

63-f-204-C

W.P. # 121-61-2

122-61

INDIAN RIVER

STRUCT. G.DGB.

5 MI. W. PEMBROKE

GIPFELS & VALLET
OF CANADA, LIMITED
CONSULTING ENGINEERS
TORONTO, ONTARIO

PEL-ENGINEERING DESIGN REPORT

HIGHWAY #62

DISTRICT #10 - BANCROFT

W. P. 121-61-2 including

W. P. 122-61 (Indian River Structure)

Grading, Drainage, Granular Base and Structure
From 5 miles west of Pembroke Westerly 5 miles

TOWNSHIP - ALICE

Project Design Engineer

A. S. Bunker

(Signed)

Jan. 9, 1963

(Date)

Sr. Project Design Engineer

John W. Lord

(Signed)

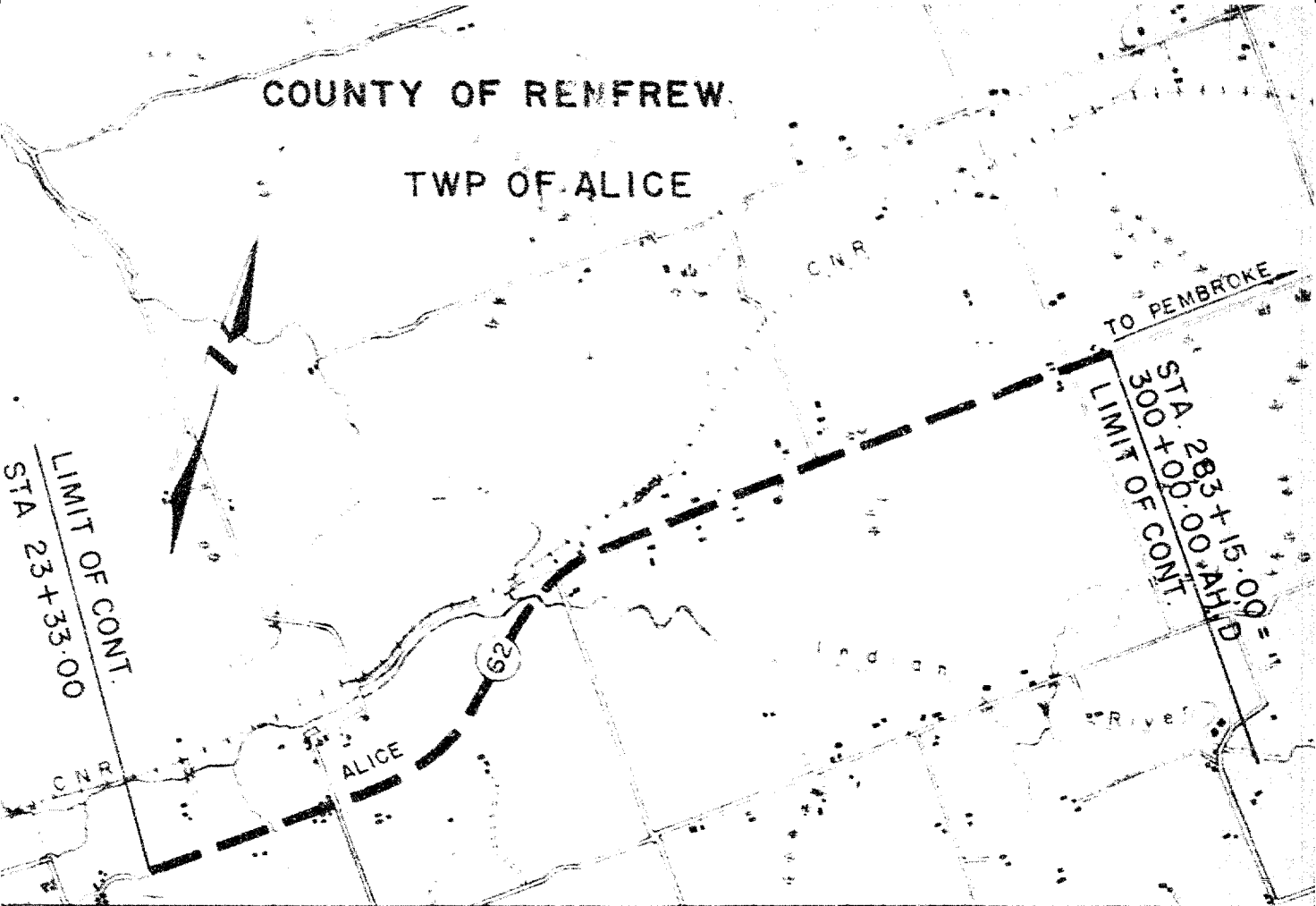
1-2-63

(Date)

gms

COUNTY OF RENFREW

TWP OF ALICE



KEY PLAN

0.5 mile 0 1 mile



NEAREST APPROVED RAILWAY SIDING: C.N.R. ALICE

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142+34.

GENERAL

This report outlines recommendations for the design of Highway #62 from 5 miles west of Pembroke westerly approximately 5 miles in the following ways:

- (a) Widening and base strengthening
- (b) Improving the horizontal and vertical alignment
- (c) Providing an adequate drainage system

In general, the existing highway consists of a twenty-foot pavement with 3 to 5 foot shoulders.

At the eastern portion of this job as well as the westerly end the proposed centreline closely follows the existing right of way. The alignment over the remainder of this project is on an extensive revision for approximately two miles at the vicinity of the village of Alice.

Within the limits is the Indian River Structure (B.P. 122-61).

A review was made in the field on April 25, 1962 by the following personnel:

- | | |
|-----------------|---------------------------|
| 1. John Ford | Sr. Proj. Design Engineer |
| 2. E. Vesterby | Construction Engineer |
| 3. J. Gruspier | Regional Soils Engineer |
| 4. P. Smith | Project Soils Engineer |
| 5. P. S. Bruski | Giffels & Vallet |

A further site meeting was held on September 25, 1962 to review the preliminary property request. The following were present:

- | | |
|--|---------------------------|
| 1. John Ford | Sr. Proj. Design Engineer |
| 2. J. A. McKillop | Construction Engineer |
| 3. Kingston Regional Property Branch Agent | |
| 4. P. S. Bruski | Giffels & Vallet |

DESIGN CRITERIA

A copy of the Design Criteria was received on February 8, 1962 and contains the following information:

	<u>Present Conditions</u>	<u>Design Standards</u>
Average Annual Daily Traffic	500	1,000 to 1,500(20 yrs)
Highway Class No.		8
Equivalent Vertical Curve		600

	<u>Present Conditions</u>	<u>Design Standards</u>
Grades Maximum	10	7
Curvature Maximum	65	7
Pavement Width	20	22
Shoulder Width	3	6
Shoulder Rounding		2
R.O.W. Width	66	100 (b)

Notes: (a) Adjusted length of project along new diversion (shortens Hwy. by 1,500')

(b) Except where property damage becomes excessive.

Remarks

1. East end of project to be at west limit of L. P. 121-61-1.
2. West end of project to match with east limit of Contract 58-615.
3. The construction of bridge over Indian River is covered by L. P. 122-61.
4. Negotiations should be undertaken when convenient to revert abandoned section of Hwy. #62 (about 2 miles) to local authority. Any work that may be agreed to be done to be included in paving contract.

PLANS & PROFILES

The following plans and profiles are available:

Plans 1" = 100'	No. 2B427
Survey Profile	No. J-427-13
Soils Profile	No. K-62B-4
Bridge Plans	No. D-5025-P

LIMITS

The West Limit is station 23+33 ~ which is the east limit of Contract 58-615 ~

The East Limit is station $283 + 15.90 = 300 + 00$ chainage ahead. This overlaps the west limit of L. P. 121-61-1 by 200 feet.

GRADE & ALIGNMENT

A change in alignment from station 21 + 74.10 to station 44 + 94.19 was requested by Mr. J. Ford. The P. I. at station 26 + 98.48 was eliminated to avoid the unnecessary "kink" in alignment upon leaving the 2 degree 30 minute curve at station 23 + 94.91.

This will necessitate an adjustment during construction to fit the new roadbed into the existing road at station 23 + 33. The new centreline of construction at this point will be approximately 1.0 foot offset to the south of existing centreline. (see sketch SK-1 Appendix B)

The soils grade was reviewed by this office and was generally accepted throughout with the exception of the following locations at which grade changes are recommended.

Three grade changes are proposed to maintain better grades for private entrances. These are listed as follows:

(1)	Existing P.V.I. 204+40	Elev. 519.912	600 V.C.
	New P.V.I. 212+50	Elev. 576.612	600 V.C.
	New P.V.I. 221+00	Elev. 581.012	600 V.C.

The grade was raised approximately 4 feet at entrance station 214 + 94. This grade raise will alter the entrance grade from 20% to 8%.

(2)	Existing P.V.I. 252+80	Elev. 640.358	500 V.C.
	New P.V.I. 270+00	Elev. 657.734	700 V.C.
	New P.V.I. 276+80	Elev. 634.577	500 V.C.

The grade was raised approximately 1 foot at entrance stations 259 + 78, 260 + 87 and 261 + 18 to improve the entrance grades from 14% to 10%.

(3)	Existing P.V.I. 164+50	Elev. 488.700	500 V.C.
	New P.V.I. 170+50	Elev. 526.988	600 V.C.
	Existing P.V.I. 182+00	Elev. 554.128	600 V.C.

The original P.V.I. at station 169+70 was relocated to station 170+50 so that a 500 V.C. could be provided at P.V.I. 164+50 instead of the original 400 V.C.

Also it should be mentioned that consideration was given for the design of a 500 V.C. at station 136+54, however because the bridge office have already completed the drawings for the Indian River Structure, it was decided to use the 450 V.C. rather than redesign the bridge.

COMMERCIAL AND SIDE ENTRANCES

1. The Esso and Shell Service Stations located at stations 65+50+ and 270+50+ respectively will require commercial entrance treatments and their proposed schemes are shown on sketches SK-2 and SK-3 in Appendix B.
2. The following entrances are recommended to be relocated:

<u>Exist. Station</u>	<u>New Station</u>	<u>Description</u>
63+06	62+85	Entrance Right
none	193+00	Entrance to exist. Hwy. #62 Left
229+24	229+75	Field entrance Right

3. Generally, all side entrances and sideroad entrances are less than the 10% slope as set by the D.H.C. design standards. Entrance grades exceeding 6% are listed below:

<u>Station</u>	<u>Exist. Grade %</u>	<u>New Grade %</u>	<u>Description</u>
56+13	0	8	private entrance right
80+67	0	8	field entrance right
170+31	4	8	private entrance right
229+24	5	10	field entrance right
269+65	4	10	private entrance right
277+30	10	10	field entrance right
59+12	10	10	field entrance left
63+03	5	9	private entrance left
102+08	0	8	field entrance left
179+88	4	10	field entrance left
182+91	10	10	field entrance left
186+93	4	10	private entrance left
202+44	5	8	private entrance left

COMMERCIAL AND SIDE ENTRANCES (Cont'd)

<u>Station</u>	<u>Exist. Grade %</u>	<u>New Grade %</u>	<u>Description</u>
214+94	6	8	private entrance left
239+70		8	field entrance left
248+51	6.5	10	private entrance left

Because the new profile grade was lowered or raised to agree with the soils recommendations, some of the above grades could not be improved to the existing.

4. Sketch SK-5, Appendix B illustrates the treatment of the private entrance joining the sidewalk at station 142+34. This is in accordance with the discussion during site review meeting of September 25, 1962.

PROPERTY

A preliminary property request was made on P. R. 62-2183 and was submitted to Mr. John Ford on September 21, 1962. It covers about 90% of the property requirements with the remaining 10% to cover contingencies that may arise during the design.

Any additional property that might be required will be submitted upon the completion of the design.

SOIL REPORT ABSTRACTS

The soils reports and soils profiles covering Highway No. 62 and the Indian River structure were received in this office on September 4, 1962. A list of the recommended depths of granular materials placed over the full width of the roadbed are as follows:

(a) New Construction

Acceptable and borderline
earth fills.....18"
Acceptable and borderline
earth cuts.....24"
Unacceptable earth cuts
and fills.....36"
Rock cuts and fills.....12"
Acceptable clay cuts and
fills.....24"

(b) Over Existing Pavement

Fills up to 9".....all GBC "A"
Fills 9" to 30".....all granular material
Fills greater than 30".....earth or rock fill and gran-
ular materials to the depths
as per (a) above.

(c) Existing Pavement Widening

Fills less than 24" - subexcavate to provide for
24" granular material as per
Std. DD-239.
Fills greater than 24" - no subexcavation required
other than removal of topsoil
on the existing shoulders.
Granular depths as per (a)
above.

(d) Township and Secondary Roads

Earth fills - 15" granular
Earth cuts - 18" granular
Rock Cuts & Fills - 12" granular

Unless otherwise noted, the above granular depths shall consist of 6" GBC Class "A" and the remainder sand cushion.

(a) Detours

It is anticipated that no major detour roads will be required except at station 163+07 where the existing 36" C.I.P. will be replaced by a 6'x4' concrete rigid frame box culvert. A detailed drawing of the detour road will be shown on the construction drawings and will generally follow the alignment as shown on sketch SK-4, Appendix B.

The rock cuts are generally on the new realignment and will not affect the existing highway. Where stage construction is necessary at rock cuts, granular quantities will be increased in order to provide for two lane traffic during construction.

(b) Transition Points

All longitudinal and transverse transition points are to be treated as per standards DD-411A,B,C, & D to 4 feet below profile grade. The backfill for the transition points will be an approved earth fill material and the actual excavated material will be used as available fill up to within 4 feet of profile grade in fill sections or in widening existing embankments.

(c) Keying of Earth Side Slopes

The widening of existing fills greater than 6 feet in height will be treated as per standard DD 414.

(d) Dense and Bouldery Cut Materials

The soils report indicates that many cut sections will contain numerous boulders which will cause excavation difficulties. Since no percentage figure is available for the rock and earth material in these areas, our estimate is based on an earth cut section throughout these areas. A special provision will be added to the contract as suggested in the soils report and a special titled "Treatment for Boulders in the Subgrade of Cut Sections" will be incorporated with the construction drawings (see special standard attached).

(e) Treatment of Old Foundations

The old house foundations at stations 56+40 and 66+20 will be completely subexcavated and backfilled with acceptable earth fill material. This work will be covered in the D4 estimate under the Items "Removal of Existing Concrete Structures" and "Earth Excavation (grading)".

(f) Frost Susceptible Material

The following cut areas contain highly frost susceptible material and shall not be used within 4 feet of profile grade if used in fills. Any material which cannot be used in this manner or outside the 1:1 slope, should be wasted in disposal areas outside the right of way. The estimated quantity is approximately 24,000 cubic yards.

EARTHWORK & DETOURS (Cont'd.)

- (a) Sta. 59 + 50 to Sta. 63 + 50
- (b) Sta. 69 + 00 to Sta. 72 + 00
- (c) Sta. 76 + 00 to Sta. 77 + 50
- (d) Sta. 128 + 00 to Sta. 130 + 40
- (e) Sta. 147 + 50 to Sta. 152 + 50
- (f) Sta. 158 + 50 to Sta. 161 + 50 (lower half of cut)

MUSKIE

The following muskeg deposits occur within this project.

	<u>Station to Station</u>		<u>Max. Depth of Soft Mat'l.</u>	<u>Underlying Material</u>
(a)	210 + 70	211 + 25	3'	Sa. Lo. (Bldy)
(b)	243 + 00	244 + 60	3' - 6'	Sa. Lo. (Bldy)
(c)	251 + 00	258 + 00	14'	F. - L. Sa.
(d)	263 + 50	265 + 50	2'	Sa. Lo. (Solid)

It is recommended that excavation of the muskeg be carried out on the widening only from the toe of existing slope to an outer limit as set by standard DD-406. However, from station 251+ to 255 +, the musk excavation should be carried out 10 feet wider than the limit set by DD-406 to provide for greater stability in the deeper portion of the deposit. The backfill for these areas can be obtained from the adjacent cuts.

STABILITY OF EMBANKMENTS

Vane tests were carried out at stations 162 + and 253 + and in both cases the results indicated that no problems other than slight settlement should be anticipated.

According to the foundation investigation for the Indian River structure, no stability problems will be encountered with the approach fills.

STANDARDS

It is proposed that the following standards be incorporated as listed below:

<u>Standard No.</u>	<u>Title</u>
DD-201	Earth Fill Section
DD-202-A	Earth Cut Section
DD-202-B	Earth Cut Section with Pipe Subdrain
DD-203	Rock Fill Section
DD-204	Rock Cut Section

STANDARDS (Cont'd.)

<u>Standard No.</u>	<u>Title</u>
DD-228	Earth Cut and Fill Section (Superelevated)
DD-229	Rock Cut and Fill Section (Superelevated)
DD-239	Widening for Granular Projects
DD-301	Side Entrance on Fill
DD-302-A	Side Entrance in Earth Cut
DD-302-B	Side Entrance in Rock Cut
DD-303	Private Entrance in Fill
DD-304	Private Entrance in Cut
DD-305	Access Roads to Borrow Pits
DD-406	Swamp Treatment under Fills
DD-411A	Treatment of Transition Points (Earth Cut to Earth Fill)
DD-411B	Treatment of Transition Points (Rock Cut to Earth Fill)
DD-411C	Treatment of Transition Points (Rock Cut to Rock Fill)
DD-411D	Treatment of Transition Points (Earth Fill to Granular Fill)
DD-414	Benching of Earth Slopes
DD707C	4' x 4' Ditch Inlet
DD-710	Catch Basin and Manhole
DD-808A	Rivetted Grating for Ditch Inlet
DD-808B	Bedding and Backfilling for C.I. Pipe and Pipe Arch (In Earth Excavation)
DD-808C	Bedding and Backfilling for C.I. Pipe and Pipe Arch (In Unstable Ground)
DD-809B	Bedding and Backfilling for C.I. Pipe and Pipe Arch (In Rock or Boulder Formations)
DD-813	Excavation and Backfill for Concrete Culverts (New Construction Frost Line Above Original Ground.)
DD-819	Granular Backfill for C.I. Pipe and Pipe Arch to Minimize Frost Action
DD-901	Corrugated Iron Culverts
DD-902	Protection Against Heavy Construction Equipment
DD-1010A	Highway Fence
DD-1215-A	Guide Rail Single Cable
	Methods of Attaining Superelevation
	Pavement revolved about Centre Line
	Standard Concrete Culvert
	Rigid Frame Box Type

STANDARDS (Cont'd.)

<u>Standard No.</u>	<u>Title</u>
DD-1214A	Standard Concrete Culverts Rigid Frame - Open Type
* Special Standard	Treatment for Boulders in Subgrade of Cut Sections

* The special standard has to be approved. (see Appendix A)

DRAINAGE RECOMMENDATIONS

Generally, the topography of the area from Alice to Pembroke is relatively flat and rolling in nature and can be classified as woodland. With the exception of the Indian River Structure, there are two main cross culverts that drain a considerable watershed area.

The proposed concrete culvert at station 53 + 70 will not present any construction problems as the existing 3' x 6' std. open type culvert can be readily replaced.

However the 36" C.I.P. at station 163 + 07 that is under 21 feet of fill, is undersized according to the drainage calculations.

The design calculations based on a watershed area of 945 acres and a C factor of 0.1 indicates that a 5' x 4' standard concrete box culvert is required.

It is recommended that this culvert be removed and replaced by the 6'x4' Rigid frame box culvert on the stream diversion line as shown on sketch SK-4.

The remaining cross culverts are listed below and in some cases where there appears to be no definite outlet at the culvert, a description is noted under the remarks column.

Reference is made to Pembroke Militia Maps 31 F/14 E. & W. and 31 F/11 E. & W. from which the appropriate drainage areas were taken to complete the culvert sizes and locations.

A copy of the Drainage Area and Culvert calculations accompany this report. (See Appendix A)

DRAINAGE RECOMMENDATIONS (Cont'd)

<u>Station</u>	<u>New Culvert</u>	<u>Recommended Treatment</u>	<u>Remarks</u>
47 + 75		Remove Exist. 15" C.I.P.	Do Not Replace
53 + 70	10'x 6' Std. Rigid Frame Box	Replace Exist. 8'x6' - Sta.53+56	Definite Watercourse Rip-rap to be provided at outlet
72 + 80	36" C.I.P.	Place New Culvert on Realigned Hwy.	Definite Watercourse however not a definitely shaped ditch
86 + 79	30" C.I.P.	Place New Culvert on Realigned Hwy.	Definite Watercourse however not a definitely shaped ditch
97 + 71	36" C.I.P.	Place New Culvert on Realigned Hwy.	Definite Watercourse
157+23		Remove Existing 18" C.I.P.	Do Not Replace
163+07	6'x 4' Box (Sta.162+82)	Replace Existing 36" C.I.P. and provide for stream diversion	Definite Watercourse (see sketch SK-4 At- tached)
174+64	30" C.I.P.	Replace Existing 18" C.I.P.	Definite Watercourse
195+05	30" C.I.P.	Replace Existing 18" C.I.P.	No Definite Watercourse
203+52	36" C.I.P.	Replace Existing 30" C.I.P.	Definite Watercourse
244+10	36" C.I.P. A.C. & A.A.	Replace Existing 1'x 1' Stone Culvert	Use as Equalizer Marsh Area Lt. & Rt.
253+66	36" C.I.P. A.C. & A.A.	Replace Existing 18" C.I.P.	Use as Equalizer Marsh Area Lt. & Rt.
263+68	36" C.I.P. A.C. & A.A.	Replace Existing 24" C.I.P.	Use as Equalizer Marsh Area Lt. & Rt.
278+40	36" C.I.P.	Replace Existing 24" C.I.P.	Definite Watercourse
218+00	36" C.I.P. A.C. & A.A.	Place new culvert	Outlet into swamp left side

UTILITIES

The following utilities will have to be relocated:

- (a) Hydro
- (b) Bell Telephone

These utilities are both aerial and there is no indication of any underground utilities throughout the length of the job. A separate set of plans and profiles indicating pole relocations was submitted to Mr. John Ford on December 13, 1962. The cost for the utility relocation has not been received by this office from the District.

STRUCTURE

The preliminary Bridge drawing No. D-5025P for the Indian River Structure has been received but the D-4 estimate has not been received.

The bridge is designed as a three span structure. The grades and location at Highway No. 62 have been checked and agree with the Bridge design.

In order to avoid erosion in the highway ditches, a series of ditch inlets and sewers are recommended to direct the water from the Highway ditches into the Indian River. These ditch inlets will be placed on both sides of the highway East of the structure as discussed during the site review meeting on April 25, 1962. The ditches will be treated with erosion mesh.

GUIDE RAILS

As requested by Mr. Ford, guide rails will not be included on this contract but will be placed with the paving contract.

SEEDING, MULCHING & STRIPPING

It is recommended that stripping be performed for full width of sub-base under fills 4 feet or less in height, and for full width of cut in cut sections. Also stripping is to be performed over the proposed ditch width.

The average depth of stripping is recommended to be 6" along the existing shoulders and from 7" to 10" through the revision areas (as given on soils profile). The stripped material is to be stockpiled for use as topsoil on cut and fill slopes of the new roadway; either 2" or 4" will be spread depending on the amount available. The existing shoulder stripping will not be included as material available for topsoil.

It should be noted that where complete grubbing operation is required, then no calculable amount of so called "stripping" is estimated as available.

CONTRACT ITEMS

(a) Removal of Old Pavement

Pavement will be removed on the old Highway on revision areas as noted below:

Station 52 + to Station 67 +
Station 153 + to Station 161 + 50
Station 210 + to Station 274 +

Also pavement will be removed at cut sections and whenever removing or placing culverts are necessary on the old Highway.

(b) Hand Laid Rip-Rap

It is recommended that rip-rap be placed at a 6 foot width on all ditches that handle considerable quantities of water combined with slopes exceeding 5%. Ditches between 3% and 5% slopes will be treated with erosion mesh under sundry construction, and will be topsoiled, seeded and mulched.

Also, the bridge office has provided for rip-rap around the bridge abutments.

SUNDRY ITEMS

The following items should be allowed for under Sundry Construction:

1. Bell Telephone Company
2. Hydro Electric
3. Seeding and Straw Mulching
4. Construction signs and sign painting
5. Permanent Highway signs
6. Painting of Guide Rails
7. Relocation of Mail Boxes
8. Erosion Mesh

SPECIAL PROVISIONS

The soils report recommends several "Specials" that are not quoted in the periodical list of Special Provisions. These special provisions will be incorporated in the contract documents and are as follows:

1. Treatment Required for Isolated Rock Knobs in Earth Cut

"The Contractor is advised that small isolated rock knobs may be encountered during construction. The Contractor will drill, blast, and excavate these to the depths specified by the Engineer. Payment for rock so excavated will be as per the unit price for rock in the Tender."

SPECIAL PROVISIONS (Cont'd.)

2. Dense and Bouldery Cut Materials

"The Contractor is hereby advised that several cuts and borrow areas on this contract are expected to consist of very dense and very bouldery till materials. A ripper will likely be required if scraper operations are to be carried out. Many boulders are expected to be well over one cubic yard in size and will require drilling and shattering before removal."

The remaining two special provisions in the soils report for sand cushion compaction and for stockpiling G.S.I. Class "A" and 5/8" crushed materials are now covered in the periodical list of special provisions and will be included in the contract documents.

MISCELLANEOUS

Two items that were under consideration for inclusion with the grading contract are listed below:

1. Treatment of Bypassed Sections of Old Highway 62

Approximately two miles of old Hwy 62 in the vicinity of Alice is to be bypassed and will be reverted to the local municipal authority when construction of the new Highway 62 is completed. The soils report lists frost heaves that should be excavated to 3 feet below existing pavement grade and backfilled with granular material consisting of 30" sandcushion and 6" granular "A". The report recommends this work to be carried out on the grading contract if remedial work is intended.

2. Pavement Type and Thickness

Owing to the fact that some muskeg areas exist on the project and there are several sidehill cuts and widening portions, the soils report recommends that stage construction be used on this project with the laying of the binder course being included in the grading contract. (2" of HL4)

The quantities involved in item No. 1 are approximately as follows:

Earth Excavation	=	3500 C.Y.
G. B. C. Class "A"	=	1500 Tons
Sandcushion	=	5000 Tons

Since these quantities were considered to be small, it was decided by Mr. John Ford that items Nos. 1 and 2 are to be included in the follow-up paving contract.

APPENDIX 'A'

PROPOSED 10' x 6'
BOX CULVERT AT
STA. 53+70

LIMIT OF CONTRACT
STA. 23+33.00

PROPOSED
BRIDGE

PROPOSED 6' x 4'
BOX CULVERT AT
STA. 162+82

LIMIT OF CONTRACT
STA. 283+15.90
= 300+00 AHEAD

SCALE 1" = 50,000

WATERSHED DRAINAGE AREAS
FOR PROPOSED BOX CULVERTS
AT STATION 53+70 &
STATION 162+82 AT
HIGHWAY No. 62

PROPOSED 10' x 6'
BOX CULVERT AT
STA 53+70

AREA = 9.45 ACRES
LENGTH = 10,000 FEET

LIMIT OF CONTRACT
STA 23+33.00

PROPOSED
BRIDGE

PROPOSED 6' x 4'
BOX CULVERT AT
STA 162+82

AREA = 49.00 ACRES
LENGTH = 29,500 FEET

LIMIT OF CONTRACT
STA 283+15.90
= 300+00 AHEAD

SCALE 1" = 50,000

WATERSHED DRAINAGE AREAS
FOR PROPOSED BOX CULVERTS
AT STATION 53+70 &
STATION 162+82 AT
HIGHWAY No. 62

DRAINAGE AREAS AND CULVERTS

DESIGNED FOR 25-YEAR STORM

DESIGN OFFICE CALCULATIONS

PROJECT DESIGN ENGINEER

STATION	A ACRES	SLOPE %	L FT	T MIN	OA	T x CA	100% D CFS	RUN OFF COEFF %	NET D CFS	CULVERT SLOPE %	CULVERT SIZE	CULVERT TYPE	EXIST CULV UP STR	CAPACITY	EXIST CULV DN STR	CAPACITY	REMARKS
47+75																	Remove exist. 18" CIP Do not place
51+70	1900	4.1	2950	98	2.1	206	4000	10	400	0.70	10"x6'	Std.	Box Rigid Frame Conc.	492			Replace exist. 8"x6" at Sta. 53+56
71+90	Neglected	-	Small Area								36" CIP						Place new CIP
61+71	Neglected	-	Small Area								30" CIP						Place new CIP
67+71	Neglected	-	Small Area								36" CIP						Place new CIP
157+23																	Replace exist. 18" CIP Do not replace
162+82	945	1.0	1000	19	1.4	97	1300	10	140	2.2	6"x4'	Std. Box Conc. (rigid frame)		222			Replace exist. 16" CIP at Sta. 163+07
174+64	Neglected	-	Small Area								30" CIP						Replace exist. 18" CIP
195+05	Neglected	-	Small Area								30" CIP						Replace exist. 18" CIP No definite course
203+52	Neglected	-	Small Area								36" CIP						Replace exist. 30" CIP
214+10											36" CIP		A.T. & A.A.				Replace exist. 1' x 1' stone culvert. Use as equalizer

ABBREVIATIONS

A Acres - Drainage Area Acres, Slope % - Average Slope %, L Ft - Creek Length Feet, T Min - Time of Concentration Minutes,
100% D CFS - 100% Discharge Cusess, Net D CFS - Net Discharge Cusess

DEFECTS IN NEGATIVE DUE TO
CONDITION OF ORIGINAL DESIGN

PROJECT DESIGN ENGINEER

ABBREVIATIONS:

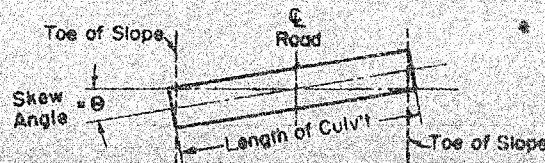
A Acres - Drainage Area Acres, Slope % - Average Slope %, L Ft. - Creek Length Feet, T Min. - Time of Concentration Minutes,
100% D C.F.S. - 100% Discharge Cusecs, Net D C.F.S. - Net Discharge Cusecs

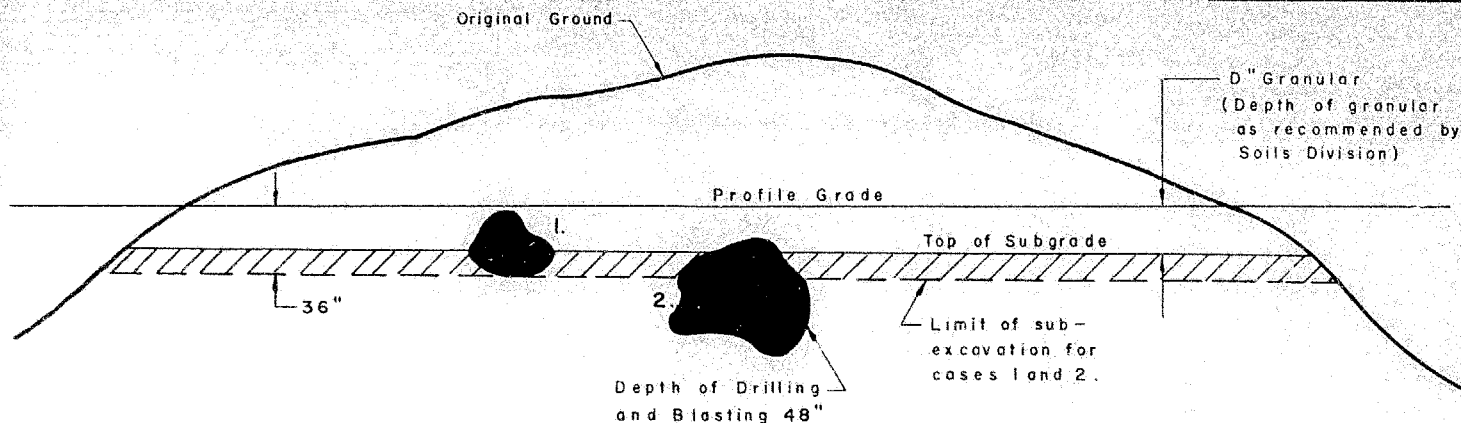
DESIGN DATA FOR CULVERT

P. NO. 121-61-2 CONTRACT NO. _____ HWY. NO. 62 LETTING NO. _____ DATE _____ REGISTRATION NO. _____
LOCATION On Highway #62, 5 Miles West of NEAREST RAILWAY SIDING Alice ON C. N. R.
Pembroke 5 Miles Westerly
TOWNSHIP Alice COUNTY OR DISTRICT Renfrew DISTRICT NO. 10 - Bancroft

[illegible]

NOTE - WHERE FOUNDATION CONDITIONS ARE UNSTABLE AND/OR WHERE EXCESSIVE FILLS ARE REQUIRED, IT IS RECOMMENDED THAT BOX CULVERTS BE SPECIFIED BY THE DISTRICT ENGINEER. BOX CULVERTS IN DRAINAGE DITCHES SHALL HAVE THE INVERT SPECIFIED LOW ENOUGH TO PROVIDE FOR ANY FUTURE DEEPENING. ALL CULVERTS WILL BE DESIGNED WITH SQUARE ENDS AND WITHOUT HEADWALLS UNLESS OTHERWISE CALLED FOR.





NOTES:

MATERIAL TO D" BELOW PROFILE GRADE TO BE EXCAVATED FULL WIDTH AFTER TREATMENT OF BOULDERS HAS BEEN CARRIED OUT AS INDICATED HEREUNDER EXCAVATIONS ARE TO BE BACKFILLED TO SUB-GRADE ELEVATION WITH SIMILAR BOULDER FREE MATERIAL FROM ADJACENT AREAS.

1. Boulders partially within D" of profile grade but no deeper than 36" — REMOVE COMPLETELY.
2. Boulders partially within D" of profile grade but deeper than 36" below profile grade — DRILL AND SHATTER TO A DEPTH OF 48"

CONSTRUCTION STANDARD — NOT TO BE USED FOR DESIGN.

DEPARTMENT OF HIGHWAYS—ONTARIO

TREATMENT FOR BOULDERS IN THE SUBGRADE OF CUT SECTIONS.

APPROVED

Sr. Project Design Engineer

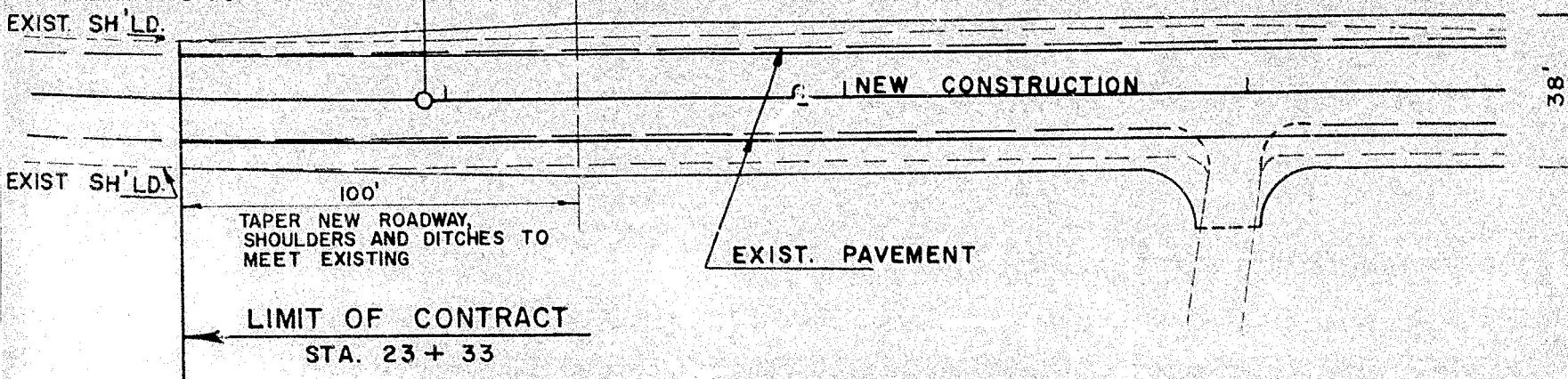
Date

Road Design Engineer

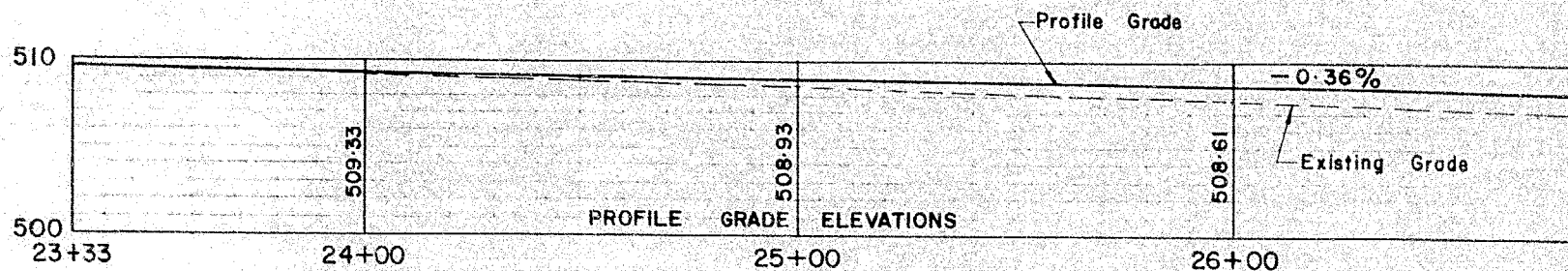
Date

APPENDIX 'B'

A - 11° 04' 30"
D. - 2° 30' Lt.
R. - 2291.83'
T. - 222.19'
L. - 443.00'
E. - 10.78'



PLAN
SCALE 1" = 40'



TREATMENT OF ROADBED AT WEST LIMITS OF PROJECT

H.O.T. 62+22.63

STA. 62+72

63+00

64+00

65+00

STA 65+20

NEW 2'x2' C.B. OFF 34'
DD-702 STA. 65+44

FUTURE
ISLAND

NEW 2'x2' C.B. OFF 34'
DD-702 STA. 65+88

66+00

STA 66+10

P.I. 66+60.68

67+00

68+00

EXISTING 20'
ROAD SHADED

LIMIT OF GRADING

NEW DITCH

BEGIN DITCH

BEGIN SEWER
STA. 63+75
OFF. 30'
INV. 510.00

PROPER
LIMIT

END TAPER
64+55

PROPOSED TREATMENT OF
ESSO STATION ENTRANCE
STA. 65+20 & INTERSECTION OF
EXISTING HWY. No. 62
355' OF 18" Ø CIP STORM AT 1.52%

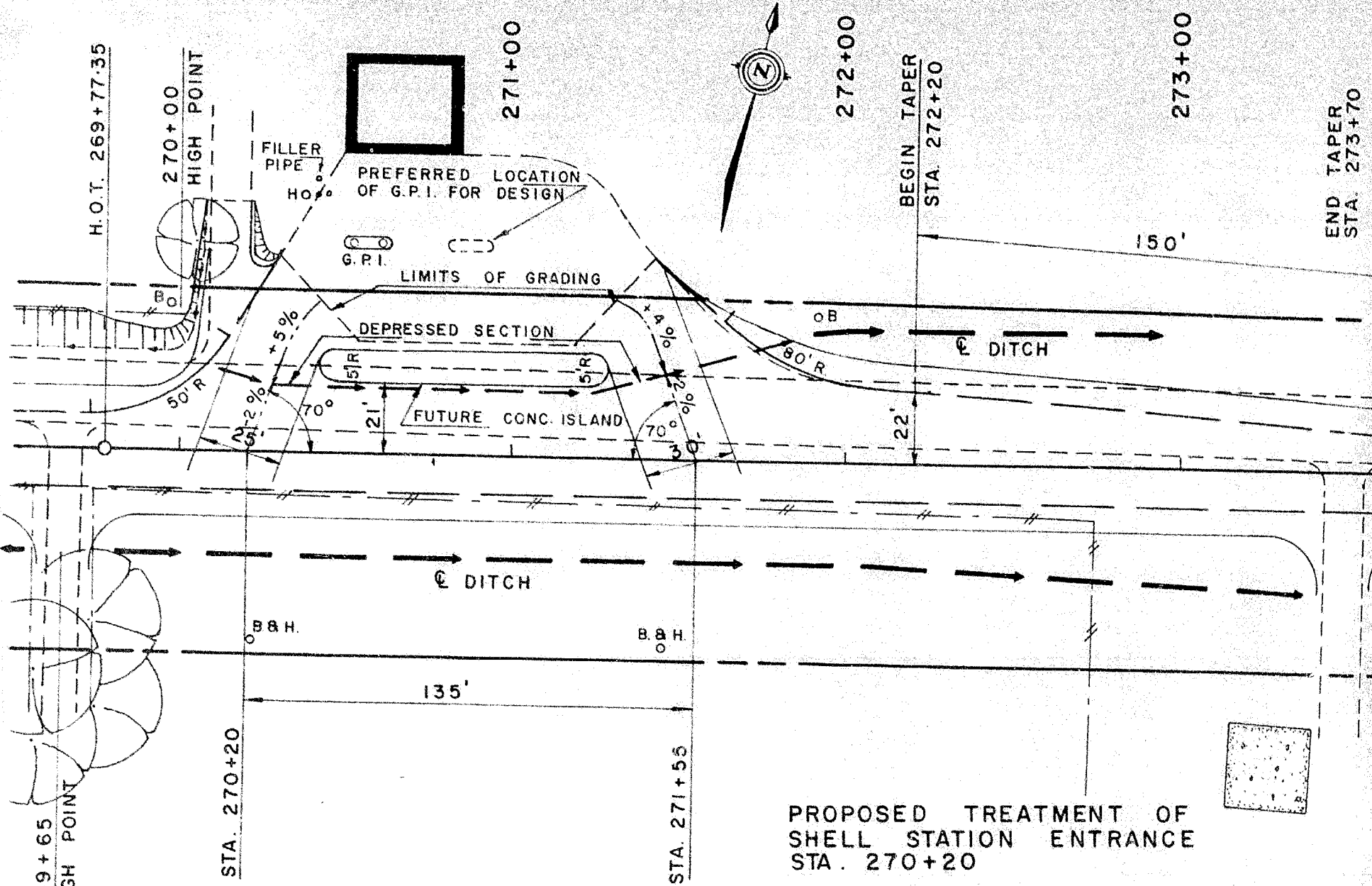
STA 66+55
C.B. DD 702
OFF 35'

NEW 2'x2' DITCH INLET
C.B. DD-702

END OF STORM SEWER
STA. 67+30
INV. 504.60

LIMIT OF GRADING





PROPOSED TREATMENT OF
SHELL STATION ENTRANCE
STA. 270+20

SCALE 1" = 40'

CON. X
LOT 12

EXISTING HIGHWAY No. 62

PROPOSED LOCATION OF 6' x 4'
CONC. BOX CULVERT (RIGID
FRAME TYPE) AT
STA. 162+82

EXISTING 36" C.I.P. STA. 163+07

PROPOSED HIGHWAY No. 62

BEGINNING OF DETOUR RD.
STA. -1+29

B.C. 0+00 DETOUR RD =
160+65 PROPOSED HWY. 62 (APPROX.)
= 177+53 EXISTING HWY. 62 (APPROX.)

LOT 12
CON. X

P.I. 2+89 (APPROX.)

E.C. 5+50 DETOUR RD. =
165+59.55 PROPOSED HWY. 62
182+46.82 EXISTING HWY. 62

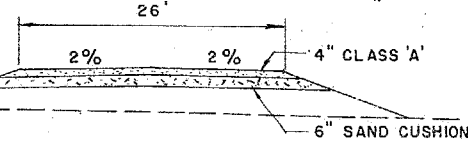
END OF DETOUR RD
167+00 PROPOSED HWY. 62
= 183+87 EXISTING HWY. 62

EASEMENT

PROPOSED DETOUR RD.

LIMIT

OF



TYPICAL SECTION OF
DETOUR ROAD

NOTE: MAXIMUM GRADE IS 7%

PLAN OF PROPOSED
6' x 4' CONC. BOX CULVERT
(RIGID FRAME TYPE)
AND DETOUR RD.

(STA. 162+82)

SCALE 1"=100'

141+00

CON. X
LOT 10

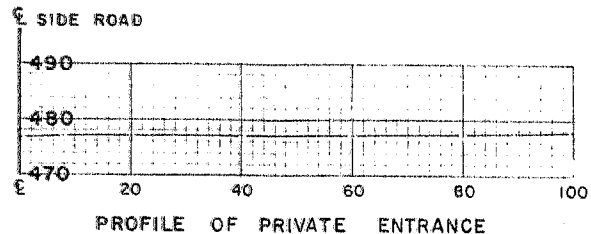
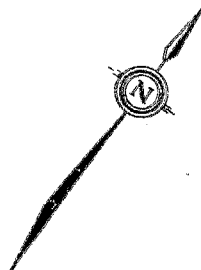
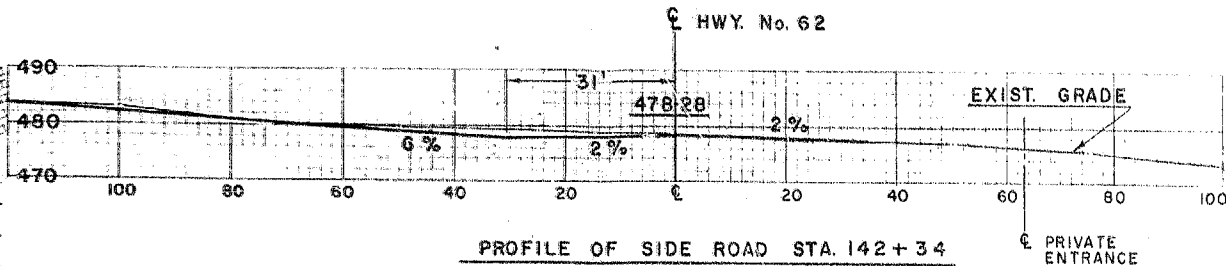
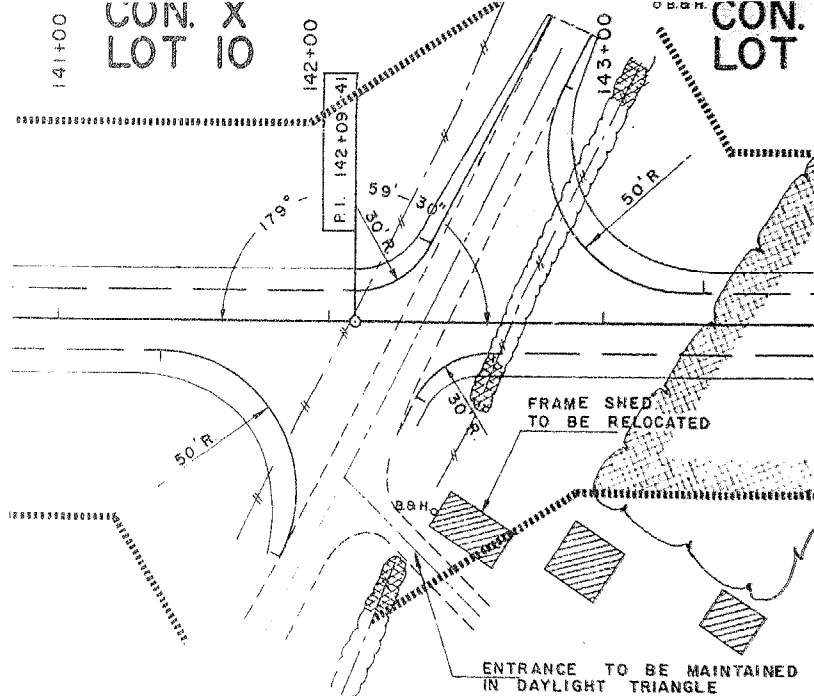
142+00

P.I. 142+09.41

CON. XI
LOT 11

143+00

CON. XII
LOT 12



SCALES
HORT. 1" = 20'
VERT. 1" = 20'

ENTRANCE TREATMENT
AT SIDE ROAD 142+34