

CANADA - BRITISH COLUMBIA

FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

Inventory and Engineering Branch
Ministry of Environment
Victoria, British Columbia

Water Planning and Management Branch
Inland Waters Directorate
Pacific Region
Department of the Environment
Vancouver, British Columbia

DISTRICT OF SURREY

Operation and Maintenance Instructions

Flood Control Works

Volume 3

As Constructed Works

Crippen Consultants
1605 Hamilton Avenue
North Vancouver, B.C.
V7P 2L9

District of Surrey

Operation and Maintenance Instructions

Flood Control Works

THE MANUAL

The operation and maintenance instructions for the flood control works for the District of District of Surrey are provided in two volumes:

VOLUME I GENERAL INSTRUCTIONS

VOLUME 3 AS-CONSTRUCTED WORKS

District of Surrey

Operation and Maintenance Instructions

Flood Control Works

Volume 3

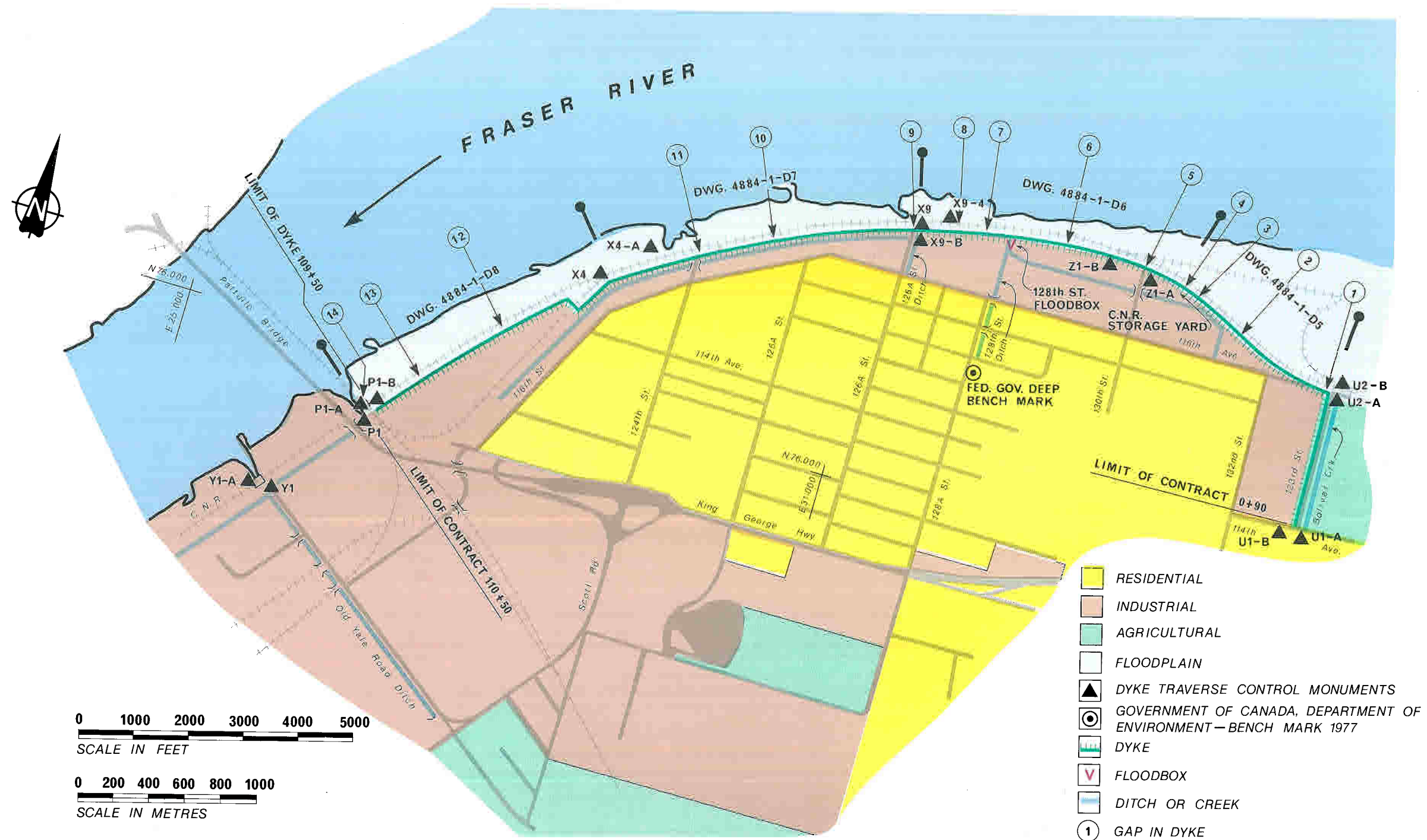
As Constructed Works

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DISTRICT OF SURREY BRIDGEVIEW AREA

DESCRIPTION OF CONSTRUCTED WORKS

I. DESCRIPTION OF CONSTRUCTED WORKS

I.1 Dyke

I.1.1 General

Arrangements were made for the removal of the Canadian National Telecommunications (CNT) pole line from along the Canadian National Railways (CNR) right-of-way prior to the start of the dyke construction. The CNT pole line was replaced with the buried cable installed approximately 3 feet offset from the end of the ties on the land side of the south track.

Because of the type of sub-surface soil conditions (peat, silt and clay) varying amounts of settlement was anticipated along the dyke. In order to monitor the settlement and detect lateral movements during construction, settlement pipes and slope indicator gauges (lateral movement gauges) were installed prior to commencing dyke construction. Total settlements and lateral movements recorded at completion of construction are shown in Appendix 3 - Instrumentation.

I.1.2 Embankment

a. Dyke Embankment

The dyke embankment was constructed from screened sand obtained from the Hillside pit near Victoria. The dyke fill was delivered to the site by barges to the Construction Aggregates dock at Musqueam Drive, Bridgeview, Surrey, B.C.

Typical gradation curves and maximum dry (Proctor) density analyses are shown in Appendix 2 - Dyke Materials.

Filter cloth - "Permaliner-Type I" was used under the filter gravel to prevent loss of dyke material by piping through the dyke fill.

b. Station 0+26 to 12+36 (Bolivar Creek)

In this area unsuitable fill from building demolitions and other sources was stockpiled in the area of the new dyke. The Contractor removed this unsuitable material and wasted it in the adjoining property with the Owner's approval. Stripping of this unsuitable material from the new dyke location revealed deposits of hog fuel. The hog fuel to the west of the dyke embankment was removed to a depth of 3 feet and backfilled with dyke fill. River sand from the structural excavation was used in this area for building the bottom 2 feet of the dyke while the remaining part of the dyke was built with the standard dyke fill material.

Varying amounts of settlement up to 5 feet was expected in this area, therefore, the dyke crest was built up to El 19 feet in the centre and 18 feet at both ends. The preload has been left in

place to allow settlement to occur with time. Settlement to the end of construction has been shown in Appendix 3 - Instrumentation.

c. Station 13+00 to 19+80 and 23+00 to 33+95

The dyke in this area was previously constructed by the C.N.R. for the Inventory and Engineering Branch (formerly Water Investigations Branch). Reconstruction of the dyke in this area was mainly to bring the dyke crest up to grade with dyke fill material plus topping with 6 inches of dyke surfacing.

d. Station 19+80 to 23+00

Stripping of the overburden and structural excavation for the dyke wall in this area revealed unstable ground due to a high water table and seepage out of the bank. To overcome this problem a very clean free draining material (Modified Filter Gravel) was placed on the landside slope of the dyke.

e. Station 33+95 to 48+29

The dyke consists of a low embankment built with typical dyke fill and filter cloth covered with filter gravel.

f. Station 48+29 to 56+09

The dyke in this area was built with typical dyke fill and filter cloth covered with filter gravel. The existing drainage ditch paralleling the dyke in this area was filled with typical dyke fill material after the bottom of the ditch had been cleaned of all soft unsuitable material.

g. Station 56+09 to 57+29

A gap has been left in the construction of the dyke in this location to facilitate construction of a pumphouse at this location at a later date. The dyke and dyke wall will be constructed under Contract No. 3.

h. Station 57+29 to 76+80

The dyke embankment was constructed with typical dyke fill material and filter cloth covered with filter gravel. A new ditch was dug to the south of the old ditch which was backfilled with dyke fill material.

New culverts were installed across 126 A Street, Domtar east crossing and Domtar west crossing.

i. Station 76+80 to 89+10A

The dyke embankment was constructed to typical dyke fill and filter cloth covered with filter gravel. A new ditch was ex

cavated to the south of the existing ditch and the existing ditch was backfilled with dyke fill. A new corrugated asphalt coated metal culvert was installed at Station 78+03 in order to save purchasing additional right-of-way at Station 78+13. The gap of 140' in the concrete wall from Station 76+17 to Station 77+57 for the future 124 St. Floodbox was brought up to Dyke wall elevation with dyke fill material and left in place as preload.

A bagged concrete wall was installed from Station 79+38 to 80+62 to save purchasing additional right-of-way at this location.

j. Station 89+10B to 109+73

The low dyke embankment in this area was constructed of typical dyke fill and filter cloth covered with filter gravel. A drainage ditch was dug on the adjacent property as a replacement for the shallow V ditch which was filled in by the dyke embankment.

1.1.3 Concrete Wall

a. Foundation

Stripping and structural excavation for the concrete wall foundation revealed generally good foundation conditions. The concrete wall is generally founded on compacted dyke fill material.

Settlement plates and slope indicator gauges were installed to monitor the settlement and movement of the dyke embankment. Appendix 3 - Instrumentation shows the results of the monitoring.

No excessive settlement or movement was noticed during construction of the embankment and no excessive movement is expected after construction.

b. Concrete

The Contract called for three different classes of concrete based on strength. A tabulation of the concrete design requirements and concrete mix designs are shown in Table I.

CONCRETE MIX - REQUIREMENTS & DESIGN

<u>Specifications</u>	<u>Class I</u>	<u>Class II</u>	<u>Class III</u>
Strength	4000	3000	2000
Cement (lbs per cu yd)	395	345	311
Fly Ash " " " "	92.4	92.4	92.4
Concrete Sand (lbs per cu yd)	1378	1446	1479
Coarse Aggregate:			
10 mm x 5 mm (lbs/cu/yd)	336	336	336
20 mm x 10 mm " " "	1680	1647	1647
Slump (inches)	3"±1"	3"±1"	6"±1-1/2"
Admixture	Pozzololith	Pozzololith	Pozzololith
Air Content (%)	5±1	5±1	5±1
Maximum W/C	0.45	0.50	0.60

c. Joints

The expansion joints in the concrete dyke wall were constructed using water stops, joint filler, joint sealant, bondbreaker and joint primer.

The water stop was a PVC Durajoint type 7C. The joint filler was Rodoflex GR grade, while the joint sealant was Duoflex non-sag polysulphide. The bond breaker between the joint filler and joint sealant was ordinary masking tape. The joint primer used was Polyprime 2.

1.2 Outlet Works 128th Street Floodbox

1.2.1 Foundation

The inlet, outlet and concrete culvert pipe installed in open trench was founded on dense Fraser River sand. A section of the concrete culvert pipe which was jacked under the railroad embankment was jacked through sandy, silty soil. The borehole information and the information obtained from the excavation for the inlet, outlet and trench for the concrete pipe shows that the same dense sand deposit would form the foundation for the culvert pipe jacked under the railroad.

Monitoring of the settlement of the pipe was documented and the results are shown in Appendix 3 - Instrumentation.

1.2.2 Concrete

Class I concrete was used for the construction of the inlet and outlet parts of the structure and has been tabulated in Table I of Sub-section 1.1.3 (b).

The concrete test cylinder results as shown in Appendix I - Concrete Test Results showed that the concrete had adequate strength.

1.2.3 Concrete Pipe

The reinforced concrete pipe used for the outlet structure was manufactured to meet the requirements of the current specification ASTM C76 series. Class V pipe was required within the CNR right-of-way while Class III was installed outside the CNR right-of-way. The concrete pipe had tongue and groove type joints which accepted rubber gaskets and thereby were waterproof.

The rubber gaskets were in accordance with the current specification ASTM C433 series.

1.2.4 Riprap

The riprap material was limited to a maximum size of 18 inch and had 50 to 75 percent of the total number of pieces having an average dimension of 12 inch or more and not more than 10 percent of the total number of pieces had an average dimension of less than 3 inches.

Filter cloth Polyfelt TS400 and Fibretex #300 was used under the riprap to prevent loss of foundation material by piping through the voids in the riprap.

1.2.5 Inlet Channel

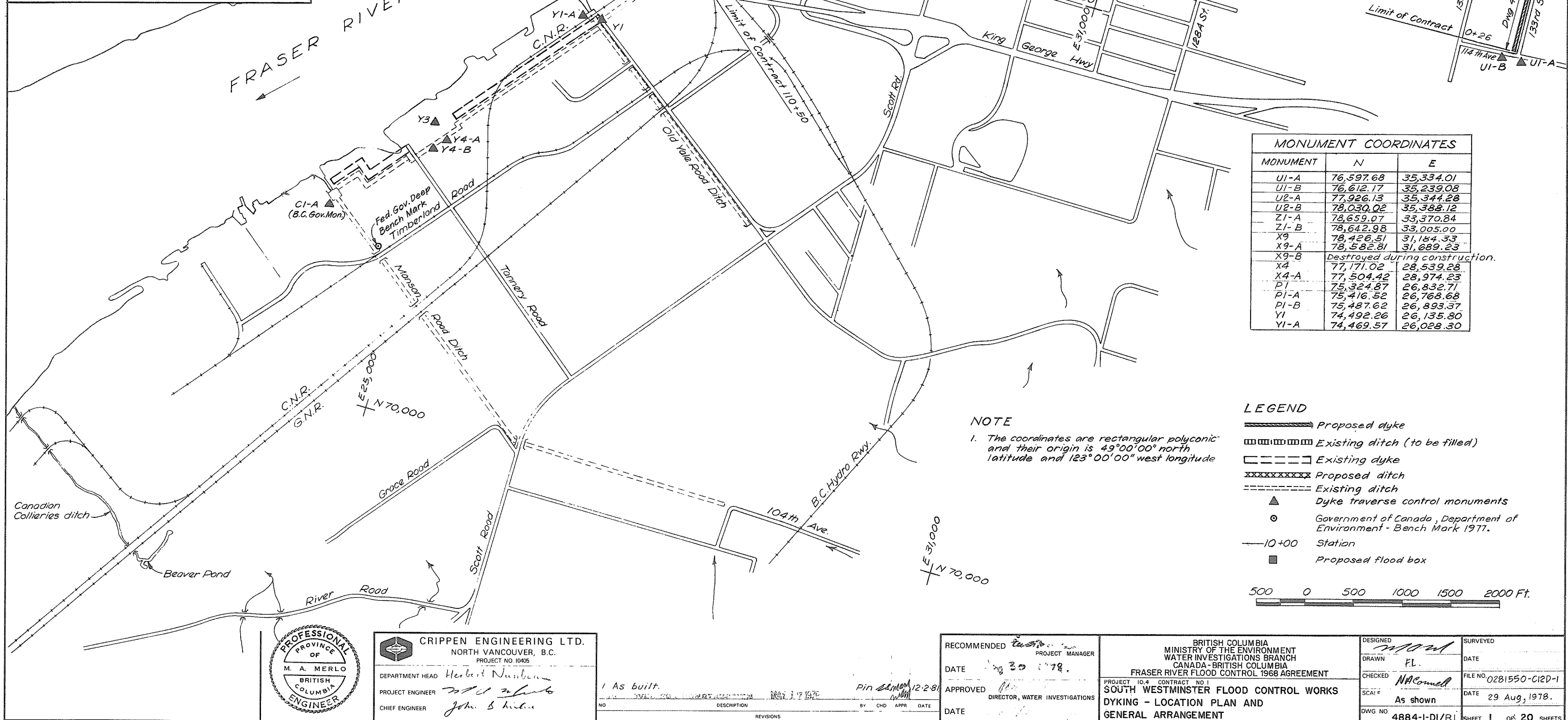
The inlet channel was constructed to connect with the existing 128th Street ditch. Should there be reconstruction of the ditch in this area at a future date the ditch should be constructed to approach the flood box in a straight line.

2. AS-CONSTRUCTED DRAWINGS

2.1 As-Constructed Drawing List

Drawing No.	Title	Provincial 105 mm Negative Number
4884-I-D1/R1	Dyking - Location Plan and General Arrangement	105764
4884-I-D4/R2	Dyke - Station 0+90.00 to 12+99.94 Plan, Profile and Sections	105765
4884-I-D5/R3	Dyke - Station 12+99.94 to 30+45 Plan, Profile and Sections	105766
4884-I-D6/R2	Dyke - Stations 30+45 to 56+25 Plan, Profile and Sections	105767
4884-I-D7/R4	Dyke - Stations 56+25 to 85+35 Plan, Profile and Sections	105768
4884-I-D8/R4	Dyke - Stations 85+35 to 110+50 Plan, Profile and Sections	105769
4884-I-D3/R2	Settlement Plate & Piezometer Details	105770
4884-I-D16/R1	Mill & Timber Spurline Dyke Retaining Walls - Plan & Section	105771
4884-I-D15/R2	Wesco Spurline - Dyke Retaining Walls Plan, Sections and Details	105772
4884-I-D2/R3	Miscellaneous Concrete Details	105773
4884-I-D18/R2	Road Crossings and Stoplog Wall Details	105774
4884-I-D9/R3	Dyke Wall - Concrete Outline and Reinforcement	105775
4884-I-D10/R3	128th Street Floodbox - General Arrangement & Work Areas	105776
4884-I-D11/R2	128th Street Floodbox - Excavation & Backfill - Sheet 1 of 2	105777
4884-I-D12/R2	128th Street Floodbox - Excavation & Backfill - Sheet 2 of 2	105778

Drawing No.	Title	Provincial 105 mm Negative Number
4884-I-D13/R2	128th Street Floodbox - Concrete Outline	105779
4884-I-D14/R2	128th Street Floodbox - Reinforcement	105780
4884-I-D17/R1	128th Street Floodbox - Flood gate	105781
4884-I-D19/R1	128th Street Floodbox - Miscellaneous Metalwork	105782
4884-I-D20/R1	128th Street Floodbox Trashracks	105783



LEGEND

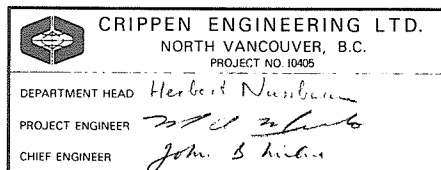
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	Existing ditch (to be filled)
	Existing dyke
	Proposed ditch
	Existing ditch
	Dyke traverse control monuments
	Government of Canada, Department of Environment - Bench Mark 1977.
	Station
	Proposed flood box

500 0 500 1000 1500 2000 F

1. The coordinates are rectangular polyconic and their origin is 49°00'00" north latitude and 123°00'00" west longitude

 *Proposed dyke*
 *Existing ditch (to be filled)*
 *Existing dyke*
 *Proposed ditch*
 *Existing ditch*
 *Dyke traverse control monuments*
 *Government of Canada, Department of Environment - Bench Mark 1977.*
 *10+00 Station*
 *Proposed flood box*

500 0 500 1000 1500 2000 Ft.

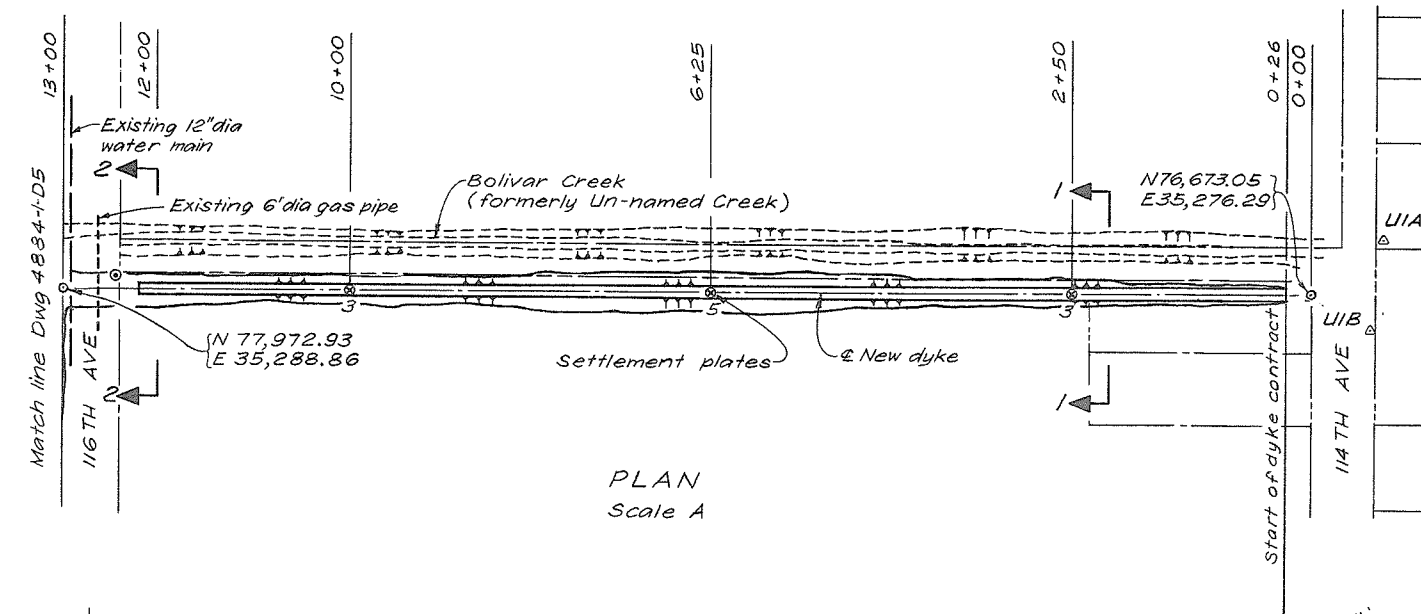
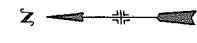


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REVISIONS					

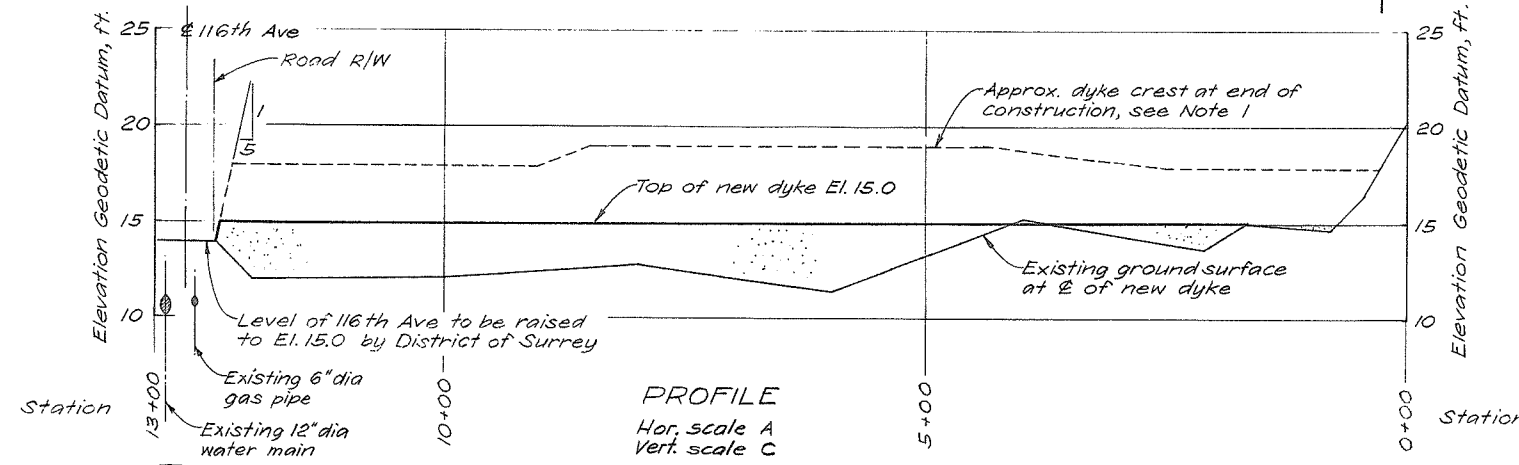
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PROJECT MANAGER
DATE *Aug 30 1978*
APPROVED *[Signature]*
DIRECTOR, WATER INVESTIGATION
DATE *Aug 30 1978*

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PROJECT 10-4	CONTRACT NO. 1
SOUTH WESTMINSTER FLOOD CONTROL WORKS DYKING - LOCATION PLAN AND GENERAL ARRANGEMENT	

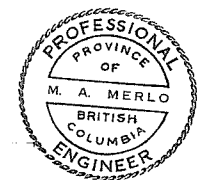
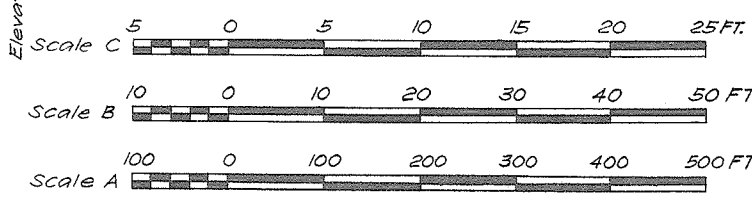
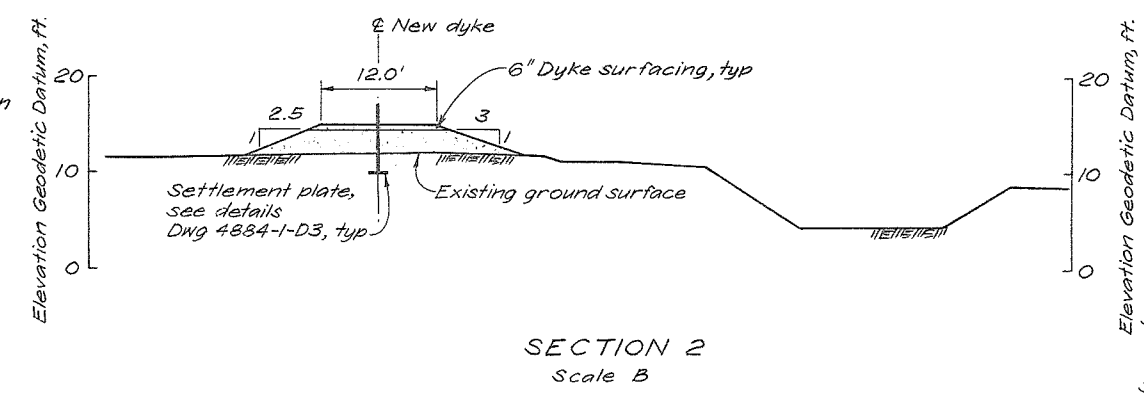
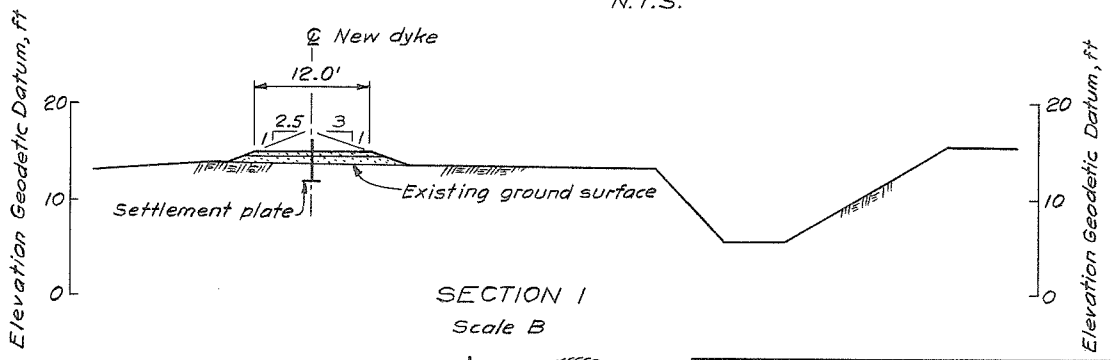
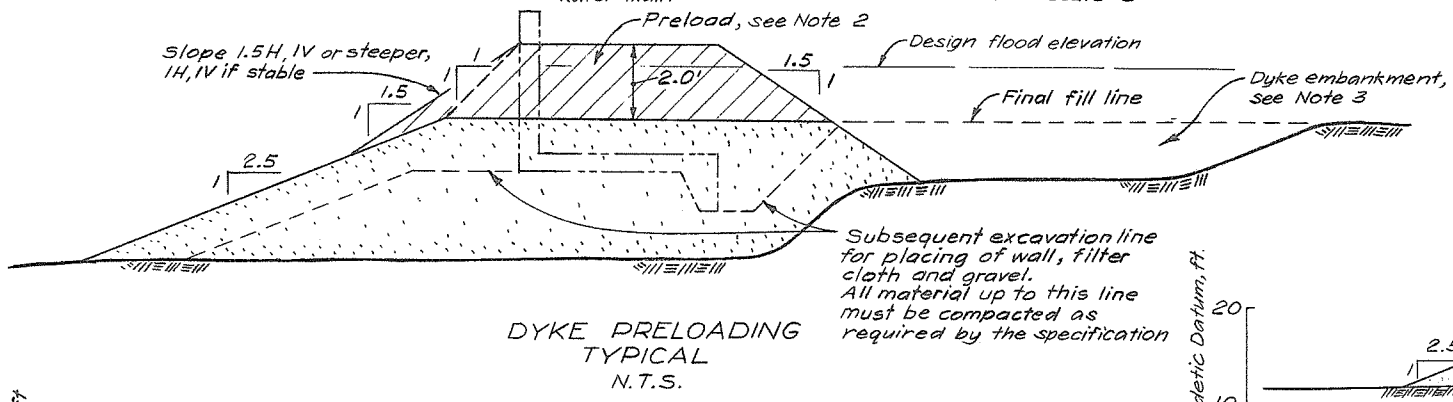
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SCALE	As shown	DATE	29 Aug, 1978.
DWG NO.	4884-1-D12/1	SHEET	1 of 20 SHEETS



- LEGEND**
- | | |
|---|--|
| ⊕ Centreline | AC-CSP Asphalt coated corrugated steel pipe |
| C.N.(R) Canadian National (Railroad) | --- Existing chain link fence |
| R/W Right of way | --- Relocated chain link fence |
| — Railroad | ○ Dyke coordinate |
| ▨ Asphaltic concrete pavement | --- Culvert |
| W.O. Works out (site adjustment) | — Dyke centreline |
| CN-ML CN-Main Line | ⊙ B.C. Hydro power pole |
| CN-SL CN-Switching Lead | --- Legal boundary |
| CN-MW CN-Maintenance walk | ▨ Structural excavation |
| Δ UIA Monument | ▨ Ditch excavation |
| ○ Lateral movement gauge location (Slope indicator casing on plan) | ▨ Fill |
| ○ Lateral movement gauge in section (Slope indicator casing in section) | ⊕ Settlement plate and piezometer on plan, nominal depth of piezometer below existing ground level in ft |
| ⊕ Bottom El. of casing | ⊕ Settlement plate and piezometer in section |
| Canadian National Telecommunication pole | --- Base of rail, south main line |
| | --- New ditch invert (Land side) |



- NOTES**
- The crest elevation at end of construction will depend to some extent on the rate of construction. A settlement of about 5 ft. is expected at Sta. 6+00. Final crest elevation is 15.0. Applies to dyke from Sta. 0+26 to 12+40.
 - The 2.0 ft. of preload shall be placed at all wall locations except where existing ground elevation at the dyke wall location is at or above the proposed surcharge elevation. The duration of preload shall be determined in field by the Engineer.
 - The preload shall be constructed with dyke fill and at the Contractors option the preload material may be incorporated as part of the dyke embankment.
- GENERAL NOTES**
- Dyke stations measured along ⊕ of south railroad track adjacent to dyke. (Not applicable adjacent to Bolivar Creek)
 - All sections taken normal to new dyke centreline or new dyke wall centreline. (Not applicable adjacent to Bolivar Creek)
 - Dyke outline shown in cross-section is section of dyke required. Additional settlement allowance not shown.
 - Unless otherwise indicated, all dyke fill and ditch backfill, except 6\"/>



CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10406

DEPARTMENT HEAD: *Harold Nussbaum*
PROJECT ENGINEER: *John L. L. L.*
CHIEF ENGINEER: *John L. L. L.*

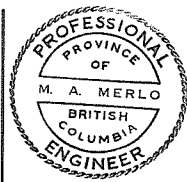
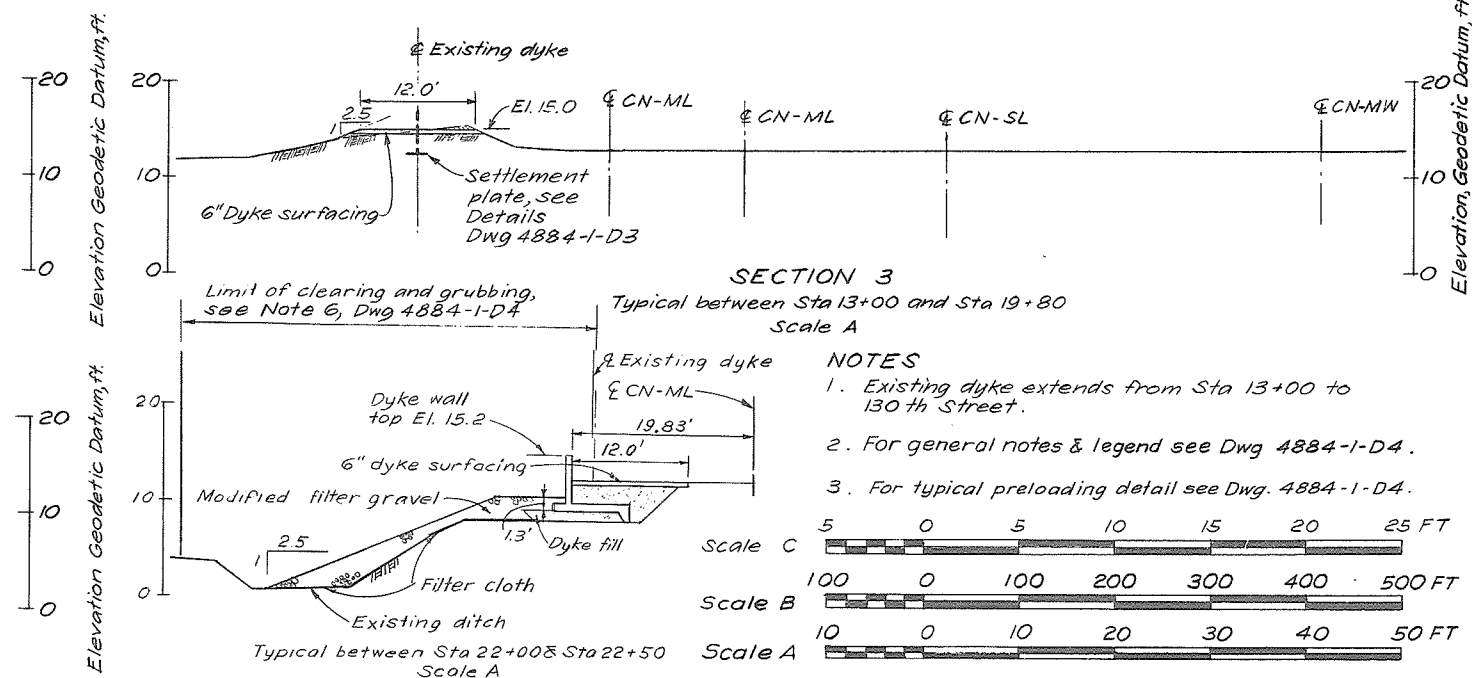
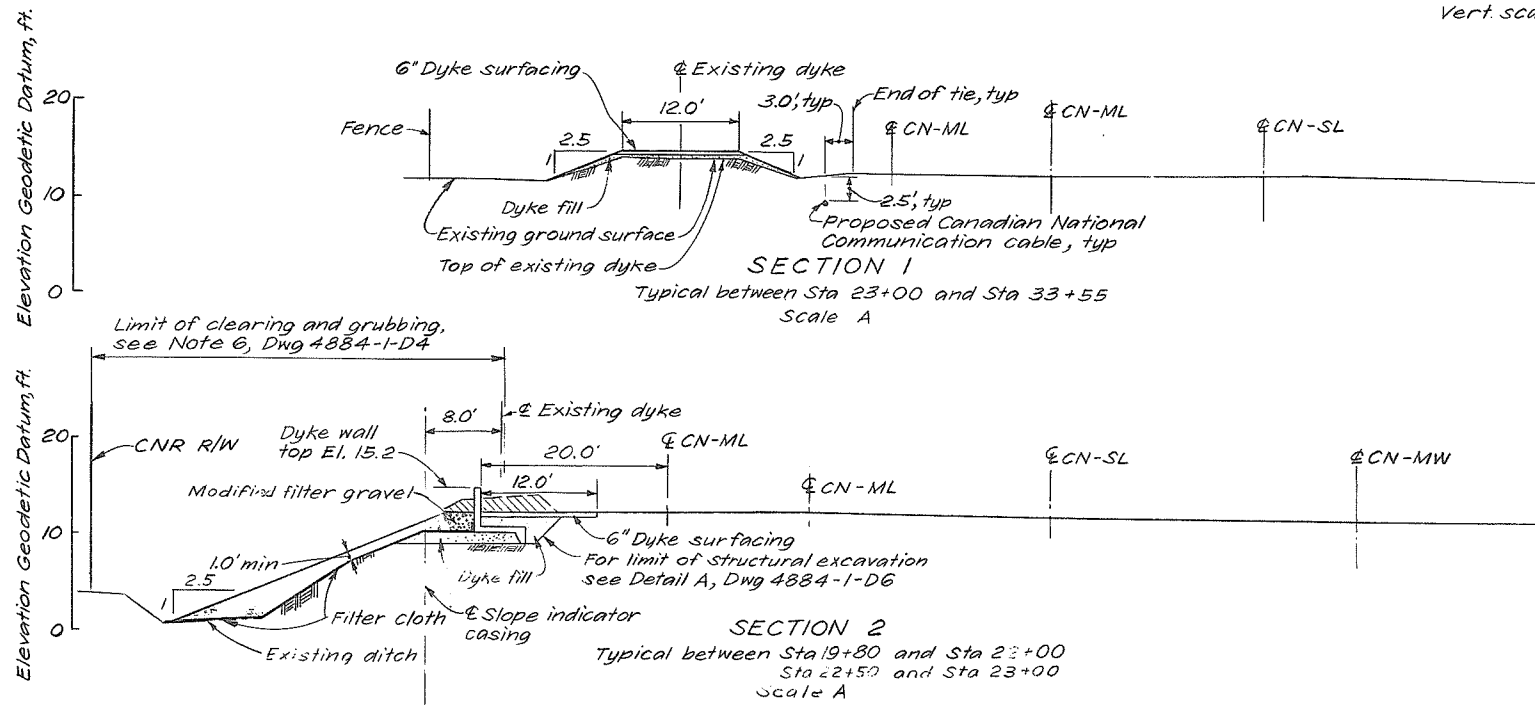
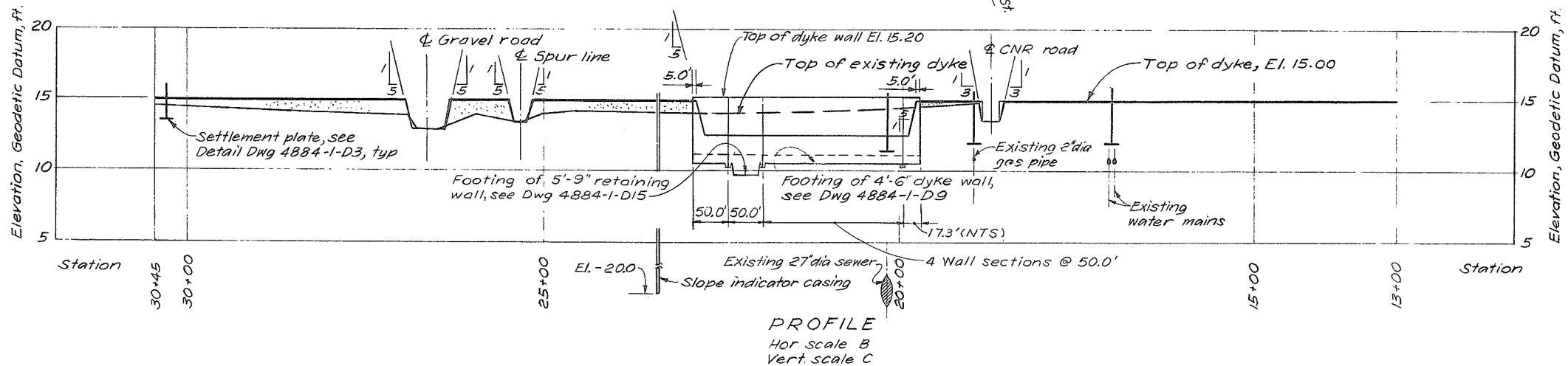
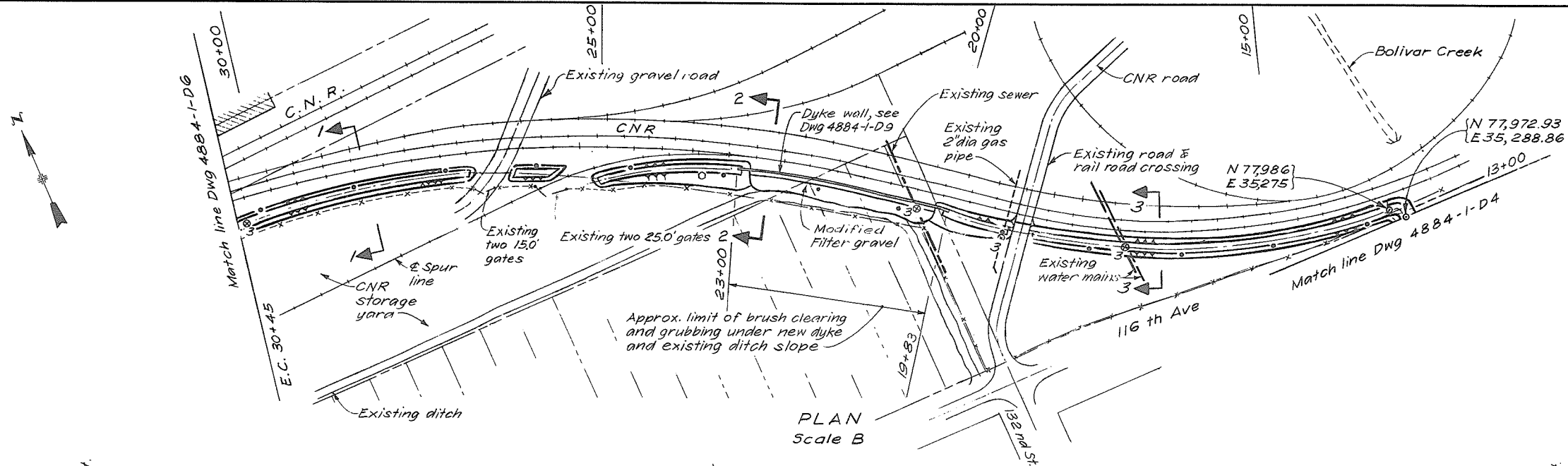
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1. General Note 11 added. General Note 8 revised		FL 20-279		20-279	
Minor revisions as shown.		BY CHD APR 8 1978		DATE	
NO.		DESCRIPTION		BY CHD APR 8 1978	
		REVISIONS			

RECOMMENDED: *John L. L. L.*
PROJECT MANAGER
DATE: *Aug 30 1978*
APPROVED: *John L. L. L.*
FOR DIRECTOR, WATER INVESTIGATIONS
DATE: *Aug 30 1978*

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT
PROJECT 10.4 CONTRACT NO. 1
SOUTH WESTMINSTER FLOOD CONTROL WORKS
DYKE STATIONS: 0+90.00 TO 12+99.94
PLAN, PROFILE AND SECTIONS

DESIGNED: *John L. L. L.*
DRAWN: FL
CHECKED: *John L. L. L.*
SCALE: As shown
DWG. NO. 4884-I-D4/R2

SURVEYED: *John L. L. L.*
DATE: *29 Aug 1978*
FILE NO. 0281550-C12D-1
DATE: *29 Aug 1978*
SHEET 2 OF 20 SHEETS



CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD: *H. A. N. [Signature]*
PROJECT ENGINEER: *[Signature]*
CHIEF ENGINEER: *[Signature]*

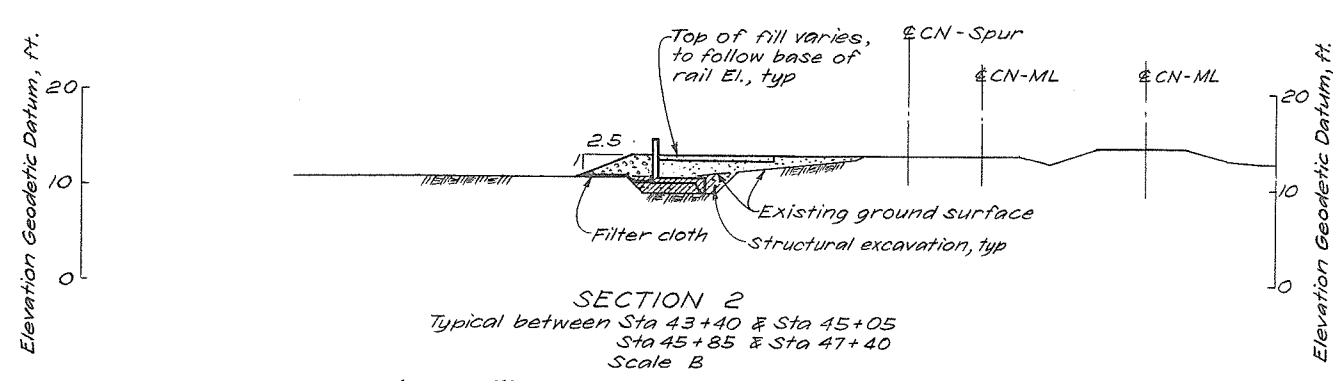
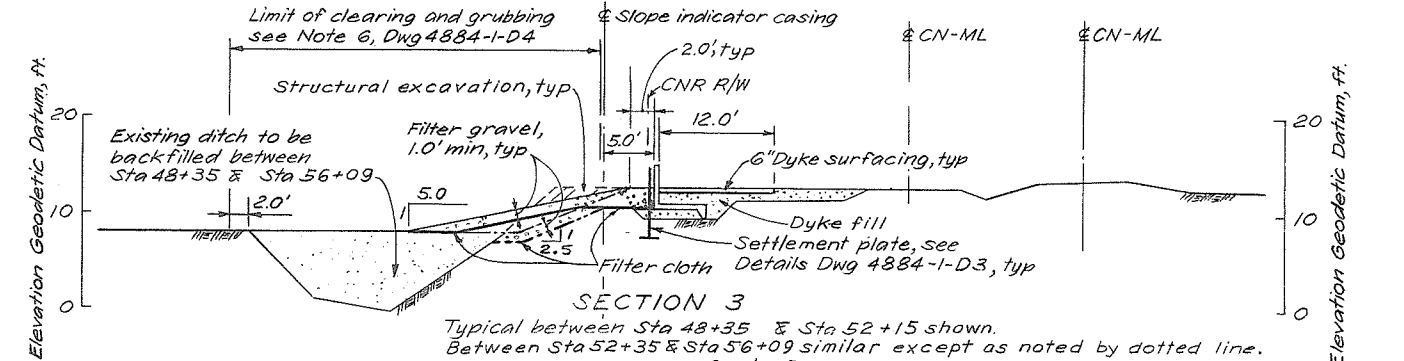
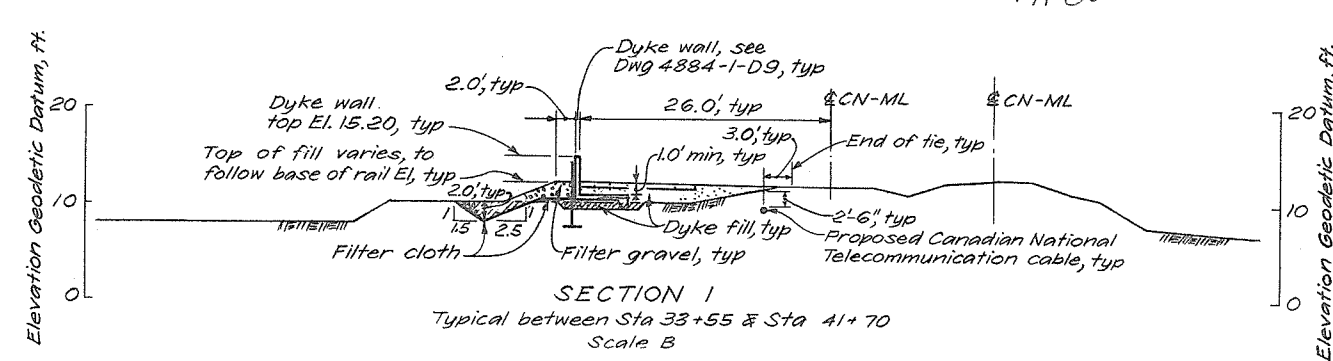
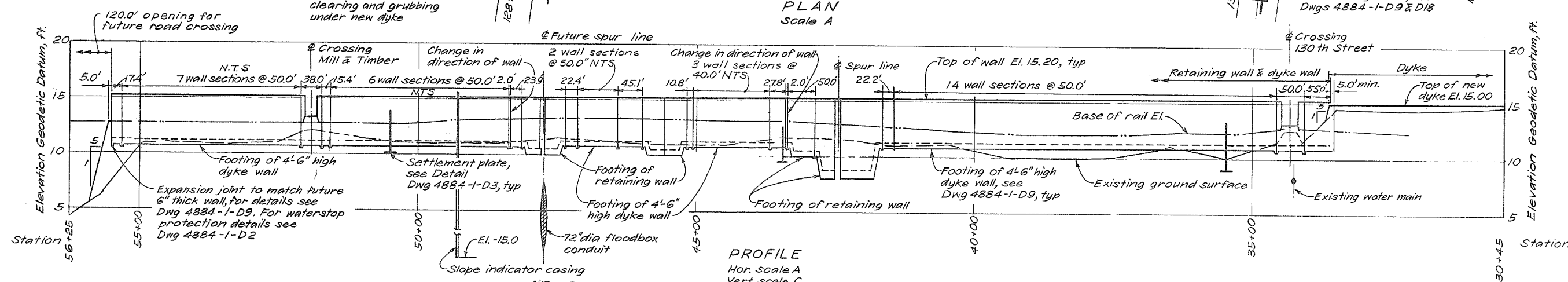
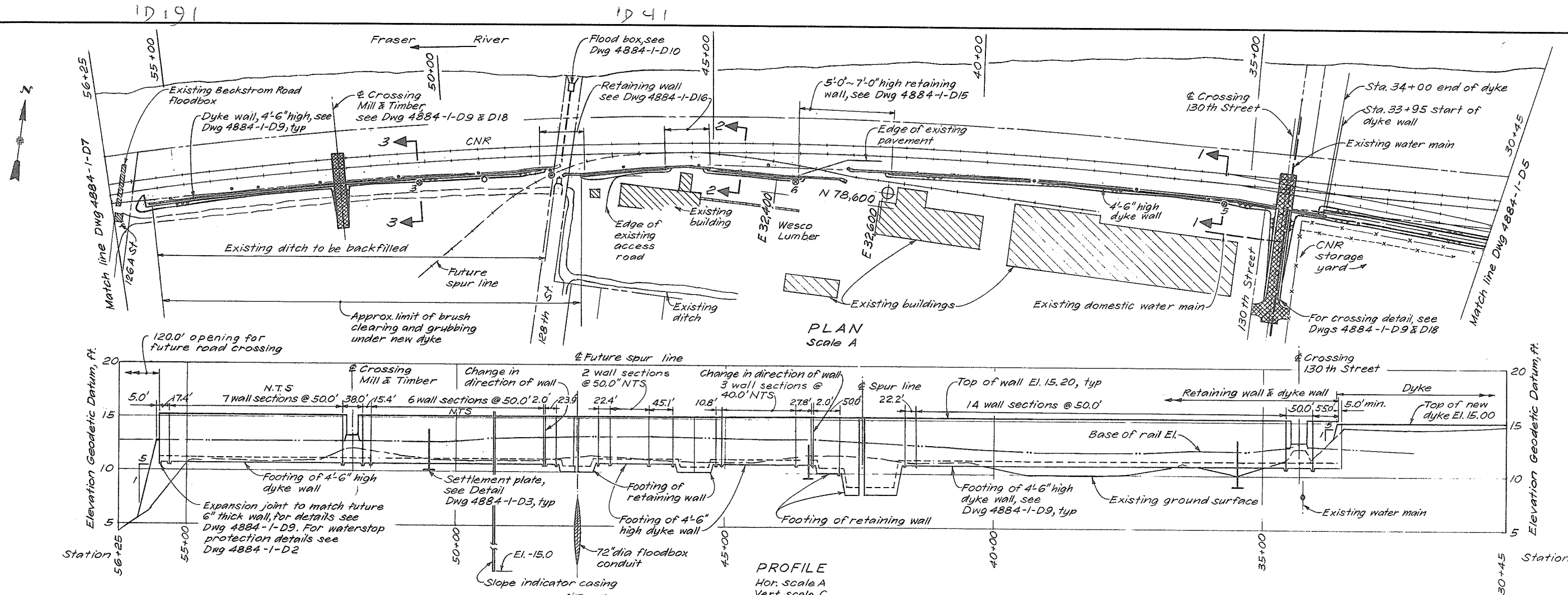
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2. Structural excavation note added to Section 2 and minor revision as shown.	FL	MM	MM	20-2-79
1. Slope indicator casing bottom tip revised	MM	MM	MM	12-9-78

RECOMMENDED	PROJECT MANAGER
DATE: <i>1 Aug 30 1978</i>	
APPROVED	DIRECTOR, WATER INVESTIGATIONS
DATE:	

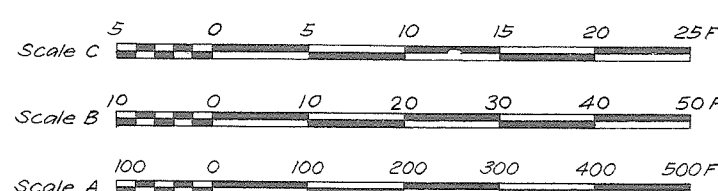
BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 1
SOUTH WESTMINSTER FLOOD CONTROL WORKS
DYKE STATIONS: 12+99.94 TO 30+45
PLAN, PROFILE & SECTIONS

DESIGNED: <i>[Signature]</i>	SURVEYED
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CHECKED: <i>RC</i>	FILE NO: 0281550-012D-1
SCALE: As shown	DATE: 29 Aug 1978
DWG. NO. 4884-1-D5/R2	SHEET 3 OF 20 SHEETS



NOTE
1. For general notes and legend see Dwg. 4884-1-D4.
2. For typical preloading detail see Dwg. 4884-1-D4

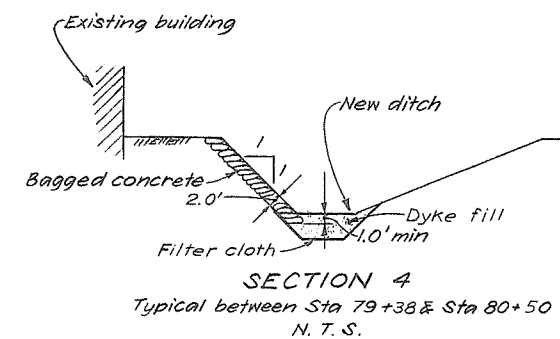
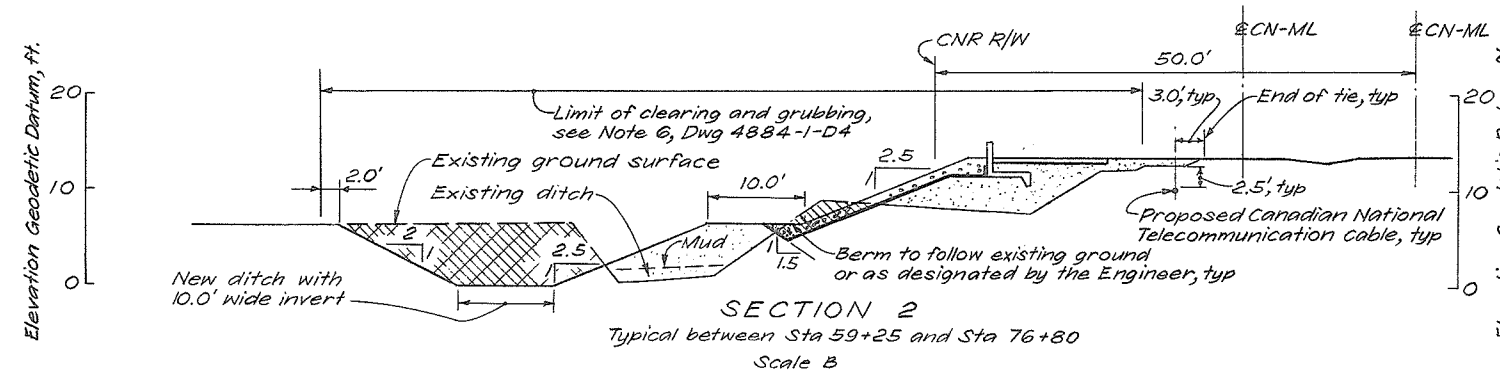
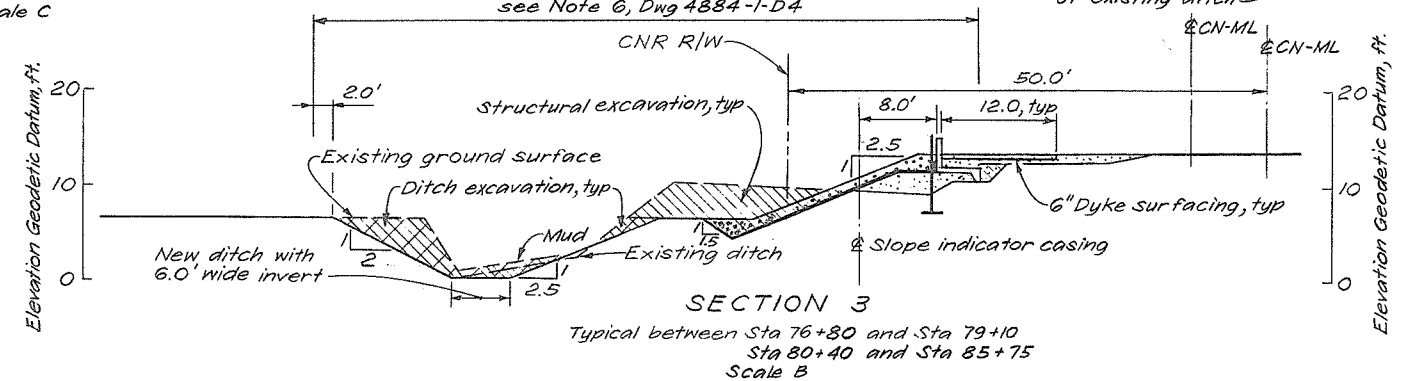
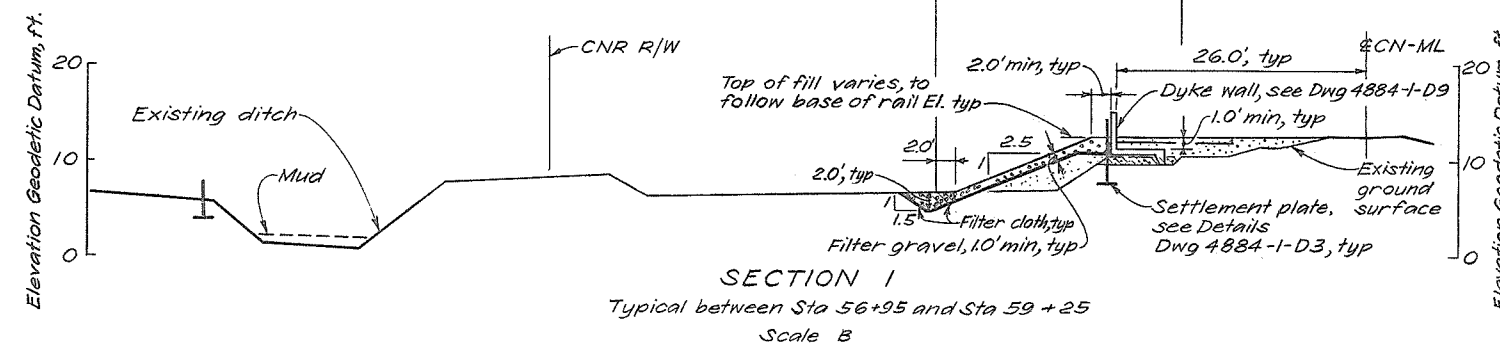
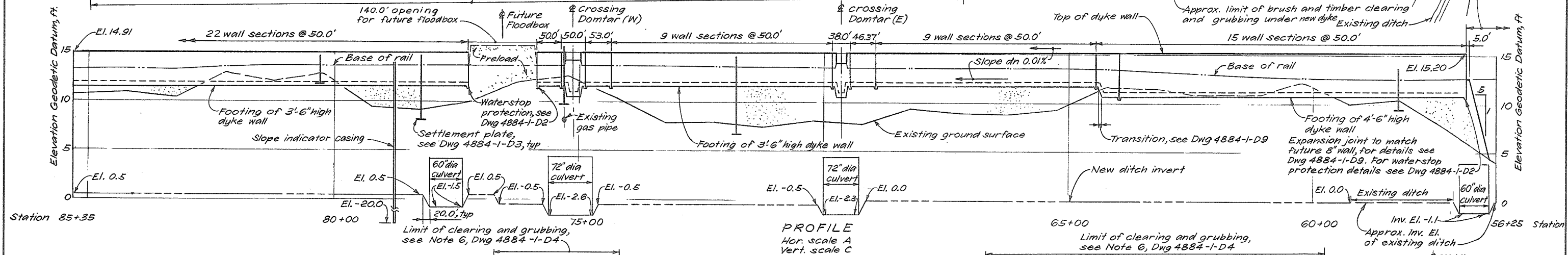
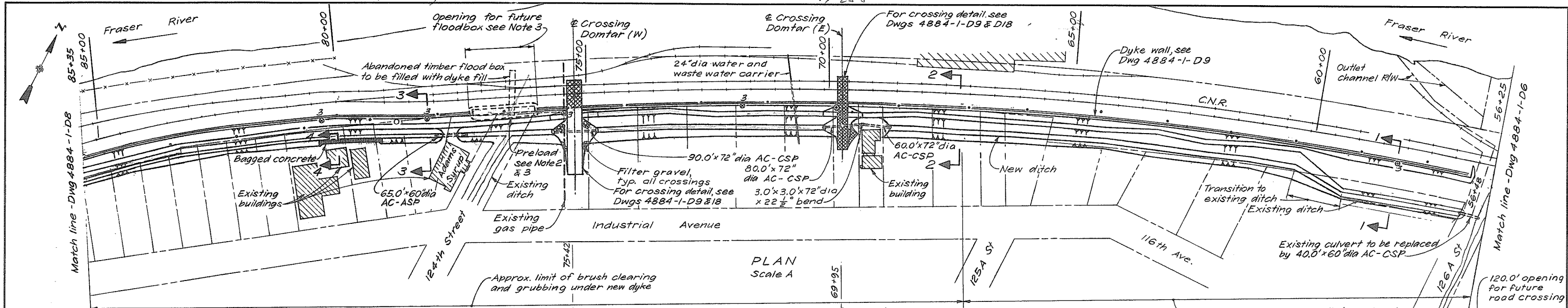


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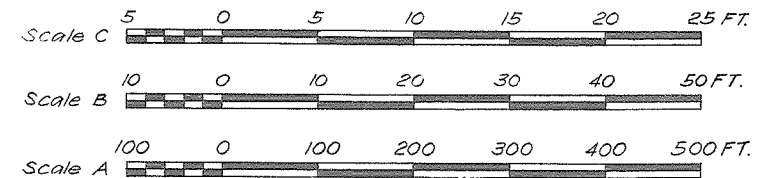
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10285



NOTES:

1. For general notes and legend see Dwg. 4884-1-D4
2. For typical preloading detail see Dwg. 4884-1-D4
3. Future location of 124th St floodbox. Omit wall and filter cloth. Preload to be left in place.



CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD: *[Signature]*
PROJECT ENGINEER: *[Signature]*
CHIEF ENGINEER: *[Signature]*

4. As built.
3. Road crossing details revised to conform to Dwg D18. Wall section numbers revised. Ditch excavation symbol at Section 3 revised.
APPROVED FOR CONSTRUCTION MAY 17 1979
2. Ditch invert El. revised. Structural & ditch excavation defined and minor revisions as shown & noted.
1. Note 3 changed.

Pin 19-9-79
FL 20-2-79
FL 7-11-78

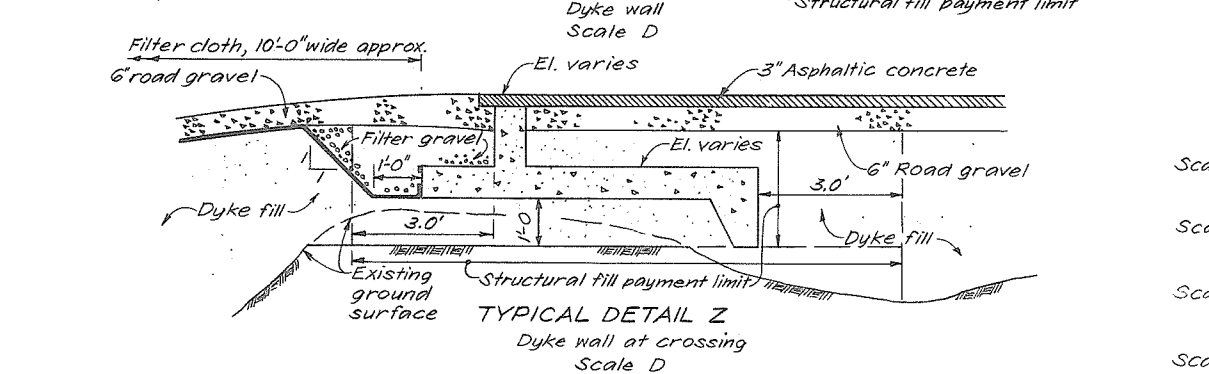
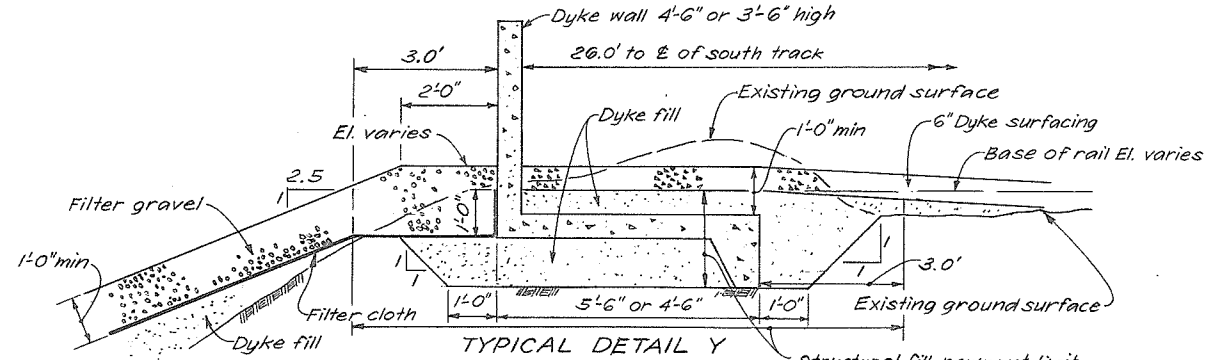
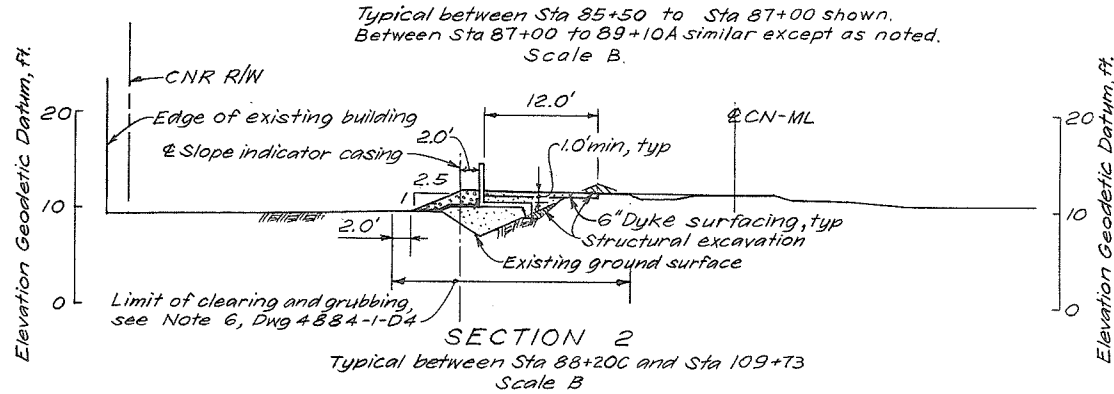
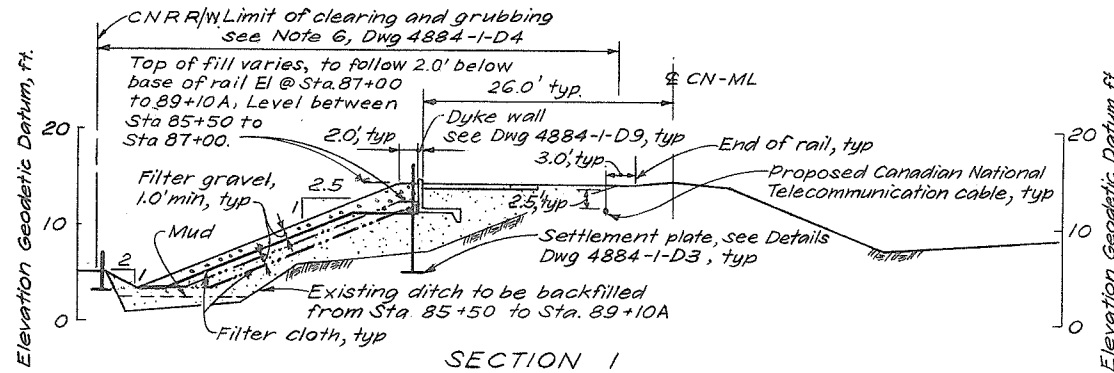
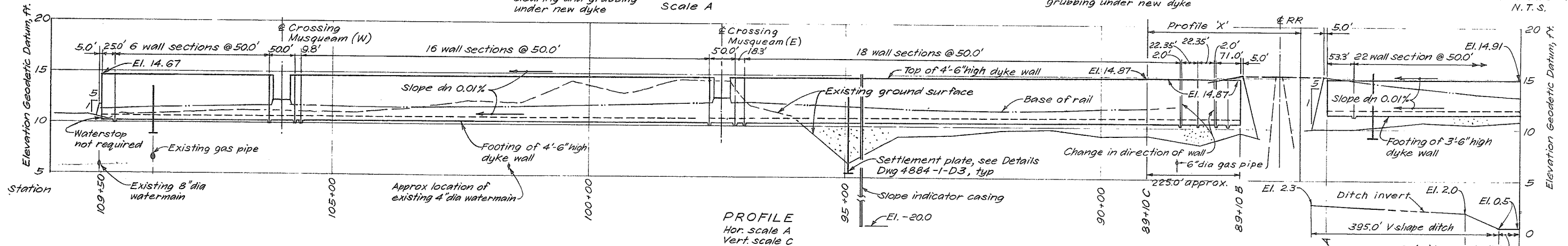
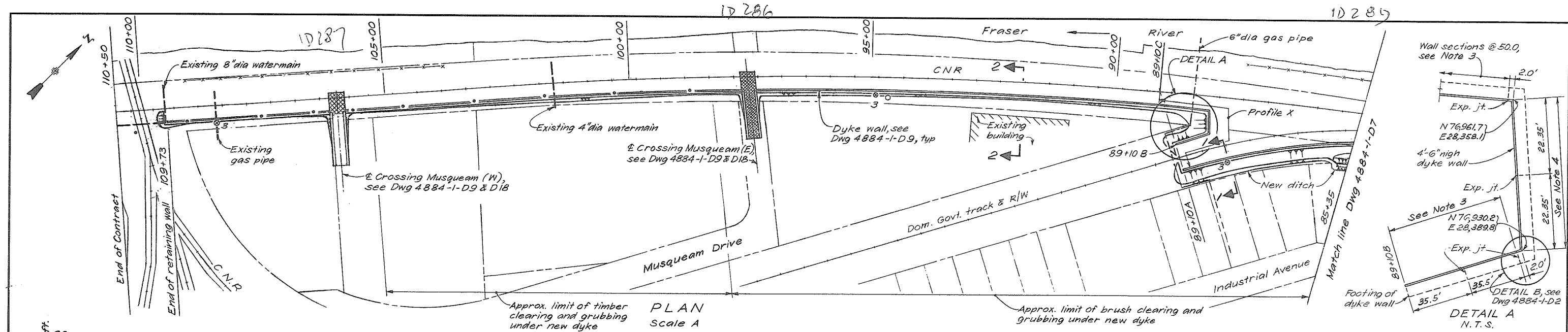
RECOMMENDED *[Signature]* PROJECT MANAGER
DATE: Aug 30 1978
APPROVED *[Signature]* DIRECTOR, WATER INVESTIGATIONS
DATE: Sep 8/78

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

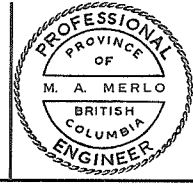
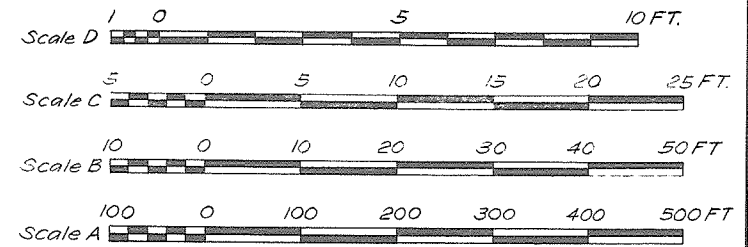
PROJECT 10.4 CONTRACT 1
SOUTH WESTMINSTER FLOOD CONTROL WORKS
DYKE STATIONS: 56+25 TO 85+35
PLAN, PROFILE AND SECTIONS

DESIGNED *[Signature]* SURVEYED *[Signature]*
DRAWN FL DATE
CHECKED *[Signature]* FILE NO. 0281550-C12D-1
SCALE As shown DATE 29 Aug 1978
DWG. NO. 4884-1-D7/R4 SHEET 5 OF 20 SHEETS

105768



- NOTES**
1. For general notes and legend see Dwg 4884-I-D4.
 2. For typical preloading detail see Dwg 4884-I-D4.
 3. For typical details see Section 2.
 4. Except for location of CNR tracks and slope indicator casing the typical details same as Section 2.



CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 30405

DEPARTMENT HEAD: *Harbert Nussbaum*

PROJECT ENGINEER: *[Signature]*

CHIEF ENGINEER: *[Signature]*

1. As built.	Pin 25/11/78	22-81
2. Detail A & no. of wall sections revised, Notes 3 & 4 added	FL 15-9-79	
3. Structural fill payment limit added to Detail Y & Z.	FL 20-2-79	
4. Existing watermain added, ditch invert revised and minor revisions as shown & noted.	FL 7-11-78	
5. Relocation of filter cloth. Waterstop at Sta 109+50 omitted.	FL 7-11-78	

RECOMMENDED *[Signature]*
PROJECT MANAGER

DATE: *Aug 30 1978*

APPROVED *[Signature]*
DIRECTOR, WATER INVESTIGATIONS

DATE: *Sept 8/78*

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT 1

SOUTH WESTMINSTER FLOOD CONTROL WORKS
DYKE STATIONS: 85+35 TO 110+50
PLAN, PROFILE & SECTIONS

DESIGNED *[Signature]*

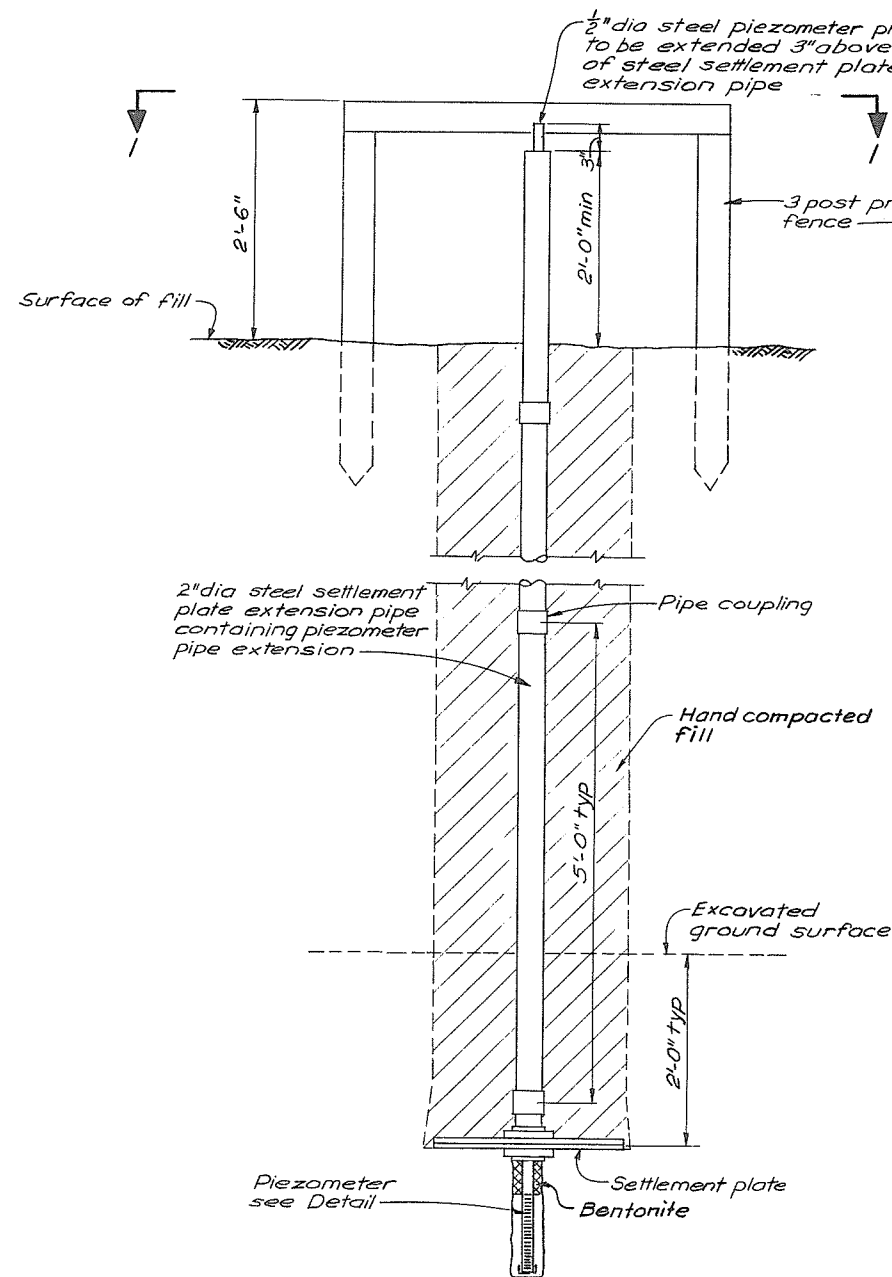
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CHECKED: *[Signature]*

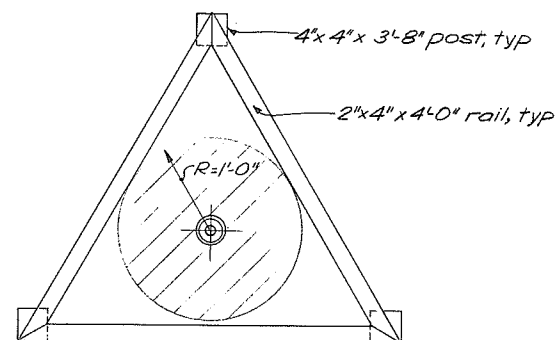
SCALE: As shown

DWG. NO. 4884-I-D 8/84

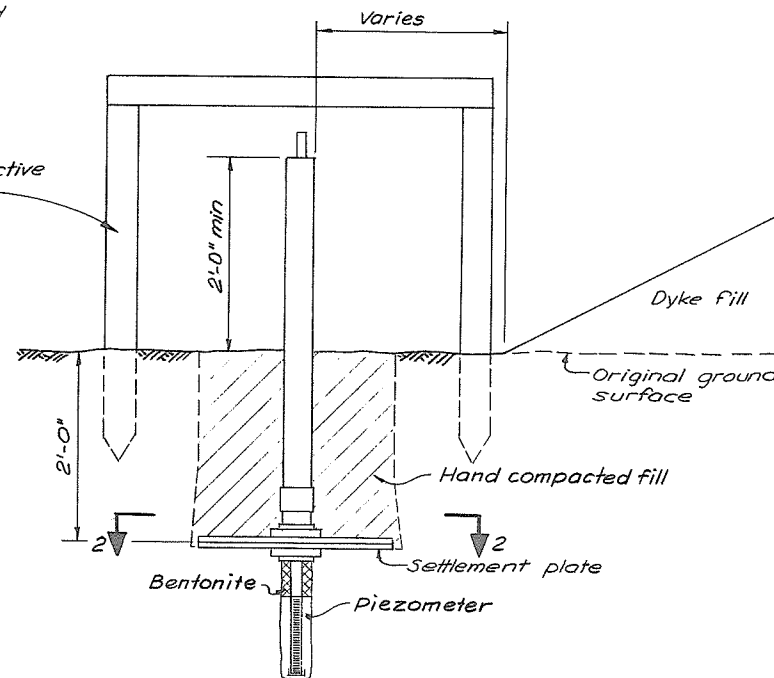
SHEET 6 OF 20 SHEETS



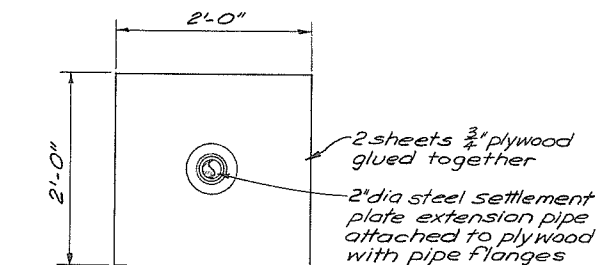
INSTALLATION AT DYKE &



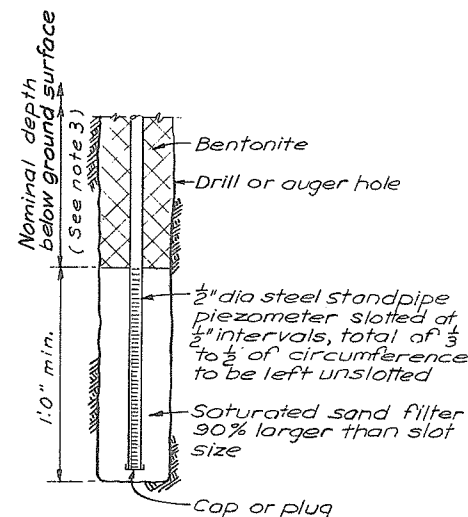
PLAN 1



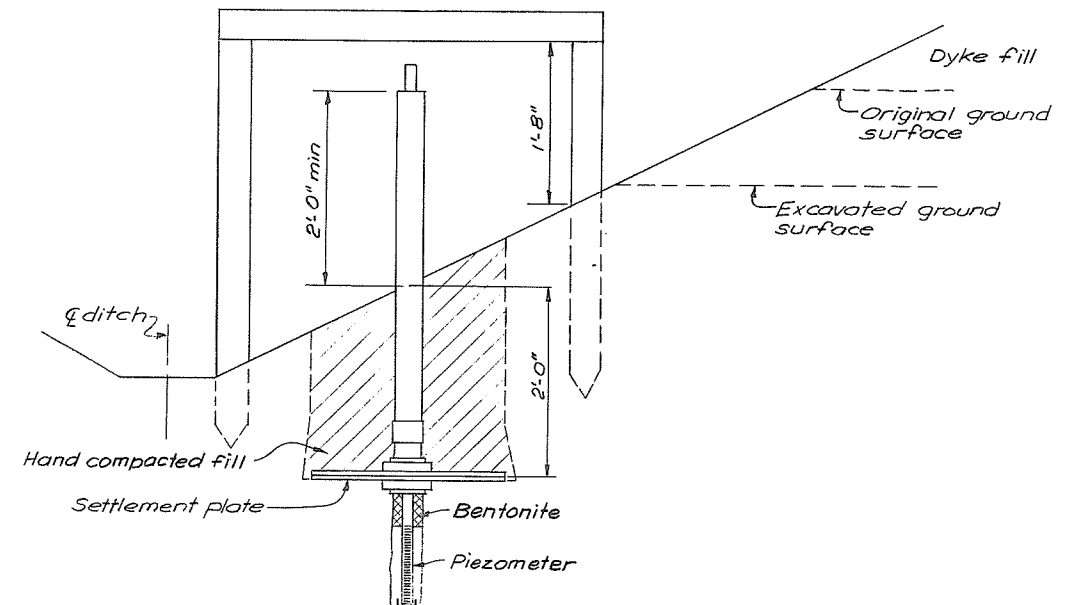
INSTALLATION OUTSIDE FILL



PLAN 2
TYPICAL SETTLEMENT PLATE



PIEZOMETER
DETAIL



INSTALLATION NEAR DITCH

NOTES

1. Surface settlement plate to be installed at approx 2'-0" depth below ground level.
2. Protective fence to be installed prior to any fill placement & raised as fill surface rises.
3. Installation depths and locations of piezometer - settlement plate units are shown on Dwg 4884-1-L D5, D6, D7 and D8.
4. All extension pipes to be clearly identified.



CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD: *Harold D. D. D.*

PROJECT ENGINEER: *M. A. Merlo*

CHIEF ENGINEER: *M. A. Merlo*

2. As built
APPROVED FOR CONSTRUCTION MAY 17 1979
1. Piezometer detail dimension added

NO.	DESCRIPTION	BY	CHK	APPR	DATE
1	Piezometer detail dimension added	M. A. Merlo			23-02-79

RECOMMENDED: *E. J. J.*

DATE: *Aug 30 1978*

APPROVED: *M. A. Merlo*

DATE: *Sep 8/78*

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10-4 CONTRACT NO. 1

**SOUTH WESTMINSTER FLOOD CONTROL WORKS
SETTLEMENT PLATE &
PIEZOMETER DETAILS**

DESIGNED: *M. A. Merlo*

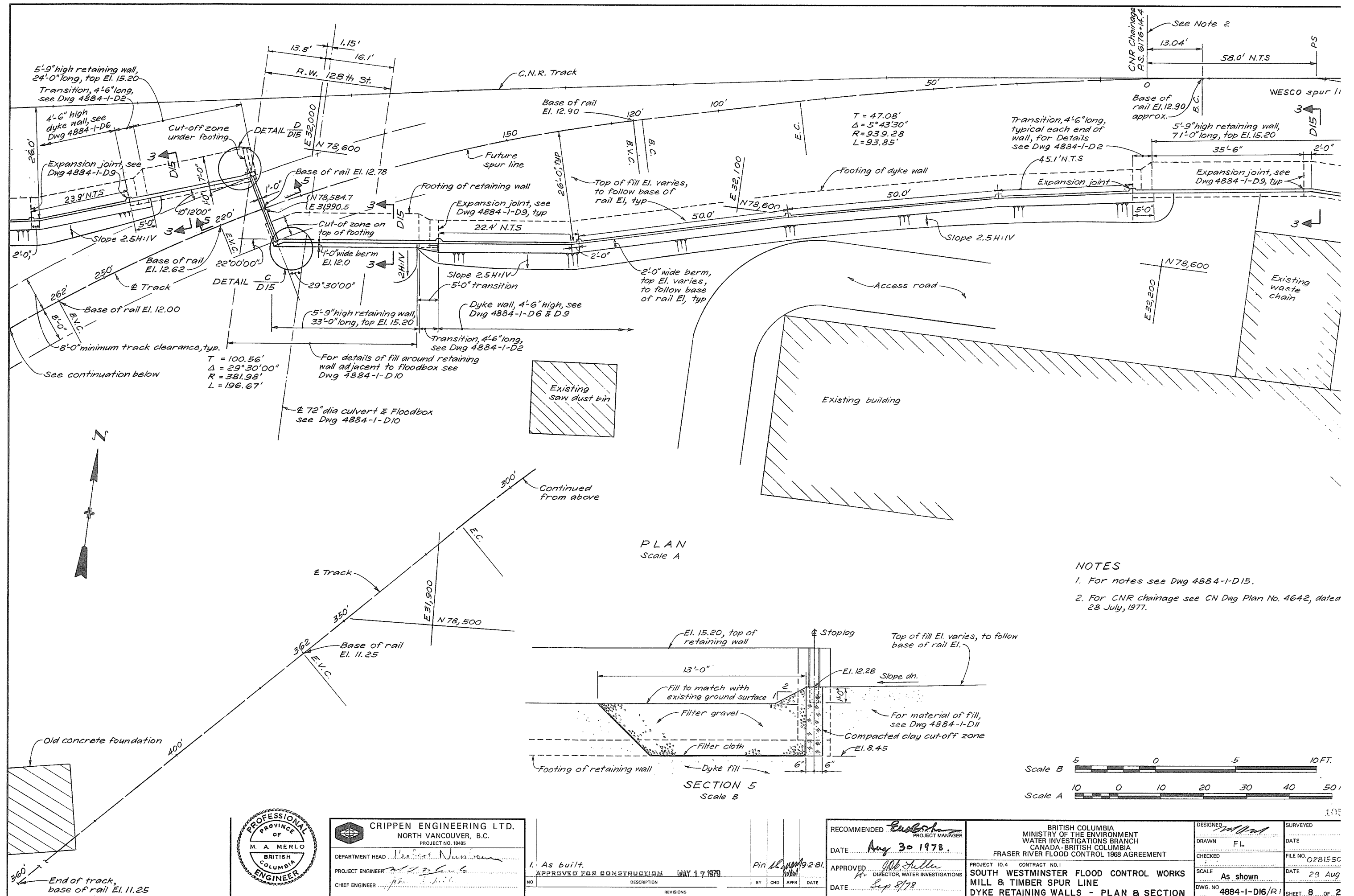
DRAWN: *M. A. Merlo*

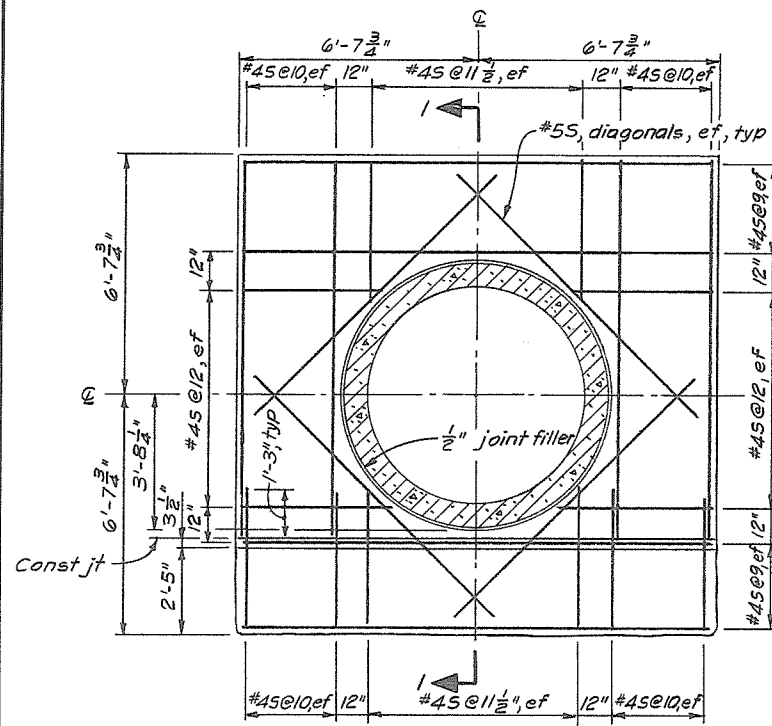
CHECKED: *R. D. D.*

SCALE: *Not to scale*

DWG. NO. *4884-1-D3-R2*

SHEET *7* OF *20*

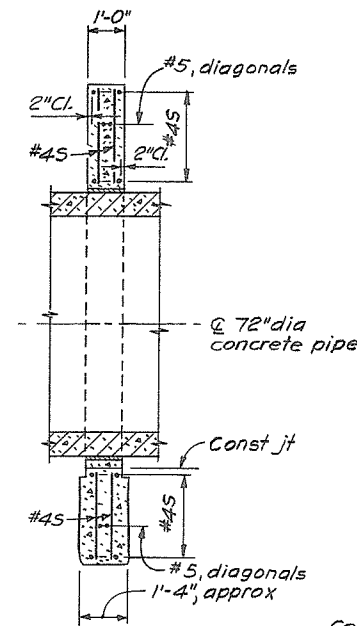




FLOODBOX SEEPAGE COLLAR

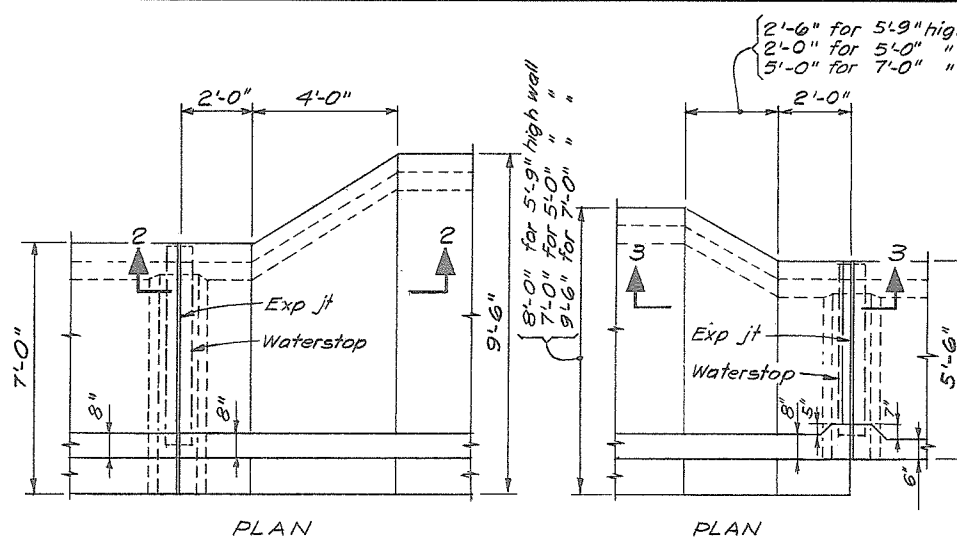
ef denotes each face; Cl. denotes clearance

2 req'd
Scale A

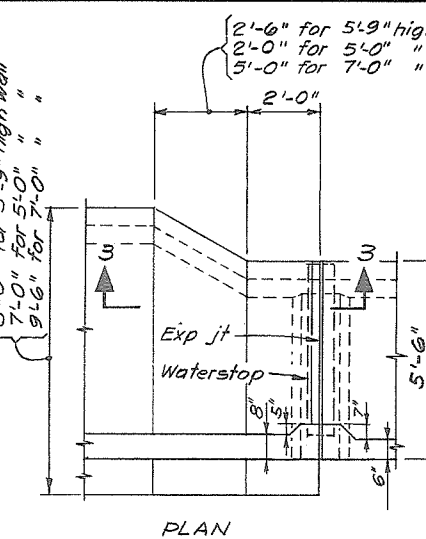


SECTION 1

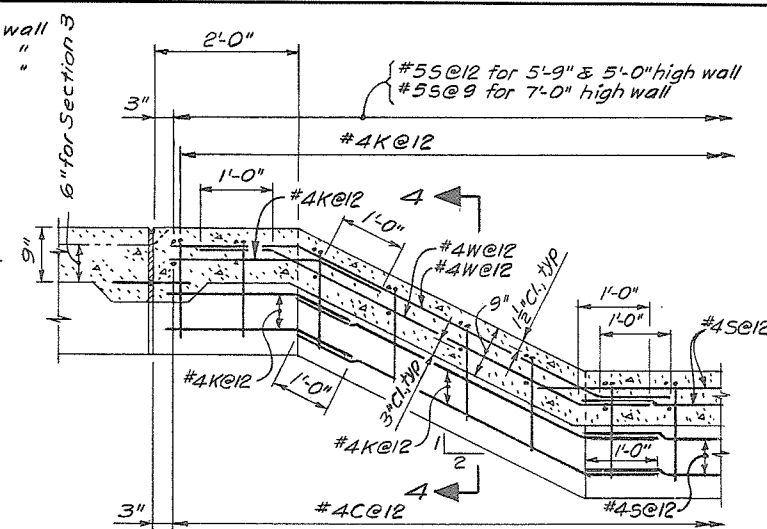
Scale A



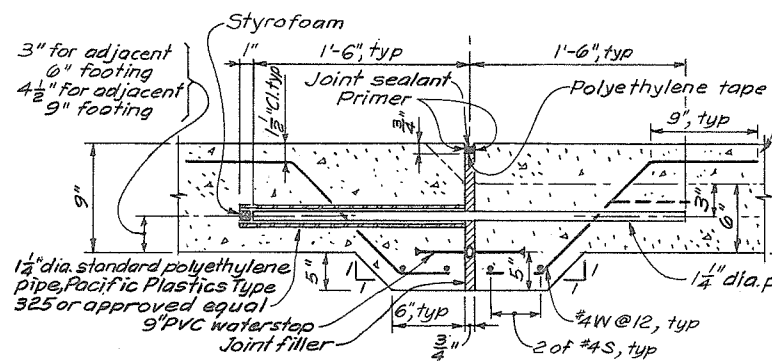
WALL TRANSITION
Scale C



WALL TRANSITION
Scale C

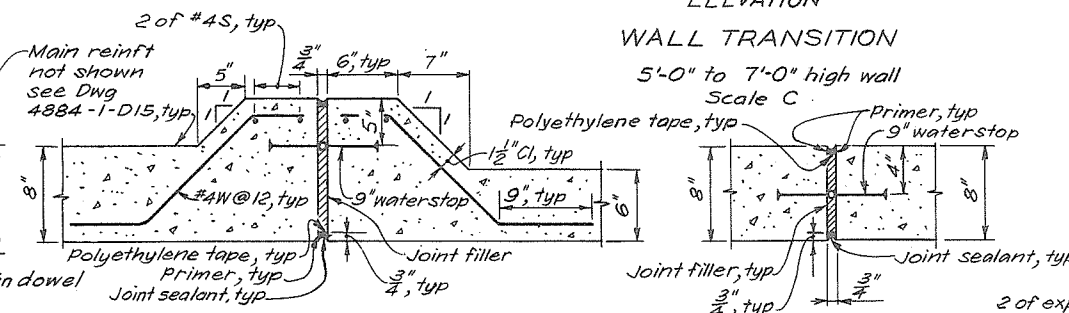


SECTION 2 Shown
SECTION 3 Similar, except as noted,
Scale B



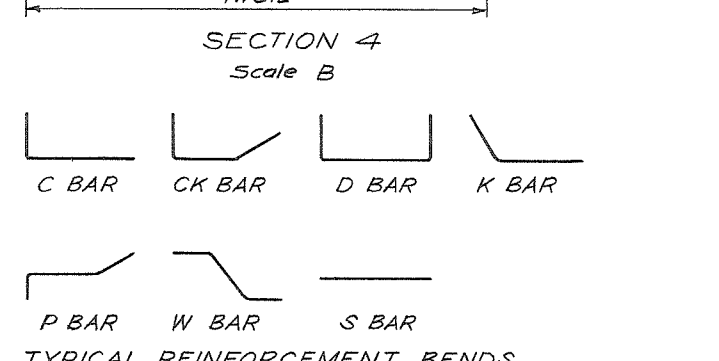
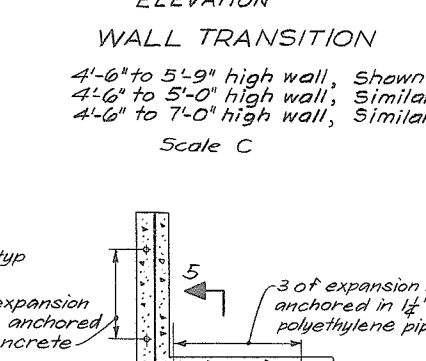
TYPICAL EXPANSION JOINT AT RETAINING WALL FOOTING

Scale A

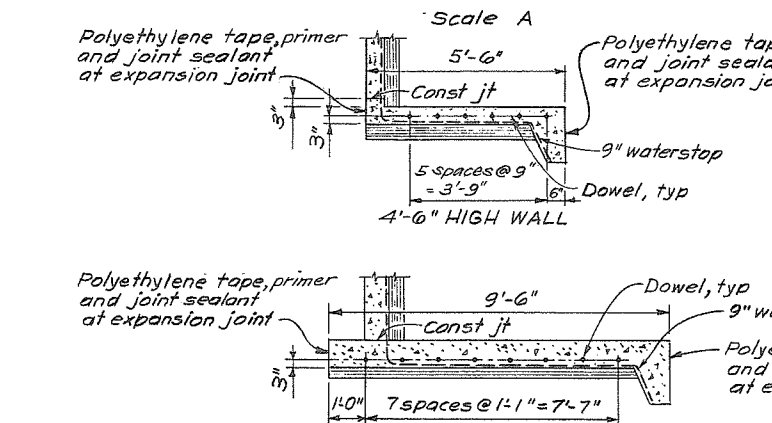


SECTIONAL PLAN 6
Scale A

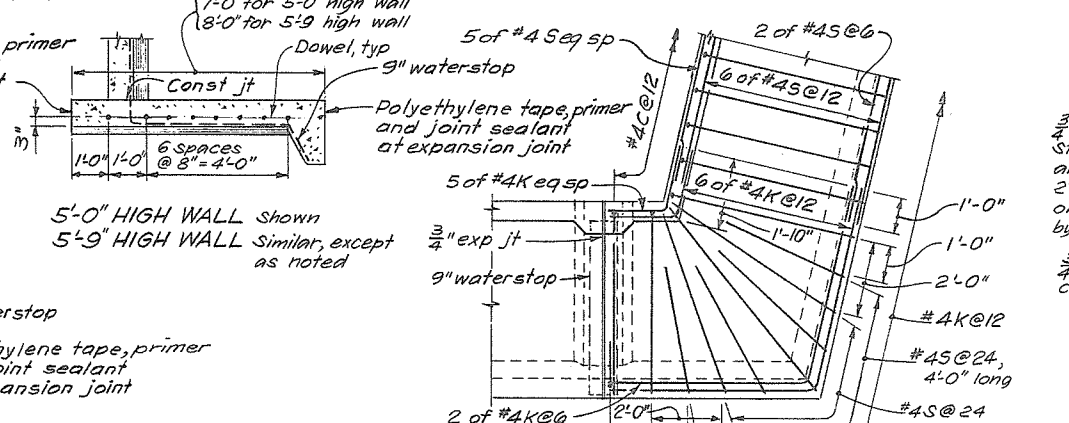
SECTIONAL PLAN 7
Scale A



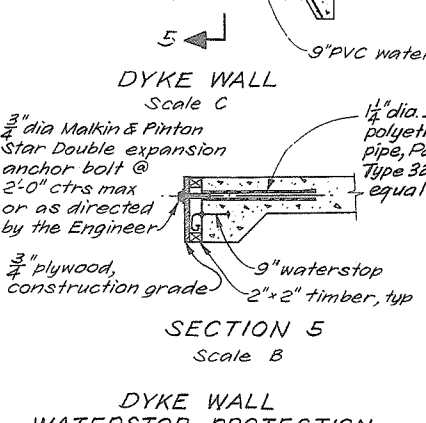
TYPICAL REINFORCEMENT BENDS



FOOTING DOWELS AT EXPANSION JOINTS
Scale C

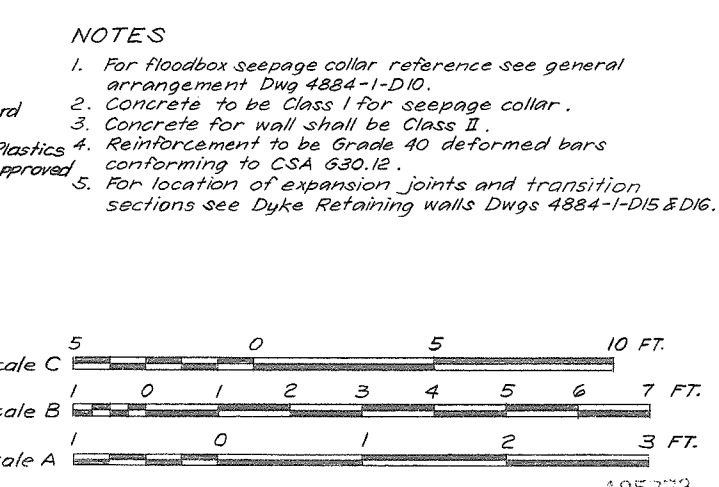


DETAIL B/D8
Scale C

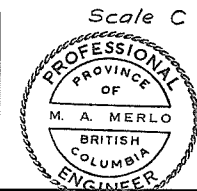


DYKE WALL
Scale C

DYKE WALL
WATERSTOP PROTECTION
Typical for termination of dyke wall at
126A St existing pump station.



105773



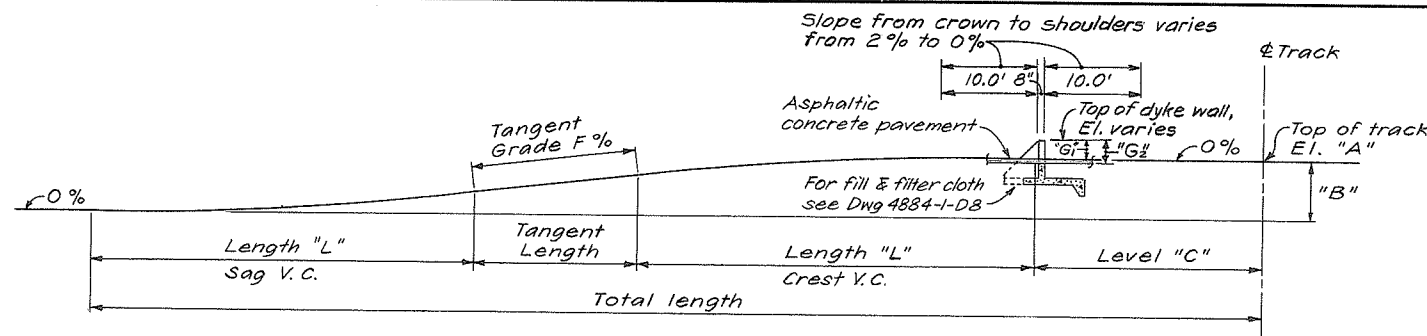
CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405
DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER

3 As built.	APPROVED FOR CONSTRUCTION MAY 17 1978	Pin 28/10281
2. Dowel spacing for 4'-6" high wall revised and 5'-9" high wall added to Footing Dowels At Expansion Joints	FL. 3/1/79	3/1/79
1. Dowel spacing & waterstop protection revised.	FL. 7/11/78	7/11/78
NO.	DESCRIPTION	BY
		CHD
		APPR
		DATE

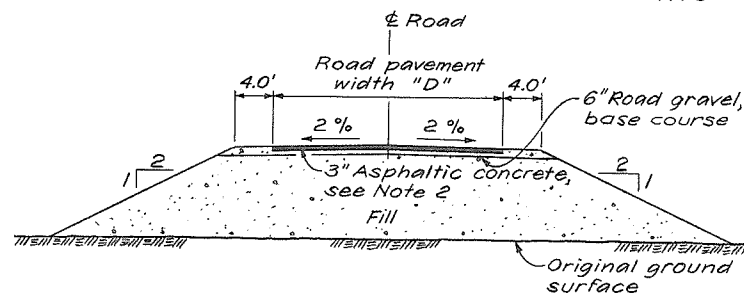
RECOMMENDED
DATE Aug 30 1978
APPROVED
DATE Sep 8/78

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT
PROJECT 10.4 CONTRACT NO. 1
SOUTH WESTMINSTER FLOOD CONTROL WORKS
MISCELLANEOUS CONCRETE DETAILS

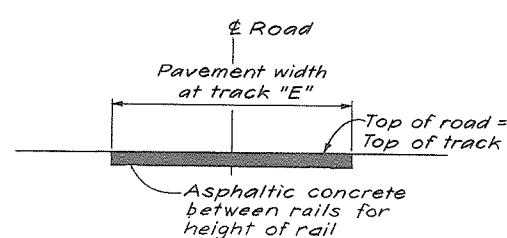
DESIGNED	SURVEYED
DRAWN	DATE
CHECKED	FILE NO.
SCALE	DATE
DWG. NO.	SHEET



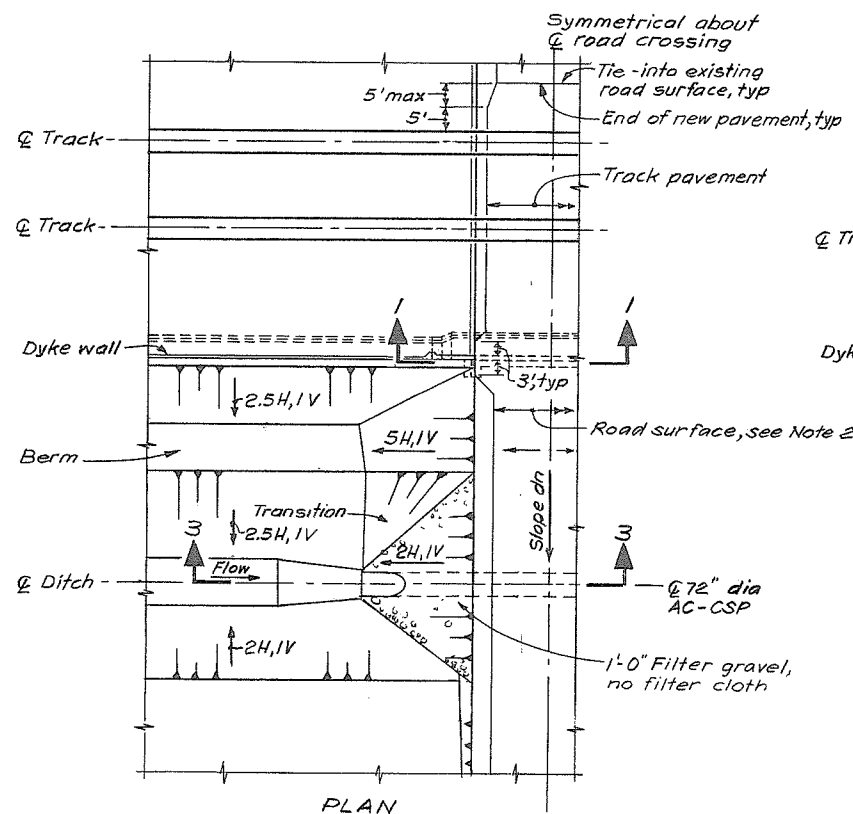
TYPICAL ROAD PROFILE
NTS



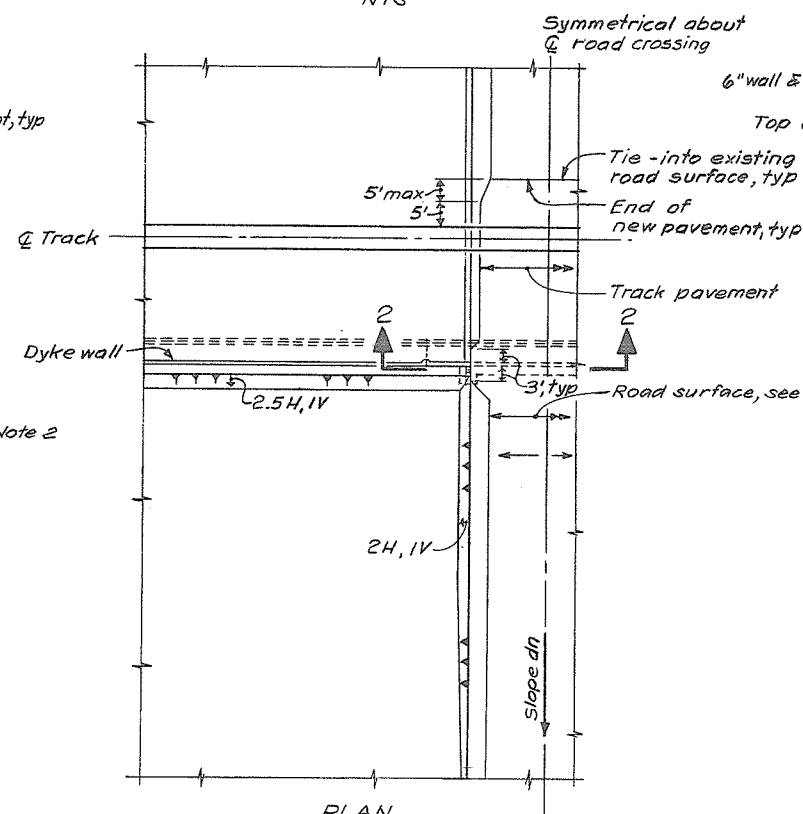
TYPICAL SECTION - ROAD CROSSING
Scale A



TYPICAL RAILWAY PROFILE
ROAD CROSSING
NTS

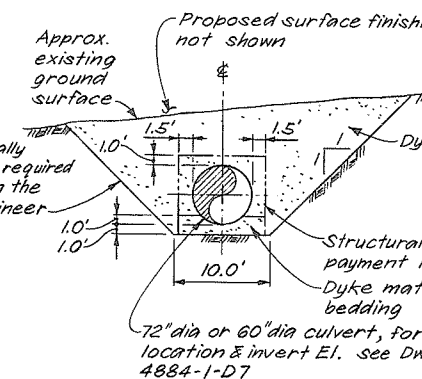
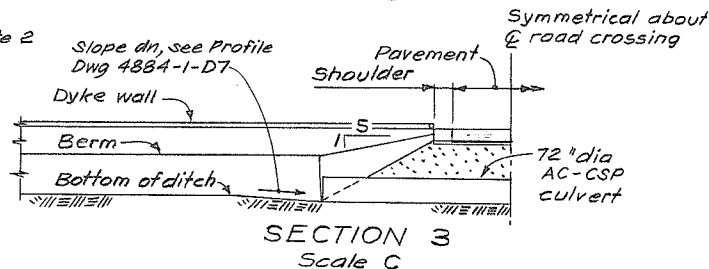
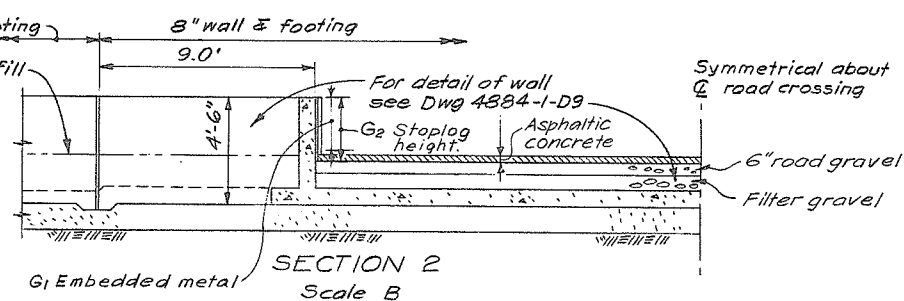
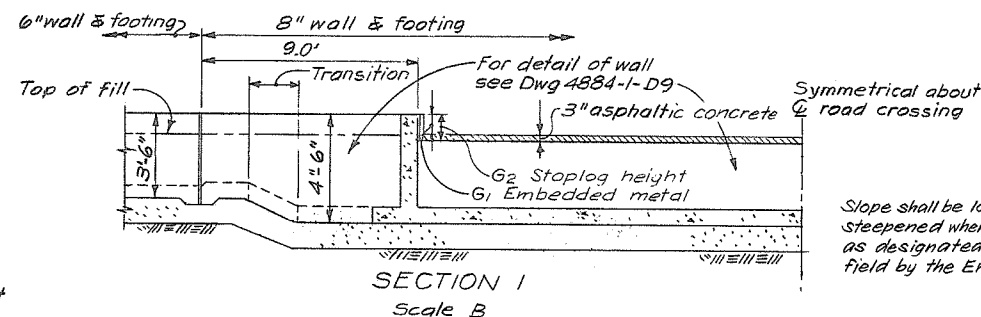


DOMTAR (W) ROAD CROSSING Shown
DOMTAR (E) ROAD CROSSING Similar
Scale C



MUSQUEAM (W) ROAD CROSSING Shown
MUSQUEAM (E) " " Similar
130th ST. " " Similar
MILL & TIMBER " " Similar
Scale C

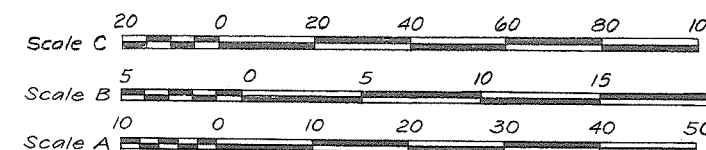
Road Crossing	Dyke Station	Top of Dyke wall El.	Top of Track El. "A"	El. Diff. "B"	Level "C"	Length "L"	Tangent Length	Tangent Grade F %	Total Length	Road Pavement Width "D"	Pave't Width "E"	Manuf. Embd Mt. G1
130th St.	34+75	15.20	12.39	4.66'	50'	100'	0	4.7	250'	24'	28'	2.35'
Mill & Timber	52+25	15.20	13.13	5.68'	27'	49'	17'	8.6	142'	12'	16'	2.15'
Domtar (E)	69+95	15.07	14.03	6.56'	27'	40'	17'	11.5	124'	12'	16'	1.32'
Domtar (W)	75+42	15.01	14.02	5.40'	35'	60'	10'	7.7	165'	24'	28'	1.06'
Musqueam (E)	97+63	14.79	13.00	1.46'	55'	35'	5'	3.7	130'	24'	28'	1.88'
Musqueam (W)	106+23	14.70	12.09	1.20'	70'	40'	0	3.0	150'	24'	28'	2.65'



TYPICAL DETAIL OF CULVERT
EXCAVATION AND FILL
N. T. S.

NOTES

- For general notes see Dwg 4884-1-D4.
- The Contractor shall pave the roads as shown on crossing plans for each location.



CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405
DEPARTMENT HEAD *[Signature]*
PROJECT ENGINEER *[Signature]*
CHIEF ENGINEER *[Signature]*

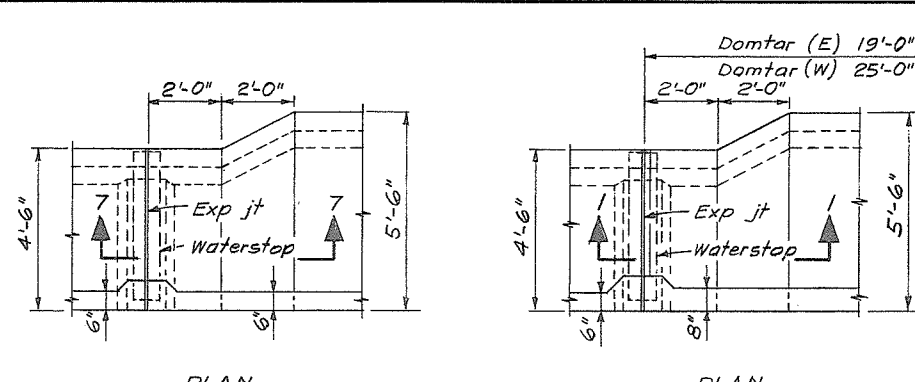
2. As built.
APPROVED FOR CONSTRUCTION *[Signature]* MAY 17 1978
1. Typical detail of culvert excavation & fill added.
Minor revisions as shown

Pin *[Signature]* 12-28-
FL *[Signature]* 20-2-78
BY CHD APPR DATE

RECOMMENDED *[Signature]*
PROJECT MANAGER
DATE *[Signature]* Aug 30 1978
APPROVED *[Signature]*
DIRECTOR, WATER INVESTIGATIONS
DATE *[Signature]* Sep 8 1978

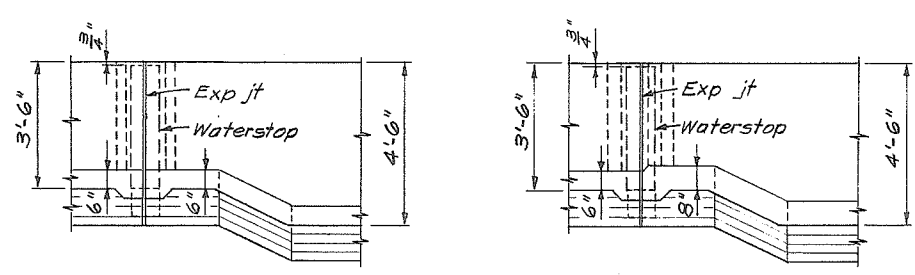
BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT
PROJECT 10.4 CONTRACT NO. 1
SOUTH WESTMINSTER FLOOD CONTROL WORKS
ROAD CROSSINGS & STOPLOG WALL DETAILS

DESIGNED *[Signature]* SURVEYED
DRAWN A.A. MP DATE
CHECKED NAC FILE NO. 0281550-
SCALE As shown DATE 29 Aug 1
DWG. NO. 4884-1-D18/R2 SHEET 11 OF 20



PLAN

PLAN

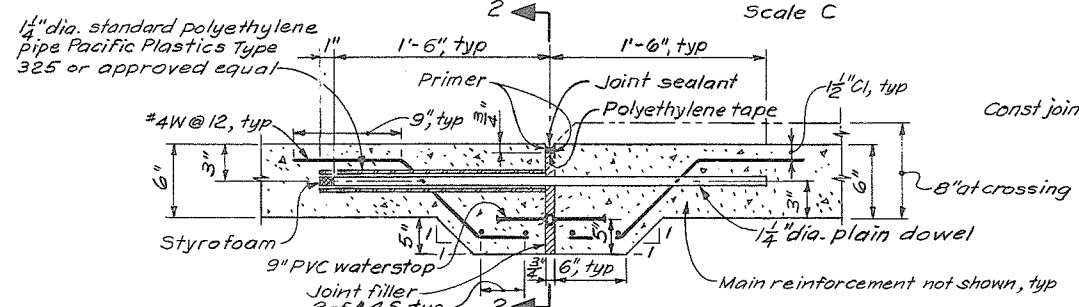


ELEVATION

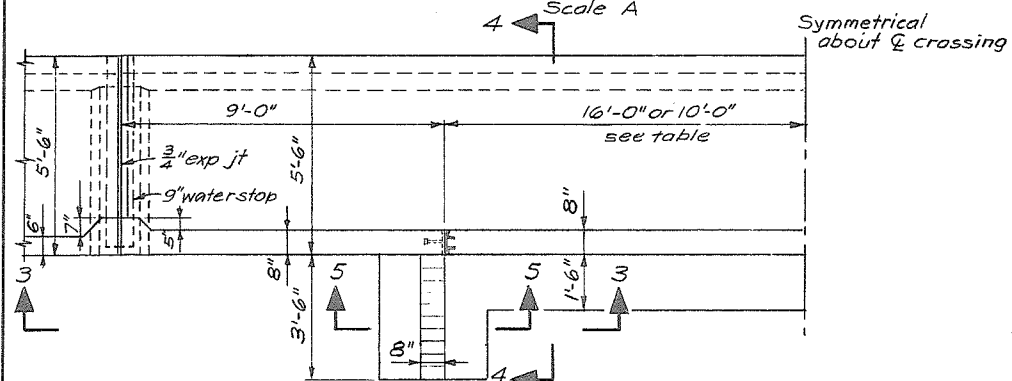
ELEVATION

TYPICAL DYKE WALL TRANSITION
Scale C

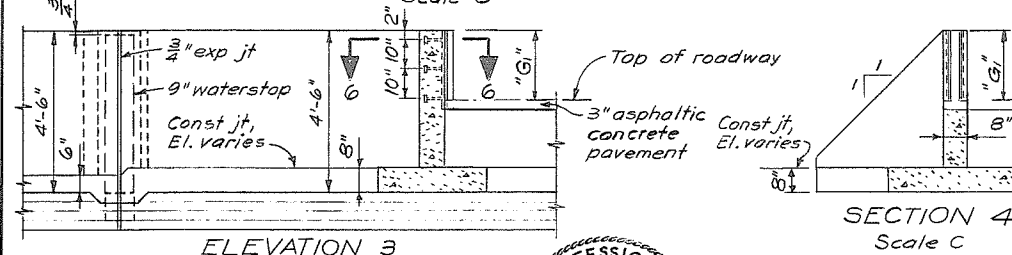
DYKE WALL TRANSITION
AT DOMTAR (E & W) CROSSINGS
Scale C



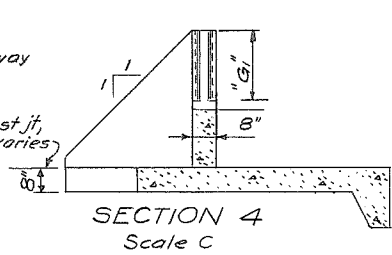
TYPICAL EXPANSION JOINT AT DYKE WALL FOOTING
Scale A



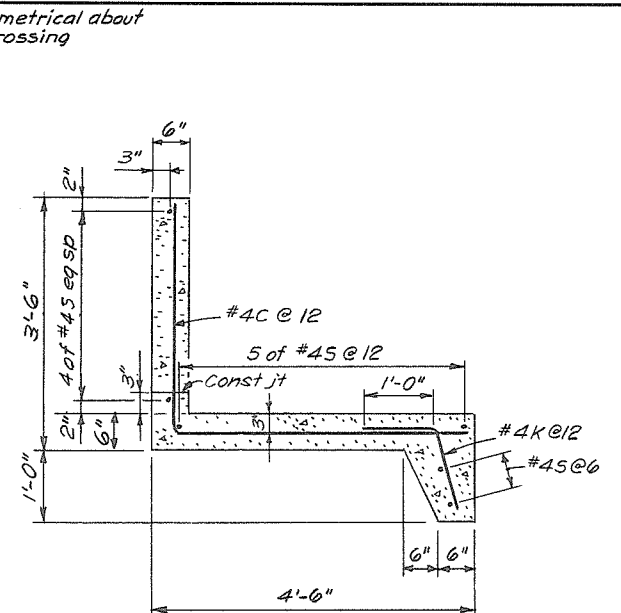
PLAN-ROAD CROSSING AT DYKE WALL
Scale C



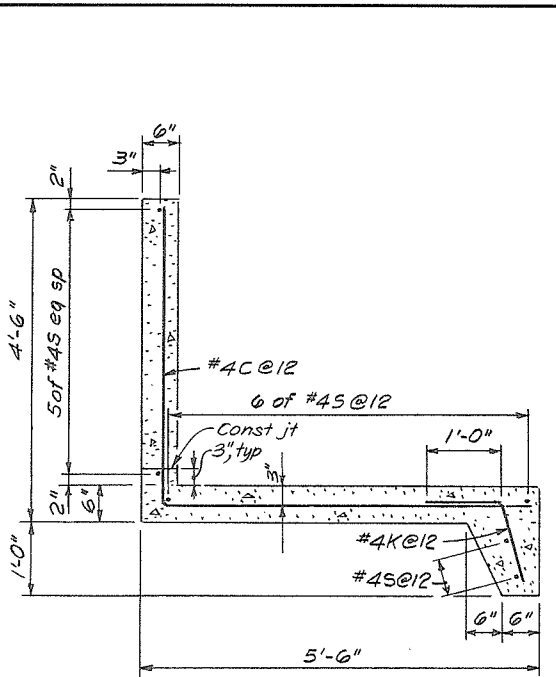
ELEVATION 3
Scale C



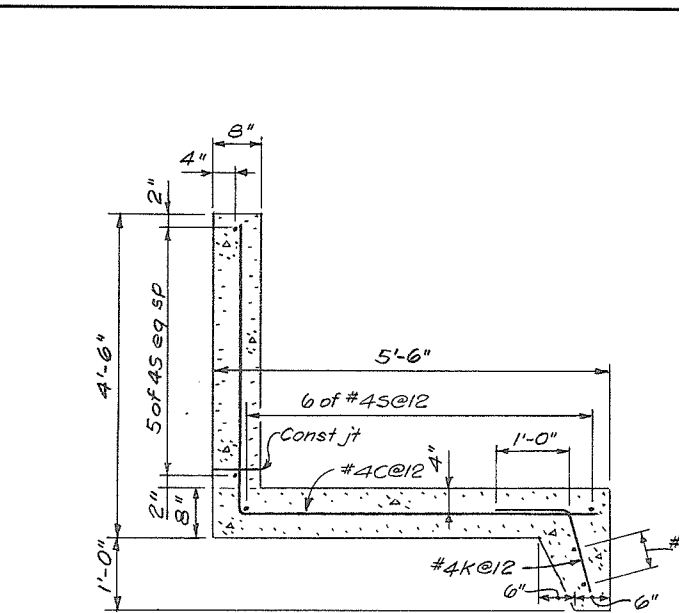
SECTION 4
Scale C



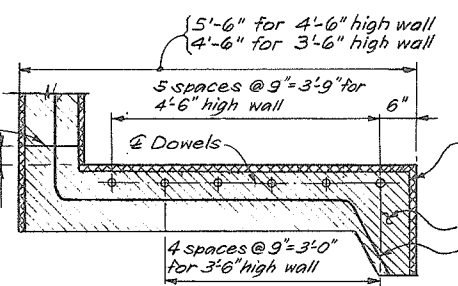
SECTION 3'-6" HIGH DYKE WALL
Scale B



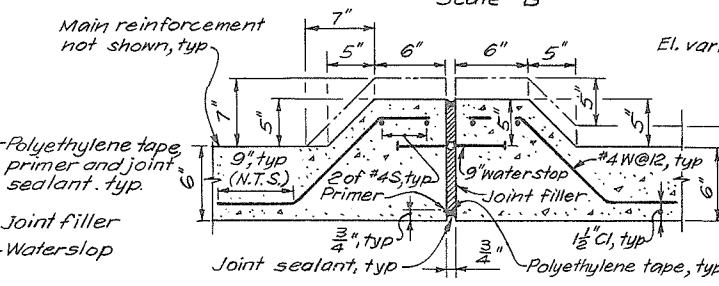
SECTION 4'-6" HIGH DYKE WALL
Scale B



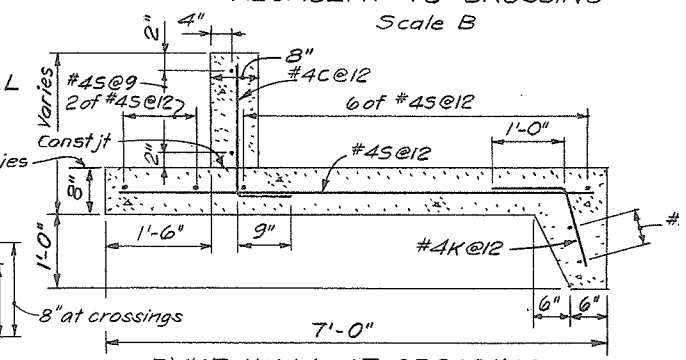
SECTION 4'-6" HIGH DYKE WALL
ADJACENT TO CROSSING
Scale B



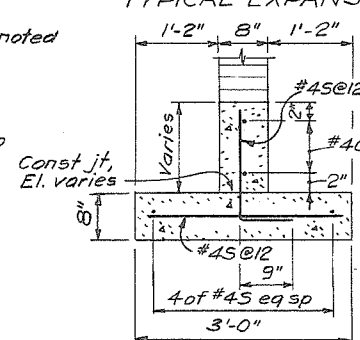
SECTION 2
4'-6" high wall shown
3'-6" " Similar, except as noted
Scale B



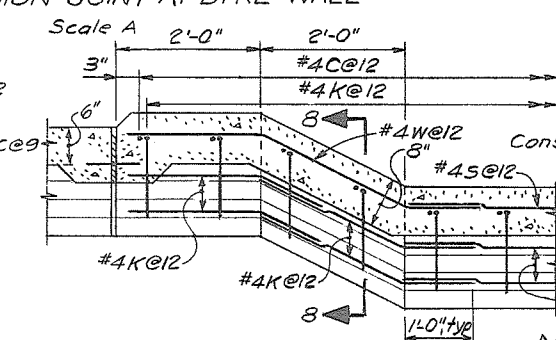
TYPICAL EXPANSION JOINT AT DYKE WALL
Scale A



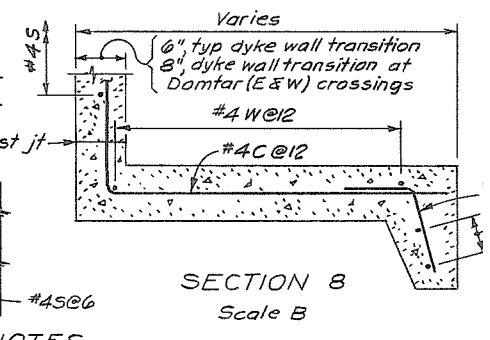
DYKE WALL AT CROSSING
Scale B



SECTION 5
Scale B

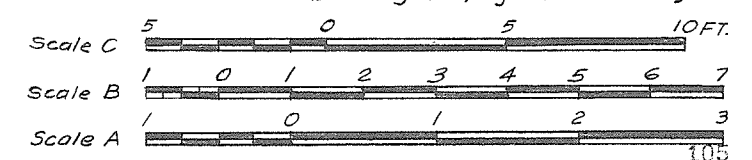


SECTION 1 Shown
SECTION 7 Similar,
except as noted
Scale B



SECTION 8
Scale B

- NOTES
- For general notes see Dwg 4884-1-D4.
 - For typical reinforcement bends see Dwg 488.
 - Splices in reinforcement to be staggered wherever p.
 - Reinforcing shall be deformed bar conform CSA G 30.12 Grade 40.
 - Dimensions to reinforcement are to C bc unless otherwise shown.
 - Concrete shall be Class II.
 - All Mk letters to be prefixed D9 and cle. painted on embedded metalwork.
 - For location of dyke retaining wall see Dwg 4884-1-D1.
 - For road crossings & stoplog wall details see Dwg 488.

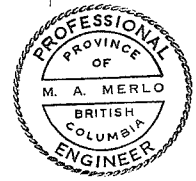


Location	Dim. "G"	Mk	No. of Studs	No. Req'd	Width of Crossing "H" (ft.)
130TH St	2.35'	A	3	2	32.0
Mill & Timber	2.15'	B	3	2	20.0
Domtar (E)	1.32'	C	2	2	20.0
Domtar (W)	1.06'	D	2	2	32.0
Musqueam (E)	1.88'	E	2	2	32.0
Musqueam (W)	2.65'	F	2	2	32.0

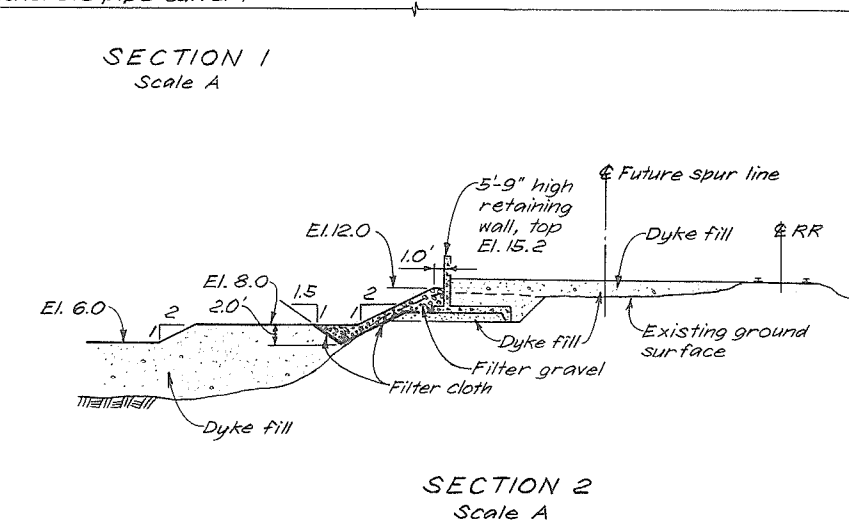
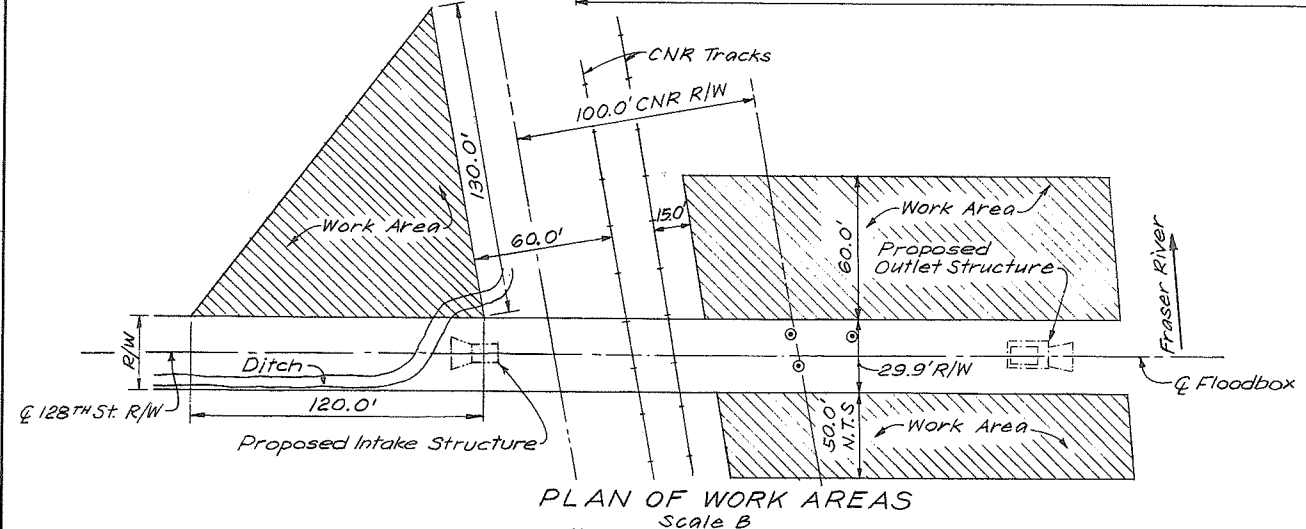
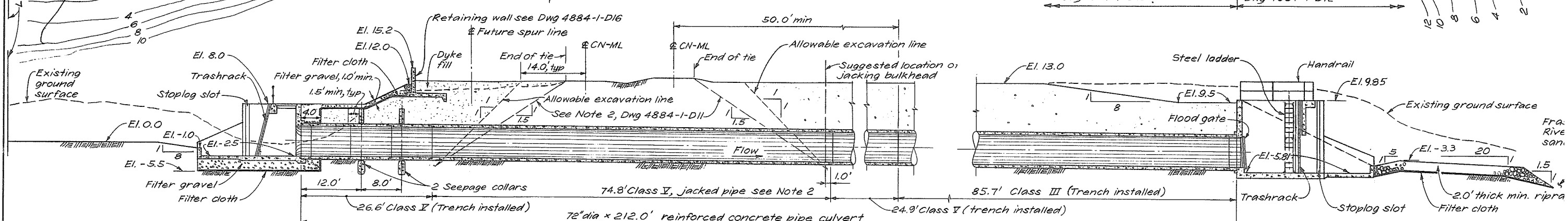
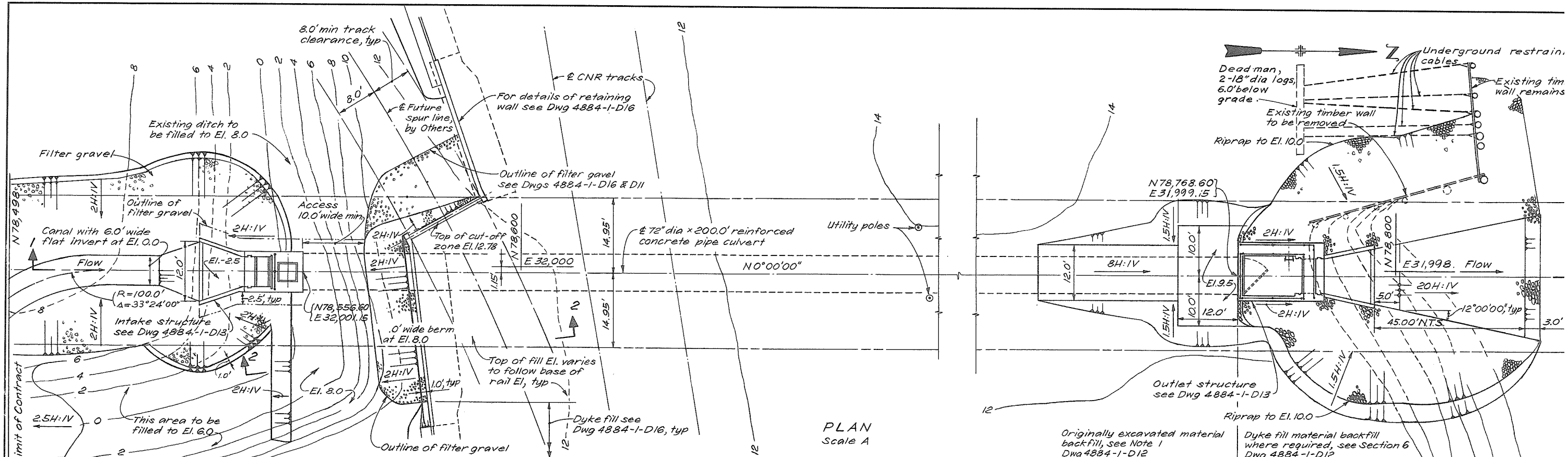
3. As built.
APPROVED FOR CONSTRUCTION MAY 17 1978
2. Dowel spacing revised
1. Dowel spacing & construction joint location revised

Pin 20.0/19.281
FL 31.1.79
7.11.78

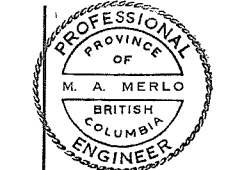
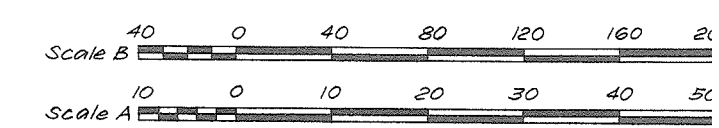
RECOMMENDED DATE Aug 30 1978	PROJECT MANAGER BRITISH COLUMBIA MINISTRY OF THE ENVIRONMENT WATER INVESTIGATIONS BRANCH CANADA - BRITISH COLUMBIA FRASER RIVER FLOOD CONTROL 1968 AGREEMENT	DESIGNED DRAWN CHECKED SCALE DWG. NO.	SURVEYED DATE FILE NO. DATE SHEET 12 OF 20
APPROVED DATE Sep 8 1978	DIRECTOR, WATER INVESTIGATIONS PROJECT 10.4 CONTRACT NO. 1 SOUTH WESTMINSTER FLOOD CONTROL WORKS DYKE WALL CONCRETE OUTLINE & REINFORCEMENT	As shown 4884-1-D9/R3	0281550 29 Aug 1



CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405
DEPARTMENT HEAD
PROJECT ENGINEER
CHIEF ENGINEER



- NOTES**
1. Elevations are to Geodetic Datum in ft.
 2. Exact length of jacked pipe shall be design in field by the Engineer.
 3. All utility poles shall be moved to a location outside the trench excavation area as design in field by the Engineer.



CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD: *[Signature]*
PROJECT ENGINEER: *[Signature]*
CHIEF ENGINEER: *[Signature]*

3. As built.
2. Outlet structure invert El. revised
1. Filter cloth & filter gravel extended.

MAY 17 1978

NO.	DESCRIPTION	BY	CHK	APP	DATE
1	Filter cloth & filter gravel extended.	FL	WMS	WMS	20-2-78

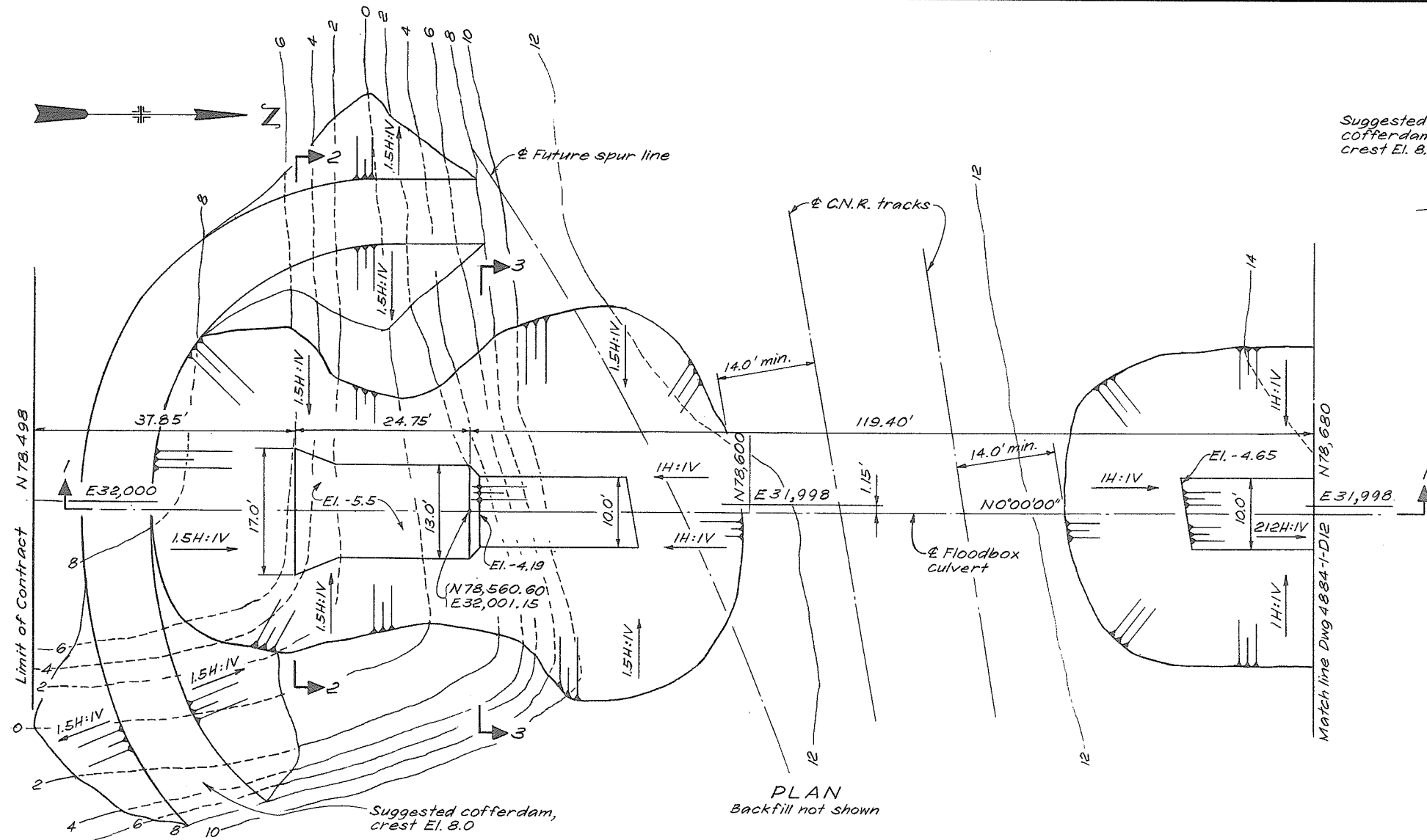
Pin 28 mm 9-2-81
Ch. R/S 14-1-78
FL WMS 20-2-78

RECOMMENDED: *[Signature]*
DATE: Aug 30 1978
APPROVED: *[Signature]*
DATE: Sep 8/78

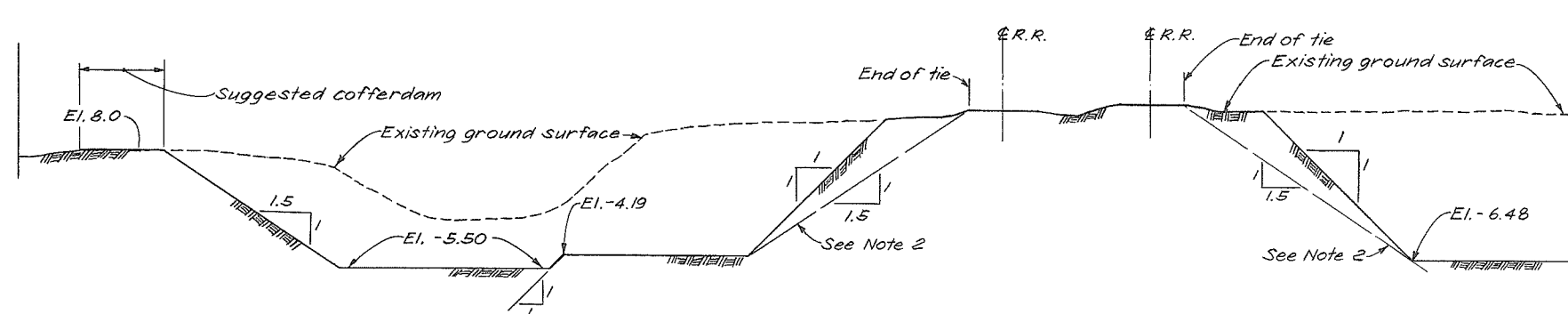
BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 1
SOUTH WESTMINSTER FLOOD CONTROL WORKS
128 TH STREET FLOODBOX
GENERAL ARRANGEMENT & WORK AREAS

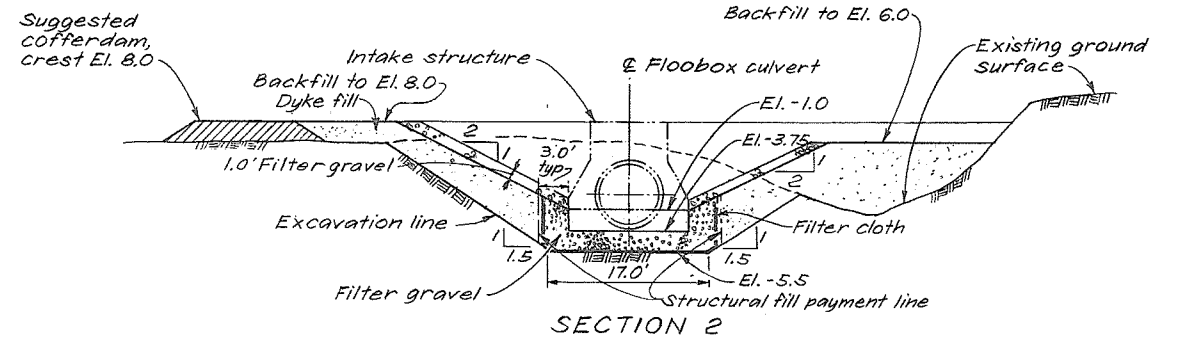
DESIGNED	SURVEYED
NHounell	
DRAWN	DATE
FL	
CHECKED	FILE NO.
FL	0281550
SCALE	DATE
As shown	29 Aug 1978
DWG. NO.	SHEET
4884-1-D10/R3	13 OF 21



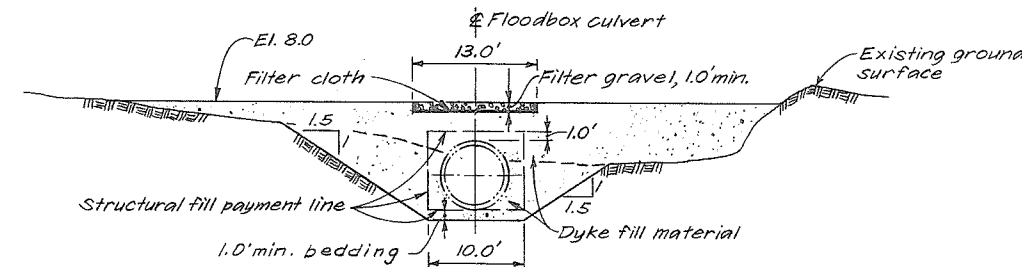
PLAN
Backfill not shown



SECTION 1



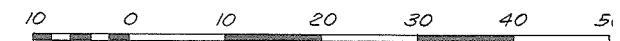
SECTION 2



SECTION 3

NOTE

1. Backfill outside of 10 ft wide dyke fill prism over the culvert and in the area north of the CNR right-of-way shall be material originally excavated, except for top 2 ft.
2. Any excavation carried out within 14 ft. of the track centreline must have its design approved by the CNR.



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CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD: *Herbert Nunbun*
PROJECT ENGINEER: *W. A. Merlo*
CHIEF ENGINEER: *W. A. Merlo*

2. As built.
APPROVED FOR CONSTRUCTION: *W. A. Merlo* MAY 17 1978
1. Structural fill payment line defined.

NO.	DESCRIPTION	BY	CHK	APPR	DATE
1	Structural fill payment line defined.	FL	W. A. Merlo	W. A. Merlo	20-2-79

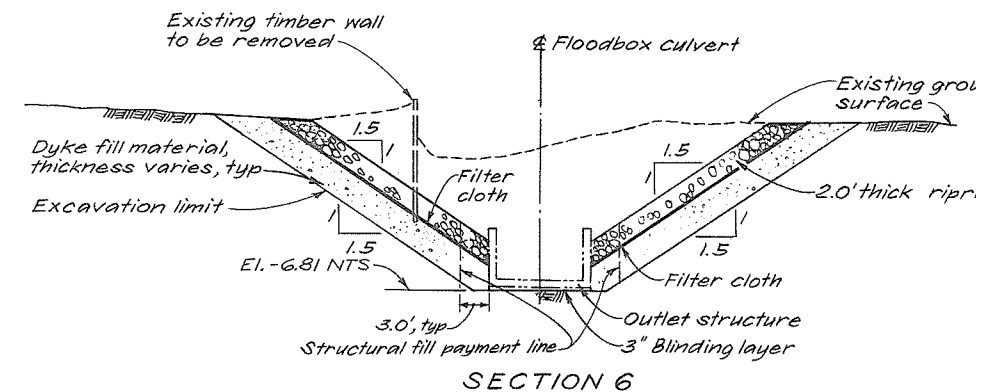
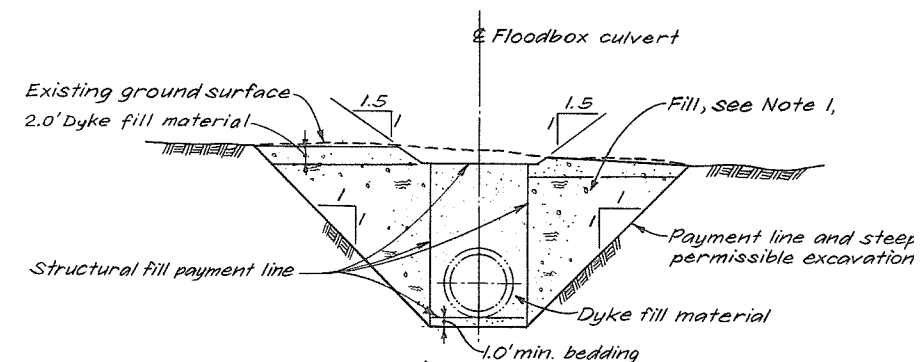
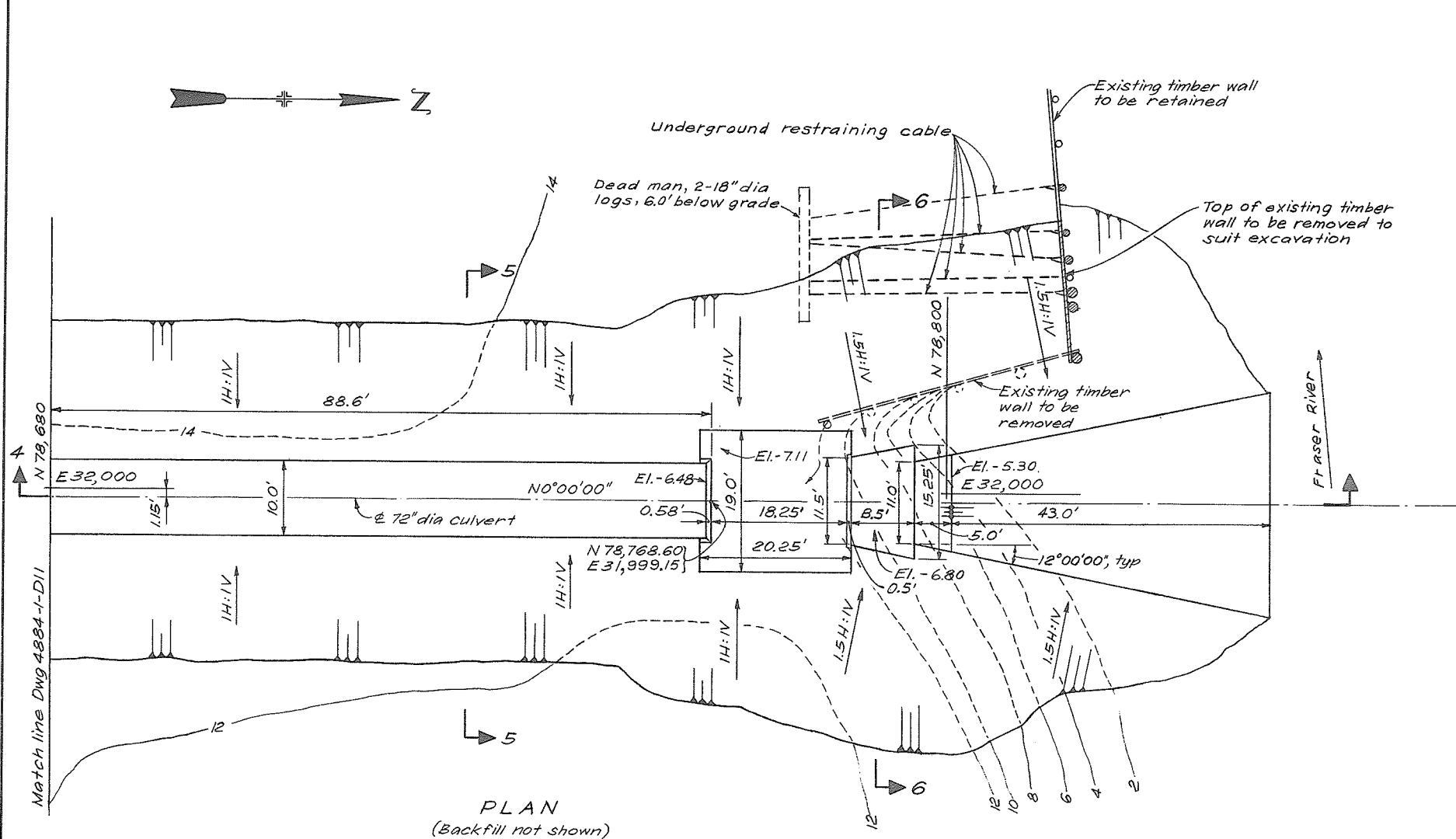
RECOMMENDED: *W. A. Merlo*
PROJECT MANAGER
DATE: *Aug 30 1978*
APPROVED: *W. A. Merlo*
DIRECTOR, WATER INVESTIGATIONS
DATE: *Sep 8/78*

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 1
SOUTH WESTMINSTER FLOOD CONTROL WORKS
128 TH STREET FLOODBOX
EXCAVATION & BACKFILL SHEET 1 OF 2

DESIGNED: *N. Macmillan*
DRAWN: *FL*
CHECKED: *FL*
SCALE: *As shown*
DWG. NO: *4884-1-D11/R2*

SURVEYED: *FL*
DATE: *29 Aug 1*
FILE NO: *0281550-1*
SHEET 14 OF 20



- NOTE**
1. Backfill outside of 10 ft wide dyke fill prism over culvert and in the area north of the CNR right shall be material originally excavated except as indicated in Section 6 and on Plan Dwg 4884-1-D10.
 2. Sheet piling was used in lieu of cofferdam during construction of floodbox.

SECTION 4



CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD: *Herbert E. Lussman*

PROJECT ENGINEER: *M. A. Merlo*

CHIEF ENGINEER: *M. A. Merlo*

2 As built.
APPROVED FOR CONSTRUCTION MAY 17 1978
1. Structural fill payment line defined.

Pin *20-279* 9-2-81
FL *20-279*

RECOMMENDED *Eurobank*
PROJECT MANAGER
DATE *Aug 30 1978*

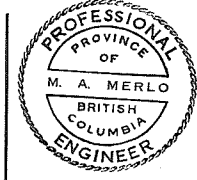
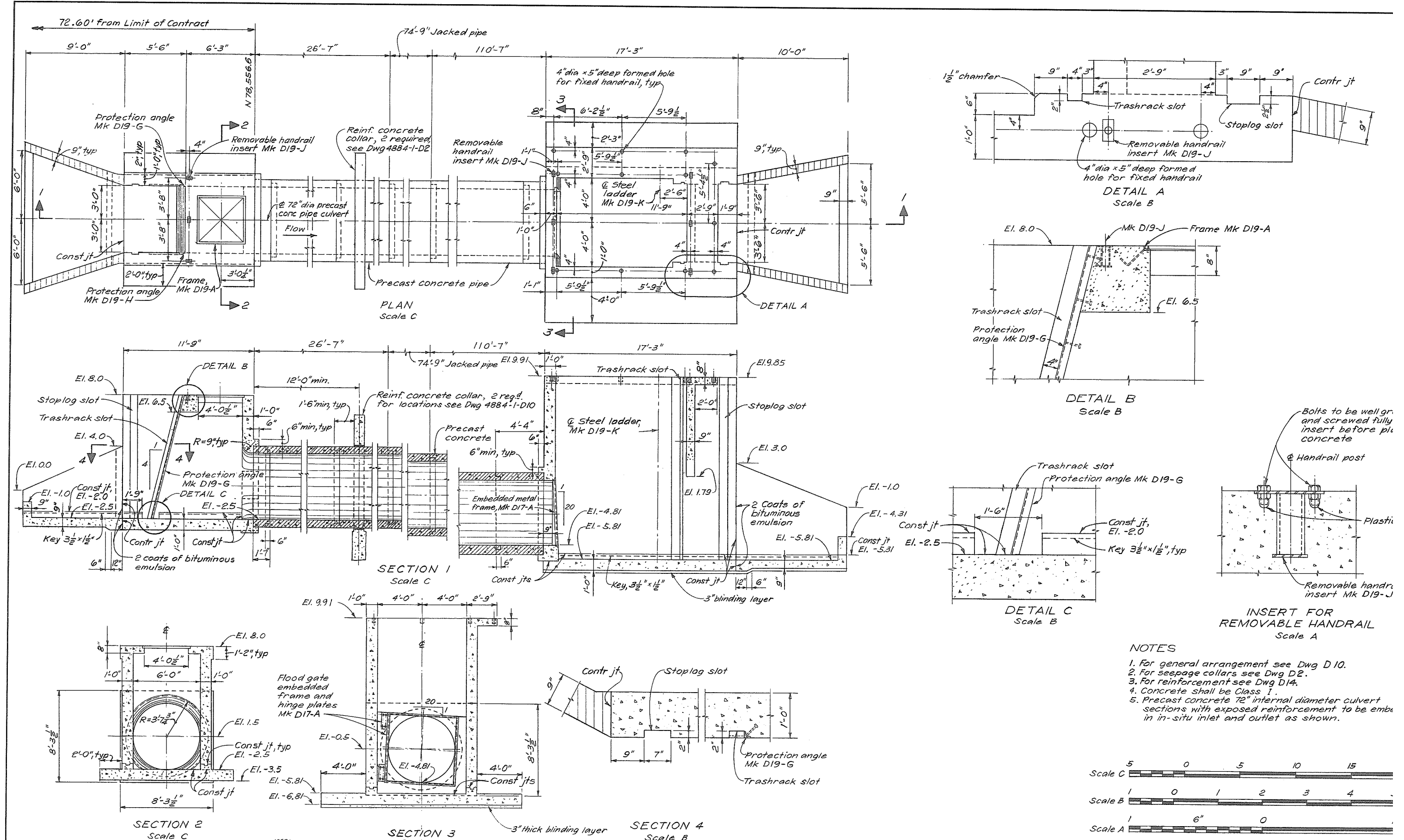
APPROVED *W. J. Miller*
DIRECTOR, WATER INVESTIGATIONS
DATE *Sep 8/78*

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 1
SOUTH WESTMINSTER FLOOD CONTROL WORKS
128 TH STREET FLOODBOX
EXCAVATION & BACKFILL SHEET 2 OF 2

DESIGNED *N. A. Coull*
DRAWN FL
CHECKED *R. A. J.*
SCALE As shown
DWG. NO. 4884-1-D12/R2

SURVEYED
DATE
FILE NO. 0281550-1
DATE 29 Aug 1
SHEET 15 OF 20



CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405

DEPARTMENT HEAD _____

PROJECT ENGINEER _____

CHIEF ENGINEER _____

2 As built.
1. Outlet structure inverts revised.

APPROVED FOR CONSTRUCTION MAY 7 1979

NO. _____ DESCRIPTION _____

BY CHD APPR DATE

DESIGNED _____

DRAWN _____

CHECKED _____

SCALE _____

DWG. NO. _____

RECOMMENDED _____ PROJECT MANAGER

DATE Aug 30 1978

APPROVED _____ DIRECTOR, WATER INVESTIGATIONS

DATE Sep 8/78

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT

PROJECT 10.4 CONTRACT NO. 1
SOUTH WESTMINSTER FLOOD CONTROL WORKS
128 TH STREET FLOODBOX
CONCRETE OUTLINE

DESIGNED _____

DRAWN FL

CHECKED JHS

SCALE As shown

DWG. NO. 4884-1-D13 R2

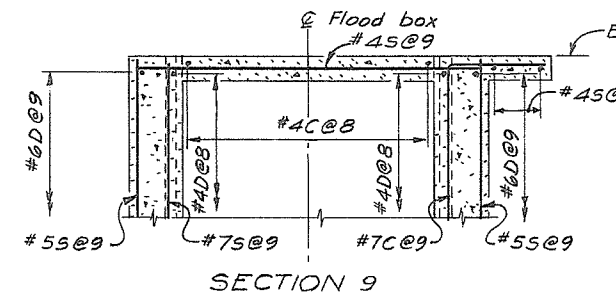
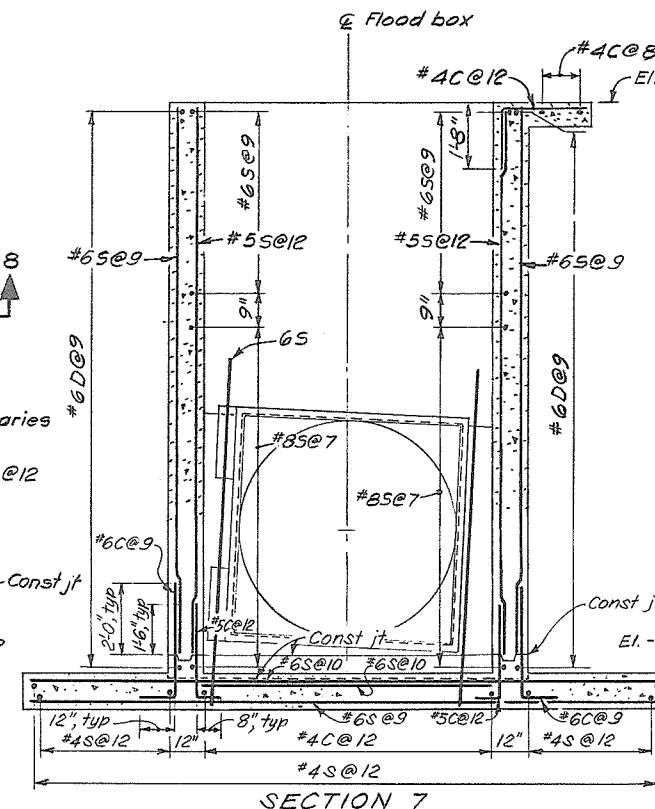
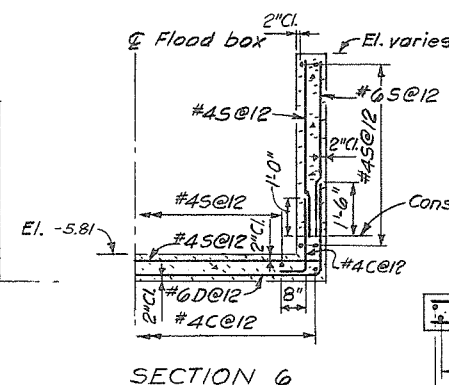
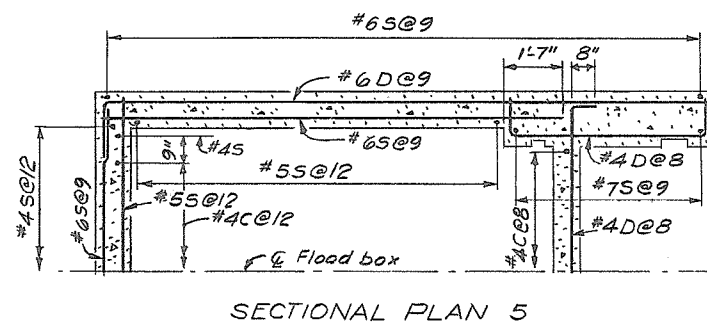
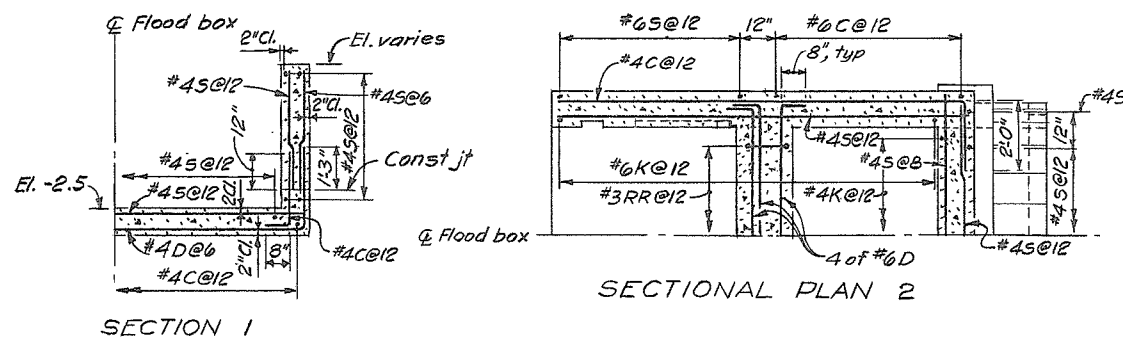
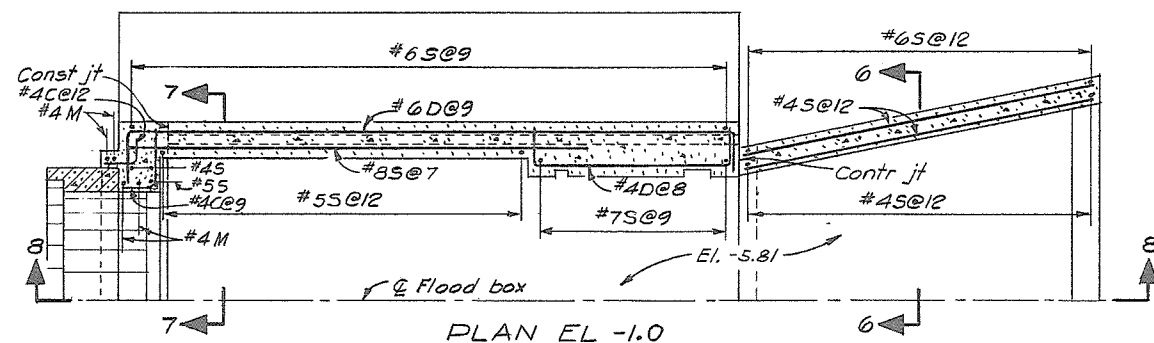
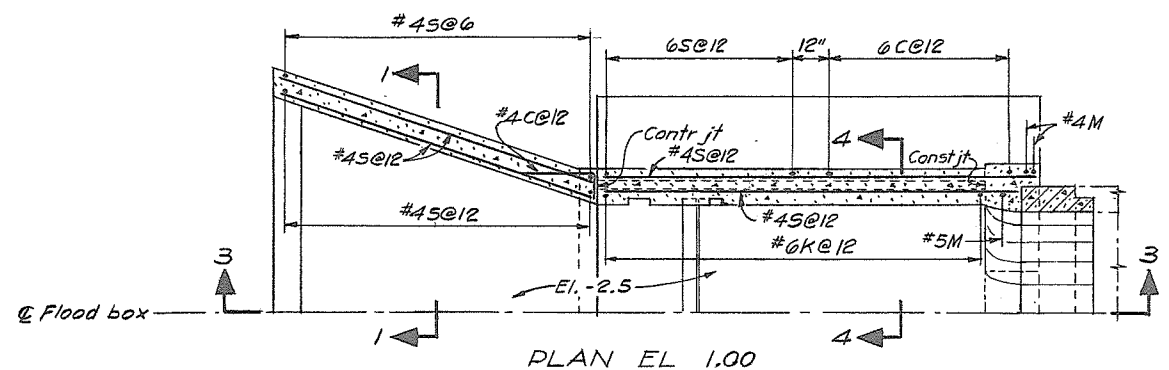
SURVEYED _____

DATE _____

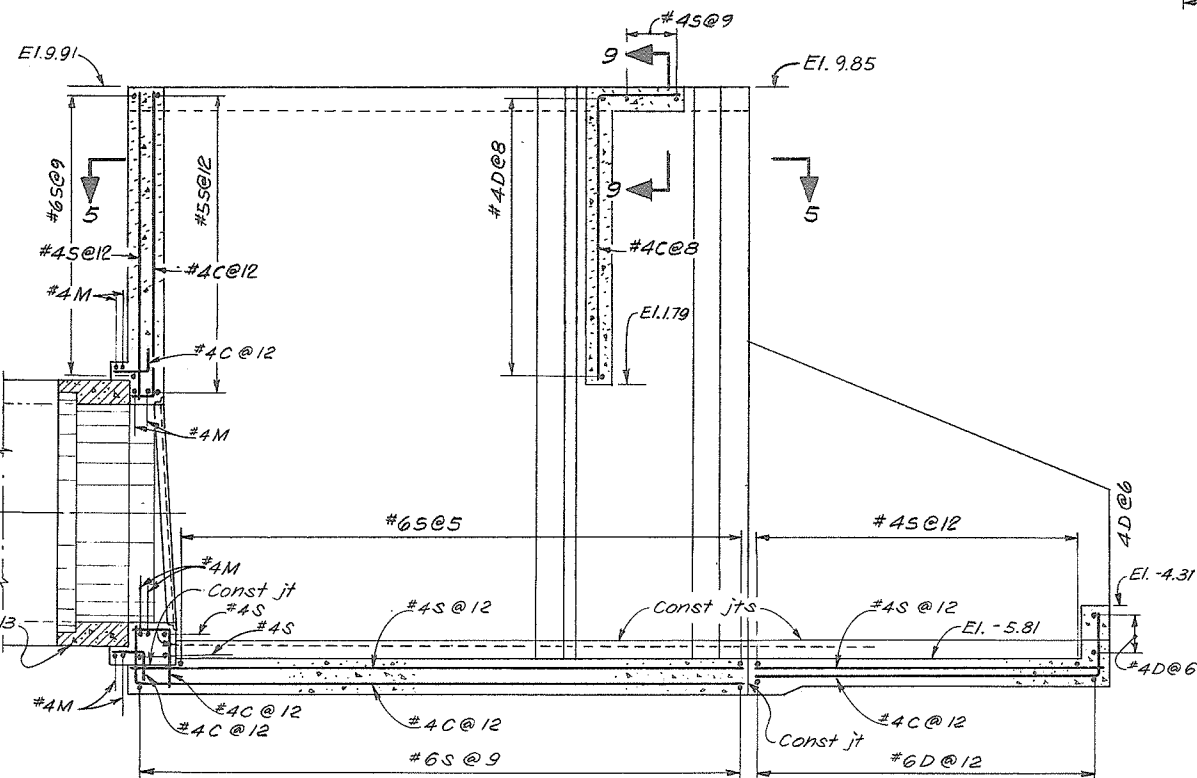
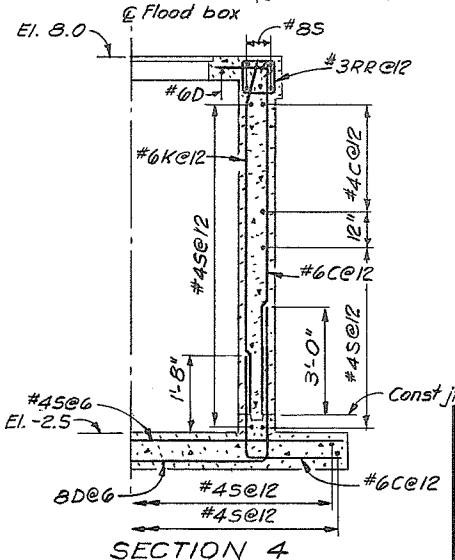
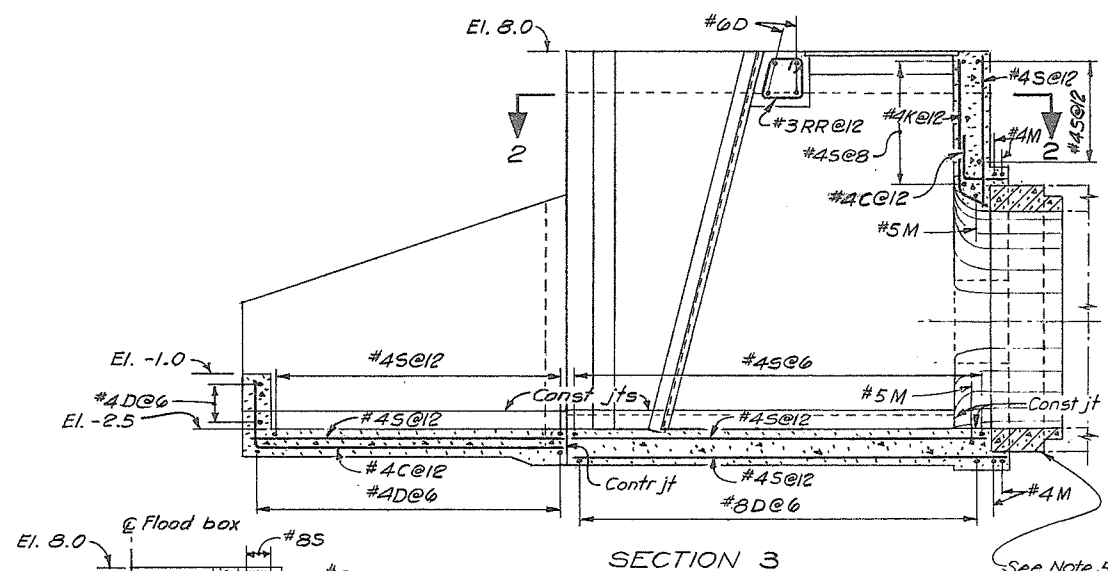
FILE NO. 0281550-1

DATE 29 Aug 1978

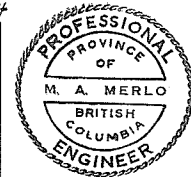
SHEET 16 OF 20



- NOTES
1. Reinforcement shown in sections to be symmetrical unless shown otherwise.
 2. For concrete outline, see Dwg D2.
 3. Reinforcement to be Grade 40 deformed bars confor to CSA G30.12.
 4. Min. lap length to be 30 bar diameters for #7 or smaller and 43 bar diameters for larger bars unless otherwise shown.
 5. Dowels to be located to splice with bars in subsequent concrete placement.
 6. Concrete cover to reinforcement to be 3" except as otherwise shown.
 7. Concrete to be Class I. See Detail Specification, Secti.
 8. Refer to Detailed Specifications Section 9 for prei concrete pipe, reinforcement and concrete requirements.



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CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405
DEPARTMENT HEAD *[Signature]*
PROJECT ENGINEER *[Signature]*
CHIEF ENGINEER *[Signature]*

2. As built.
1. Outlet structure reinf & invert El. revised
APPROVED FOR CONSTRUCTION MAY 17 1979
NO. DESCRIPTION BY CHD APPR DATE

RECOMMENDED *[Signature]* PROJECT MANAGER
DATE Aug 30 1978
APPROVED *[Signature]* DIRECTOR, WATER INVESTIGATIONS
DATE Sep 8/78

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT
PROJECT 10.4 CONTRACT NO.1
SOUTH WESTMINSTER FLOOD CONTROL WORKS
128 TH STREET FLOODBOX
REINFORCEMENT

DESIGNED *[Signature]* SURVEYED
DRAWN MP DATE
CHECKED JPS FILE NO. 0281550-
SCALE As shown DATE 29 Aug
DWG. NO. 4884-1-D14R2 SHEET 17 OF 20

ELEVATION - FLOODGATE
Mk A, One required
Scale A

SECTION 1
Scale A

DETAIL A
Scale B

DETAIL B
Scale B

SECTION 2
Scale A

SECTION 3
Scale B

ELEVATION

PLAN

PLAN
HINGE PINTLE
Scale B

ELEVATION
HINGE BRACKET
Scale B

SECTION 4
Scale B

NOTES

1. Mk letters to be prefixed D17 and clearly pain on assemblies.
2. Protective coatings to be in accordance with Clause 12.6 of the Specification.
3. Floodgate & frame to be grade G40.21-44 except as otherwise noted.
4. Reinforcement shall be adjusted to clear stud anchors.

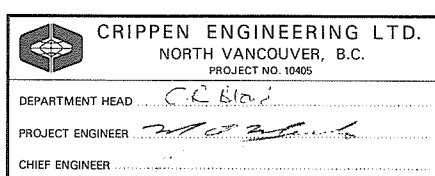
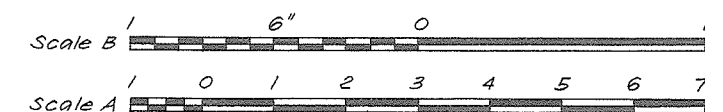
NOTE ON DESIGN

Design adapted from DWg 4944-1-D125

By: M.A.N.

Checked : N.A.C.

Original designed by A.D. checked by M.G. B., 6 Aug



1 As built.

APPROVED FOR CONSTRUCTION

MAY 17 1979

Pin ~~EL~~ ~~nm~~ 10.2.81

FILE # - 7/20/81 10-2-81

RECOMMENDED *Endorsement*
PROJECT MANAGER

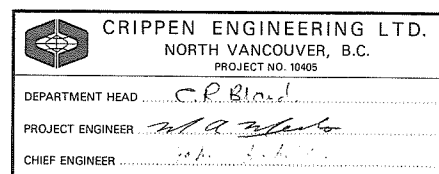
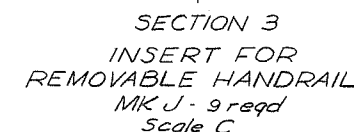
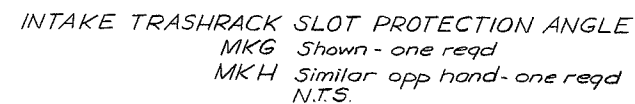
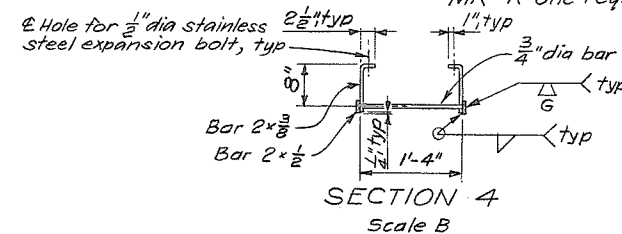
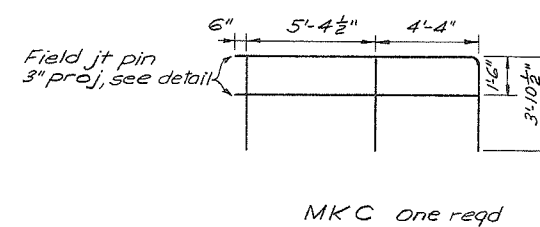
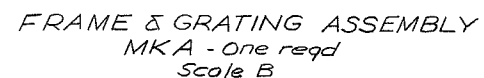
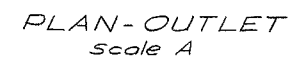
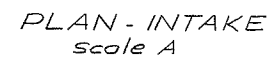
DATE Aug 30 1978.

APPROVED *J. D. Fuller*
DIRECTOR, WATER INVESTIGATIONS

DATE Sep 8/78

BRITISH COLUMBIA MINISTRY OF THE ENVIRONMENT WATER INVESTIGATIONS BRANCH CANADA - BRITISH COLUMBIA FRASER RIVER FLOOD CONTROL 1968 AGREEMENT	
PROJECT 10.4	CONTRACT NO.1
SOUTH WESTMINSTER FLOOD CONTROL WORKS 128 TH STREET FLOODBOX FLOODGATE	

DESIGNED	<i>See Note</i>	SURVEYED	
DRAWN	FL	DATE	
CHECKED	<i>See Note</i>	FILE NO.	0281550-
SCALE	As shown	DATE	29 Aug 1
DWG. NO.	4884-1-D17/R/	SHEET	18 OF 20



1	As built.	Pin	22	MMW	1028
APPROVED FOR CONSTRUCTION		MAY 17 1979			
NO.	DESCRIPTION	BY	CHD	APPR	DATE
REVISIONS					

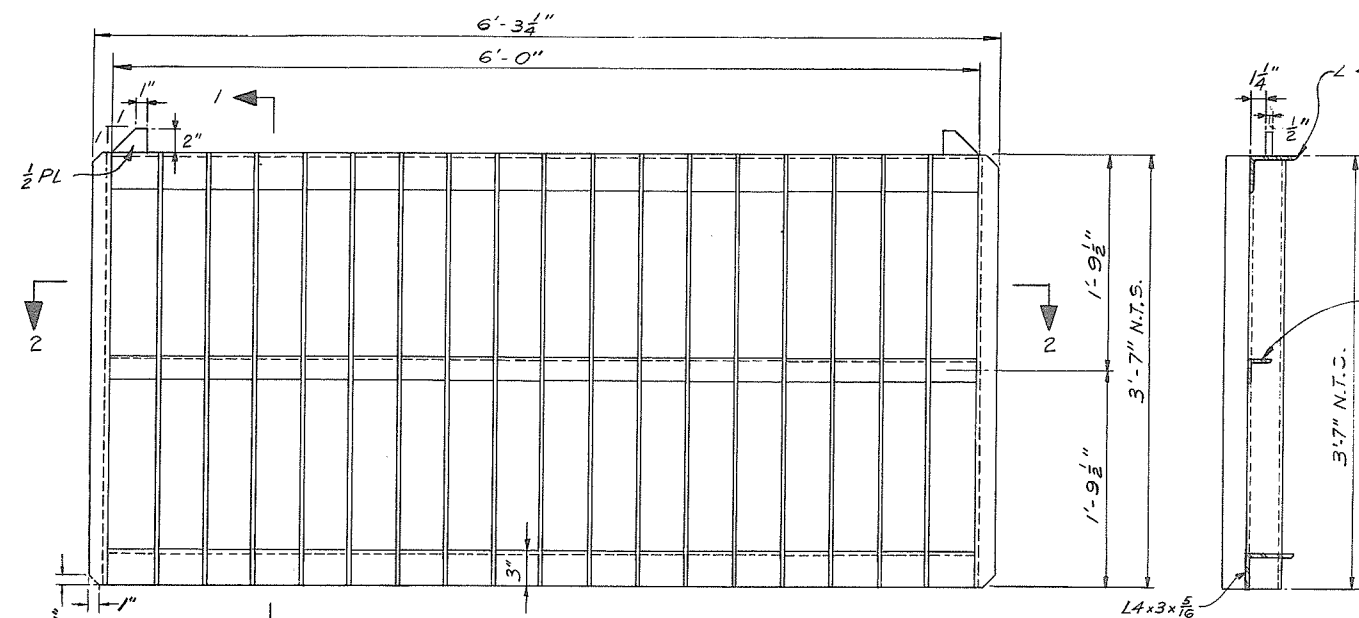
RECOMMENDED *Eric B. ...*
PROJECT MANAGER
DATE *Aug 30 1978*
APPROVED *John Fuller*
for DIRECTOR, WATER INVESTIGATION
DATE *Sep 8/78*

BRITISH COLUMBIA MINISTRY OF THE ENVIRONMENT WATER INVESTIGATIONS BRANCH CANADA - BRITISH COLUMBIA FRASER RIVER FLOOD CONTROL 1968 AGREEMENT
PROJECT 10.4 CONTRACT NO.1 SOUTH WESTMINSTER FLOOD CONTROL WORKS 128 TH STREET FLOODBOX MISCELLANEOUS METALWORK

DESIGNED	<i>Amiel</i>	SURVEYED	
DRAWN	<i>MAH</i>	DATE	
CHECKED	<i>NACornell</i>	FILE NO.	0281550
SCALE	As shown	DATE	29 Aug
DWG. NO.	4884-1-D19/R	SHEET	19 of 20

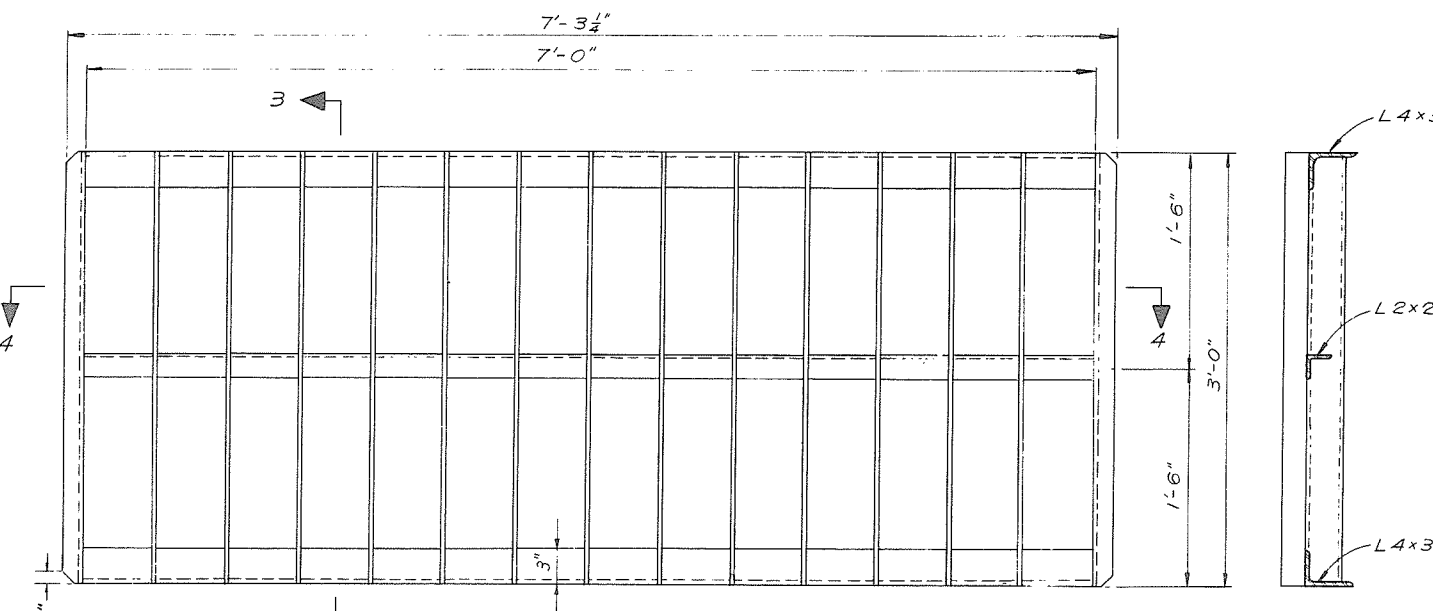
Figure 1 shows four horizontal scales, labeled Scale A, Scale B, Scale C, and Scale D, each with different markings and segment lengths. Scale A is marked from 5 to 15 FT. Scale B is marked from 1 to 6 FT. Scale C is marked from 1 to 9 INS. Scale D is marked from 1 to 4 INS, with a 1/2 mark between 1 and 2. Each scale is divided into segments of different lengths and patterns of shading.

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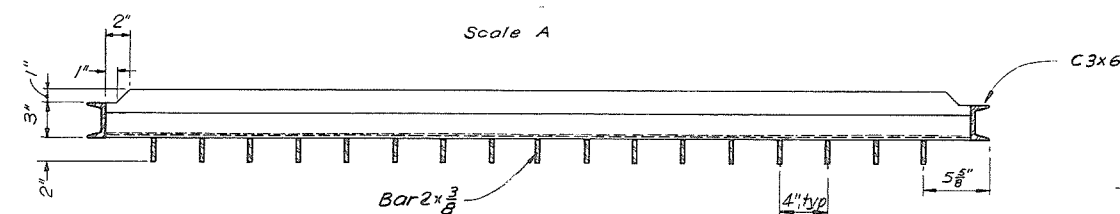
ELEVATION - INTAKE TRASHRACK
MK A 3 required

SECTION 1
Scale A

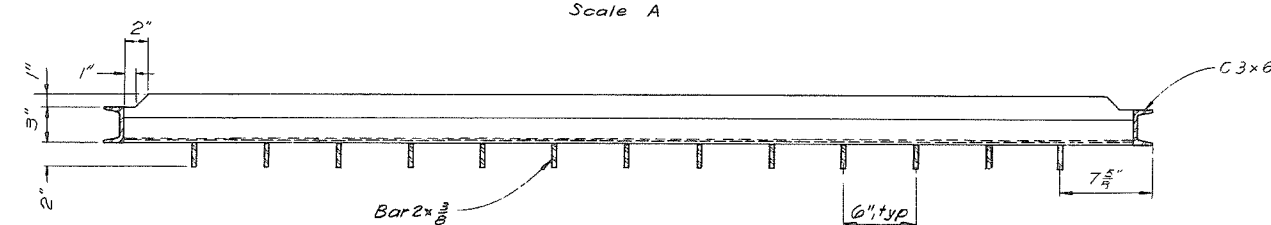


ELEVATION - OUTLET TRASHRACK
Mk B 3 required
Scale A

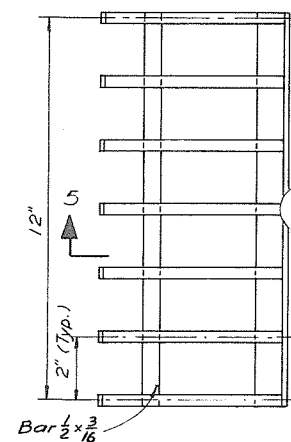
SECTION 3
Scale A



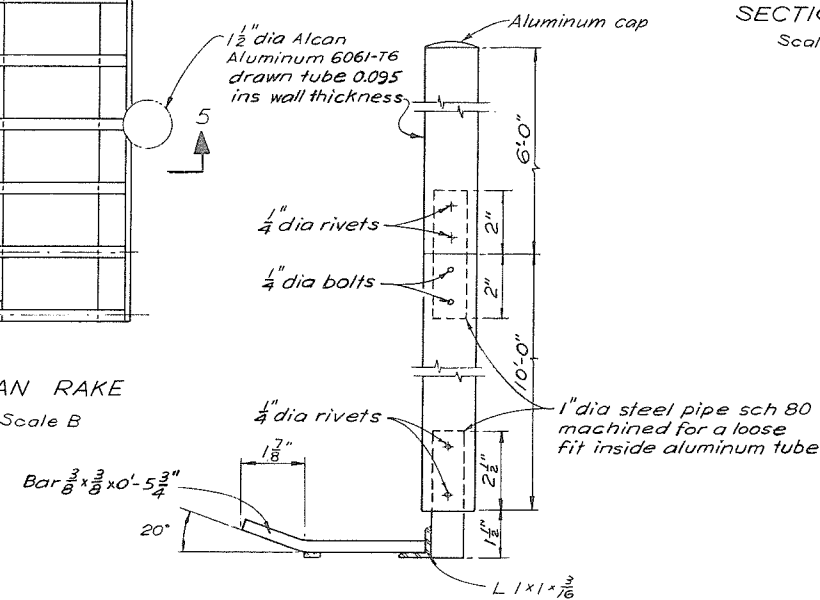
SECTION 2
Scale A



SECTION 4
Scale A



PLAN RAKE
Scale B

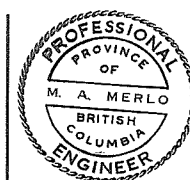
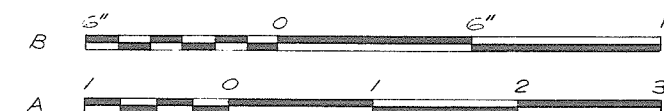


SECTION 5
Scale B

RAKE

NOTE ON DESIGN
Design adapted from Dwg 4944-1-D127
By: M.H.P.
Checked: NAL
Original designed by N. vdG. and W.K.C., checked by M.G.B., 6 Aug 1976.

- NOTES
1. Protective coatings to be in accordance with Clause 11.6 of the Specification.
 2. Full strength continuous welds throughout.
 3. Trashracks & rake to be grade G 40.21-44W steel except as otherwise noted.



CRIPPEN ENGINEERING LTD.
NORTH VANCOUVER, B.C.
PROJECT NO. 10405
DEPARTMENT HEAD *C.R. Bland*
PROJECT ENGINEER *John S. Bland*
CHIEF ENGINEER *John S. Bland*

1 As built

APPROVED BY INSTRUCTION 1 MAY 1979
NO DESCRIPTION REVISIONS BY CHD APPR DATE

RECOMMENDED *[Signature]*
DATE *Aug 30 1978*
APPROVED *[Signature]*
DATE

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH
CANADA-BRITISH COLUMBIA
FRASER RIVER FLOOD CONTROL 1968 AGREEMENT
PROJECT 10.4 CONTRACT NO. 1
SOUTH WESTMINSTER FLOOD CONTROL WORKS
128 TH STREET FLOODBOX
TRASHRACKS

DESIGNED *See Note*
DRAWN *F.L.*
CHECKED *See Note*
SCALE *As shown*
DWG. NO. 4884-1-D20/R1
SURVEYED
DATE
FILE NO. 0281550-
DATE 29 Aug 1978
SHEET 20 OF 20

CONCRETE TEST RESULTS

APPENDIX I

CONCRETE TEST RESULTS

CONCRETE TEST RESULTS

MIX DESIGN

Test No.	Date Cast	Age days	Test Strength psi	Design Strength psi	Air* %	Slump* inches	Admixtures	Remarks
1A	29 Aug 79	7	2557	4000	5.0	2.75	Pozzilith (300N) Flyash	Class I
B		14	3486					
C		28	4043					
2A	30 Aug 79	7	2086	3000	4.8	2.36	Pozzilith (300N) Flyash	Class II
B		14	2886					
C		28	3657					
3A	30 Aug 79	7	1186	2000	5.0	5.51	Pozzilith (300N)	Class III
B		14	1529					
C		28	2229					
8A	19 Oct 79	7	2329	3000	5.5	3.54		Class II
B		28	3657					
C		28	3643					
37A	6 Dec 79	7		4000	3.3	3.0		
B		28						
C		28						

* For Class I, II & III Specifications require 5% ± 1%

** For Class I & II Specifications require 3 in. ± 1 in.

*** For Class III Specifications require 6 in. ± 1½ in.

CONCRETE TEST RESULTS

Concrete Wall

Test No.	Date Cast	Location	Air	Slump	7 day	28 day	Remarks
			%	inches	psi	psi	
4	26 Sept 79	Footing 108+75 to 109+25 107+75 to 108+25 and 106+75 to 107+25	5.0	2.76	1843	3543	
5	4 Oct 79	Footing - Musqueam (W) Road Crossing	4.2	2.0	2514	3957	
6	12 Oct 79	Wall 104+15 to 103+65	5.9	3.35	1772	2943	
7	19 Oct 79	Wall 100+15 to 100+65	5.4	3.74	2343	3671	
9	23 Oct 79	Footing 92+70 to 92+20	-	3.35	2157	4000	
10	23 Oct 79	Wall 96+70 to 97+20	4.1	3.74	2100	3943	
11	24 Oct 79	Wall 95+20 to 95+70	3.4	2.76	2929	4507	
12	25 Oct 79	Wall 95+70 to 96+20	4.8	4.72	2214	3700	
13	26 Oct 79	Wall 94+20 to 94+70	4.8	2.76	2515	4086	
14	29 Oct 79	Wall 94+00	4.3	3.94	1914	3686	
15	31 Oct 79	Wall 90+70 to 91+20	5.5	3.94	1986	3829	

CONCRETE TEST RESULTS

Concrete Wall

Test No.	Date Cast	Location	Air	Slump	7 day	28 day	Remarks
			%	inches	psi	psi	
16	2 Nov 79	Wall 88+70 to 89+20	5.3	3.94	1800	3614	
17	6 Nov 79	Footing 86+40 to 86+90	5.0	1.97	2843	4500	
18	7 Nov 79	Footing 87+90 to 88+40	4.3	1.97	2829	4371	
19	8 Nov 79	Wall 105+75 to 105+25	5.2	.76	2086	3414	
20	9 Nov 79	Wall 100+02 to 100+45	5.4	2.56	2129	3671	
21	14 Nov 79	Footing #11	4.8	2.36	3200	4200	
22	15 Nov 79	Wall 89+20 to 88+57	5.6	3.94	2371	3600	
23	16 Nov 79	Footing #23	4.8	2.76	3471	4957	
24	19 Nov 79	Musqueam West Road Crossing	4.6	2.17	4357	5743	
25	20 Nov 79	Footing 78+40 to 77+90	6.1	2.36	2800	2737	
26	21 Nov 79	Musqueam West Road Crossing Wall	5.0	3.54	3386	5236	
27	22 Nov 79	Wall 83+06 to 83+56	4.5	4.33	2343	3307	

CONCRETE TEST RESULTS

128 th Street Floodbox

Test No.	Date Cast	Location	Air %	Slump Inches	Strength		Remarks
					7 Day	28 Day	
psi							
28	23 Nov 79	128th St. Flood Box Seepage collar ftg.	4.1	3.35	3857	4915	
35	5 Dec 79	128th St. Flood Box & Seepage collars	3.8	3.35	3100	4615	
49	15 Jan 80	Flood Box slab-north of 128th F.B.	4.0	2.56	3186	4250	
52	22 Jan 80	Inlet Box Walls, 128th F.B.	5.0	4.33	3043	4136	
56	4 Feb 80	Flood Box walls at outlet	3.6	3.35	3100	4207	
79	13 Mar 80	128 F.B. Head Wall & Apron walls	4.6	2.56	4043	5672	

CONCRETE TEST RESULTS

Concrete Wall

Test No.	Date Cast	Location	Air	Slump	7 day	28 day	Remarks
			%	inches	psi	psi	
29	26 Nov 79	Wall 81+56 to 82+06	4.8	2.56	3514	4000	
30	27 Nov 79	Wall 81+06 to 81+56 & 80+06 to 80+56	4.4	2.76	2629	3729	
31	28 Nov 79	Wall 78+40 to 78+90	4.5	2.95	2629	4171	
32	29 Nov 79	Wall 78+40 to 77+90	7.4	3.74	1229	2971	
33	30 Nov 79	Wall 77+90 to 77+40	5.9	3.15	2371	4114	
34	4 Dec 79	Wall 75+00 to 74+50	4.8	2.95	2414	4093	
36	6 Dec 79	Wall 72+63 to 73+13 & 71+63 to 72+13	5.3	3.94	2071	3600	
38	7 Dec 79	Footing Musqueam East Road Crossing	6.0	3.54	1843	3686	
39	10 Dec 79	Wall 98+00 to 98+50	5.0		2400		
40	11 Dec 79	Wall 99+00 to 99+50	3.8	2.95	2943	4093	
41	12 Dec 79	Wall 67+00 to 67+50	5.9	3.35	2443	3629	

CONCRETE TEST RESULTS

Dyke Wall

Test No.	Date Cast	Location	Air %	Slump Inches	Strength 7 Day	Strength 28 Day	Remarks
psi							
42	13 Dec 79	Walls Sta 65+00 to 66+00	6.0	3.35	2529	3686	
43	14 Dec 79	Sta 65+293 to 65+793 66+293 to 66+793 Walls	6.4	5.51	2057	3415	
44	19 Dec 79	Footing Sta 54+00 to 54+50	6.0	6.30	2200	3057	
45	20 Dec 79	Footing Sta 50+50 to 51+00	5.4	1.97	2600	3715	
46	21 Dec 79	Footing Sta 52+50 to 53+00	5.6	2.76	2329	3643	
47	3 Jan 80	2nd slab East of M & T Crossing	6.4	2.36	2000	3343	
48	4 Jan 80	Wall Sta 60+50 to 61+00	4.2	2.76	2443	3657	
49	15 Jan 80	Flood Box Slab North of 128th	4.0	2.56	3186	4257	
50	16 Jan 80	Domtar E Crossing Slab	-	1.77	2972	4000	
51	18 Jan 80	Sta 60+00 to 60+50 Wall	4.9	2.95	2729	3957	

CONCRETE TEST RESULTS

Dyke Wall

Test No.	Date Cast	Location	Air %	Slump Inches	Strength		Remarks
					7 Day	28 Day	
psi							
53	23 Jan 80	Sta 59+50 to 60+00 Wall	5.0	2.76	2672	3786	
54	24 Jan 80	Sta 35+05 to 35+55 Footing	4.3	2.36	2843	3907	
55	25 Jan 80	Wall @ Sta 58+00 to 58+50	5.3	2.76	2629	3900	
57	6 Feb 80	Slab @ Sta 41+005 to 41+55	5.4	2.76	2843	4072	
58	7 Feb 80	Wall @ Sta 53+44 to 53+04	4.9	2.76	2886	4029	
59	8 Feb 80	Slab @ West of Domtar X-ing	5.2	3.15	3315	5129	
60	11 Feb 80	Wall @ East of M & T X-ing	5.5	3.75	2429	3686	
61	12 Feb 80	Slab @ Sta 45+06 to 44+50	4.7	2.56	2429	3786	
62	12 Feb 80	Wall @ Domtar E X-ing	4.5	2.95	3586	5215	
63	13 Feb 80	Wall @ 1/2 Musqueam W X-ing	4.3	2.36	4657	5715	
64	14 Feb 80	Wall @ 3rd Section West of 130th St.	3.15	5.7	2714	4143	

CONCRETE TEST RESULTS

Dyke Wall

Test No.	Date Cast	Location	Air %	Slump Inches	Strength 7 Day	Strength 28 Day	Remarks
psi							
65	15 Feb 80	Wall @ 1st Section, West of 130th St.	3.35	5.4	1957	3672	
66	19 Feb 80	Wall @ Sta 37+51 to 38+01	3.54	4.6	2686	4072	
67	20 Feb 80	Wall @ Sta 38+01 to 38+51	3.94	5.2	2472	3657	
68	21 Feb 80	Slab @ Sta 45+01 West	3.54	4.0	2843	4015	
69	22 Feb 80	Wall @ Sta 40+50 to 41+00	3.35	5.6	2672	4372	
70	26 Feb 80	Footing @ Wesco Area by Spur Line	5.12	3.1	3786	4843	
71	27 Feb 80	-	-	-	4186	4843	
72	28 Feb 80	Footing @ Sta 45+39 to 45+83	4.2	2.56	3200	4357	
73	29 Feb 80	Footing @ Sta 43+43 to 42+99	4.7	1.77	2915	3986	
74	4 Mar 80	Wall @ Sta 43+63 to 44+00	4.9	2.76	2757	3686	
75	5 Mar 80	Wall @ Sta 44+00 to 44+50	5.8	2.95	2357	3600	
76	7 Mar 80	Wall @ Sta 43+41 to 43+91 5'-0" High Wall	4.7	3.15	2600	4243	

CONCRETE TEST RESULTS

Dyke Wall

Test No.	Date Cast	Location	Air %	Slump Inches	Strength		Remarks
					7 Day	28 Day	
					psi		
77	11 Mar 80	Wall @ Sta 45+90 to 46+30 5'-9" High Wall	5.3	3.74	2600	3757	
78	12 Mar 80	Wall @ Sta 43+01 to 43+41 7'-0" High Wall	4.5	2.17	2786	4043	
80	14 Mar 80	Wall @ Sta 45+50 to 45+90 5'-9" High Wall	5.7	3.15	2271	3543	
81	18 Mar 80	Wall @ Sta 42+22 to 42+62	4.7	2.95	2114	3586	
82	19 Mar 80	Footing @ Sta 21+50 to 22+00 22+50 to 23+00	3.7	2.17	2286	3900	
83	20 Mar 80	Wall @ Sta 42+62 to 42+02	5.0	2.76	2957	3715	
84	24 Mar 80	Footing @ Sta 21+00 to 21+50 Sta 22+00 to 22+50	4.6	1.97	3272	4500	
85	25 Mar 80	Wall @ Sta 48+41 to 48+69	5.6	2.56	2543	4036	
86	25 Mar 80	Footing @ Sta 19+82 to 20+00 & Sta 10+50 to 21+00	4.5	2.17	2572	4329	
87	26 Mar 80	Footing @ Sta 20+00 to 20+50	4.8	1.77	3000	4457	
88	27 Mar 80	Footing @ 1/2 130 St X-ing	5.0	2.36	2886	4086	

CONCRETE TEST RESULTS

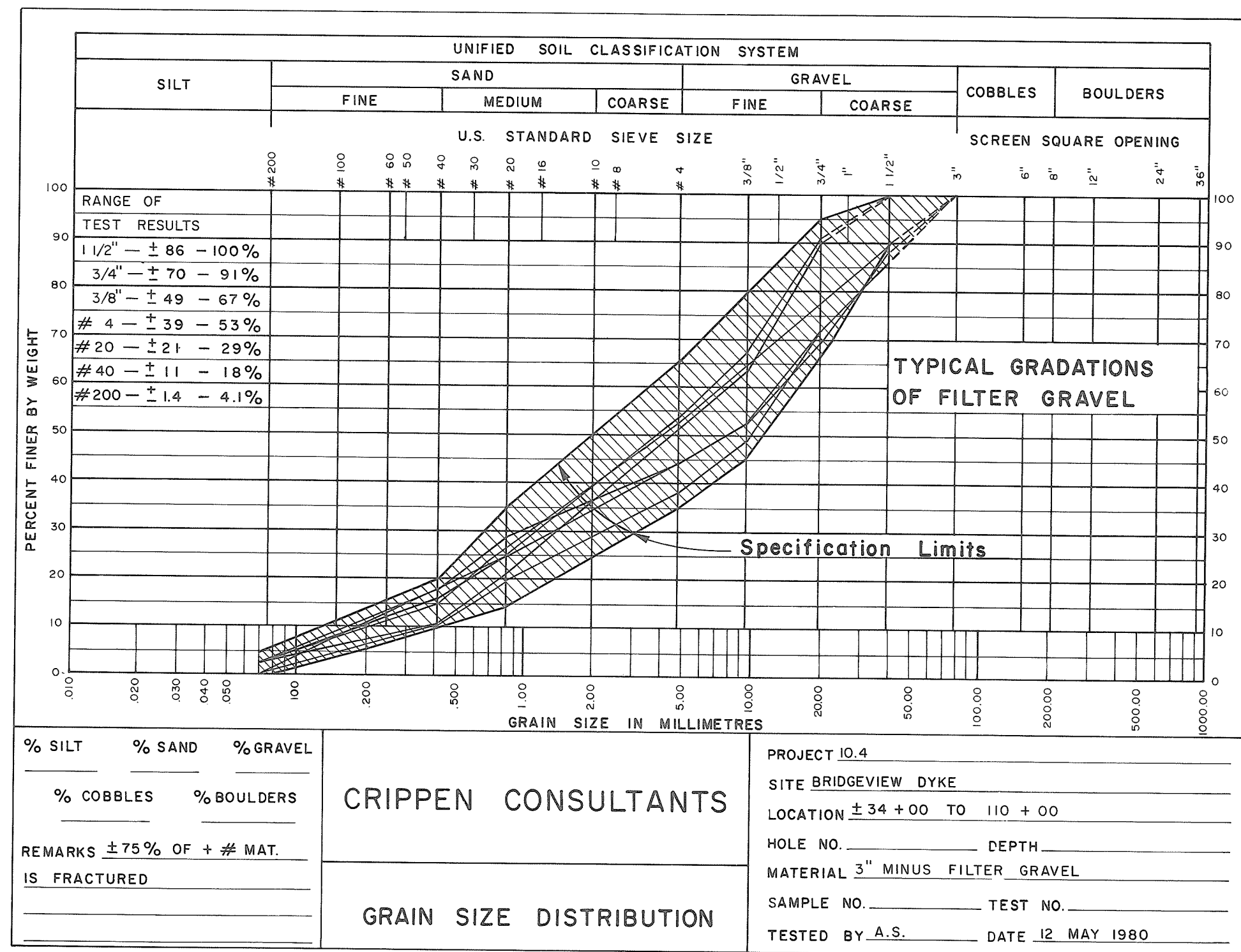
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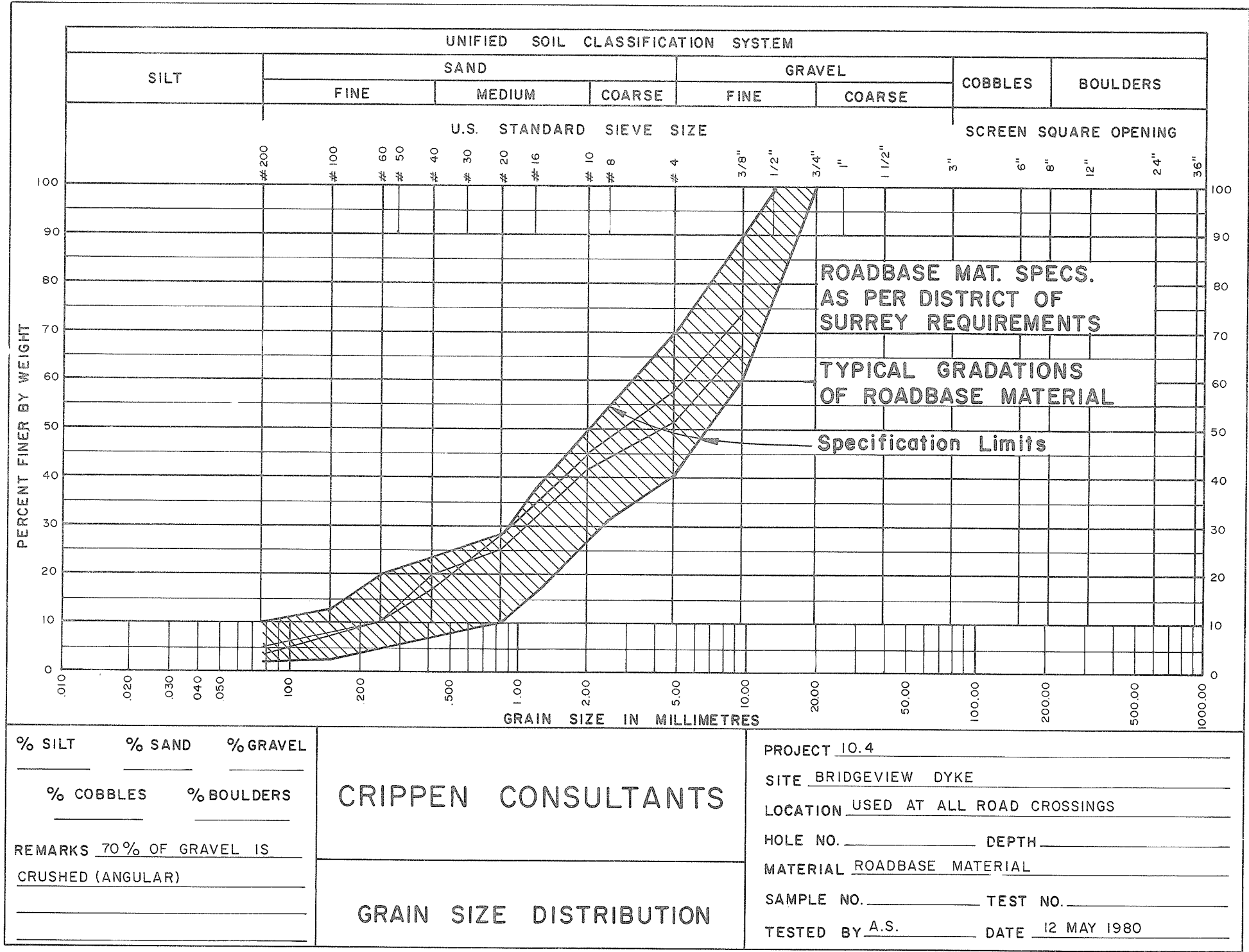
Test No.	Date Cast	Location	Air %	Slump Inches	Strength 7 Day	28 Day	Remarks
					psi		
89	28 Mar 80	Footing @ ½ Domtar W X-ing	3.8	2.36	4043	4857	
90	28 Mar 80	Wall @ Sta 22+50 to 23+00	4.5	3.15	3257	4300	
91	28 Mar 80	Wall @ ½ 130 St. X-ing	4.5	2.36	3386	4186	
92	1 Apr 80	Wall @ ½ Domtar W X-ing	5.0	3.54	2643	3906	
93	1 Apr 80	Wall @ Sta 22+00 to 22+50	4.7	2.95	2572	3928	
94	3 Apr 80	Wall @ Sta 21+00 to 21+50	6.2	3.74	1829	3486	
95	8 Apr 80	Wall @ Sta 20+50 to 21+00	5.1	2.95	2157	3715	
96	9 Apr 80	Wall @ Sta 20+00 to 20+50	4.8	3.74	2143	3557	
97	10 Apr 80	Footing @ Sta 55+14 to 55+64	5.1	4.53	2086	3629	
98	10 Apr 80	Wall @ Sta 19+80 to 20+00	4.6	2.56	2472	3886	
99	11 Apr 80	Footing @ 27' W.O. East of 126A St.	4.9	3.35	1986	3600	
100	11 Apr 80	Footing @ ½ 130 St. X-ing	3.4	2.56	2929	5100	
101	15 Apr 80	Wall @ ½ 130 St. X-ing	3.4	2.56	3657	4657	
103	18 Apr 80	Footing @ Sta 48+41 & 48+69	5.3	2.76	2400	3609	

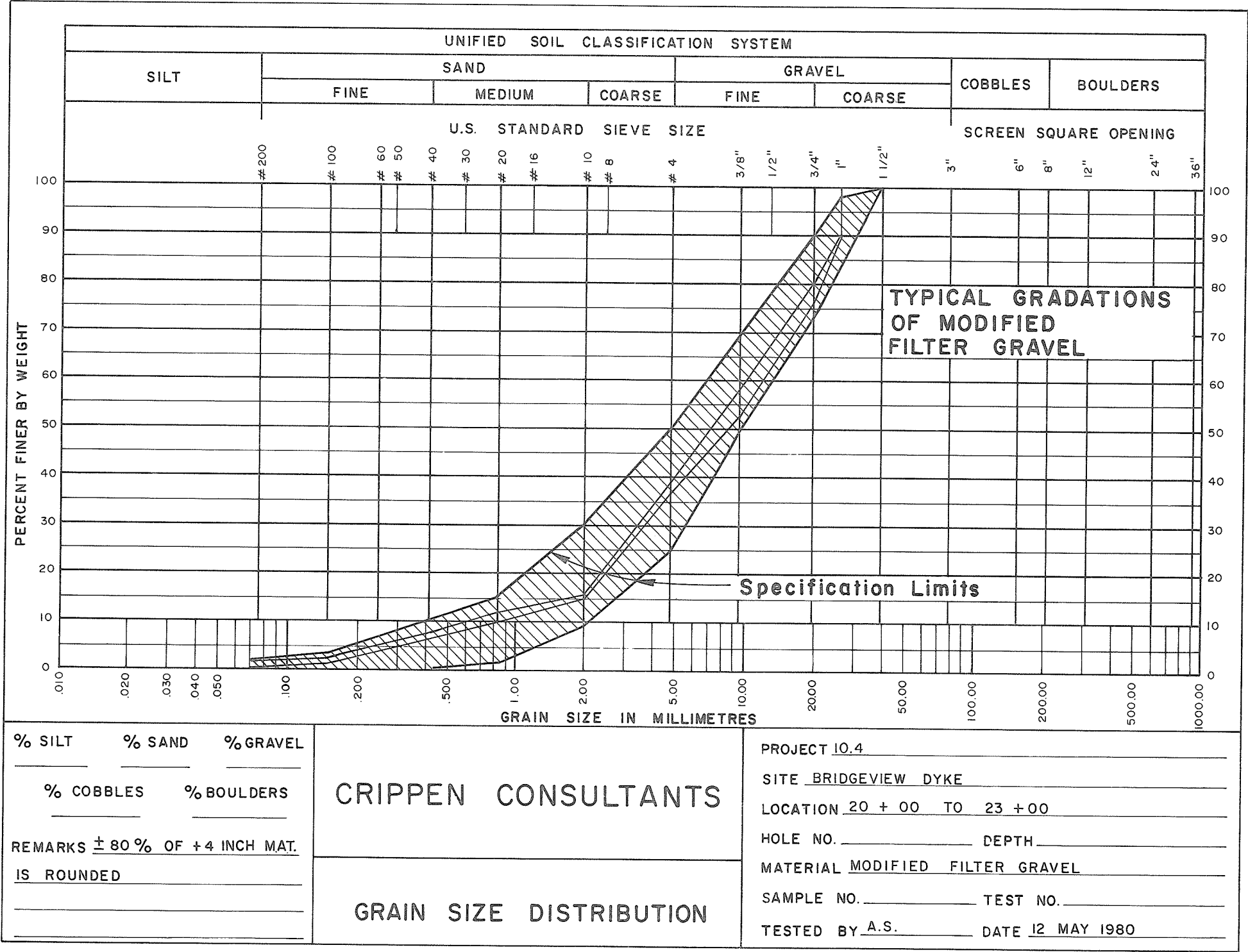
TYPICAL MATERIAL GRADATION

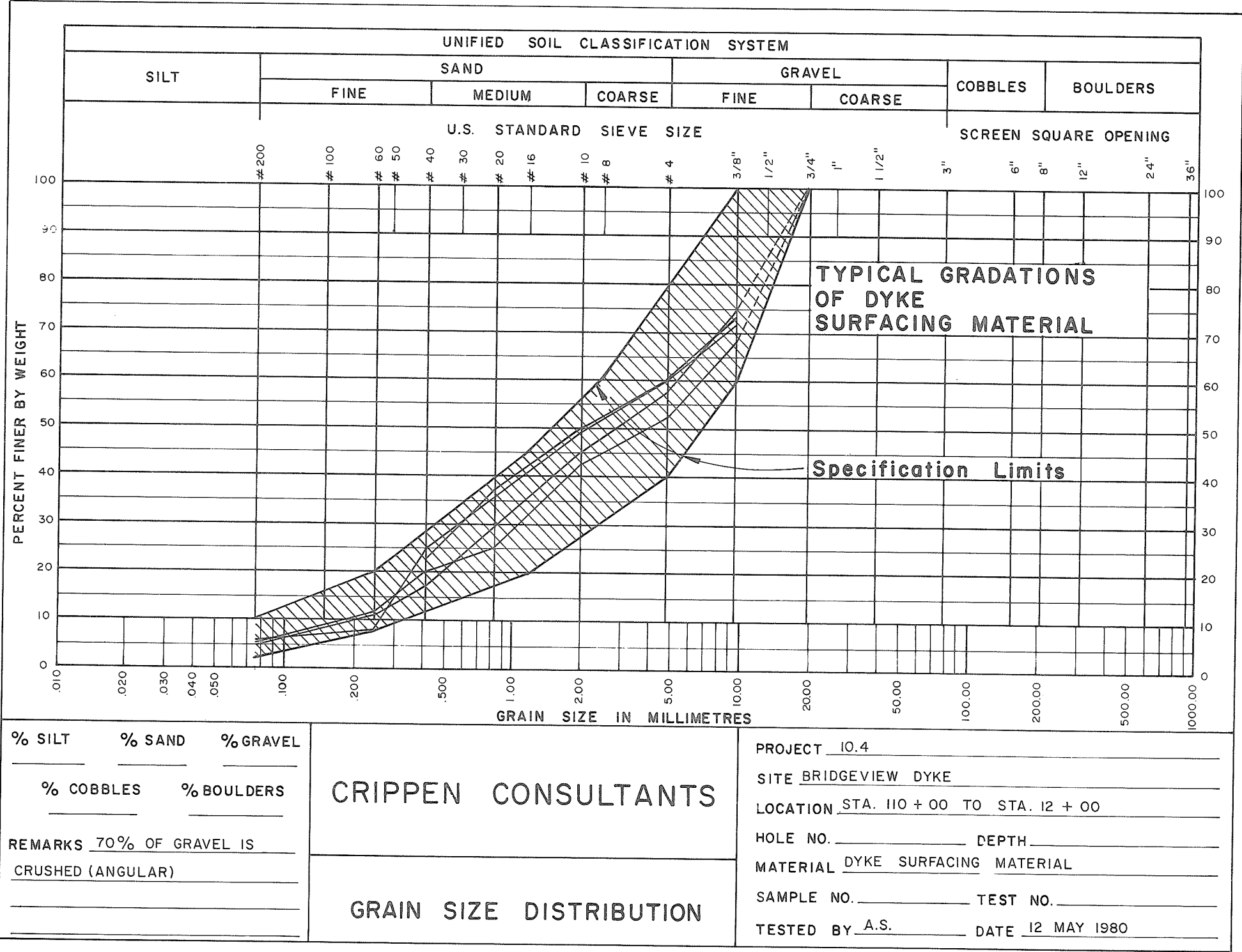
APPENDIX 2

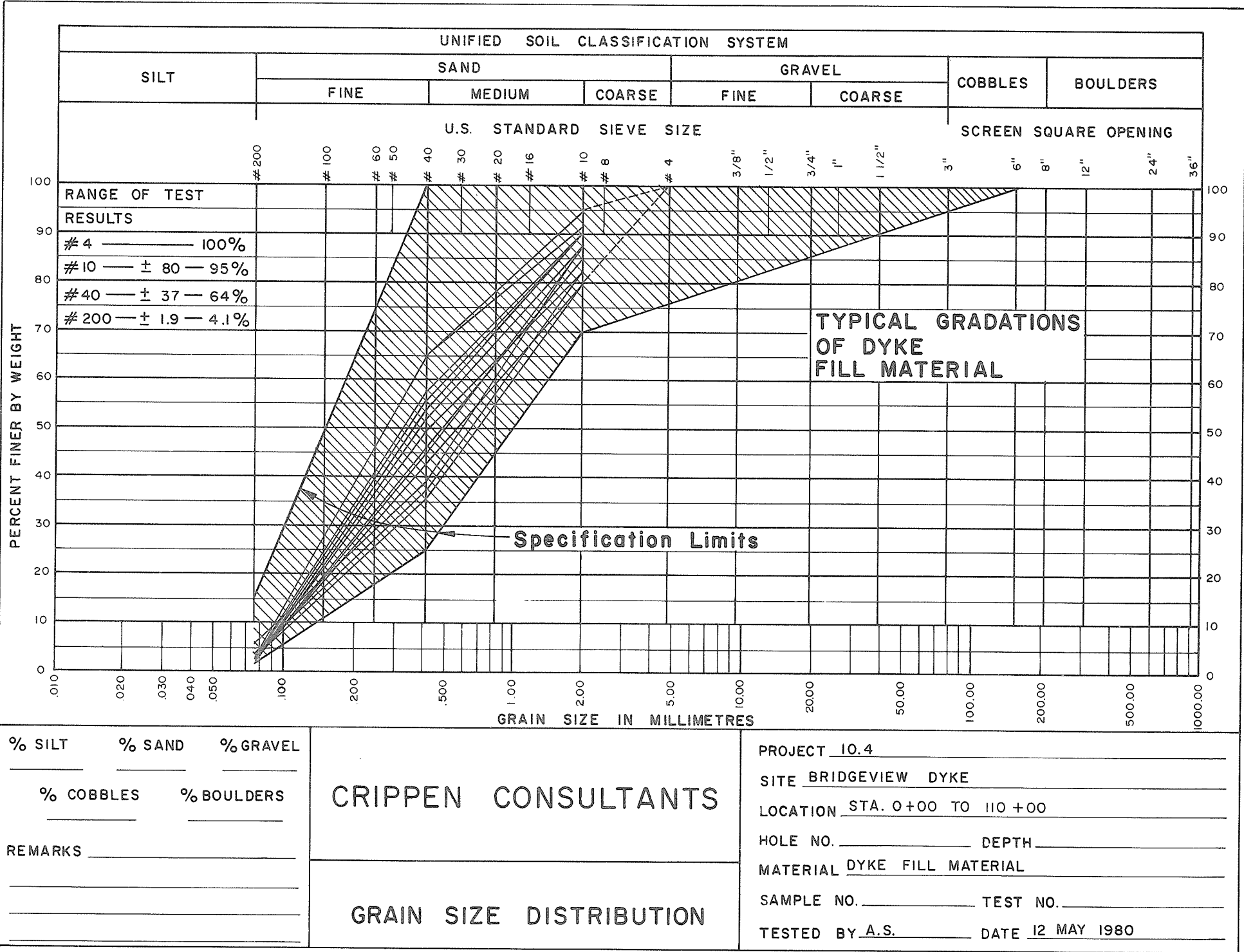
DYKE MATERIALS





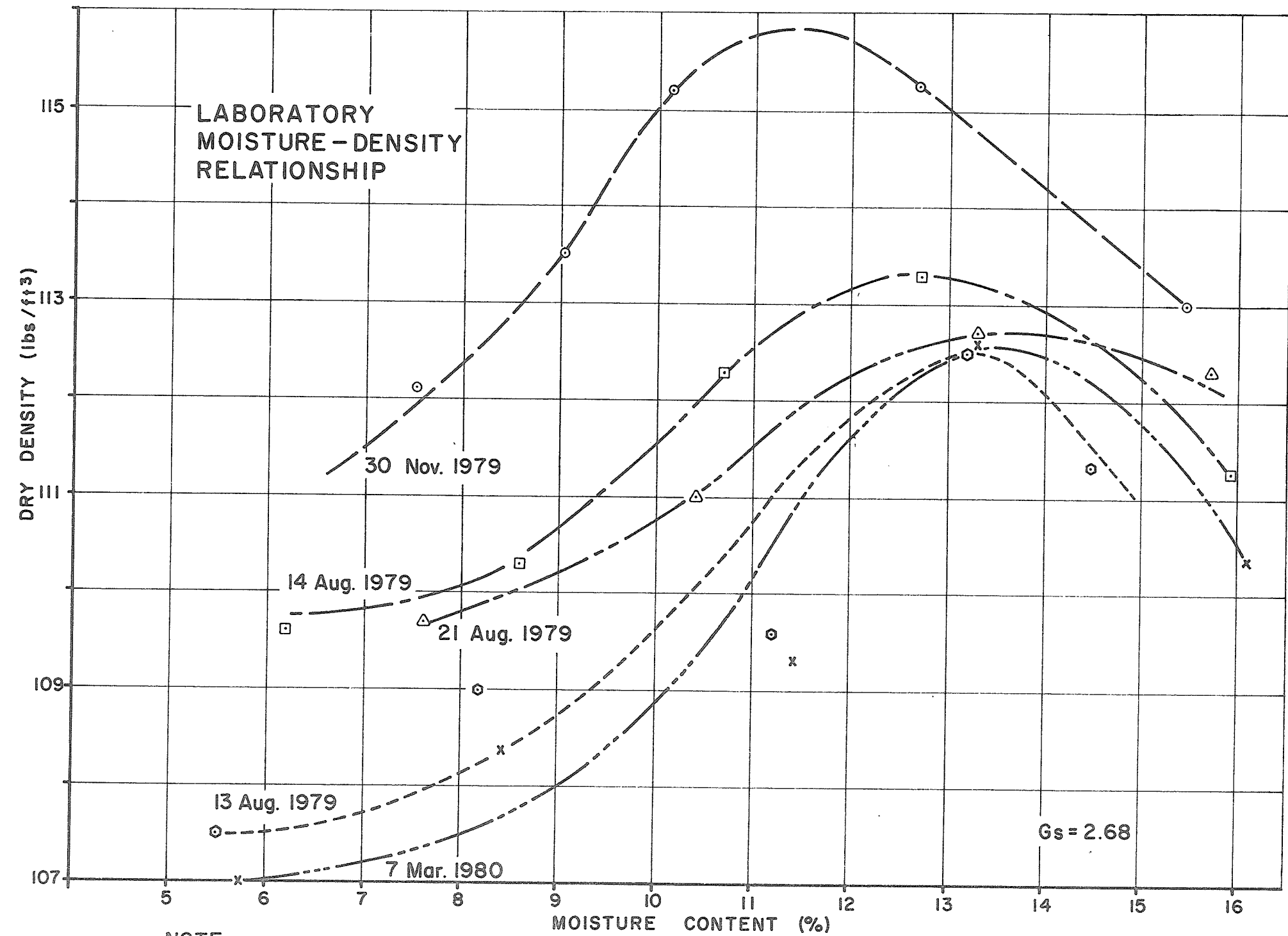






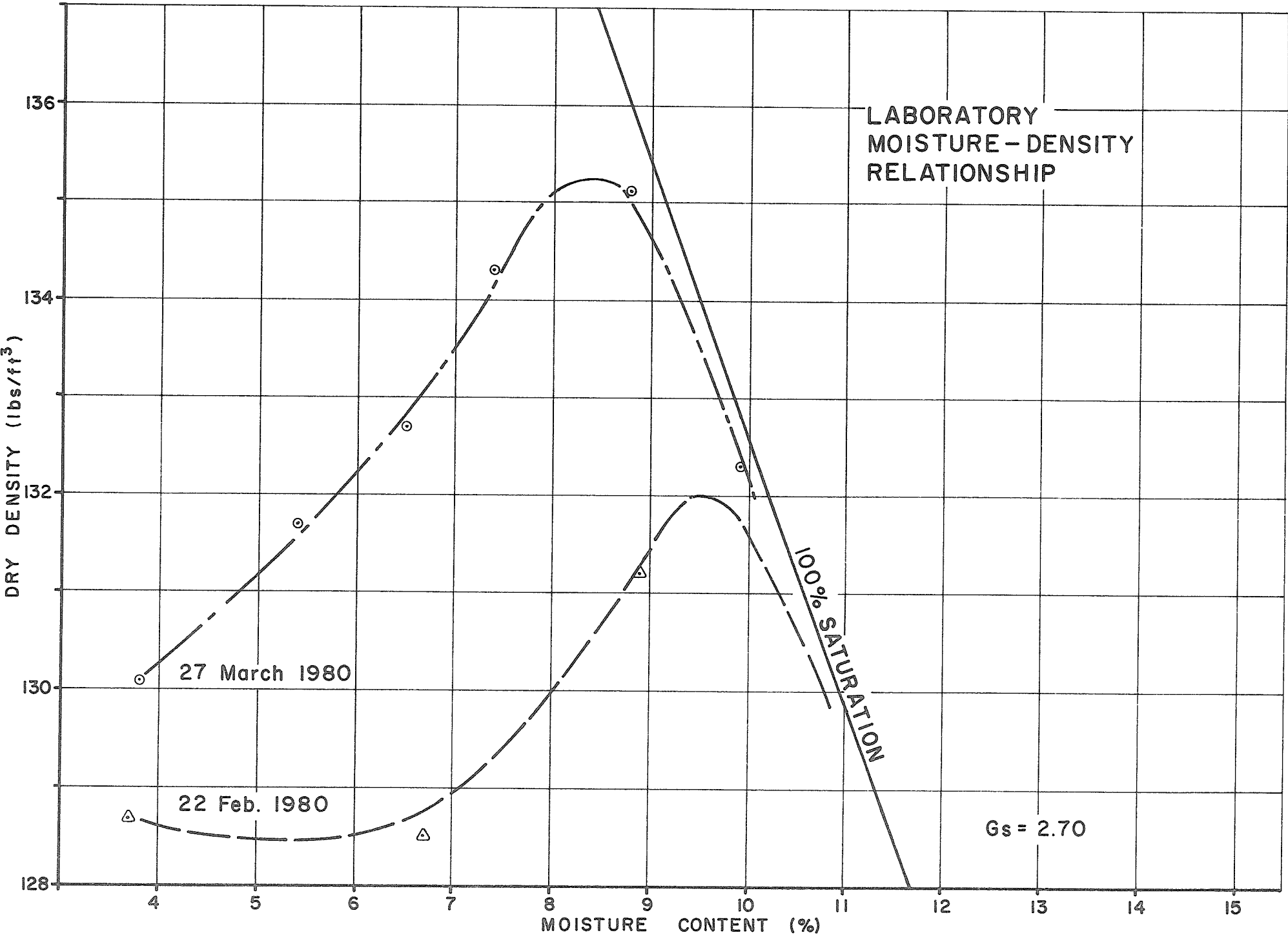
APPENDIX 3
INSTRUMENTATION

DYKE FILL MATERIAL

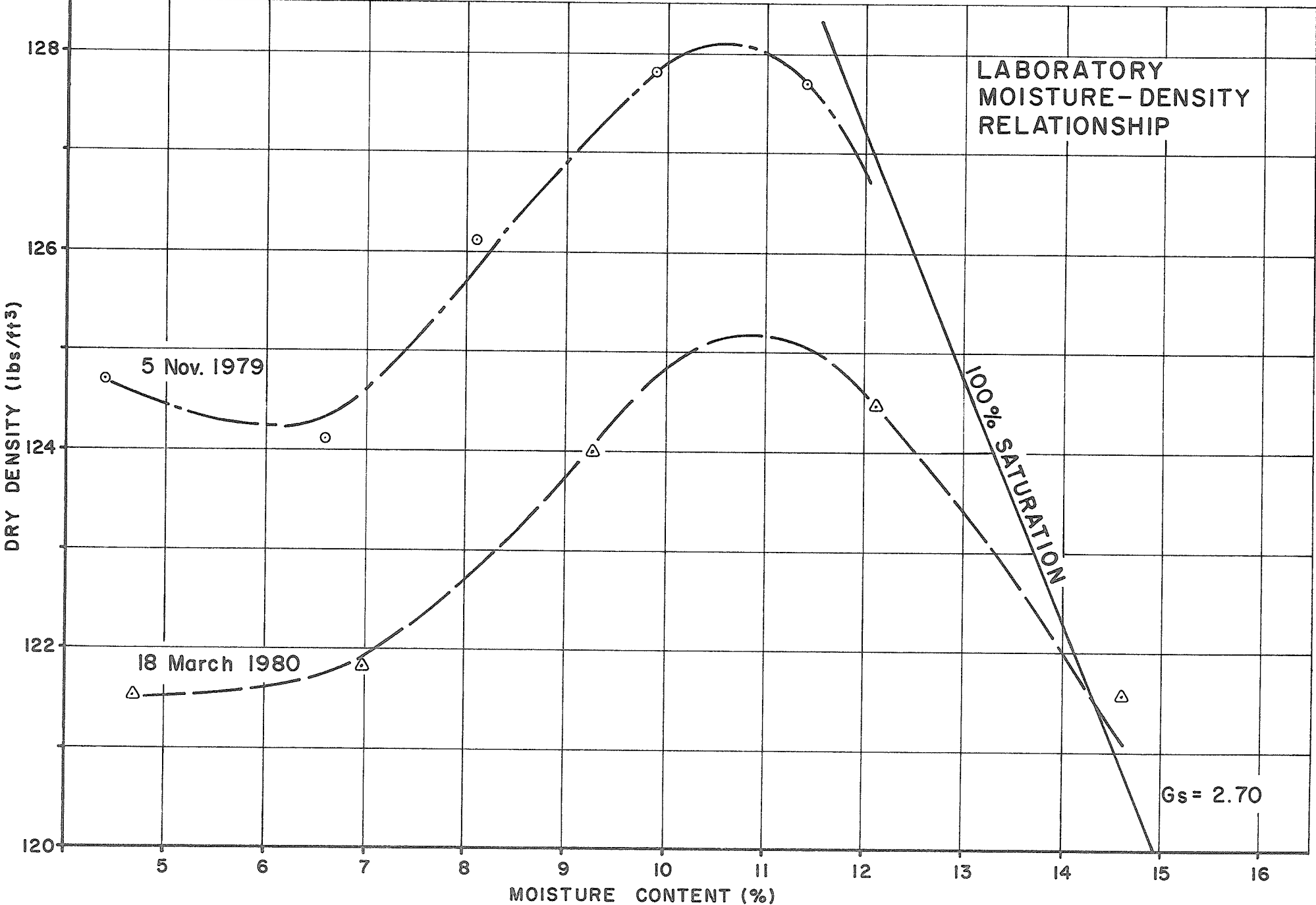


NOTE
 LABORATORY TEST RESULTS UNRELIABLE AT HIGHER MOISTURE CONTENTS DUE TO LEAKAGE OF WATER FROM SAMPLE.
 MAXIMUM DRY DENSITY ESTIMATED FROM LOWER PORTION OF CURVES AND FROM FIELD COMPARISON TESTS OF COMPACTION VS NUMBER OF ROLLER PASSES.

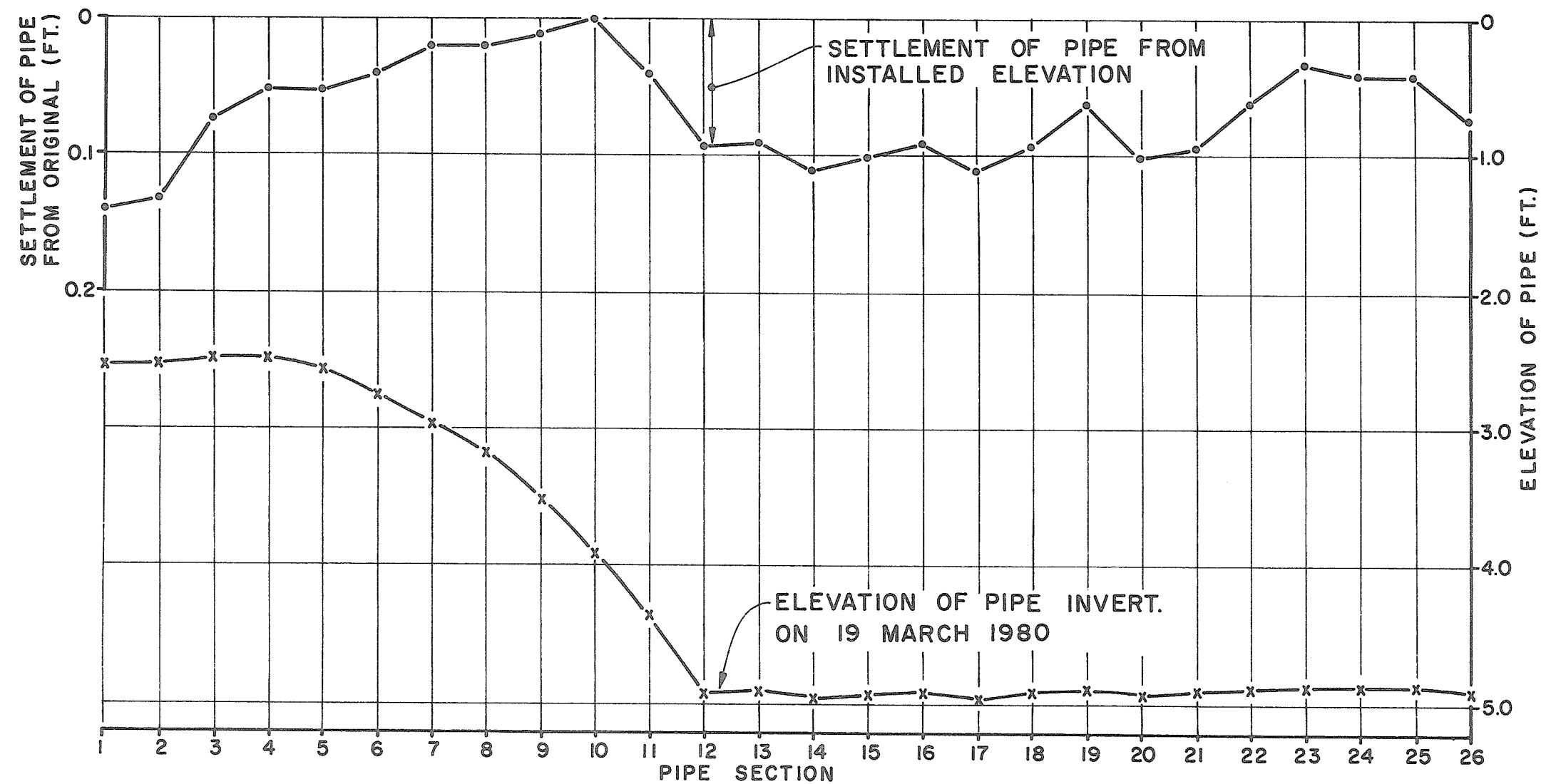
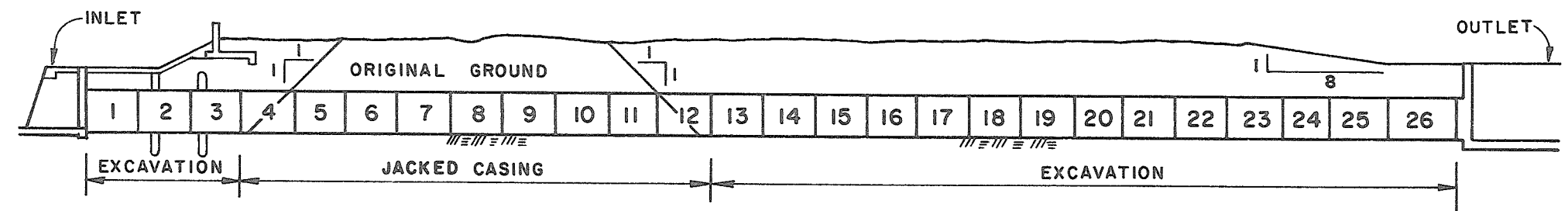
BASECOURSE / DYKE SURFACING MATERIAL



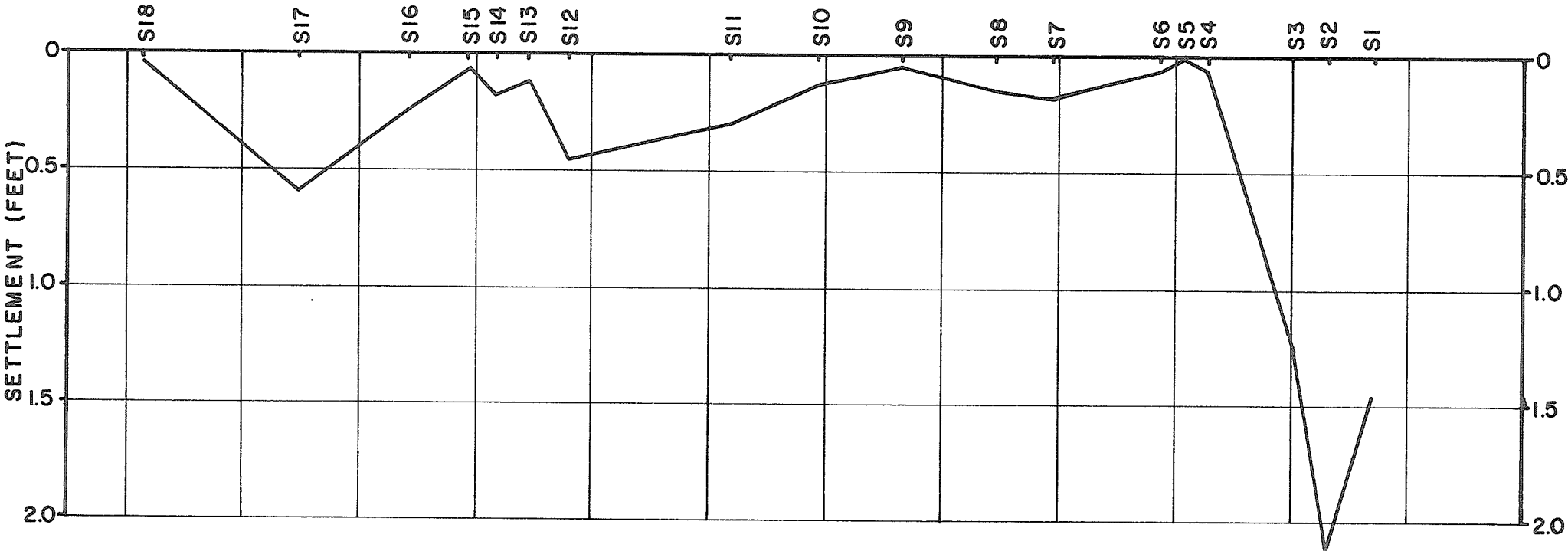
FILTER GRAVEL MATERIAL



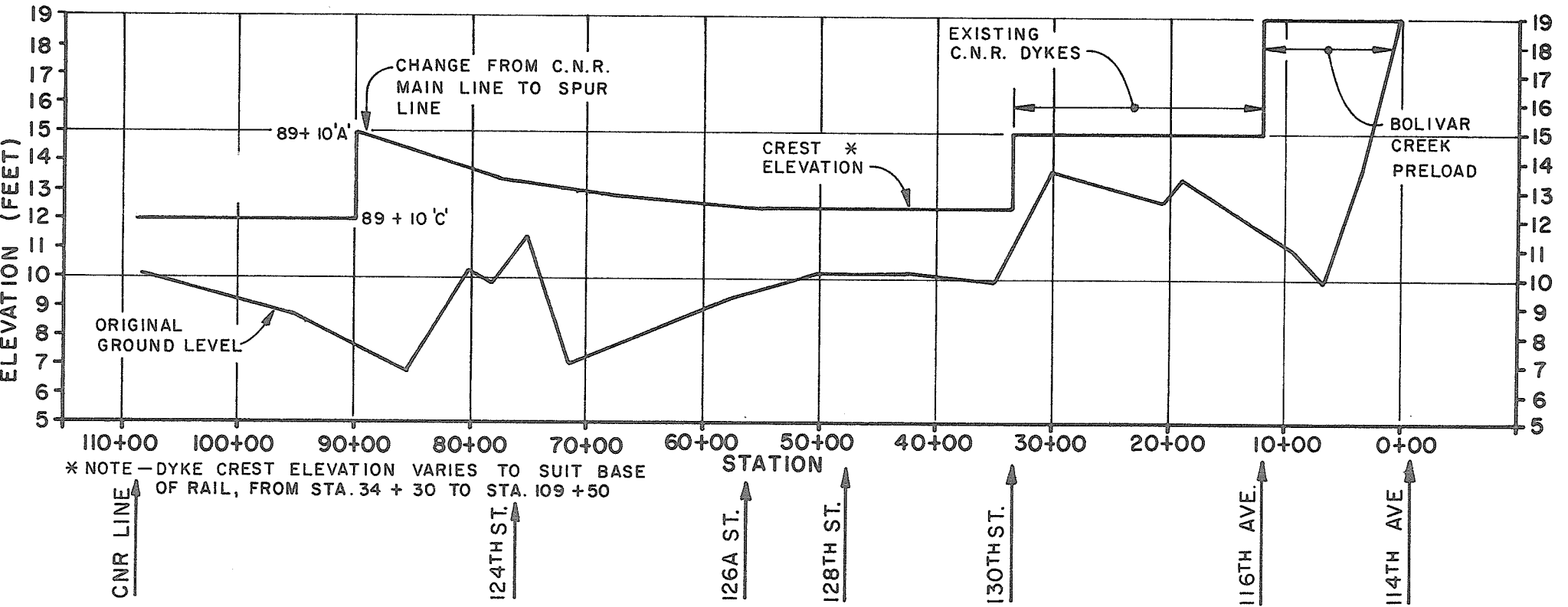
SETTLEMENT PROFILE OF 72" Ø PIPE AT 128TH ST. OUTLET WORKS

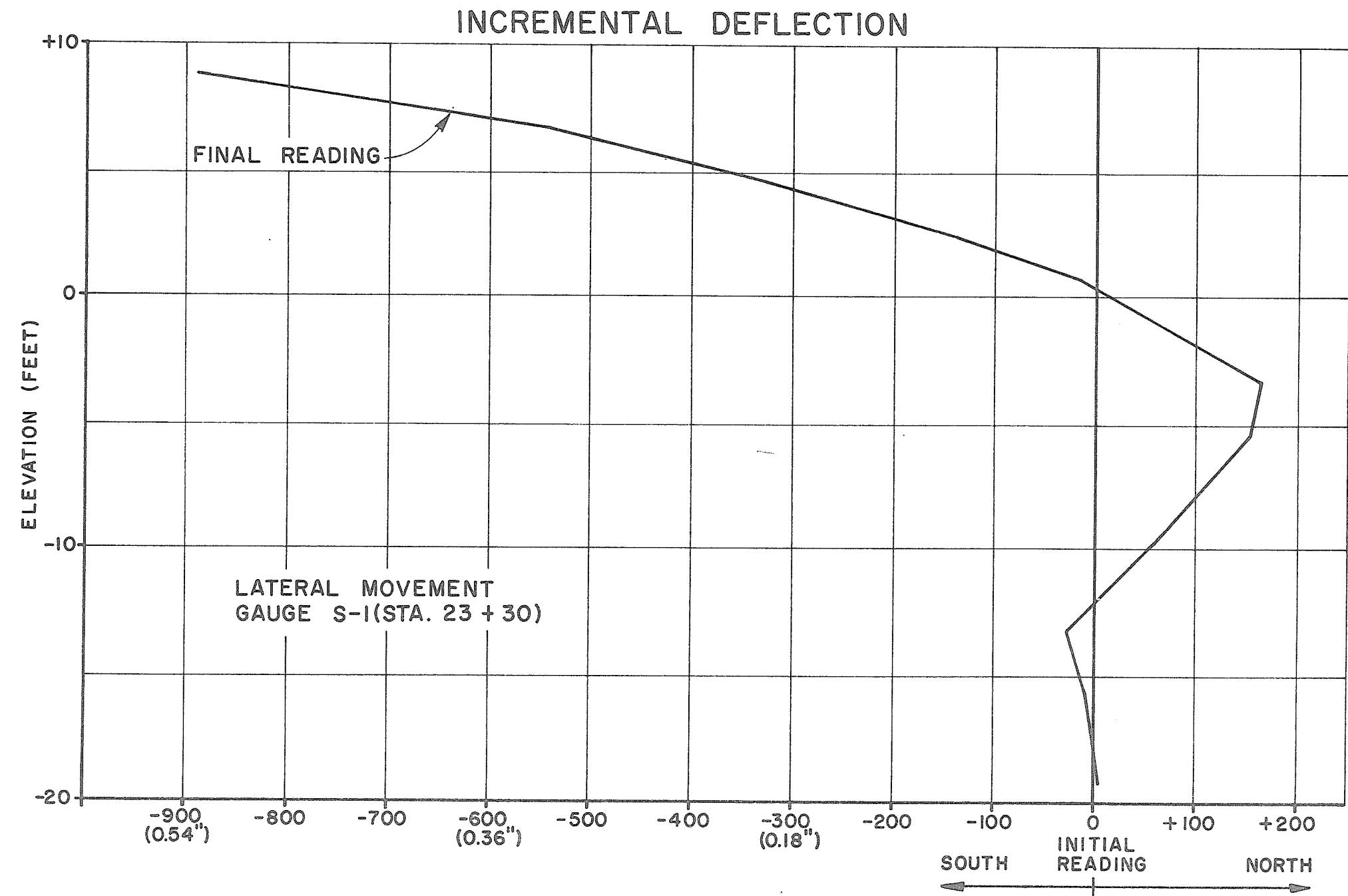


DYKE CENTRE LINE PROFILES SETTLEMENT PROFILE

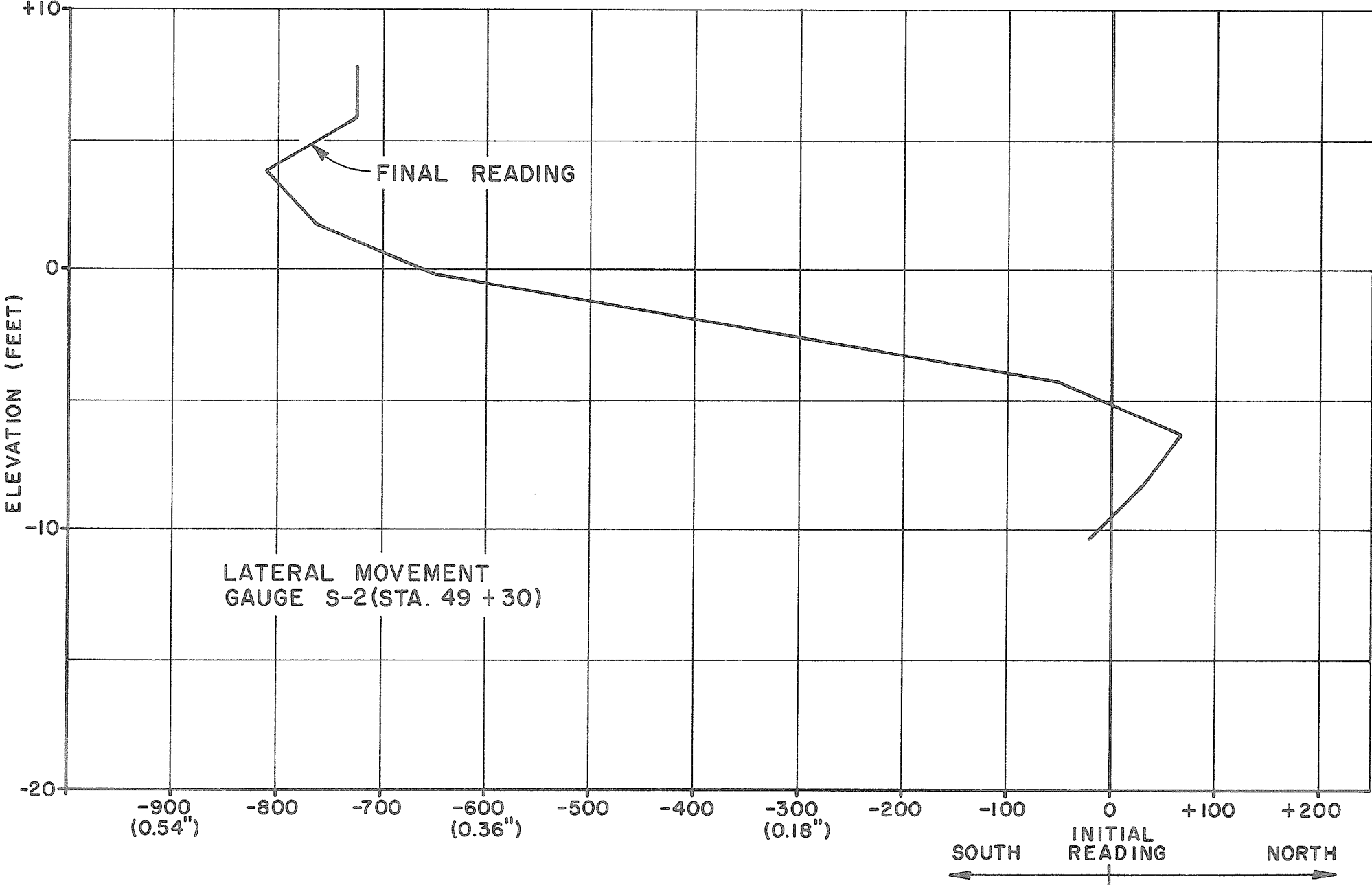


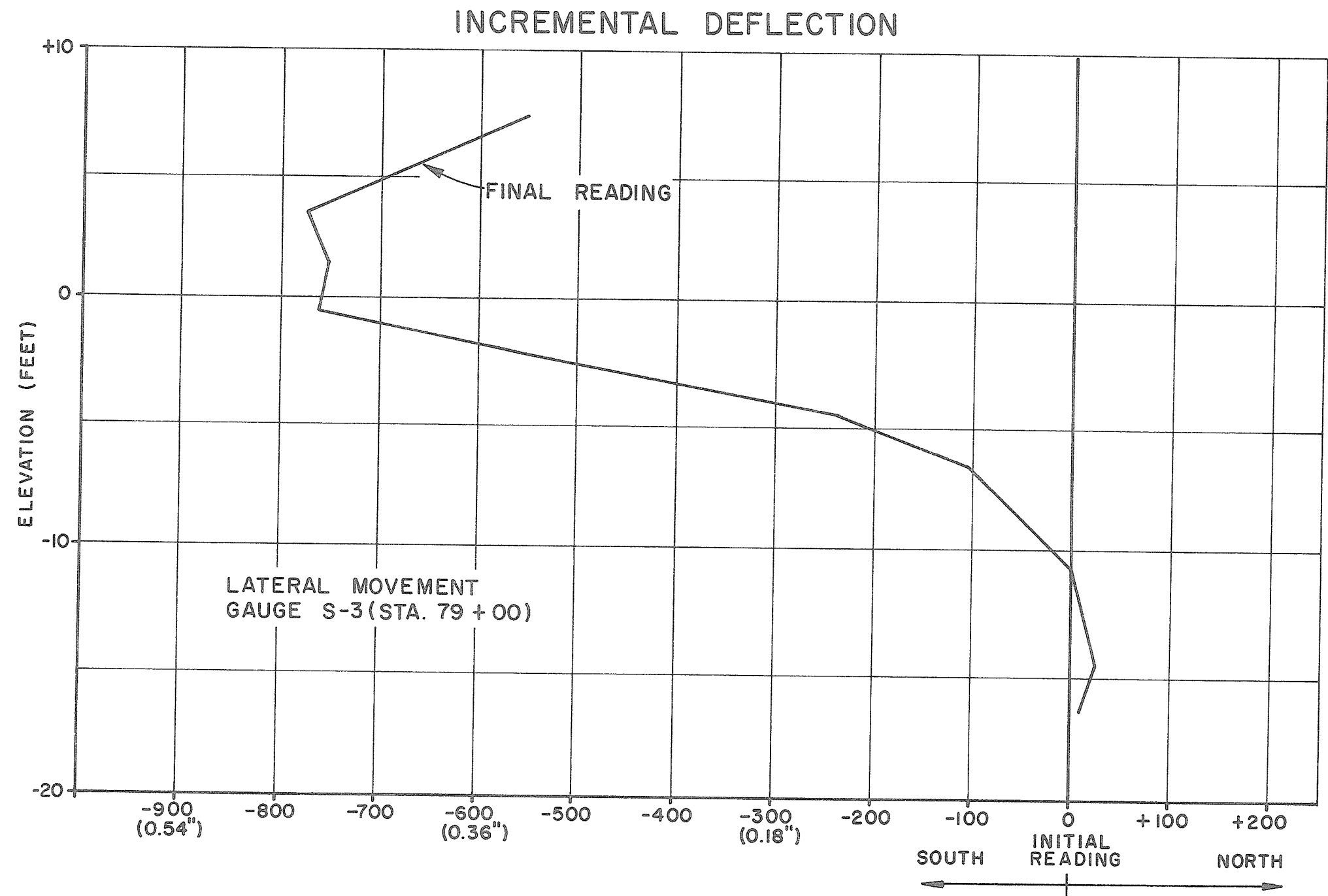
LONGITUDINAL PROFILE

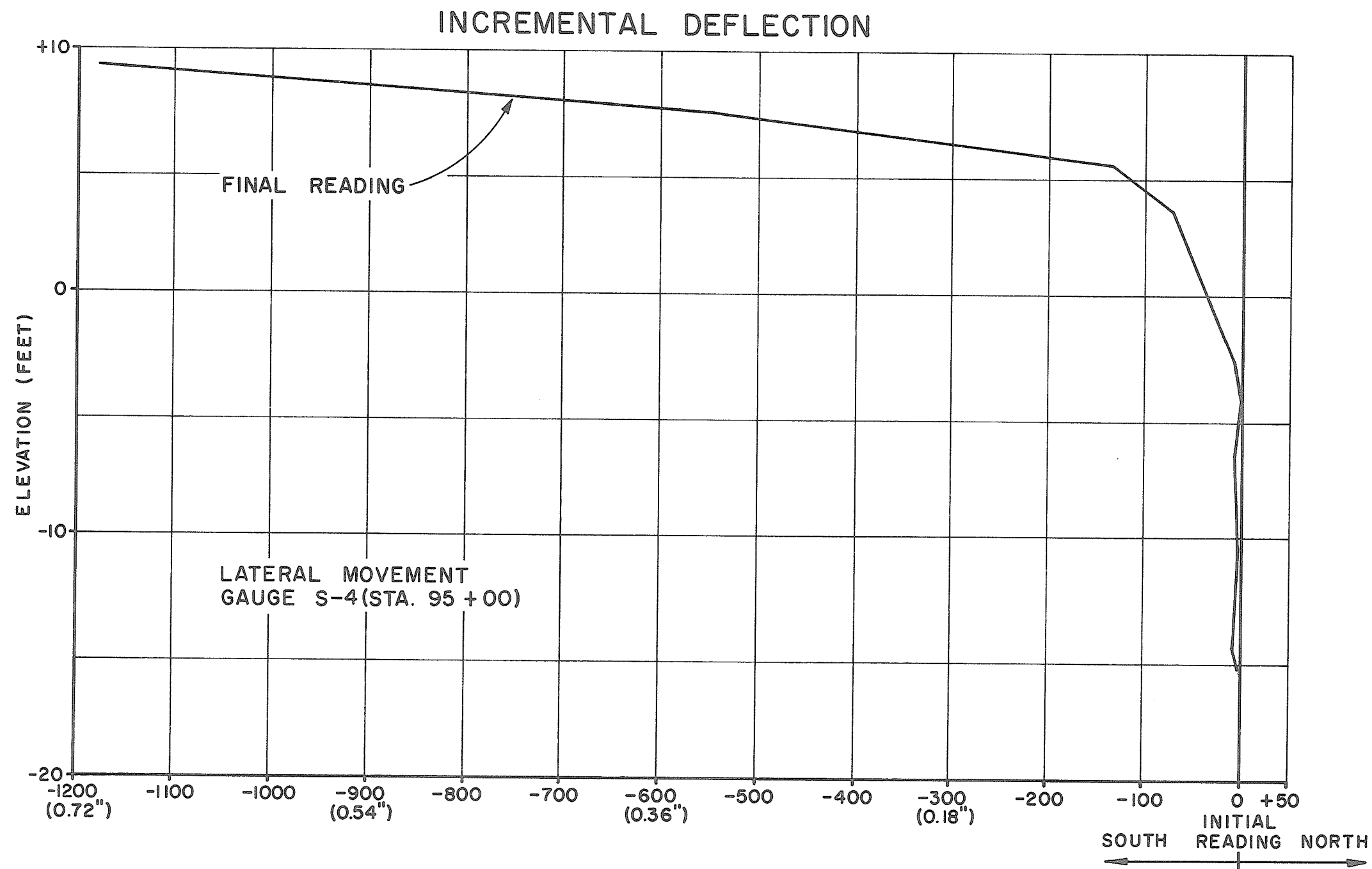




INCREMENTAL DEFLECTION







FIELD TRIALS - COMPACTION vs NO. OF ROLLER PASSES

