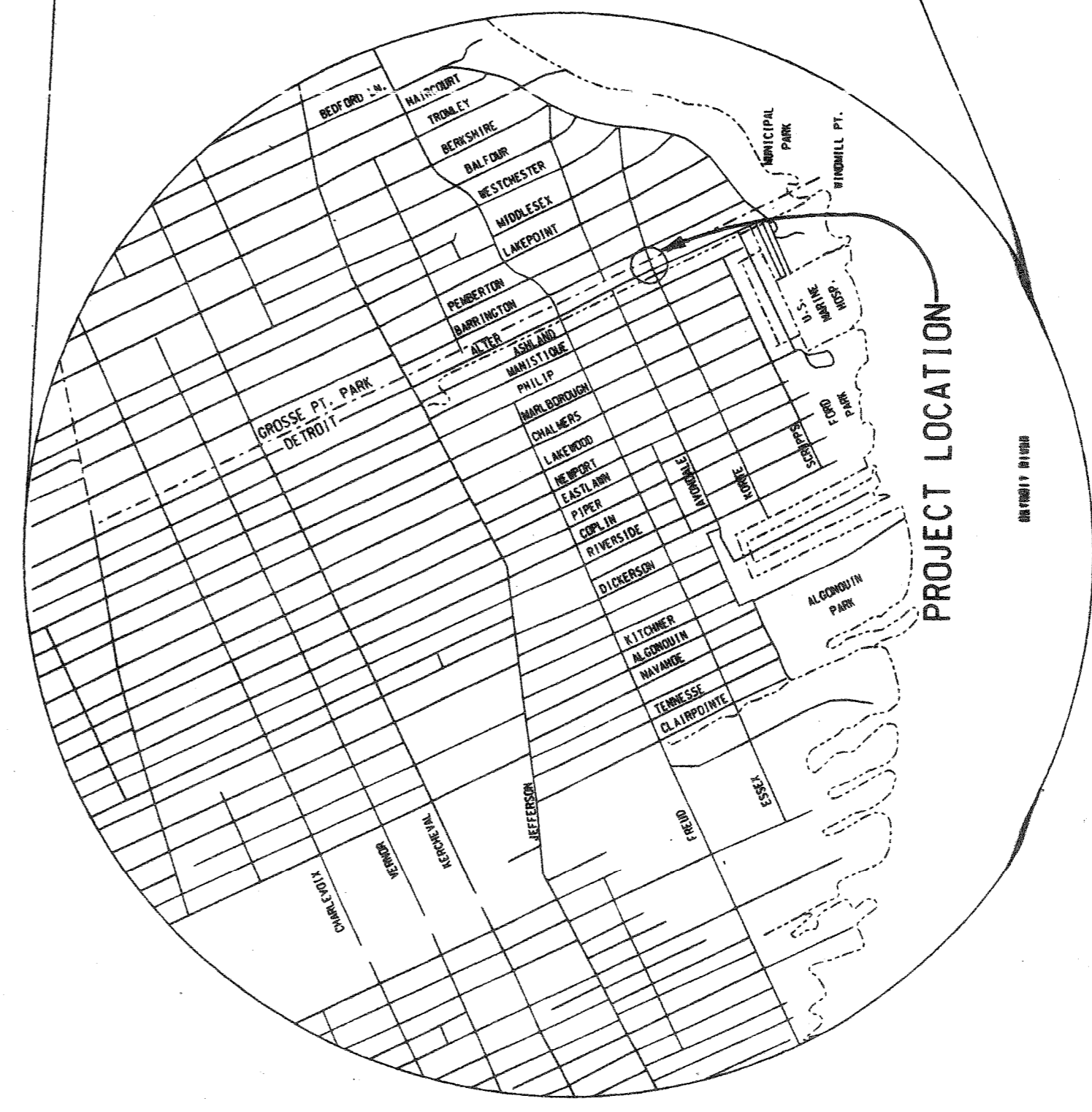
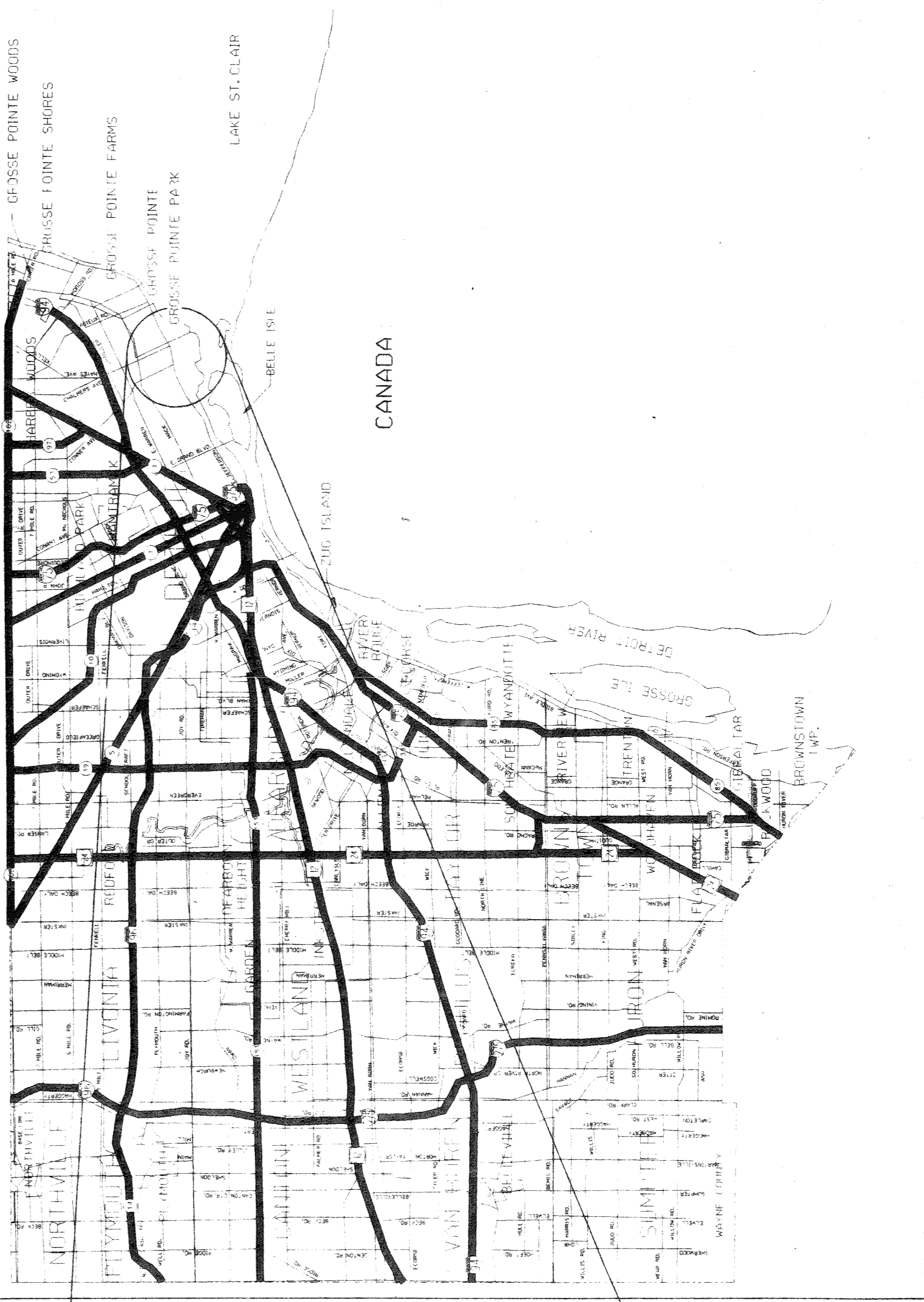
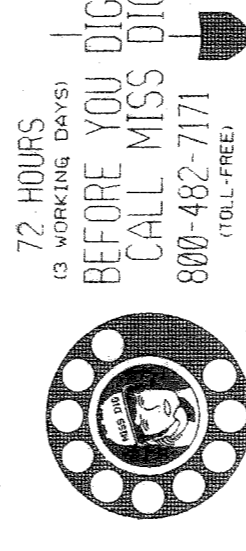
CITY OF DETROIT STANDARD PLANS (3-7-98)

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CITY OF DETROIT
KWAME M. KILPATRICK – MAYOR
CITY ENGINEERING DIVISION
DEPARTMENT OF PUBLIC WORKS

PLANS FOR PROPOSED
REPLACEMENT OF THE KORTE AVE. BRIDGE
OVER FOX CREEK

(BW-249), FEDERAL STRUCTURE NO. 0108600B01



THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES M518 LOADING, LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/1000 OF THE SPAN LENGTH.

EXCEPT WHERE OTHERWISE INDICATED ON THESE PLANS, THE PROPOSAL, AND SUPPLEMENTAL SPECIFICATIONS CONTAINED HEREIN, ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION 1996 EDITION.

THE STATIONING AS SHOWN ON THESE PLANS FOR THE INTERSECTION OF THE CENTERLINE OF BRIDGE AND ROADWAY CENTERLINE IS BELIEVED TO BE CORRECT. IT SHALL, HOWEVER, BE CHECKED AT THE TIME OF STARTING CONSTRUCTION, AND IF THE STATIONING SHOWN ON THE PLANS IS INCORRECT IT SHALL BE REPORTED TO THE DESIGN OFFICE IN DETROIT, AND THE STRUCTURE SHALL BE STAKED OUT USING THE ACTUAL INTERSECTION OF THE CENTERLINE OF THE BRIDGE AND ROADWAY CENTERLINE AS THE CONTROL POINT.

ALL EXPOSED CONCRETE CORNERS SHOWN SQUARE ON THE PLANS SHALL BE BEVELED WITH 13 mm TRIANGULAR MOLDINGS EXCEPT AS OTHERWISE NOTED.

THE DESIGN OF THE STRUCTURAL MEMBERS IS BASED ON MATERIAL OF THE FOLLOWING GRADES AND STRESSES.

CONCRETE:	GRADE S2	f'c = 21 MPa
CONCRETE:	GRADE D	f'c = 28 MPa
STEEL REINFORCEMENT:		fy = 400 MPa

ALL DIMENSIONS ON THESE PLANS ARE IN MILLIMETERS EXCEPT AS NOTED.

METRIC

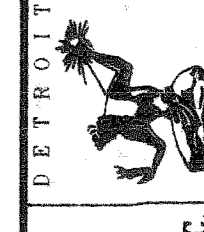
DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN. ELEVATIONS, COORDINATES, CURVE AND ALIGNMENT DATA ARE IN METERS. STATIONS ARE IN KILOMETERS + METERS.

REVISIONS	DATE	BY	CHK'D BY	APP'D BY
	7-97	F.T.	J.E.	CDP
	7-97	J.E.	CDP	
	7-97	CDP		



SNELL ENVIRONMENTAL GROUP, INC.
 151 W. CONGRESS, SUITE 328
 DETROIT, MICHIGAN 48208
 TELEPHONE: (313) 961-4640

F T A
FEMI TALABI & ASSOCIATES INC.
 605 GREENWOOD, SUITE 100, DETROIT, MICHIGAN 48208



CITY OF DETROIT
MICHIGAN

KORTE AVE. OVER
THE FOX CREEK

TITLE SHEET

SCALE	NOT TO SCALE
PROJECT NO.	9641-5160-02
SHEET NO.	K-1
TOTAL SHEETS	OF 22

UTILITIES	
TELEPHONE	AMERITECH 4000 ALLEN RD. ROOM 101 ALLEN PARK, MICHIGAN 48101 ATTN: DAVE BUCIENSKI PHONE NO.: (313) 389-9819
WATER & SEWERAGE	CITY OF DETROIT WATER & SEWERAGE DEPT 735 RANDOLPH ST. DETROIT, MICHIGAN 48226 PHONE NO.: (313) 224-4800
ELECTRIC	DETROIT EDISON 2000 SECOND AVE. ROOM 607 G.O. DETROIT, MICHIGAN 48226 ATTN: JOHN SQUIRES PHONE NO.: (313) 235-6597
GAS	MICHIGAN CONSOLIDATED GAS CO. DRAFTING CLERK MAIN REPLACEMENT TEAM NOBLE SECOND FLOOR 3200 HOBSON DETROIT, MICHIGAN 48201 PHONE NO.: (313) 577-7236

SIDEWALK TO BE PAVED TO PROVIDE A SMOOTH TRANSITION BETWEEN PROPOSED PAVEMENT AND EXISTING SIDEWALK AS DIRECTED BY ENGINEER.

EXISTING STRUCTURE
ONE SPAN REINFORCED CONCRETE ARCH STRUCTURE MEASURING 10.67 m AND RISE 1.52 m BUILT IN 1924.
732mm CLEAR ROADWAY.

STA 9+977.500 TO STA 9+992.500
REMOVE 15 m CURB & REMOVE 30 m² SIDEWALK
STA 9+977.500 TO STA 9+994.158
PLACE 18 m MISC. CURB, CONC., 100mm
& 30 m² SIDEWALK, CONC., 100mm

REMOVE, SALVAGE & REPLACE 11 m FENCE

BENCHMARK
B.M. #62-254A
ELEV. 174.852
CITY OF DETROIT, N.E. OGDON PHILIP RD. AND AVONDALE RD. INTERSECTION OF SIDEWALKS

B.M. #61-255
ELEV. 174.605
CITY OF DETROIT, N.E. OGDON CHALMERS RD. AND SCRIPPS RD. INTERSECTION OF SIDEWALKS

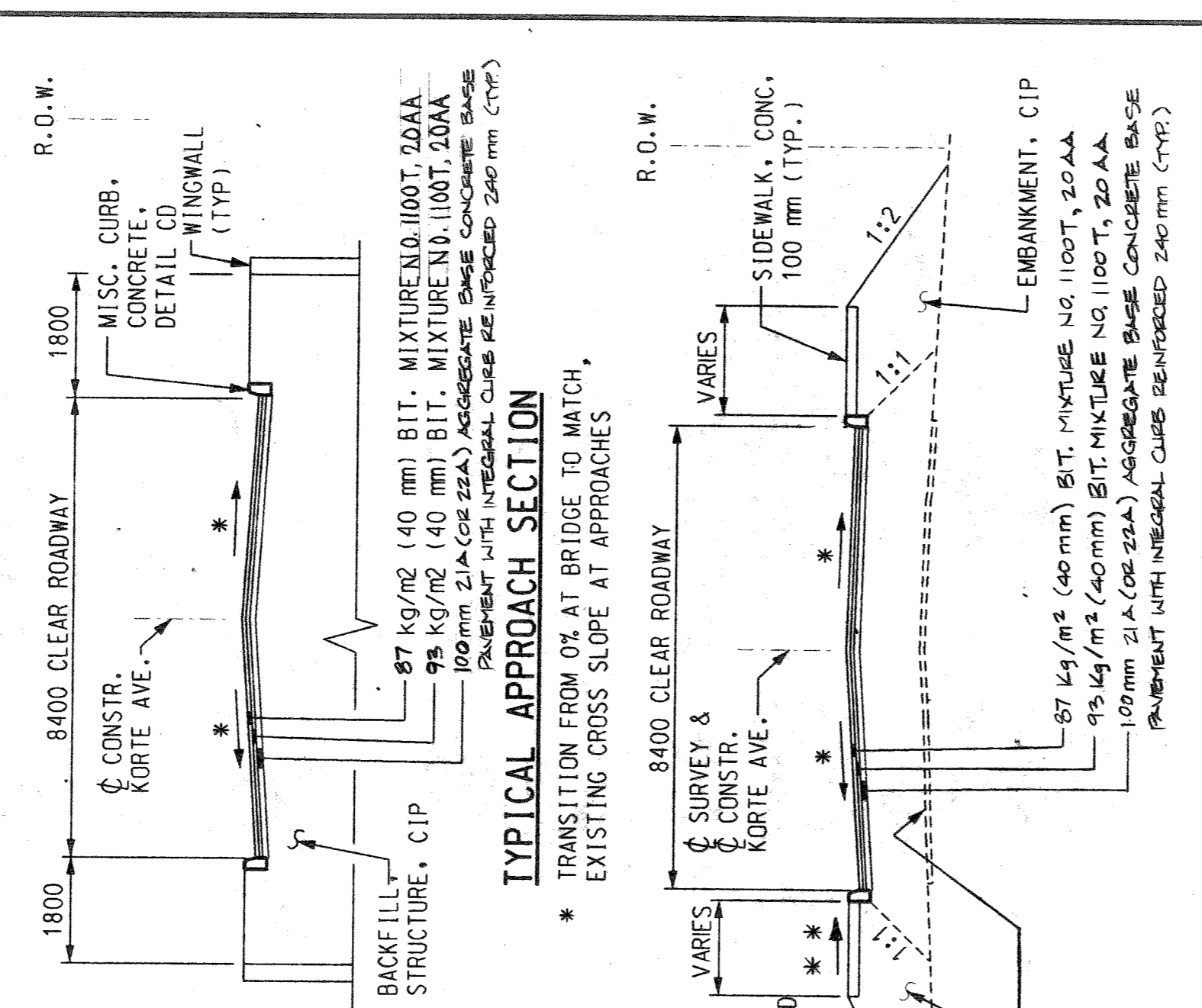
PROPOSED REPLACEMENT KORTE AVE. BRIDGE
MDOT - B01 OF 1086
CITY - BW-249

EXISTING STRUCTURE TO BE REMOVED

REMOVE, SALVAGE & REPLACE 10 m FENCE

STA 10+007.500 TO STA 10+012.500
REMOVE 10 m CURB & REMOVE 10 m² SIDEWALK
STA 10+005.842 TO STA 10+012.500
PLACE 10 m MISC. CURB, CONC., 100mm
& 10 m² SIDEWALK, CONC., 100mm

WITNESSES	
WITNESS TO CONTROL POINT 102: STA. 9+900	(MAG. NAIL)
N 80° W	18.92 m
S 50° W	15.99 m
S 60° E	10.15 m
WITNESS TO CONTROL POINT 103: STA. 10+040	(MAG. NAIL)
N 85° W	13.36 m
S 10° E	6.25 m
N 30° W	12.10 m



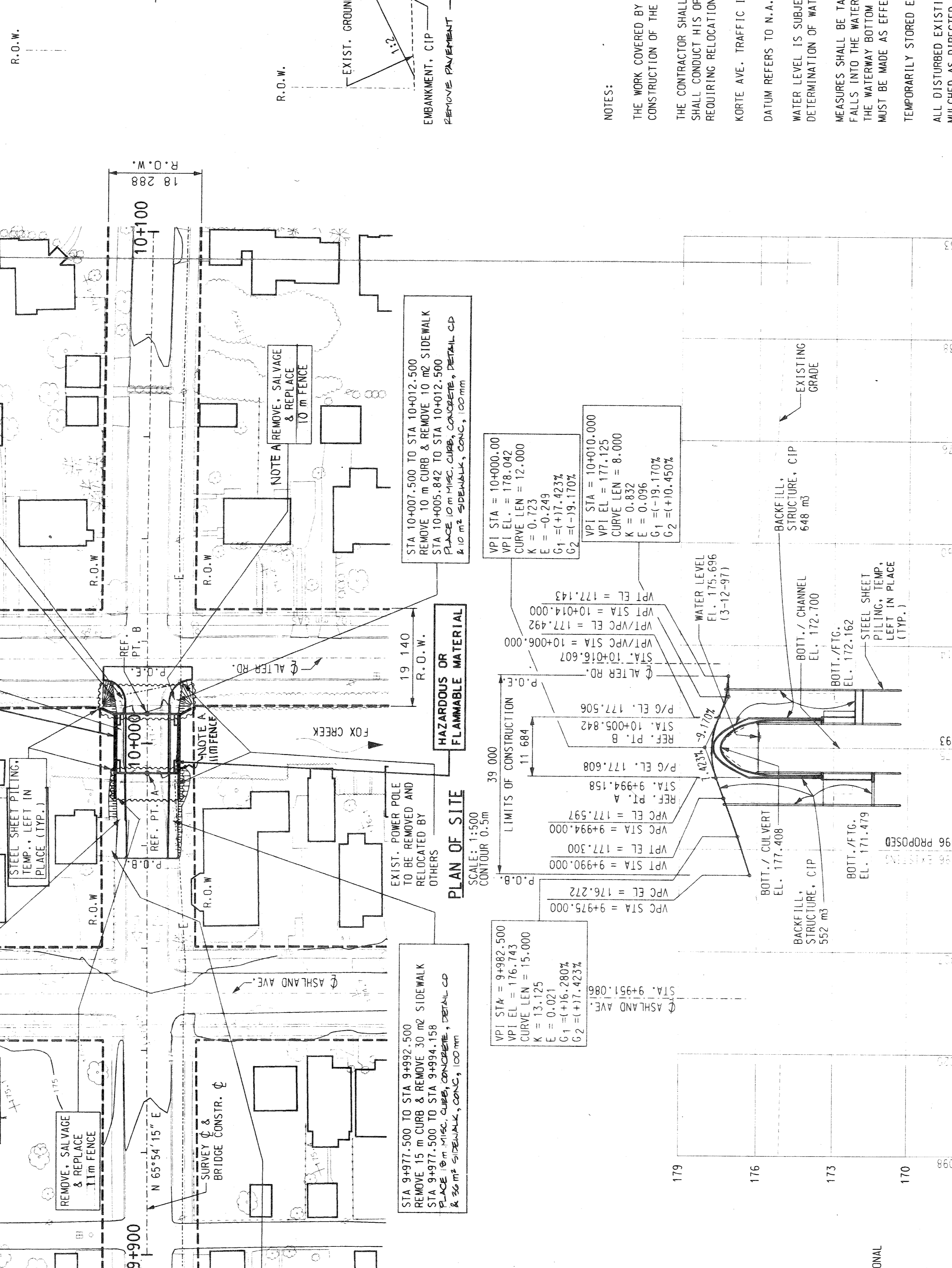
TYPICAL APPROACH SECTION
STA. 9+975 TO STA. 9+989.158 & STA. 10+005.842 TO STA. 10+007

* TRANSITION FROM 0% AT BRIDGE TO MATCH EXISTING CROSS SLOPE AT APPROACHES
* 20 mm/m, OR AS DIRECTED BY THE ENGINEER

NOTES:
THE WORK COVERED BY THESE PLANS INCLUDES MAINTAINING TRAFFIC, REMOVAL OF EXISTING BRIDGE, CONSTRUCTION OF THE PROPOSED BRIDGE AND APPROACH WORK.

THE CONTRACTOR SHALL LOCATE ALL ACTIVE UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

KORTE AVE. TRAFFIC IS TO BE DETOURED OVER THE EXISTING ROADS.
DATUM REFERS TO N.A.-V.D. DATUM.
WATER LEVEL IS SUBJECT TO CHANGE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATION OF WATER LEVELS THAT WILL EXIST DURING CONSTRUCTION.
MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE. IF DEBRIS FALLS INTO THE WATERWAY, IT SHALL BE REMOVED WITHIN 24 HOURS. SINCE DISTURBANCE OF THE WATERWAY BOTTOM MAY BE AS HARMFUL AS THE DEBRIS ITSELF, THE PREVENTIVE MEASURES MUST BE MADE AS EFFECTIVE AS POSSIBLE.
TEMPORARILY STORED EXCAVATED MATERIAL SHALL NOT BE ALLOWED TO ERODE INTO THE WATERCOURSE.
ALL DISTURBED EXISTING GROUND AND ANY NEW FILL SLOPES SHALL BE SEED, FERTILIZED, AND MULCHED AS DIRECTED BY THE ENGINEER. TO BE INCLUDED IN THE PAY ITEMS "SEEDING, MIXTURE TUF," "FERTILIZER, CHEMICAL NUTRIENT, CLASS A," AND "MULCH BLANKET."



TEST HOLE SB-1
 LOCATION STATION 9+990.834 1150 LT
 KORTE AVE. OVER FOX CREEK
 ELEV. GROUND SURFACE ELEVATION 177.270

TEST HOLE SB-2
 LOCATION STATION 10+023.384 158 RT
 KORTE AVE. OVER FOX CREEK
 ELEV. GROUND SURFACE ELEVATION 176.734

177.270	76 mm ASPHALT PAVEMENT
176.508	FILL brown to variegated silty to sandy CLAY, trace small gravel, moist, very stiff
176.051	POSSIBLE FILL Black sandy to clayey FEA1, with organics, trace small gravel, very moist, firm to stiff
175.746	POSSIBLE FILL Gray to variegated, silty to sandy CLAY, some organics, trace small gravel, very moist, soft
174.984	Brown fine to medium sandy SILT, trace small gravel, moist, very stiff to hard
174.832	ESTIMATED TOTAL SCOUR LIMIT ABUT. A (E.L. 172.700 +/-)
174.222	Gray silty to sandy CLAY, little small gravel, moist, stiff
173.308	BOTTOM OF FOOTING ABUTMENT A (E.L. 171.479)
172.698	Gray silty to sandy CLAY, little small gravel, moist, firm to very stiff
171.784	Gray silty to sandy CLAY, moist, very soft
171.174	Gray silty to sandy CLAY, moist, very soft
169.802	Gray silty to sandy CLAY, moist, very soft
169.345	Gray silty to sandy CLAY, moist, very soft
168.278	Gray silty to sandy CLAY, moist, very soft
166.754	Gray silty to sandy CLAY, moist, very soft
165.688	Gray silty to sandy CLAY, moist, very soft
165.230	Gray silty to sandy CLAY, moist, very soft
164.468	Gray silty to sandy CLAY, moist, very soft
163.706	Gray silty to sandy CLAY, moist, very soft
163.402	Shelby tube sample taken from 13.411 to 14.326
162.182	Gray silty to sandy CLAY, moist, very soft
162.030	Gray silty to sandy CLAY, moist, very soft
160.658	Gray silty to sandy CLAY, moist, very soft
159.134	Gray silty to sandy CLAY, moist, very soft
157.610	Gray silty to sandy CLAY, moist, very soft
157.153	Shelby tube sample taken from 19.507 to 20.422
156.085	Gray silty to sandy CLAY, moist, very soft
155.834	Gray silty to sandy CLAY, moist, very soft
154.562	Gray silty to sandy CLAY, moist, very soft
153.038	Gray silty to sandy CLAY, moist, very soft
151.514	Gray silty to sandy CLAY, moist, very soft
149.890	Gray silty to sandy CLAY, moist, very soft
149.838	Gray silty to sandy CLAY, moist, very soft
148.466	Gray silty to sandy CLAY, moist, very soft
146.942	Gray silty to sandy CLAY, moist, very soft
145.418	Gray silty to sandy CLAY, moist, very soft
144.809	Gray silty to sandy CLAY, moist, very soft
143.894	Gray silty to sandy CLAY, moist, very soft
143.590	END OF BORING AT 33.680 m

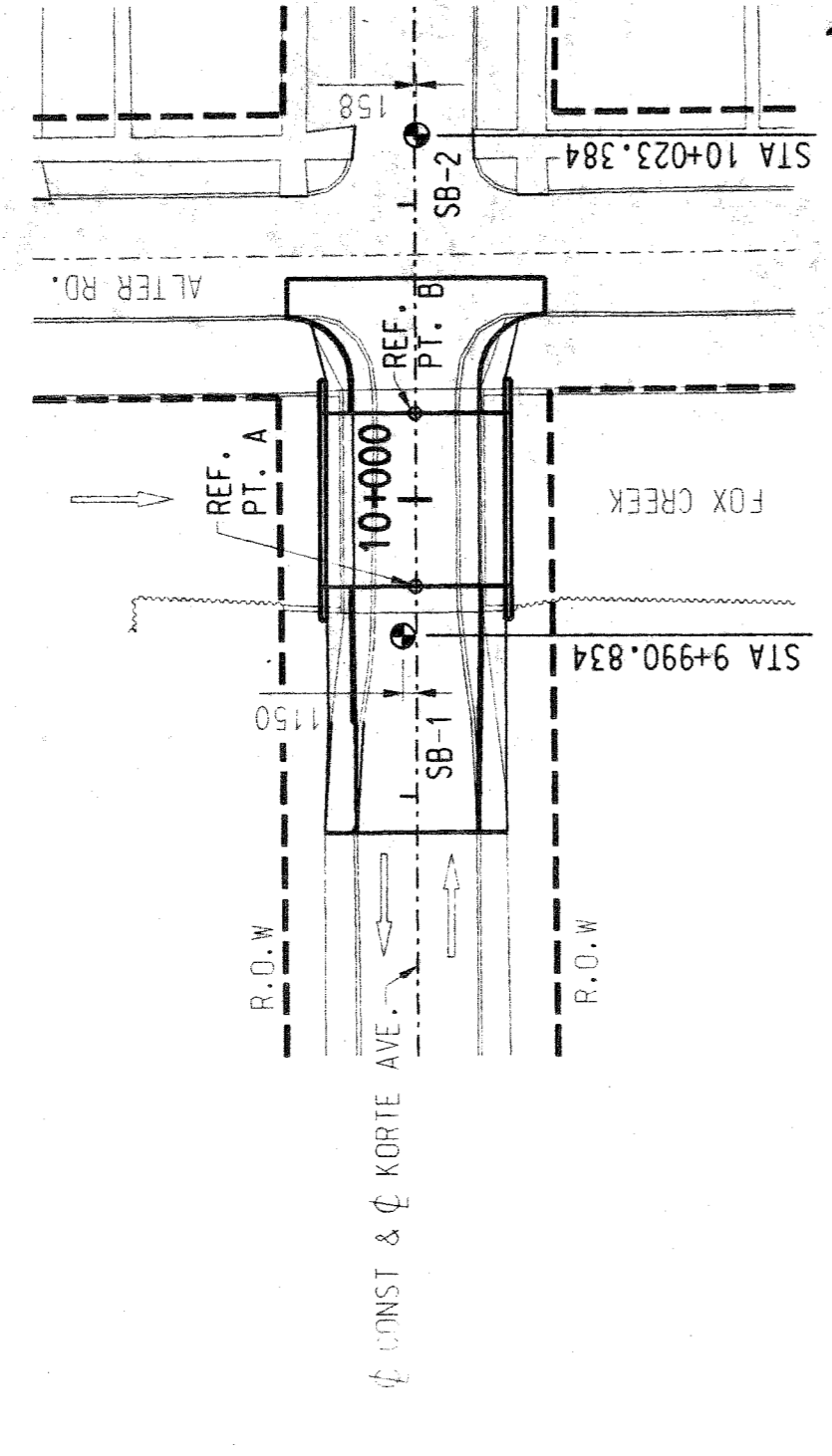
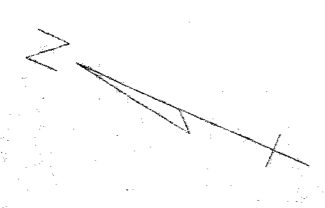
NOTE: WATER LEVEL AT COMPLETION: 25.6 m

BORING DATE 10/12/94

176.734	100 mm ASPHALT PAVEMENT
175.972	FILL Gravelly sandstone and silty, slightly moist, dense
175.820	POSSIBLE FILL Black sandy to clayey FEA1, with organics, trace small gravel, very moist, firm to stiff
175.210	POSSIBLE FILL Gray to variegated, silty to sandy CLAY, some organics, trace small gravel, very moist, soft
174.448	Brown fine to medium sandy SILT, trace small gravel, moist, very stiff to hard
174.296	ESTIMATED TOTAL SCOUR LIMIT ABUT. B (E.L. 172.162)
173.686	Gray silty to sandy CLAY, trace small gravel, moist, very soft
173.381	Gray silty to sandy CLAY, trace small gravel, moist, very soft
172.162	ESTIMATED TOTAL SCOUR LIMIT ABUT. B (E.L. 172.162)
171.490	BOTTOM OF FOOTING ABUTMENT B (E.L. 172.162)
170.638	Gray silty to sandy CLAY, trace small gravel, moist, very soft
170.028	Gray silty to sandy CLAY, trace small gravel, moist, very soft
169.266	Gray silty to sandy CLAY, trace small gravel, moist, very soft
167.995	Gray silty to sandy CLAY, trace small gravel, moist, very soft
167.742	Gray silty to sandy CLAY, trace small gravel, moist, very soft
166.676	Gray silty to sandy CLAY, trace small gravel, moist, very soft
166.218	Gray silty to sandy CLAY, trace small gravel, moist, very soft
166.066	Gray silty to sandy CLAY, trace small gravel, moist, very soft
165.152	Gray silty to sandy CLAY, moist, very soft
164.694	Gray silty to sandy CLAY, moist, very soft
163.922	Gray silty to sandy CLAY, moist, very soft
163.400	Gray silty to sandy CLAY, moist, very soft
163.118	Gray silty to sandy CLAY, moist, very soft
161.799	Shelby tube sample taken from 13.411 to 14.326
161.646	Gray silty to sandy CLAY, moist, very soft
160.122	Gray silty to sandy CLAY, moist, very soft
158.598	Gray silty to sandy CLAY, moist, very soft
157.532	Gray silty to sandy CLAY, moist, very soft
157.074	Gray silty to sandy CLAY, moist, very soft
155.703	Shelby tube sample taken from 21.051 to 21.94
155.550	Gray silty to sandy CLAY, moist, very soft
154.941	Gray silty to sandy CLAY, moist, very soft
154.026	Gray silty to sandy CLAY, moist, very soft
152.502	Gray silty to sandy CLAY, moist, very soft
150.978	Gray silty to sandy CLAY, moist, very soft
149.912	Gray silty to sandy CLAY, moist, very soft
149.454	Gray silty to sandy CLAY, moist, very soft
148.083	Gray silty to sandy CLAY, moist, very soft
147.930	Gray silty to sandy CLAY, moist, very soft
146.406	Gray silty to sandy CLAY, moist, very soft
144.882	Gray silty to sandy CLAY, moist, very soft
144.425	Gray silty to sandy CLAY, moist, very soft
143.358	Gray silty to sandy CLAY, moist, very soft
141.834	Gray silty to sandy CLAY, moist, very soft
141.682	END OF BORING AT 35.000 m

NOTE: WATER LEVEL AT COMPLETION: 11.3 m

BORING DATE 10/19/94



LOCATION PLAN
 SCALE: NTS

NOTES:

NUMBERS IN CIRCLES DENOTE NUMBER OF BLOWS REQUIRED TO DRIVE A 50.8 mm SPLIT SPOON SAMPLER 3 SUCCESSIVE 0.15 m INCREMENTS USING A 63.5 kg HAMMER FALLING 0.76 m. WHERE THE SAMPLER IS DRIVEN DISTANCES OTHER THAN THE 0.15 m INCREMENT, THE DISTANCE IS SHOWN IN PARENTHESES TO THE RIGHT OF THE NUMBER OF BLOWS.

- (X) NUMBER OF BLOWS PER 0.15 m
- (X) NUMBER OF BLOWS PER 0.15 m
- (X) NUMBER OF BLOWS PER 0.15 m
- (X) NUMBER OF BLOWS PER 0.15 m
- XX(X) NUMBER OF BLOWS PER DISTANCE (mm)
- XX(XX) NUMBER OF BLOWS PER DISTANCE (mm)

CONSISTENCY WAS DETERMINED BY INSPECTION OF SAMPLES AND SUBSTANTIATED BY SOILS RESISTANCE TO DRILLING TOOLS.

WATER LEVELS MAY BE INFLUENCED BY RESIDUAL BORING WATER.

THE SOIL BORING LOGS REPRESENT POINT INFORMATION. PRESENTATION OF THIS INFORMATION IN NO WAY IMPLIES THAT SUBSURFACE CONDITIONS ARE THE SAME AT LOCATIONS OTHER THAN THE EXACT LOCATION OF THE BORING.

SOIL BORINGS WERE PERFORMED ON DATES SHOWN BELOW BORING.

BY: PROFESSIONAL SERVICES INDUSTRIES, INC.
 24355 Capitol Ave.
 Detroit, Mich. 48239
 Phone: (313) 255-4200

METRIC

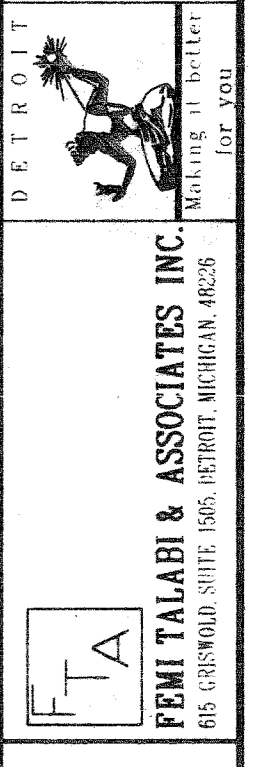
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PROJECT NO.	9641-5160-02
SHEET NO.	43
OF	22

LOG OF BORINGS

KORTE AVE. OVER THE FOX CREEK

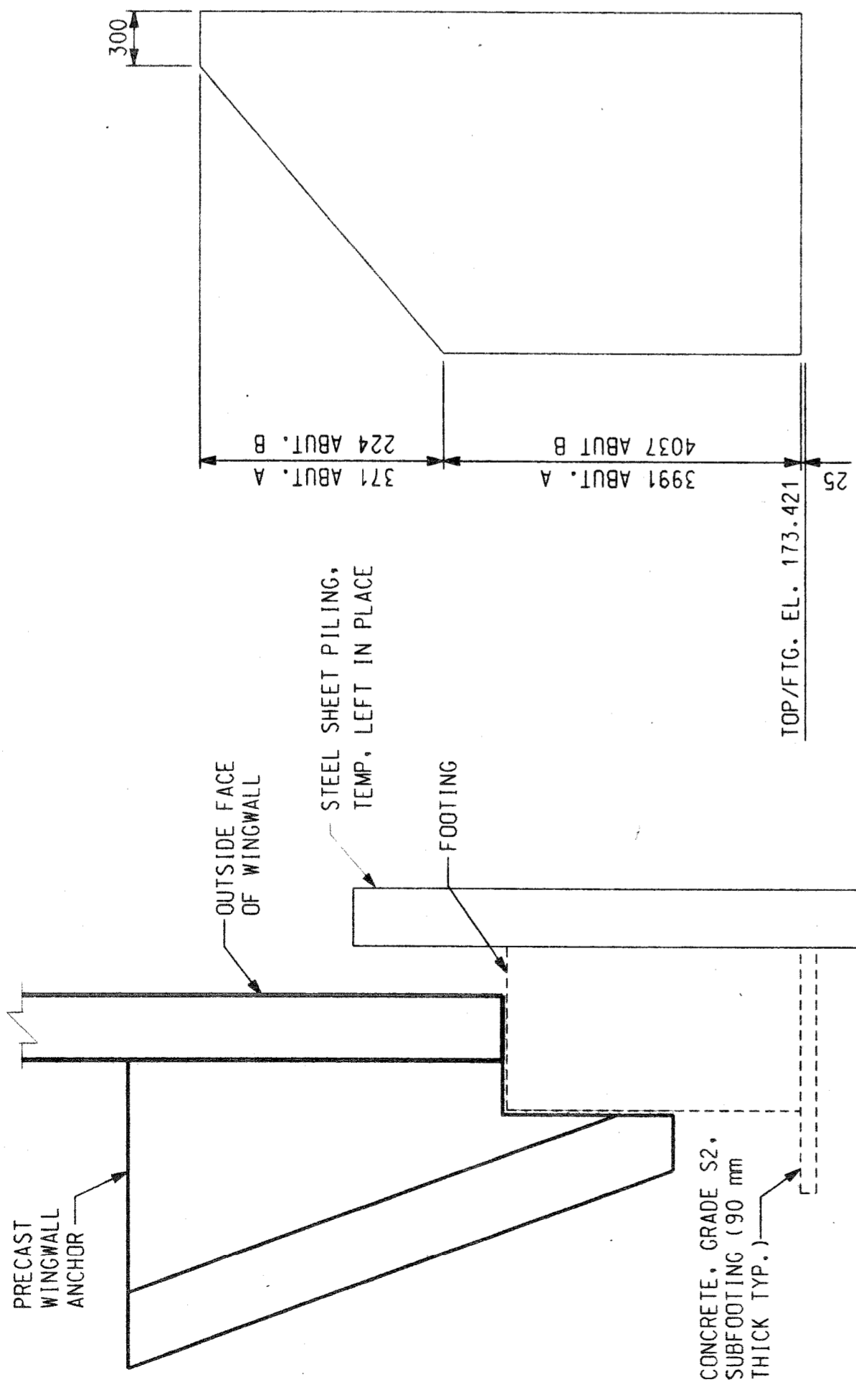
CITY OF DETROIT MICHIGAN



SNELL ENVIRONMENTAL GROUP, INC.
 17600 WINDYBROOK DRIVE
 DETROIT, MICHIGAN 48224
 TELEPHONE: 313-551-9641

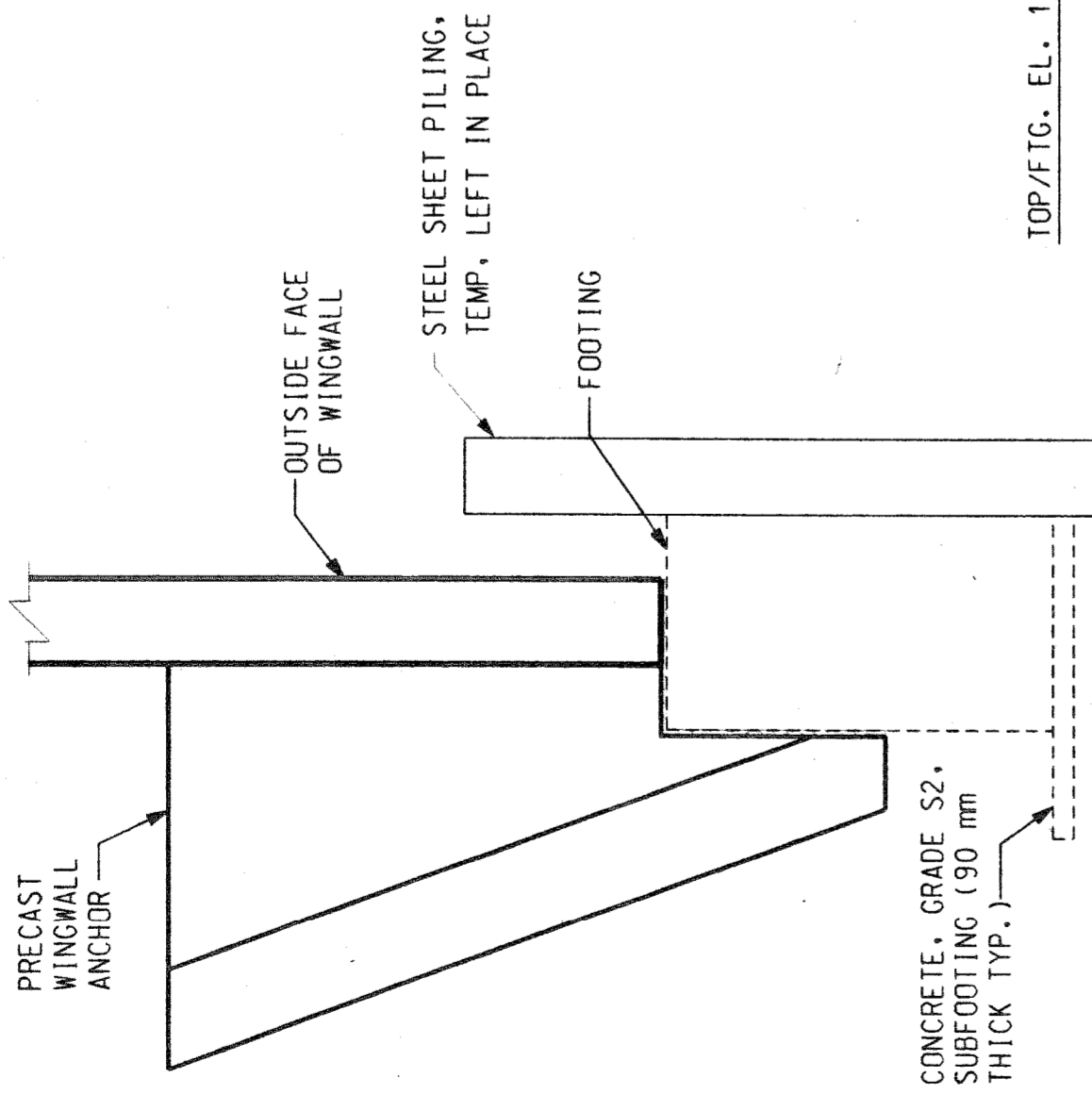
BOSEG

DESIGN BY	F.T.	7-97
DR'N BY	J.E.	7-97
CK'D BY	COP	7-97
APP'D BY		



WINGWALL ELEVATION
(SHOWN PARALLEL TO WALL)

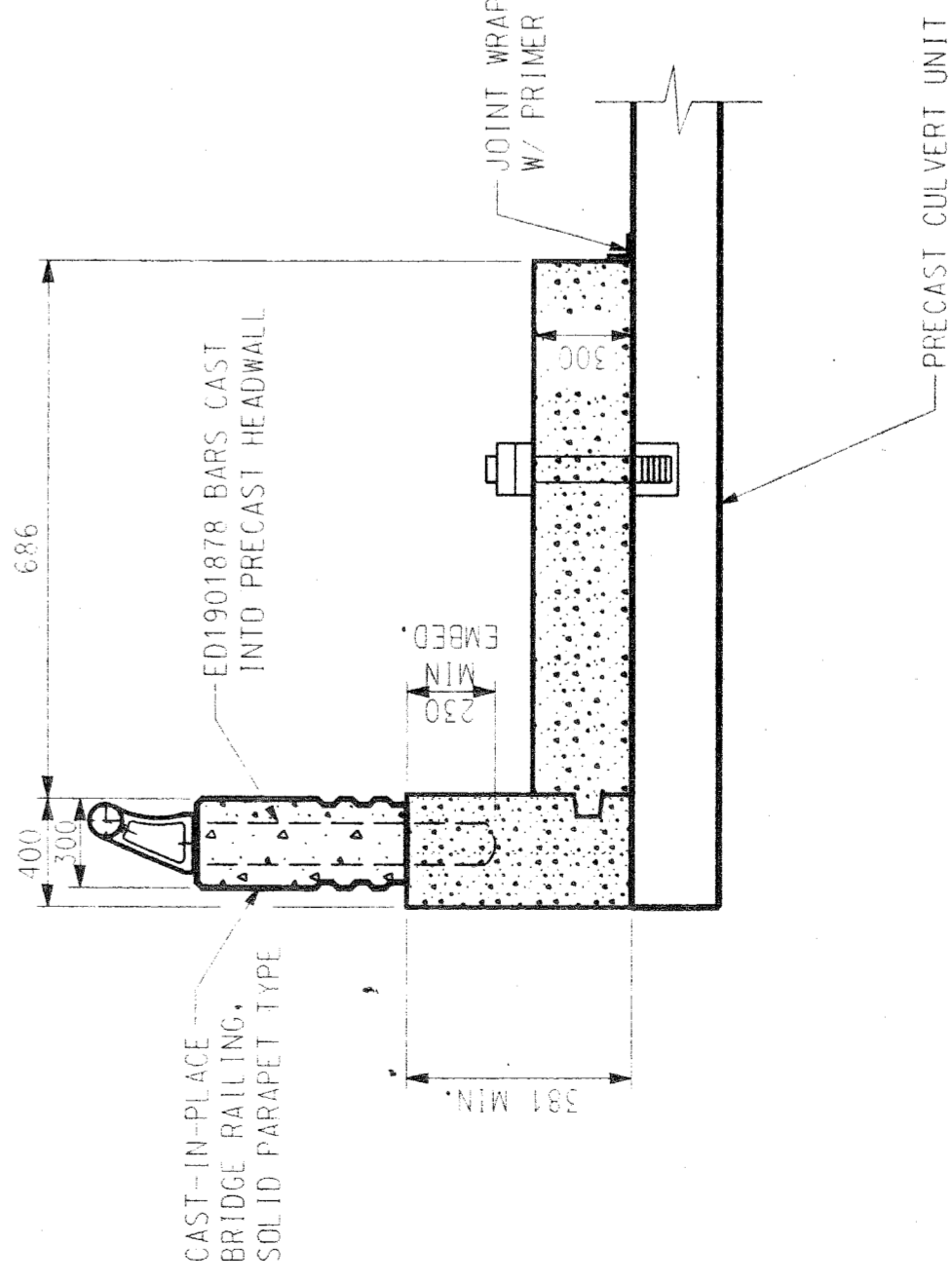
LENGTH OF WINGWALL SHALL BE DERIVED FROM PLAN OF FOOTING SHEET 5)



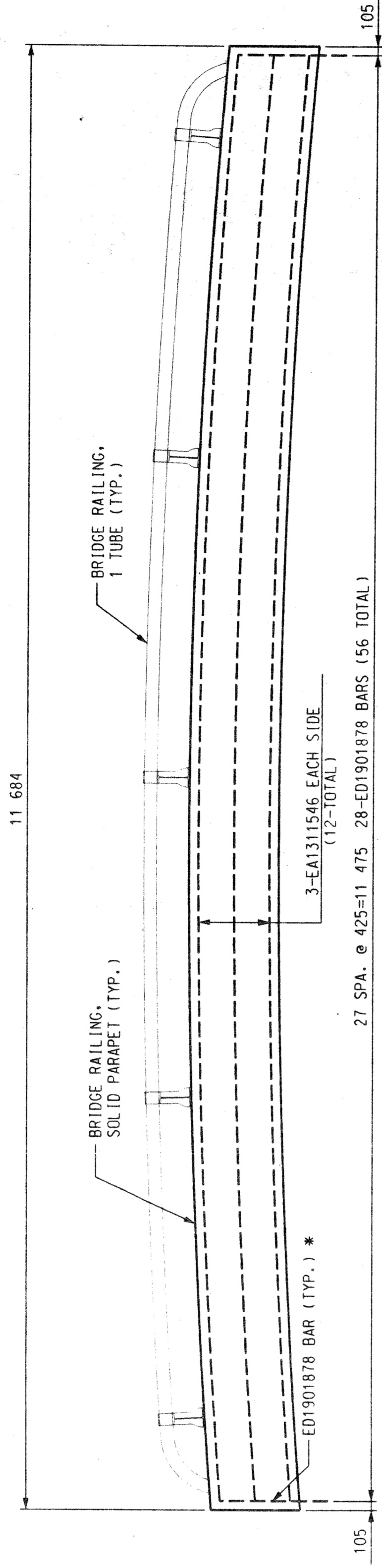
TYPICAL SECTION THRU PRECAST WINGWALL

PRIMER COMPATIBLE WITH JOINT WRAP
22 mm x 35 mm BUTYL ROPE OR APPROVED EQUAL
300 mm WIDE MACWRAP OR EZ-WRAP RUBBER OR APPROVED EQUAL
PRECAST CULVERT UNIT

STANDARD PRECAST JOINT DETAIL

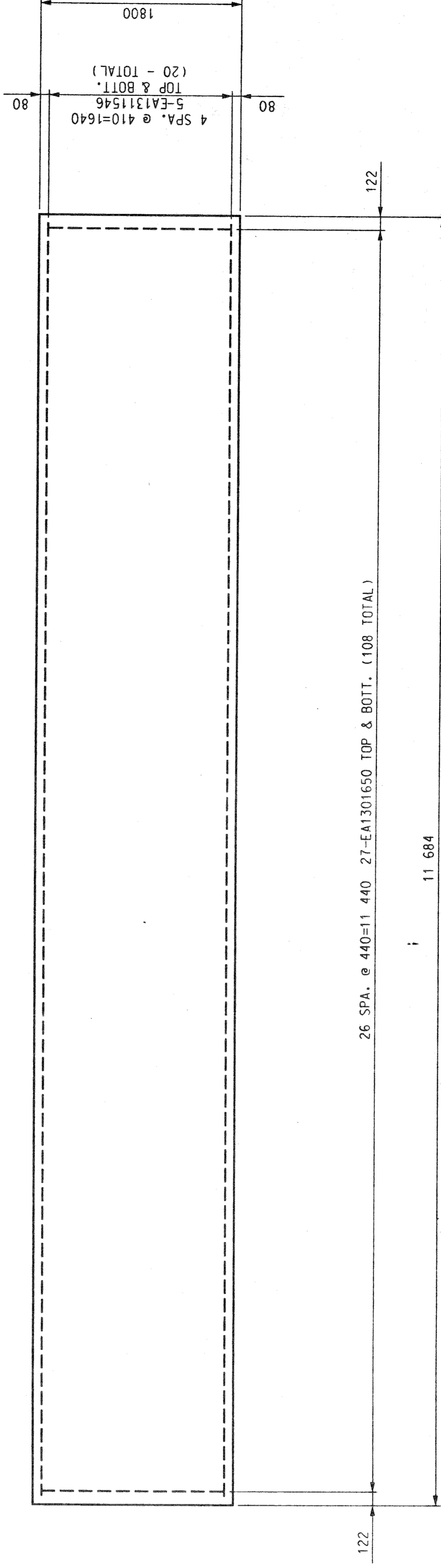


DETAIL A



BRIDGE RAILING ELEVATION

* SHALL BE CAST INTO PRECAST HEADWALL



TYPICAL PLAN OF SIDEWALK

METRIC

DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN. ELEVATIONS, COORDINATES, CURVE AND ALIGNMENT DATA ARE IN METERS. STATIONS ARE IN KILOMETERS + METERS.

PROJECT NO. 9641-5160-02
SHEET NO. K2 OF 22

MISCELLANEOUS DETAILS

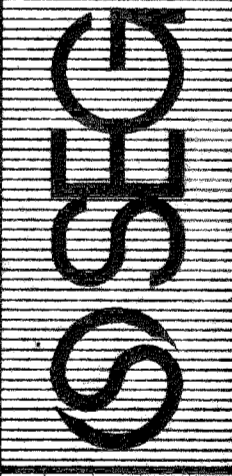
KORTE AVE. OVER THE FOX CREEK

CITY OF DETROIT MICHIGAN



F.T.A. FEMI TALABI & ASSOCIATES INC. 650 GREENWICH SUITE 400 DETROIT, MICHIGAN 48226

SNELL ENVIRONMENTAL GROUP, INC. A TRUST COMPANY 1501 W. COYOTE ST. SUITE 520 DE TROIT, MICHIGAN 48226 TEL: 313.371.7611 FAX: 313.371.7611



DESIGN BY	H.J.	6-97
DR'N BY	J.E.	6-97
CHK'D BY	C.D.P.	7-97
APP'D BY		

REVISIONS	

SPECIFICATIONS FOR MANUFACTURE AND INSTALLATION OF PRECAST CULVERT BRIDGE SYSTEMS

1. DESCRIPTION

This work shall consist of constructing a Cor/Span culvert or precast reinforced concrete Cor/Span culverts or approved equipment manufactured in accordance with this specification shall be designated by span and rise.

2. TYPES

Precast reinforced concrete Cor/Span culverts or approved equipment manufactured in accordance with this specification shall be designated by span and rise.

3. MATERIALS - CONCRETE

The concrete for the culverts shall be air-entrained when installed in areas subject to freeze-thaw conditions, composed of portland cement, fine and coarse aggregates, admixtures and water. Concrete shall conform to ASTM C 150. The air-entraining admixture shall conform to ASTM C 497.

- 3.1 Cement - Portland cement shall conform to the requirements of ASTM Specifications C150-Type 1, Type I, or Type III cement.
- 3.2 Course Aggregate - Shall consist of stone having a maximum size of 25 mm. Aggregate shall meet requirements for ASTM C 33.
- 3.3 Water Reducing Admixture - The manufacturer may submit or approve by the Engineer, water reducing admixture for the concrete, which will improve workability and reduce the water requirement for the concrete.
- 3.4 Calcium Chloride - The addition to the mix of calcium chloride or admixtures containing calcium chloride will not be permitted.

4. MATERIALS - STEEL REINFORCEMENT AND HARDWARE

All reinforcing steel for the culverts shall be fabricated and placed in accordance with the detailed shop drawings submitted by the manufacturer.

- 4.1 Steel Reinforcement - Reinforcement shall consist of welded wire fabric conforming to ASTM Specification A 185, CR 497, or deformed billet steels conforming to ASTM Specification A 615, Grade 60, or deformed billet steels conforming to ASTM Specification A 615, Grade 60, or deformed billet steels conforming to ASTM Specification A 615, Grade 60.

5. MANUFACTURE

- 5.1 Mixture - The aggregates, cement and water shall be proportioned and mixed in a batch mixer to produce a homogeneous concrete meeting the requirements of Section 7. The concrete shall be placed in the forms within 30 minutes of the time of batching. The concrete shall be placed in the forms within 30 minutes of the time of batching. The concrete shall be placed in the forms within 30 minutes of the time of batching.
- 5.2 Curing - The precast concrete culvert units shall be cured for a sufficient length of time so that the concrete will develop the specified compressive strength in 28 days or less. The curing shall be by any means of curing or combinations thereof that shall be used.
- 5.2.1 Steam Curing - The culverts may be low pressure, steam cured by a system that will maintain a moist atmosphere.
- 5.2.2 Water Curing - The culverts may be water cured by any method that will keep the sections moist.
- 5.2.3 Membrane Curing - A sealing membrane conforming to the requirements ASTM Specification C 309 may be applied and shall be left intact until the required concrete compressive strength is attained. The concrete temperature at the time of application shall be within 6 degrees C. of the atmospheric temperature. All curing compounds shall be applied in the proportion of the compound and shall be damp when the compound is applied.

6. DESIGN

- 6.1 The culvert dimension and reinforcement details shall be as prescribed in the plan and the shop drawings provided by the manufacturer subject to the provisions of Section 7. The minimum concrete compressive strength shall be 28 MPa. The minimum steel yield strength shall be 400 MPa.
- The culverts are designed in accordance with the "Standard Specifications for Highway Bridges," adopted by the American Association of State Highway and Transportation Officials, 1996; and the Alternate Military Loading, A minimum of 300 mm of cover above the loading of the culvert is required in the installed condition, unless noted otherwise and designed accordingly.
- 6.2 Placement of Reinforcement - The cover of concrete over the outside circumferential reinforcement shall be 50 mm minimum. The cover of concrete over the inside circumferential reinforcement shall be 40 mm minimum. The clear distance of the reinforcement shall be 50 mm from the ends of the culvert. Reinforcement shall be assembled utilizing single or multiple layers of welded wire fabric, or utilizing a single layer of deformed billet-steel bars. The welded wire fabric shall be composed of circumferential and longitudinal wires meeting the spacing requirements of 6.4 and shall contain sufficient longitudinal wires extending through the reinforcement. Longitudinal distribution reinforcement may be welded wire fabric or deformed billet-steel bars and shall meet the spacing requirements of 6.4. The ends of the longitudinal distribution reinforcement shall be not more than 75 mm from the ends of the culvert.
- 6.3 Bending of Reinforcement - The outside and inside circumferential reinforcing steel for the corners of the culvert shall be bent to such an angle that is approximately equal to the configuration of the culvert's outside corner.
- 6.4 Laps, Welds, and Spacing - Tension splices in the circumferential reinforcement shall be made by lapping. Laps may be lap, welded lap, or welded lap. Spacing shall meet the requirements of ACI 12.8 and shall meet the requirements of ACI 12.8 and 12.18. For deformed billet-steel bars, the overlap shall meet the requirements of ACI 12.2. For splices other than tension splices, the overlap shall be a minimum of 300 mm for welded wire fabric or deformed billet-steel bars. The spacing center to center shall be not less than 50 mm nor more than 100 mm. For the wire fabric, the spacing center to center of the longitudinal wires shall not be more than 200 mm. The spacing center to center of the longitudinal distribution steel for either line of reinforcing in the top slab shall be not more than 400 mm.

7. PERMISSIBLE VARIATIONS

- 7.1 Internal Dimensions - The internal dimension shall vary not more than 1% from the design dimensions nor more than 40 mm whichever is less. The haunch dimensions shall vary not more than 20 mm from the design dimension.
- 7.2 Slab and Wall Thickness - The slab and wall thickness shall be not less than that required by the design, but shall not be more than 6 mm. A thickness more than that required in the design shall not be cause for rejection.
- 7.3 Length of Opposite Surfaces - Variations in laying lengths of two opposite surfaces of the culvert shall not be more than 16 mm in any culvert section, except where beveled ends for laying of curves are specified by the purchaser.
- 7.4 Length of Section - The under-run in length of a section shall not be more than 13 mm in any culvert.
- 7.5 Position of Reinforcement - The maximum variation in position of the reinforcement shall be ± 13 mm. In no case shall the cover over the reinforcement be less than 40 mm for the outside circumferential steel or be less than 25 mm for the inside circumferential steel measured to the external or internal surface of the culvert. These tolerances or cover requirements do not apply to mating surfaces of the joints.
- 7.6 Area of Reinforcement - The areas of steel reinforcement shall be as shown on the design. Areas shown greater than those required shall not be cause for rejection. The permissible variation in diameter of any reinforcement shall conform to the tolerances of any reinforcement.

13. REJECTION

Culverts shall be subject to rejection on account of any of the specification requirements. Individual culverts may be rejected because of any of the following:

- 13.1 Fractures or cracks passing through the wall, except for surface cracks, or joints that does not exceed one half the thickness of the wall.
- 13.2 Defects that indicate poor proportioning, mixing, and molding not in compliance with Section 5.
- 13.3 Honeycombed or open texture, and
- 13.4 Damaged ends where such damage would prevent making a satisfactory joint.

14. MARKING

Each culvert shall be clearly marked by waterproof paint, following the marking shown on the inside of the vertical leg of the culvert section.

Culvert Section Span X Culvert Rise
Date of Manufacture
Name or trademark of the manufacturer
And in the case of headwall sections, east or west face shall also be marked

15. CONSTRUCTION REQUIREMENTS

- 15.1 Footings - The culverts shall be installed on either precast or cast-in-place concrete footings. The design size and elevation of the footers shall be as determined by the Engineer. A 75 mm deep keyway shall be formed in the top surface of the footing 75 mm clear of the outside faces of the culvert, unless specified otherwise on the plans. The footings shall be given a smooth finish and shall reach a compressive strength of 14 MPa before placement of the culvert sections. The completed footing surface shall be finished with a 3000 mm grid shown on the plans. When tested with 3000 mm grids, the concrete shall not vary more than 6 mm in 3000 mm. If a precast concrete footer is used, the contractor shall prepare a 100 mm thick layer of compacted granular material the full width of the footer prior to placing the precast footer.
- 15.2 Placement of the Culverts - The culverts shall be placed as shown on the Engineer's plan drawings. Special care shall be taken in setting the culverts to the true line and grade. The culverts shall be set on 150 mm X 150 mm masonry or steel shims. A minimum of 13 mm gap shall be provided between the footing and the bottom of the culvert's vertical legs. The footing and the bottom of the culvert shall be sealed with water or cement mortar composed of one part water and cement and three parts of sand by volume and water.
- 15.3 External Protection of Joints - The butt joint made by two adjoining culverts shall be protected with a minimum of 230 mm round equivalent piece of butyl tape and a minimum of 230 mm wide joint wrap. The surface shall be free of dirt before applying the joint material. A primer compatible with the joint wrap to be used shall be applied for a minimum width of 230 mm on each side of the joint. The external wrap shall be either EZ-WRAP RUBBER by PRESS-SEAL GASKET CORPORATION, SEAL WRAP by MAR MAC MANUFACTURING CO. INC. or approved equal. The joint shall be covered continuously from the bottom of the culvert leg, across the top of the arch and to the opposite culvert leg. The top of the arch and the joint wrap shall be a minimum of 150 mm long with the overlap running downhill.

In addition to the joints between units, the joint between the end unit and the headwall shall be sealed. If using precast wingwalls, the joint between the end bridge unit and the wingwall shall be sealed with this type of wrap or at the discretion of the Engineer, filter fabric shall be substituted.

During the backfilling operation, care shall be taken to keep the joint wrap in its proper location over the joint.

16. MEASUREMENT AND PAYMENT

The completed work as measured for Precast Culvert will be paid for at the contract unit price for the following contract item (pay item).

Pay Item	Pay Unit
10.973 x 3962 Precast Concrete Culvert	Meter
Three - Sided Box Culvert	

Payment for Precast Culvert shall be payment in full for labor and materials necessary to design, manufacture and install the culvert. This shall include the cost of the culvert, the arch elements, casting holes, in the elements as needed for arch drapings, casing in the anchor assembly per STD B-18-B furnishing and placing the gasket between the footings and the arch elements, precast headwall units, steel connection plates between units, and furnishing and placing the joint waterproofing.

15.4 Backfill

Backfill shall be considered as all replaced excavation material placed in the space between the culvert and the adjacent bridge units and wingwalls. The project contractor shall be responsible for the design and construction of the backfill. The project contractor shall be responsible for the design and construction of the backfill. The project contractor shall be responsible for the design and construction of the backfill.

Backfill material for a minimum width of 1220 mm on each side of the culvert, from the base of the unit to 300 mm above the outside corner, shall be a soil meeting AASHTO classification A1, A2, A3, or A4. The material shall be compacted to 95% relative density. The material shall be compacted to 95% relative density. The material shall be compacted to 95% relative density.

No backfill shall be placed against any structural elements until they have been approved by the Engineer. Backfill against a waterproofed surface shall be placed carefully to avoid damage to the waterproofing material.

Mechanical tampers or approved compacting equipment shall be used to compact the backfill. The backfill shall be placed adjacent to each side of the culvert and over the top of the culvert unit. The backfill shall be placed to a minimum depth of 300 mm. The backfill within 1220 mm of each side of the culvert shall be placed in lifts of 200 mm or less (loose depth). Heavy compaction equipment shall not be operated in this area or over the culvert until it is covered to a depth of 300 mm.

Lightweight dozers and graders may be operated over earth having one 300 mm of compacted cover, but heavy earth moving equipment larger than a D-4 Dozer weighing in excess of 107 kN and having track pressures of 55 kPa or greater shall require 600 mm of cover unless the design cover is less than 600 mm. In no case shall the design cover be less than 600 mm. In no case shall the design cover be less than 600 mm.

Any additional fill and subsequent excavation required to provide the minimum cover shall be made at no additional cost to the project.

As a precaution against introducing unbalanced stresses in the culvert and wingwalls, when placing backfill at no time shall the difference between the heights of fill on opposite sides of the culvert exceed 600 mm.

Backfill in front of wingwalls shall be carried to ground lines shown in the plans.

METRIC

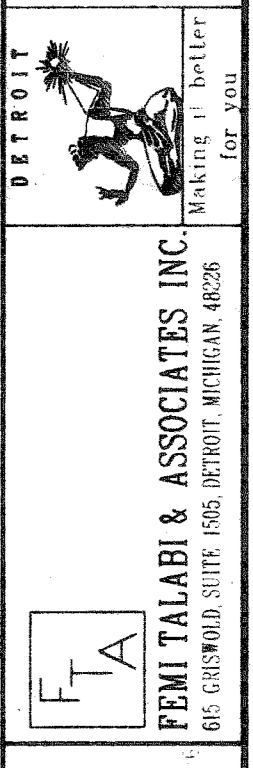
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SCALE	NOT TO SCALE
PROJECT NO.	9641-5160-02
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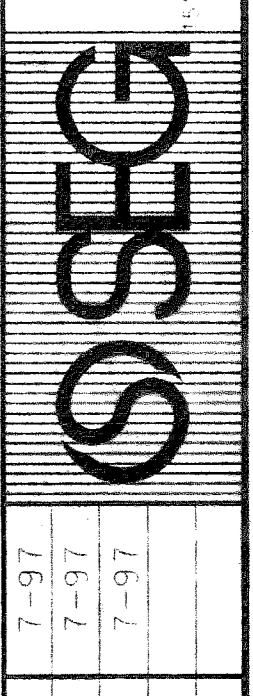
CITY OF DETROIT
MICHIGAN

KORTE AVE. OVER
THE FOX CREEK

PRECAST
CULVERT
SPECIFICATIONS



SNELL
ENVIRONMENTAL
GROUP, INC. A 100% COMPANY
1146 G. ORR ST. STE. 208, DETROIT, MICHIGAN 48202
TEL: (313) 961-4940 FAX: (313) 961-4940

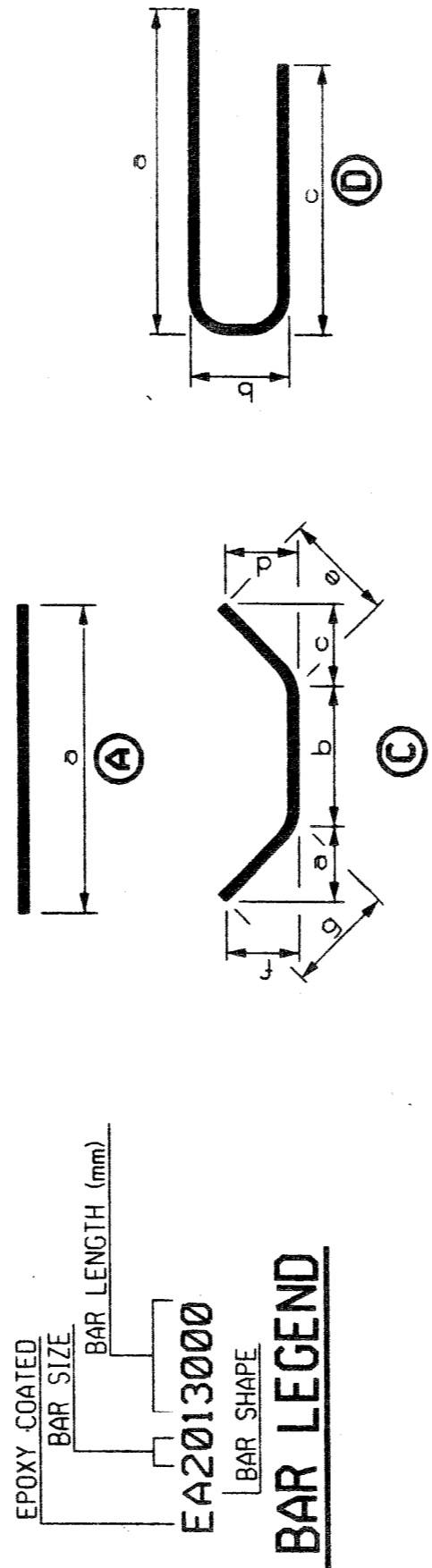


DESIGN BY	F.I.	7-97
DR'N BY	J.E.	7-97
CK'D BY	CDP	7-97
APP'D BY		

REVISIONS	

BAR	DIMENSIONS											NO. RECD	TOTAL MASS
	a	b	c	d	e	f	g	h	j	k	m		
A1905533	5533											28	346
A1913000	13000											10	291
A1913358	13358											14	418
C1903302	866	2302	0	0	0	500	1000					10	75
C1903557	906	2357	0	0	0	423	1000					10	79
D1302968	1059	850	1059									84	248
D1304334	1742	850	1742									112	482
SUBTOTAL = 1939 kg													
EA1301650	1650											108	177
EA1311546	11546											32	367
EA1901878	870	138	870									56	235
EPoxy SUBTOTAL = 179 kg													

* SHALL BE CAST INTO PRECAST HEADWALL.



BAR LEGEND

SUMMARY OF QUANTITIES

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY
1500000	MOBILIZATION, MAX.	Lsum	1
2040005	CURB, REMOVE	m	50
2040013	SIDEWALK, REMOVE	m ²	80
2040020	STRUCTURES, REMOVE	Lsum	1
2047102	FENCE, REMOVAL, SALVAGE AND REPLACE	m	50
2050010	EMBANKMENT, CIP	m ³	100
2060002	BACKFILL, STRUCTURE, CIP	m ³	1200
2060011	EXCAVATION, FOUNDATION	m ³	500
2080025	EROSION CONTROL, SILT FENCE	m	40
3020014	AGGREGATE BASE, 140 mm	m ²	92
3027000	AGGREGATE, 6A (LM)	m ³	42
4017102	10 973 X 3962 PRECAST CONC THREE-SIDED BOX CULVERT	m	12.8
5020115	BIT MIXTURE NO. 1100L 70AA	t	30
5020116	BIT MIXTURE NO. 1100T 70AA	t	28
7040003	STEEL SHEET PILING, TEMP. LEFT IN PLACE	m ²	514
7060007	CONCRETE, GRADE D	m ³	13
7060010	CONCRETE, GRADE S2, SUBFOOTING	m ³	4
7060020	SUBSTRUCTURE CONCRETE	m ³	89
7060030	REINFORCEMENT, STEEL	kg	1939
7060031	REINFORCEMENT, STEEL, EPOXY COATED	kg	179
7060250	STRUCTURE NAME PLATE	ea	2
7100001	JOINT WATERPROOFING	m ²	7
7100004	BRIDGE RAILING, SOLID PARAPET TYPE	m	24
7110007	BRIDGE RAILING, ONE TUBE	m	56
8027102	MISC. CURB, CONCRETE, DETAIL CD	m	125
8030002	SIDEWALK, CONCRETE, 100 mm	m	80
8110241	PAVT MRKG, REGULAR DRY, 100 mm, WHITE	m	80
8120026	PAVT MRKG, REGULAR DRY, 100 mm, YELLOW	m	80
8120027	PLASTIC DRUM, LIGHTED, FURN	ea	20
8120036	BARRICADE, TYPE III, LIGHTED, OPER.	ea	20
8120037	BARRICADE, TYPE III, LIGHTED, OPER.	ea	8
8120060	SIGN, TYPE B TEMPORARY, PRISMATIC RETRIFLEC SHEETING	m ²	45
8160007	SEEDING, MIXTURE TUF	kg	2
8160020	FERTILIZER, CHEMICAL NUTRIENT, CLASS A	kg	2
8160077	MULCH BLANKET	m ²	70
2040011	PAVT MEM	m ²	755
2160003	WATER	kl	15
2120054	MISC TRAFFIC DEVICES	Lsum	1

REINFORCEMENT SHALL BE BUNDLED AND TAGGED AS TO THE LOCATION AS SHOWN ON THIS SHEET.

ALL BENDS IN REINFORCING STEEL TO BE MADE ABOUT A PIN OF THE MINIMUM DIAMETER ALLOWED BY THE STANDARD SPECIFICATIONS.

TOLERANCES IN CUTTING AND BENDING BARS ARE AS ESTABLISHED IN THE MANUAL OF STANDARD PRACTICE OF THE CONCRETE REINFORCING STEEL INSTITUTE AND DETAILING MANUAL OF THE AMERICAN CONCRETE INSTITUTE.

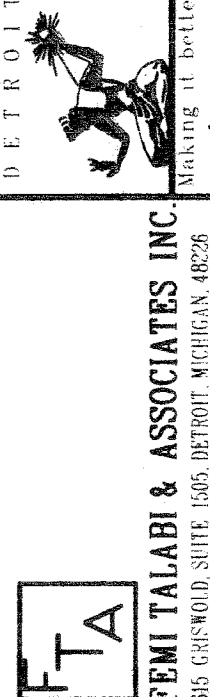
WHERE FIELD CUTTING OF EPOXY BARS IS REQUIRED, THE CONTRACTOR SHALL REPAIR THE EPOXY COATING AT THE CUT END AS PROVIDED FOR IN STANDARD SPECIFICATION 706.03.E.6.

METRIC

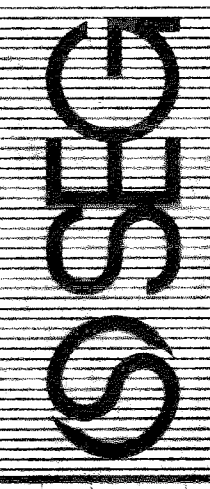
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SCALE NOT TO SCALE
PROJECT NO. 9641-5160-02
SHEET 15 OF 22

CITY OF DETROIT
MICHIGAN
KORTE AVE. OVER
THE FOX CREEK



SNELL ENVIRONMENTAL GROUP, INC. a wholly owned subsidiary of FTA
10000 WOODWARD AVENUE, SUITE 1000, DETROIT, MI 48202
TEL: (313) 963-4000

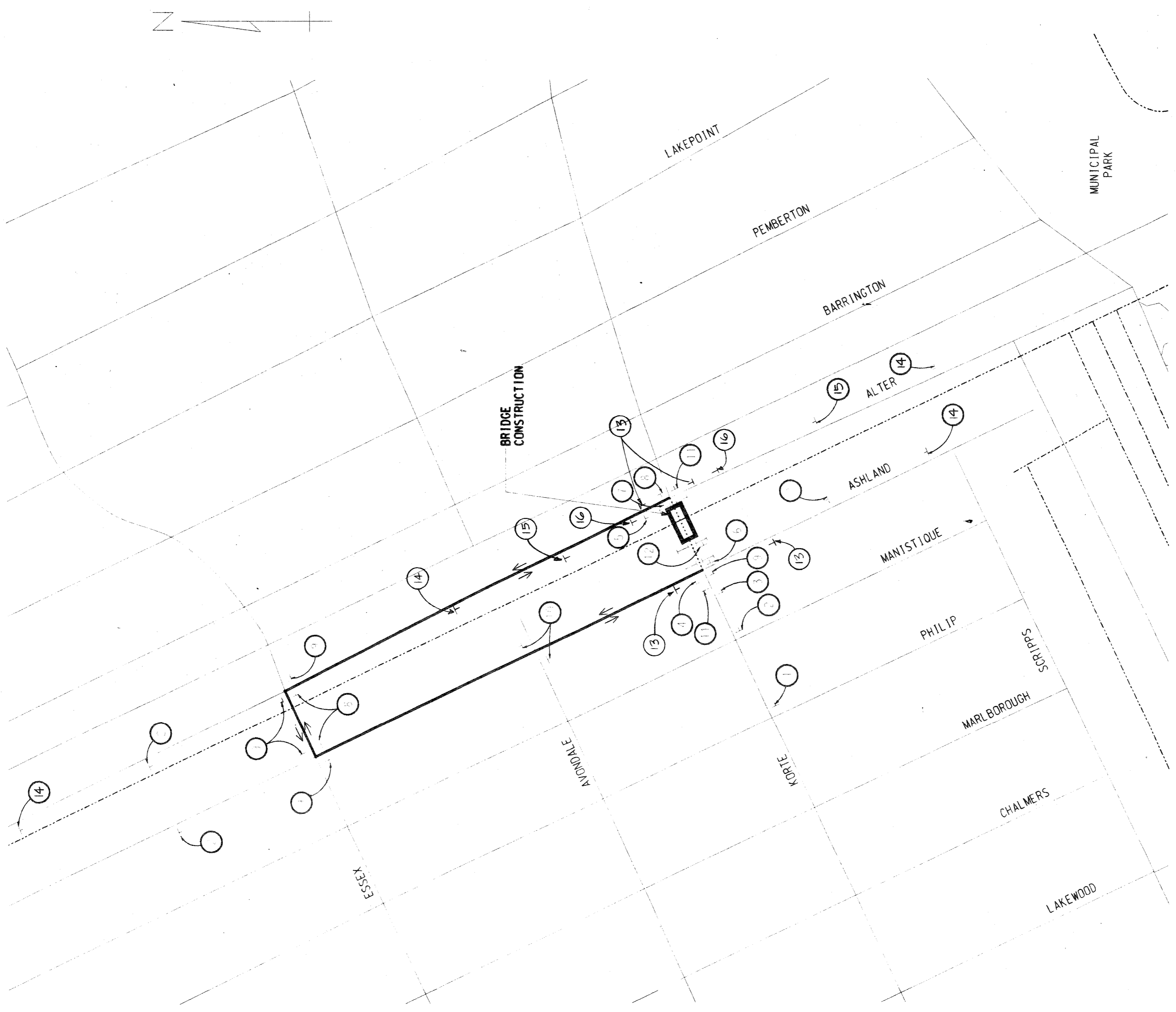


DESIGN BY	F.T.	7-97
DR'N BY	J.E.	7-97
CK'D BY	C.D.P.	7-97
APP'D BY		

REVISIONS		

MISCELLANEOUS QUANTITIES			
ITEM	UNIT	AMOUNT	
BARRICADE - TYPE III, LIGHTED, OPER	ea	8	
BARRICADE - TYPE III, LIGHTED, FURN	ea	8	
PLASTIC DRUM, LIGHTED, OPER	ea	20	
PLASTIC DRUM, LIGHTED, FURN	ea	20	
STON, TYPE B, TEMPORARY, PRISMATIC RETROREFLECTIVE SHEETING	m ²	45	

SIGN TYPE LEGEND	
—	SIGN, TYPE B
---	TYPE III BARRICADE



SIGN CHART, CONTINUED FROM BELOW			
I.D. NUMBER	SIGN	SIZE	NUMBER REQUIRED
16		1200x1200	2
15		1200x1200	2
14		1200x1200	4

SIGN CHART			
I.D. NUMBER	SIGN	SIZE	NUMBER REQUIRED
1		1200x1200	1
2		1200x1200	1
3		1200x1200	1
4		900x300	1
		525x375	1
5		900x300	1
		525x375	1
6		1500x750	1
		1200x450	1
7		1200x750	1
		1200x450	1
8		900x300	1
		750x600	1
9		900x300	1
		750x600	1
10		900x300	1
		750x600	2
11		600x450	2
12		1200x750	1
13		1500x750	4
		1200x750	4

NOTES:
 THE CONTRACTOR WILL FURNISH AND ERECT THE SIGNS LISTED ON THE SIGN CHART AT THE LOCATIONS SHOWN.
 AS DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ANY ADDITIONAL SIGNS, BARRICADES AND LIGHTS WITHIN THE PROJECT TO PROTECT THE TRAFFIC AND WORK AREA.
 THE CONTRACTOR SHALL PLACE SANDBAGS ON BARRICADES TO PREVENT MOVEMENT OF THE BARRICADES. THE CONTRACTOR SHALL ATTACH AND MAINTAIN THREE (3) STEADY BURN AMBER LIGHTS (TYPE "C") ON EACH OF THE BARRICADES.
 THE CONTRACTOR SHALL ATTACH AND MAINTAIN ONE (1) BATTERY OPERATED AMBER FLASHER LIGHTS (TYPE "A") AND ONE (1) ORANGE FLUORESCENT DAY-GLO FLAG ON EACH ADVANCE CONSTRUCTION SIGN (SIGNS 1, 2 & 3).
 TRAFFIC CONTROL SIGNS WHICH ARE REMOVED FROM THE VICINITY OF THE PROJECT DUE TO INTERFERENCE SHALL BE TURNED OVER TO THE CITY. UPON COMPLETION OF THE PROJECT, TRAFFIC CONTROL SIGNS AND STREET NAME SIGNS WILL BE RESET IN THEIR PROPER POSITION BY THE CONTRACTOR.
 THE CONTRACTOR SHALL NOT BEGIN ANY OPERATIONS ON THE PROJECT UNTIL ALL OF THE SIGNS HAVE BEEN POSITIONED AND FLASHER LIGHTS AND FLAGS ARE ATTACHED TO ALL REQUIRED SIGNS AND BARRICADES.
 ANY OTHER SIGNS WHICH THE CONTRACTOR MAY BE REQUIRED TO FURNISH SHALL CONFORM TO THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
 ALL CONSTRUCTION SIGNS SHALL CONFORM TO MDT 1996 STANDARD SPECIFICATIONS FOR CONSTRUCTION 812.02.B.1.
ALTER ROAD WILL REMAIN OPEN TO TRAFFIC

METRIC
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DETOUR PLAN KORTE AVE.

	PROJECT NO. 9641-5160-02	SCALE NOT TO SCALE
	SHEET NO. 149 OF 22	DETOUR ROUTE DETAILS
CITY OF DETROIT MICHIGAN	KORTE AVE. OVER	DETOUR ROUTE DETAILS
SNELL ENVIRONMENTAL GROUP, INC. A CITY COMPANY 11000 W. MICHIGAN AVE. #200 E. FRENCH, MI 48133-3613-3640	FEMITAJABI & ASSOCIATES INC. 515 GERRARD ST. E. SUITE 1500, DETROIT, MICHIGAN 48226	REVISIONS
DSN BY F.T. 7-97 DR'N BY J.E. 7-97 CK'D BY C.D.P. 7-97 APP'D BY		