TOLTZ, KING, DUVALL, ANDERSON
AND ASSOCIATES, INCORPORATED
ENGINEERS-ARCHITECTS-PLANNERS

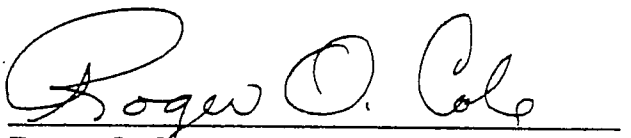
SAINT PAUL, MINNESOTA

JANUARY 19, 1993

REPORT ON

THE FEASIBILITY OF CONSTRUCTING A BRIDGE ON STURGEON LAKE ROAD OVER THE C.P. RAIL SYSTEM TRACKS CITY OF RED WING, MINNESOTA

I hereby certify that this Report was prepared by me or under my direct supervision and that I am a duly registered Professional Engineer under the laws of the State of Minnesota.



Roger O. Cole, P.E.
Registration No. 8715

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LIST OF EXHIBITS

I. INTRODUCTION AND SCOPE

Recent development at the Treasure Island Casino owned by the Mdewakanton Sioux Indian Community, plus the commuting work force at the Prairie Island Nuclear Generating Plant, has resulted in heavy traffic volumes, time delays, and greater accident potential on Sturgeon Lake Road in the City of Red Wing, Minnesota. Sturgeon Lake Road is presently a 2-lane bituminous surfaced roadway and is the primary access road to the Casino and Generating Plant from CSAH 18 to the west. It crosses the main line of the Canadian Pacific Rail System (CPRS) track approximately 0.4 miles west of of the Treasure Island Casino entrance and 0.7 miles east of the junction with CSAH 18. Figure 1 (page 2) and Photo 1 show the location of Sturgeon Lake Road and surrounding developments.

A new entrance road to the Prairie Island Nuclear Generating Plant was constructed by Northern States Power Company (NSP) during the summer of 1992. It connects with Sturgeon Lake Road between CSAH 18 and the railroad track, and follows a new alignment to the south (Photo 2). It crosses railroad track at grade approximately 0.2 miles south of the railroad crossing with Sturgeon Lake Road (Photo 4). The only other access road to this area is Church Road, approximately one mile north of Sturgeon Lake Road (Photos 15 and 16).

Proposed future developments at the Treasure Island Casino are expected to result in even heavier traffic on Sturgeon Lake Road. Because of the anticipated increase in traffic, the City of Red Wing commissioned Toltz, King, Duvall, Anderson and Associates, Inc. (TKDA) of St. Paul Minnesota, to perform a preliminary engineering study to determine feasibility, cost and funding sources for the construction of a new bridge on Sturgeon Lake Road over the CPRS track.

By letter agreement, dated July 28, 1992, TKDA agreed to perform the following services in connection with this project:

A. Meet with and discuss project requirements with participating organizations, including the following:

- City of Red Wing Department of Public Works
- Mdewakanton Sioux Tribal Council
- Prairie Island Nuclear Generating Plant (NSP)
- Canadian Pacific Rail System (CPRS)
- Minnesota Department of Transportation (MnDOT)
- Bureau of Indian Affairs (BIA)
- Goodhue County Highway Department
- City of Red Wing Police Department

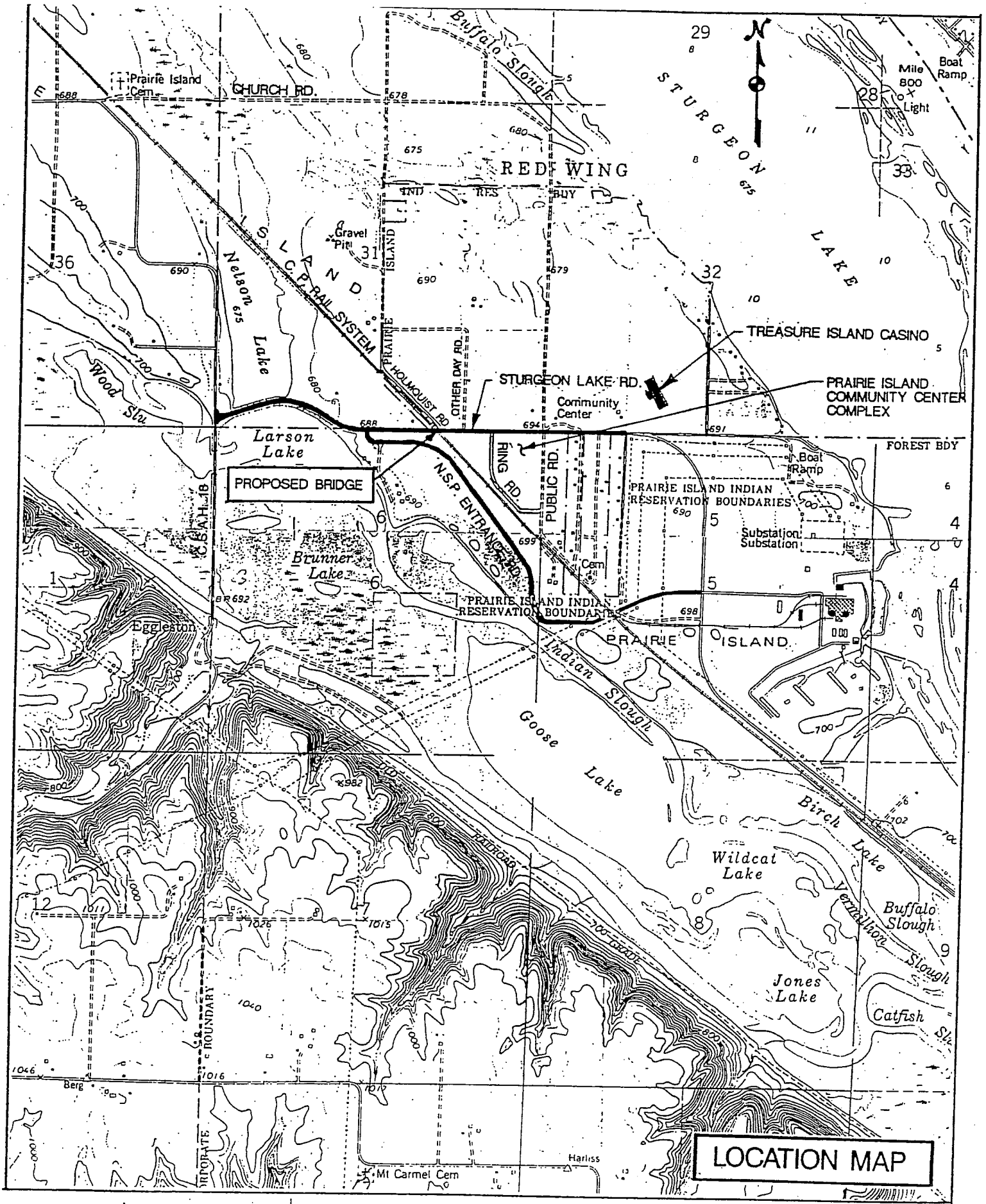

Prairie Island Cem.
CHURCH RD.
Buffalo Slough
REDWING
STURGEON LAKE
Mile 800 Light
Boat Ramp
Gravel Pit
ISLAND
PRAIRIE
HOLMQUIST RD.
OTHER DAY RD.
Nelson Lake
Wood Slu
Larson Lake
PROPOSED BRIDGE
C.S.A.H. 18
Brunner Lake
Eggleston
N.S.P. ENTRANCE RD.
RING RD.
PUBLIC RD.
STURGEON LAKE RD.
Community Center
TREASURE ISLAND CASINO
PRAIRIE ISLAND COMMUNITY CENTER COMPLEX
FOREST BDY
PRAIRIE ISLAND INDIAN RESERVATION BOUNDARIES
Substation
Substation
Cem
PRAIRIE ISLAND
Indian Slough
Goose Lake
Birch Lake
Wildcat Lake
Vermillion Slough
Buffalo Slough
Jones Lake
Catfish Slu
RAILROAD
100' GRADE
CORPORATE BOUNDARY
Berg
Mt Carmel Cem
Harliss
LOCATION MAP
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
SCALE

FIGURE 1

B. Using available topographic and geotechnical information, complete a comparison evaluation for a grade separation structure carrying Sturgeon Lake Road over the CPRS track, versus a new improved signalized grade crossing. The study will include detailed cost estimates based on estimated quantities and unit price extensions. Areas of additional right-of-way will be determined, but right-of-way acquisition costs will not be included in the estimate.

C. Investigate possible sources of funding and determine appropriate funding for the project.

D. Prepare a written report summarizing the findings, identifying funding opportunities and providing recommendations for further project development initiatives.

A log of photographs, sequentially numbered, are provided at the end of this report.

II. GENERAL DISCUSSION AND DESIGN CRITERIA

Two separate meetings were held with participating organizations. The first meeting was held on September 2, 1992, at the Mdewakanton Sioux Tribal Center for the purpose of accumulating all existing site mapping, soil borings, and planning, traffic and engineering studies adjacent to or along Sturgeon Lake Road in the area of the railroad crossing. Possible funding options were also discussed. The meeting was attended by representatives of CPRS, the City of Red Wing, MnDOT District 6, BIA, Mdewakanton Sioux Tribal Council, Goodhue County, Tribal Council Architects (Kane and Johnson Architects), and TKDA.

A second meeting was held on September 18, 1992, at the Goodhue County Highway Department offices in Red Wing. The purpose of this meeting was to coordinate this study with a roadway system study being performed by Martell & Associates of Kansas City, Kansas for the Tribal Council. Their study is being sponsored by the BIA. The meeting was also held to more precisely define the scope of services to be performed by TKDA. This meeting included representatives from the City of Red Wing, Goodhue County, the BIA, Martell & Associates, and TKDA.

At the September 18, 1992, meeting it was determined that TKDA's study should include a bridge for a 4-lane undivided roadway with 6'-0" sidewalks on each side, using urban design standards, based on a 40 mph design speed.

1. Alternative "A"

   Alternative "A" would include a skewed bridge with the above defined cross section located on the existing Sturgeon Lake Road alignment (see typical section on Figure 2 on page 8.) The project limits for the study would include the distance between touchdown points from the beginning of the sag vertical curve on one roadway approach to the end of the sag vertical curve on the opposite roadway approach.

2. Alternative "B"

   Alternative "B" would be for a bridge with an identical cross section but crossing the railroad track at a perpendicular orientation. The bridge could be located at a number of different locations and the approach grading costs would be considered identical to those for Alternative "A". Since the vertical geometry is primarily a function of the vertical clearance required over the railroad track plus the depth of structure, which would be almost identical for both alternatives, the length of roadway and embankment quantities for the approaches would be very similar also.

3. Alternative "C"

Alternative "C" would be for an improved signalized grade crossing of the railroad track with Sturgeon Lake Road. The project limits, for the purposes of the comparative study, would be the same distance as described for the grade separation structure of Alternative "A".

New bridges over the CPRS track must be designed to provide 23'-0" of vertical clearance above the top of rail. Horizontal side clearances must be 22'-0" from centerline of track to face of pier at the west side of the track where the maintenance roadway is located, and 18'-0" from centerline of roadway to face of pier on the opposite (east) side (see Figure 3 on page 9.)

To prevent total collapse of the bridge superstructures in the event of a train derailment, the railroad has a requirement for providing crash walls between the pier columns when they are within 25'-0" of the centerline of track. Figure 4 (page 10) shows the required dimensions of the crash wall protection for CPRS.

Traffic counts taken on Sturgeon Lake Road on six consecutive days from Wednesday through Monday during July, 1992, showed an Average Daily Traffic (ADT) of 10,145 vehicles. With the anticipated future development, the traffic volume is expected to increase to about 14,000 vehicles per day. This is in the range where four traffic lanes are warranted to provide a reasonable level of service.

CPRS presently operates on one track at this location and currently does not have plans to add any more tracks. There are two scheduled Amtrak trains per day, and 14 to 15 unscheduled freight trains per day. The running speed is 70 mph for the Amtrak trains, and 50 mph for the freight trains. The freight trains consist of a maximum of 110 cars with each car being about 65 feet long.

Police reports show a total of 13 accidents over the 4-year period from 1987 to 1991. During the first 10 months of 1992 there have been 10 reported accidents on Sturgeon Lake Road.

It is the policy of MnDOT that all new bridges be designed for HS25 loading. The preliminary bridge designs used in this study are based on the Load Factor method specified in the American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Highway Bridges. A 2-inch low lump overlay was assumed for the bridge deck, along with a 17 pound per square foot allowance for future wearing course modifications.

III. ALTERNATIVE "A" - NEW BRIDGE ON EXISTING STURGEON LAKE ROAD ALIGNMENT

The CPRS track crosses Sturgeon Lake Road at a skew angle of approximately 44°30'. Figure 5 (page 11) shows a proposed plan and profile for a new grade separation structure on the existing alignment of Sturgeon Lake Road. Using a design speed of 40 mph, the roadway approaches would touch down to existing grade very near to the NSP entrance road on the west (Photo 2) and the ring road for the Community Center Complex (Photo 12). Using maximum approach grades of 5.00%, only minor modifications would be necessary to keep these two connections functional. Holmquist Road parallel to the track on the east side, and Other Day Road farther to the east, would have to be relocated (Photos 7 and 11).

The bridge structure considered for this alternative is shown on Figure 2 (page 8). It features a 3-span prestressed concrete beam superstructure, column bent piers with monolithic crash walls, and parapet type stub abutments. Strip-seal type expansion joints would be located between the abutment end blocks and superstructure deck slab at each abutment. The maximum span is the center span at 76'-0" and the total length of bridge is 219'-3". The depth of structure from profile grade to low concrete is 4.65 feet. 20-foot long reinforced concrete approach panels would be provided at each end of the bridge.

The typical approach roadway cross section away from the bridge is shown in Figure 6 (page 12). The 6'-0" boulevard strip between the sidewalk and B624 curb and gutter section would transition to zero feet at the end of the bridge.

The study length is 1,940 feet long, including the bridge, and extends from the touchdown points with existing grade at each end.

The existing right-of-way on Sturgeon Lake Road is 66 feet wide. A right-of-way width of 80'-0" would be required just to build the proposed roadway section in a flat area without embankments. Approximately 8.0 acres of additional right-of-way will be required for construction of the approach embankment and nominal side ditches within the study limits.

The estimated construction cost of the bridge is $965,000. The estimated cost of the approach roadways, including approach panels, is $672,000. Figure 7 (page 13) and Figure 8 (page 14) show itemized listings of pay items, unit prices and total cost extensions for each item of work, for the bridge and roadway respectively.

It is assumed that a temporary bypass around the construction site will be used and that it will not be necessary to construct the bridge in two separate phases under traffic. There are several possible bypass locations. One possibility is to provide a bypass about 200 feet south of the project site and connect to the NSP entrance road, if this would be allowed by NSP. A rough estimate of this cost is $70,000, not including the temporary crossing of the railroad track.

In addition to the above mentioned costs, are the cost of flagging services by the railroad company and the cost of providing a temporary crossing of the railroad track on the bypass route around the construction site. If traffic could be rerouted on existing roads all the way to the east terminus of the NSP entrance road, a temporary bypass could be eliminated. Usually, the contractor requires a temporary crossing of the track for the use of construction equipment only. Normal practice is for the railroad company to do the work and charge the contractor. Estimates for the above mentioned costs are itemized on Figure 7 (page 13), and amount to $34,100.

No cost estimate has been made for the additional area of right-of-way that must be acquired. Relocation of Holmquist Road and Other Day Road (shown on Figure 1 on page 2, and Photos 7 and 11) north of Sturgeon Lake Road, are also not included in the estimate. No estimates have been made for utility relocation costs either. It is assumed that private utilities are at their locations by permit, and that they would be required to relocate their facilities at their own cost.

Constructing a new grade separation (bridge) structure would obviously be the safest solution. The possibility of train collisions with cars or pedestrians would be eliminated. If a new bridge is constructed, emergency evacuation of people on the east side of the track for any reason would never be interrupted by train traffic. Also, emergency vehicles such as police cars, fire trucks and ambulances, would not have to stop for trains.

FIGURE 7

ALTERNATIVE "A"

ESTIMATED CONSTRUCTION COST
NEW BRIDGE ON EXISTING STURGEON LAKE ROAD ALIGNMENT
(44°30'00" SKEW ANGLE)

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT COST	TOTAL COST
2021.501	MOBILIZATION	1	LUMP SUM	50,000.00	50,000.00
2401.501	STRUCTURE CONCRETE (1A43)	220	CU YD	200.00	44,000.00
2401.501	STRUCTURE CONCRETE (3Y43)	575	CU YD	260.00	149,500.00
2401.512	BRIDGE SLAB CONCRETE (3Y36)	14,470	SQ FT	5.00	72,350.00
2401.513	TYPE F RAILING CONCRETE (3Y46)	484	LIN FT	30.00	14,520.00
2401.515	SIDEWALK CONCRETE (3Y46)	3,144	SQ FT	6.00	18,864.00
2401.541	REINFORCEMENT BARS	22,000	POUND	0.50	11,000.00
2401.541	REINFORCEMENT BARS (EPOXY COATED)	175,000	POUND	0.55	96,250.00
2401.543	SPIRAL REINFORCEMENT (EPOXY COATED)	1,570	POUND	1.00	1,570.00
0401.601	STRUCTURE EXCAVATION	1	LUMP SUM	10,000.00	10,000.00
2402.583	ORNAMENTAL METAL RAILING, TYPE S-1	484	LIN FT	65.00	31,460.00
2402.591	EXPANSION JOINT DEVICES, TYPE 4	180	LIN FT	70.00	12,600.00
2402.595	BEARING ASSEMBLY	54	EACH	450.00	24,300.00
2404.501	CONCRETE OVERLAY TYPE SPECIAL	11,401	SQ FT	2.60	29,642.60
2405.502	PRESTRESSED CONCRETE BEAMS 40	1,916	LIN FT	85.00	162,860.00
2405.511	DIAPHRAGMS FOR TYPE 40 PRESTRESSED BEAMS	420	LIN FT	45.00	18,900.00
2452.510	STEEL H-PILING DRIVEN, 12"	7,770	LIN FT	1.60	12,432.00
2452.511	STEEL H-PILING DELIVERED, 12"	7,770	LIN FT	16.00	124,320.00
2452.520	STEEL H-TEST PILES, 95' LONG	6	EACH	3,000.00	18,000.00
2452.520	STEEL H-TEST PILES, 120' LONG	6	EACH	3,750.00	22,500.00
0452.602	PILE TIP PROTECTION	94	EACH	60.00	5,640.00
2514.501	CONCRETE SLOPE PAVING	990	SQ YD	35.00	34,650.00
TOTAL					$965,358.60
TOTAL (ROUNDED) FOR SKEWED BRIDGE					$965,000.00

ESTIMATED RAILROAD FORCE ACCOUNT WORK

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT COST	TOTAL COST
A	FLAGGING SERVICES	80	DAYS	270.00	21,600.00
B	TEMPORARY BYPASS CROSSING	1	LUMP SUM	10,000.00	10,000.00
C	CONTRACTOR'S WORK CROSSING	1	LUMP SUM	2,500.00	2,500.00
TOTAL FORCE ACCOUNT WORK					$34,100.00

FIGURE 8

ESTIMATED CONSTRUCTION COST
APPROACH ROADWAY CONSTRUCTION FOR A NEW BRIDGE
ON EXISTING STURGEON LAKE ROAD ALIGNMENT

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT COST	TOTAL COST
2021.501	MOBILIZATION	1	LUMP SUM	30,000.00	30,000.00
2031.501	FIELD OFFICE TYPE D	1	EACH	4,000.00	4,000.00
2104.505	REMOVE BITUMINOUS PAVEMENT	5,200	SQ YD	1.35	7,020.00
2105.501	COMMON EXCAVATION	4,500	CU YD	2.00	9,000.00
2105.507	SUBGRADE EXCAVATION	1,300	CU YD	2.50	3,250.00
2105.523	COMMON BORROW (CV)	132,000	CU YD	3.25	429,000.00
2105.525	TOPSOIL BORROW (LV)	2,500	CU YD	6.50	16,250.00
2211.501	AGGREGATE BASE, CLASS 5	4,660	TON	5.25	24,465.00
2301.553	BRIDGE APPROACH PANELS	237	SQ YD	65.00	15,405.00
2331.508	TYPE 41 WEARING COURSE MIXTURE	750	TON	22.50	16,875.00
2331.510	TYPE 41 BINDER COURSE MIXTURE	750	TON	22.00	16,500.00
2331.514	TYPE 31 BASE COURSE MIXTURE	1,500	TON	21.25	31,875.00
2357.502	BITUMINOUS MATERIAL FOR TACK COAT	910	GALLON	0.70	637.00
2521.501	4" CONCRETE WALK	20,400	SQ FT	2.00	40,800.00
2531.501	CONCRETE CURB & GUTTER DESIGN 624	3,360	LIN FT	6.75	22,680.00
2575.501	SEEDING	5	ACRE	125.00	625.00
2575.502	SEED, MIXTURE 500	250	POUND	2.00	500.00
2575.511	MULCH MATERIAL, TYPE 1	10	TON	125.00	1,250.00
2575.519	DISK ANCHORING	5	ACRE	50.00	250.00
2575.532	COMMERCIAL FERTILIZER ANALYSIS 10-20-20	2,250	POUND	0.50	1,125.00
TOTAL					$671,507.00
TOTAL (ROUNDED) FOR BRIDGE ON EXISTING ALIGNMENT					$672,000.00

IV. ALTERNATIVE "B" - NEW BRIDGE WITH PERPENDICULAR CROSSING OF CPRS TRACK AT UNDESIGNATED LOCATION

Some consideration has been given to constructing a new bridge which would cross over the track at a perpendicular angle. A significant savings can be achieved in the cost of the bridge structure because the area of the superstructure would be reduced and the length of the abutments and piers would be reduced.

Figure 9 (page 16) shows a general plan and elevation view of the perpendicular crossing. The deck cross-section is identical to Alternative "A". The longest span is the center span at 54'-0" and the total length of the bridge is 155'-8".

The cost of the approach roadways would be nearly identical as that for a skewed bridge. The depth of structure is four inches less, but less of the distance between touchdown points is taken up by the bridge, as compared to the skewed crossing. For the purposes of this study, the approach roadway costs are considered the same as for the skewed bridge and the length of the roadway segment under consideration is still 1,940 feet (same as the skewed bridge alternative).

One advantage of constructing a new bridge at a new location is that traffic can be maintained on Sturgeon Lake Road while the new bridge is being built. The cost of a temporary bypass would then be eliminated. Additional right-of-way costs would be expected to be significantly greater and are not considered in the estimates.

A new alignment would provide the opportunity to improve other sections of Sturgeon Lake Road beyond the study area. Horizontal curves near Sturgeon Lake could be flattened out and congestion between the Casino and the Community Center Complex could be reduced. Other advantages of a grade separation crossing have already been addressed for Alternative "A".

The estimated construction cost of a new bridge on a perpendicular crossing is $680,000. Figure 10 (page 17) is an itemized listing of pay items, unit prices and the total cost extensions for the perpendicular bridge. Since a bypass crossing would not be necessary, the estimate for railroad force account work would be less than Alternative "A" and is estimated to be $24,100.

If the new bridge is to be located anywhere near the existing Sturgeon Lake Road crossing and it is serving the same traffic needs as the old Sturgeon Lake Road, it is expected that CPRS would require that the old crossing to be obliterated.

FIGURE 10

ALTERNATIVE "B"

ESTIMATED CONSTRUCTION COST
NEW BRIDGE WITH PERPENDICULAR CROSSING OF CPRS TRACK AT UNDESIGNATED LOCATION (0°00' SKEW ANGLE)

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT COST	TOTAL COST
2021.501	MOBILIZATION	1	LUMP SUM	40,000.00	40,000.00
2401.501	STRUCTURE CONCRETE (1A43)	154	CU YD	200.00	30,800.00
2401.501	STRUCTURE CONCRETE (3Y43)	401	CU YD	260.00	104,260.00
2401.512	BRIDGE SLAB CONCRETE (3Y36)	10,274	SQ FT	5.00	51,370.00
2401.513	TYPE F RAILING CONCRETE (3Y46)	350	LIN FT	30.00	10,500.00
2401.515	SIDEWALK CONCRETE (3Y46)	2,232	SQ FT	6.00	13,392.00
2401.541	REINFORCEMENT BARS	16,000	POUND	0.50	8,000.00
2401.541	REINFORCEMENT BARS (EPOXY COATED)	147,000	POUND	0.55	80,850.00
2401.543	SPIRAL REINFORCEMENT (EPOXY COATED)	1,200	POUND	1.00	1,200.00
0401.601	STRUCTURE EXCAVATION	1	LUMP SUM	8,000.00	8,000.00
2402.583	ORNAMENTAL METAL RAILING, TYPE S-1	350	LIN FT	65.00	22,750.00
2402.591	EXPANSION JOINT DEVICES, TYPE 4	128	LIN FT	70.00	8,960.00
2402.595	BEARING ASSEMBLY	42	EACH	400.00	16,800.00
2404.501	CONCRETE OVERLAY TYPE SPECIAL	8,095	SQ FT	2.60	21,047.00
2405.502	PRESTRESSED CONCRETE BEAMS 36	1,064	LIN FT	73.00	77,672.00
2405.511	DIAPHRAGMS FOR TYPE 36 PRESTRESSED BEAMS	420	LIN FT	43.00	18,060.00
2452.510	STEEL H-PILING DRIVEN, 12"	6,090	LIN FT	1.60	9,744.00
2452.511	STEEL H-PILING DELIVERED, 12"	6,090	LIN FT	16.00	97,440.00
2452.520	STEEL H-TEST PILES, 95' LONG	4	EACH	3,000.00	12,000.00
2452.520	STEEL H-TEST PILES, 120' LONG	4	EACH	3,750.00	15,000.00
0452.602	PILE TIP PROTECTION	72	EACH	60.00	4,320.00
2514.501	CONCRETE SLOPE PAVING	800	SQ YD	35.00	28,000.00
TOTAL					$680,165.00
TOTAL (ROUNDED) FOR PERPENDICULAR BRIDGE					$680,000.00

ESTIMATED RAILROAD FORCE ACCOUNT WORK

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT COST	TOTAL COST
A	FLAGGING SERVICES	80	DAYS	270.00	21,600.00
B	CONTRACTOR'S WORK CROSSING	1	LUMP SUM	2,500.00	2,500.00
TOTAL FORCE ACCOUNT WORK					$24,100.00

V. ALTERNATIVE "C" - UPGRADED GRADE CROSSING OF CPRS TRACK ON EXISTING STURGEON LAKE ROAD ALIGNMENT

This alternative involves upgrading Sturgeon Lake Road to a 4-lane urban street with curb and gutter and sidewalks on both sides, as shown in Figure 6 (page 12). The length of the roadway section included in the study is 1,940 feet. This length was used because it is the same length needed for grade revisions for the bridge alternative. This length will provide a direct comparison of initial improvement costs. New construction beyond these limits would not be influenced by the choice of alternatives at the railroad crossing.

The estimated cost for a new upgraded at-grade crossing is $269,000 for the roadway construction, and $80,000 for the railroad crossing and flagging services. The resulting total of $349,000 is obviously the lowest cost solution.

Figure 11 (page 19) is an itemized listing of pay items, unit prices and the total cost extensions for the upgraded grade crossing on the existing Sturgeon Lake Road alignment.

FIGURE 11

ALTERNATIVE "C"

ESTIMATED CONSTRUCTION COST
UPGRADED GRADE CROSSING OF CPRS TRACK
ON EXISTING STURGEON LAKE ROAD ALIGNMENT

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT COST	TOTAL COST
2021.501	MOBILIZATION	1	LUMP SUM	15,000.00	15,000.00
2031.501	FIELD OFFICE TYPE D	1	EACH	4,000.00	4,000.00
2104.505	REMOVE BITUMINOUS PAVEMENT	5,200	SQ YD	1.35	7,020.00
2105.501	COMMON EXCAVATION	4,800	CU YD	2.00	9,600.00
2105.507	SUBGRADE EXCAVATION	8,200	CU YD	2.50	20,500.00
2105.523	COMMON BORROW (CV)	10,700	CU YD	3.25	34,775.00
2105.525	TOPSOIL BORROW (LV)	100	CU YD	6.50	650.00
2211.501	AGGREGATE BASE, CLASS 5	5,240	TON	5.25	27,510.00
2331.508	TYPE 41 WEARING COURSE MIXTURE	860	TON	22.50	19,350.00
2331.510	TYPE 41 BINDER COURSE MIXTURE	860	TON	22.00	18,920.00
2331.514	TYPE 31 BASE COURSE MIXTURE	1,720	TON	21.25	36,550.00
2357.502	BITUMINOUS MATERIAL FOR TACK COAT	1,040	GALLON	0.70	728.00
2521.501	4" CONCRETE WALK	22,900	SQ FT	2.00	45,800.00
2531.501	CONCRETE CURB & GUTTER DESIGN 624	3,860	LIN FT	6.75	26,055.00
2575.501	SEEDING	3	ACRE	125.00	375.00
2575.502	SEED, MIXTURE 500	150	POUND	2.00	300.00
2575.511	MULCH MATERIAL, TYPE 1	6	TON	125.00	750.00
2575.519	DISK ANCHORING	3	ACRE	50.00	150.00
2575.532	COMMERCIAL FERTILIZER ANALYSIS 10-20-20	1,350	POUND	0.50	675.00
TOTAL					$268,708.00
TOTAL (ROUNDED) FOR ROADWAY CONSTRUCTION					$269,000.00

ESTIMATED RAILROAD FORCE ACCOUNT WORK

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT COST	TOTAL COST
A	FLAGGING SERVICES	40	DAYS	270.00	10,800.00
B	PERMANENT ROADWAY CROSSING	1	LUMP SUM	50,000.00	50,000.00
C	RELOCATE SIGNALS & CROSS ARMS	1	LUMP SUM	20,000.00	20,000.00
TOTAL FORCE ACCOUNT WORK					$80,800.00

VI. SUMMARY OF ESTIMATED COSTS

Figure 7 (page 13), Figure 8 (page 14), Figure 10 (page 17) and Figure 11 (page 19) show itemized listings of work items for bridge, roadway and railroad force account costs. Utility relocation, local road relocation and right-of-way costs have not been estimated for reasons previously stated in this report.

Total project costs are summarized for each of the three alternatives as follows:

A. Alternative "A" - New Bridge on Existing Sturgeon Lake Road Alignment

New Bridge (Skewed) Construction		$ 965,000.00
Approach Roadway Construction		672,000.00
	Subtotal	$ 1,637,000.00
Temporary Bypass		70,000.00
Railroad Force Account (Flagging and Temporary Crossings)		34,100.00
	Subtotal	$ 1,741,100.00
Engineering, Legal and Administrative Costs @ 15%		261,165.00
	Total	$ 2,002,265.00
Contingency @ 10%		200,226.50
	TOTAL PROJECT COST	$ 2,202,491.50
	TOTAL (ROUNDED) FOR ALTERNATIVE "A"	$ 2,202,000.00

B. Alternative "B" - New Bridge with Perpendicular Crossing of CPRS Track at Undesignated Location

New Bridge (Perpendicular) Construction		$ 680,000.00
Approach Roadway Construction		672,000.00
	Subtotal	$ 1,352,000.00
Railroad Force Account (Flagging and Contractor's Work Crossing)		24,100.00
	Subtotal	$ 1,376,100.00
Engineering, Legal and Administrative Costs @ 15%		206,415.00
	Total	$ 1,582,515.00
Contingency @ 10%		158,251.50
	TOTAL PROJECT COST	$ 1,740,766.50
	TOTAL (ROUNDED) FOR ALTERNATIVE "B"	$ 1,741,000.00

C. Alternative "C" - Upgraded Grade Crossing of CPRS Track on Existing Sturgeon Lake Road Alignment

Roadway Construction (4-lane Roadway, Curb and Gutter, and Sidewalks)		$ 269,000.00
Railroad Force Account (Flagging, Permanent Crossing and Signal Relocation)		80,800.00
	Subtotal	$ 349,800.00
Engineering, Legal and Administrative Costs @ 15%		52,470.00
	Total	$ 402,270.00
Contingency @ 10%		40,227.00
	TOTAL PROJECT COST	$ 442,497.00
	TOTAL (ROUNDED) FOR ALTERNATIVE "C"	$ 443,000.00

The project costs summarized herein are estimates based on our limited scope of services and known available information. Further refinement would be possible after obtaining soil borings and topographic surveys. Some items, such as common borrow, significantly impact the project cost and are dependent on local availability, distance from the project site, and traffic interference with hauling equipment. Further refinement of such items would provide more accurate estimates.

Some items, such as sidewalks, may be deferred until some time in the future but could be provided for on the bridge now and on the approach embankment later.

VII. FUNDING POSSIBILITIES

It is anticipated that funding for the project would be obtained from a number of sources. If it is determined that the project should proceed, an agreement would be established from the following potential funding sources:

A. The City of Red Wing may be able to add Sturgeon Lake Road to its State Aid System. State Aid funds would then be available for bridge and roadway approach costs. Additional State Aid funds could be obtained if non-existent bridge and State Aid bonding is used for the bridge construction costs. The City would be able to increase their State Aid needs over the next 15 years and thereby recoup an estimated 75% of the bridge cost.

B. BIA grants to the Indian Community could be designated for new bridge and roadway construction, even though they are not specifically allocated for this purpose.

C. The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) may have funds available under the category of "safety" or "grade crossing improvement funds".

D. CPRS could provide track related services during construction of the project that would reduce the cost.

E. The Mdewakanton Sioux Indian Community, NSP, and others along the roadway, could participate by dedicating required right-of-way. The adjacent property owners could also participate in the cost of the project. Impact fees or benefits from the project could be used to determine the cost participation.

If federal funding options are pursued, the required federal processing requirements would be expected to add about 5% to the cost of the project and add about two years to its completion.

VIII. CONCLUSIONS AND RECOMMENDATIONS

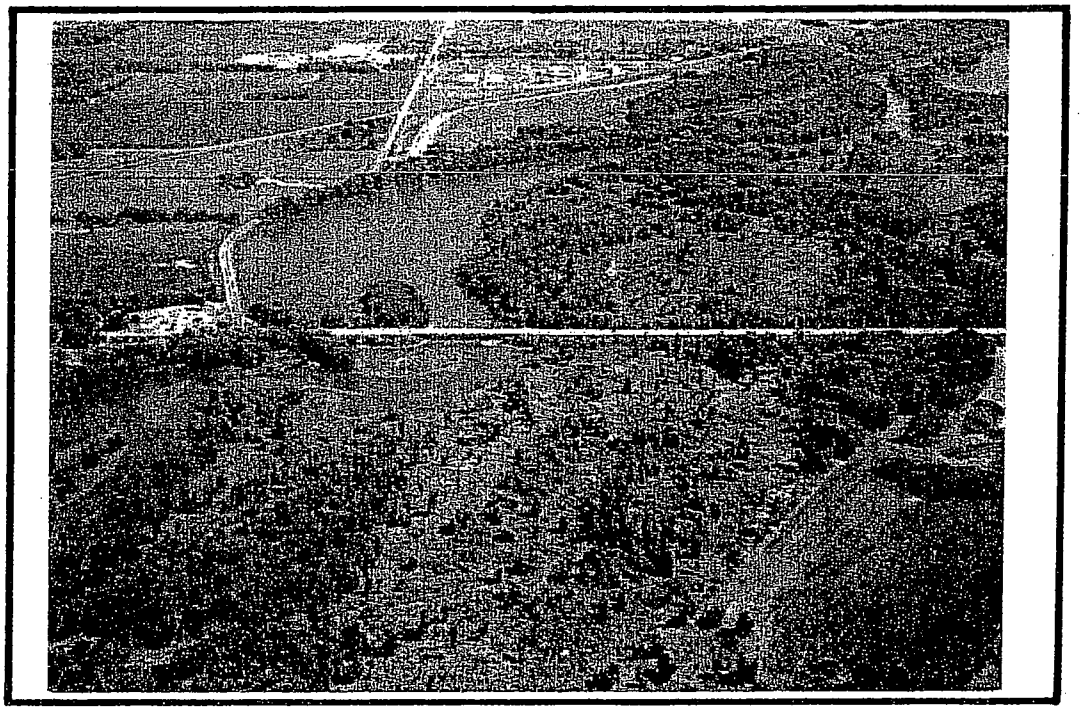
Traffic on Sturgeon Lake Road to the Treasure Island Casino has experienced a dramatic increase in volume in recent years. Based on proposed new developments, future increases are inevitable. Measures should be taken to alleviate traffic congestion or the problem is likely to approach gridlock conditions in the future.

Upgrading existing Sturgeon Lake Road on the existing alignment to a 4-lane grade crossing (Alternative "C") is the least expensive at $443,000. However, many intangible factors must be considered before deciding on a course of action.

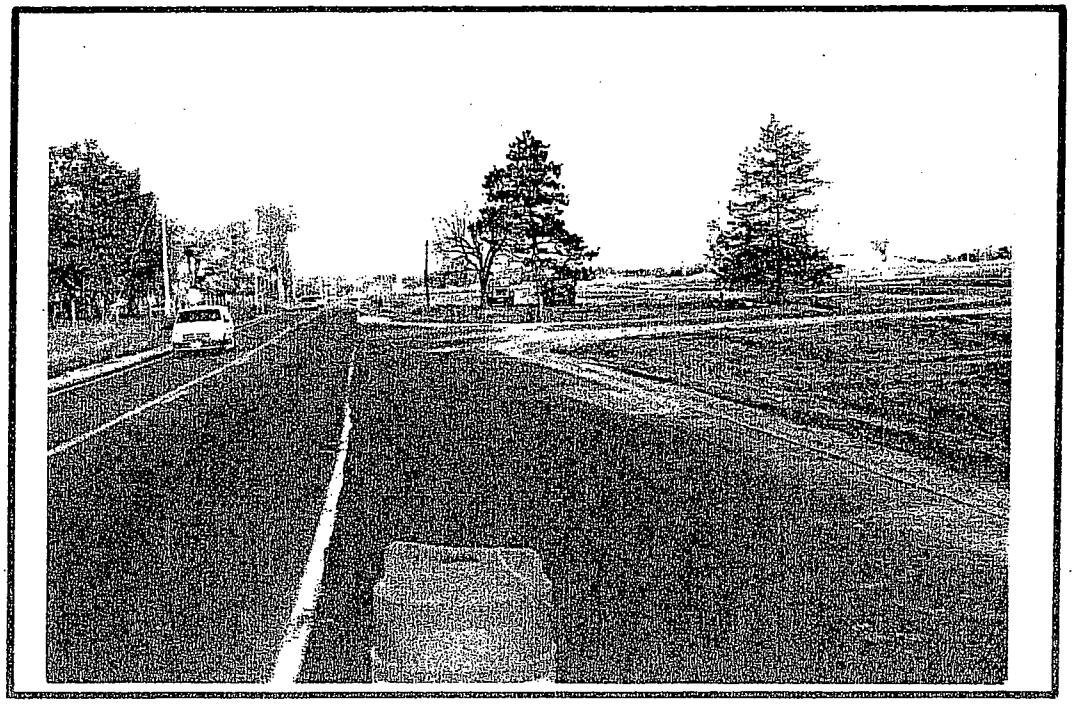
Even with a new signalized grade crossing, car/train accidents are still possible. A greater accident potential is also possible away from the crossing, just as a result of vehicles stopping for trains to pass. Even without trains nearby, buses are required to stop at the track. Drivers' patience, loss of fuel and loss of time are other factors that are difficult to assess. Emergency evacuation at a time when a train is present, would be hindered by a stoppage of traffic. The possible loss of life or property due to delayed emergency vehicles, such as police cars, fire trucks and ambulances, cannot be assessed in a report of this scope.

If a new route location could be found that would cross the track at right angles (Alternate "B"), the project cost of a new bridge over the track would be $1,741,000. This is about 80% of the cost of constructing a new bridge on the existing Sturgeon Lake Road alignment (Alternative "A"). Most of the savings is in the cost of the bridge and the temporary bypass. A new alignment would provide opportunities for improving traffic within the Casino/Community Center Complex.

The project cost of building a new bridge over the track on the existing Sturgeon Lake Road alignment (Alternative "A") is $2,202,000. If the NSP entrance road could be used as a detour route, about $100,000 could be shaved off the cost of Alternative "A". The difference between Alternative "A" and Alternative "B" would then be reduced to $361,000.

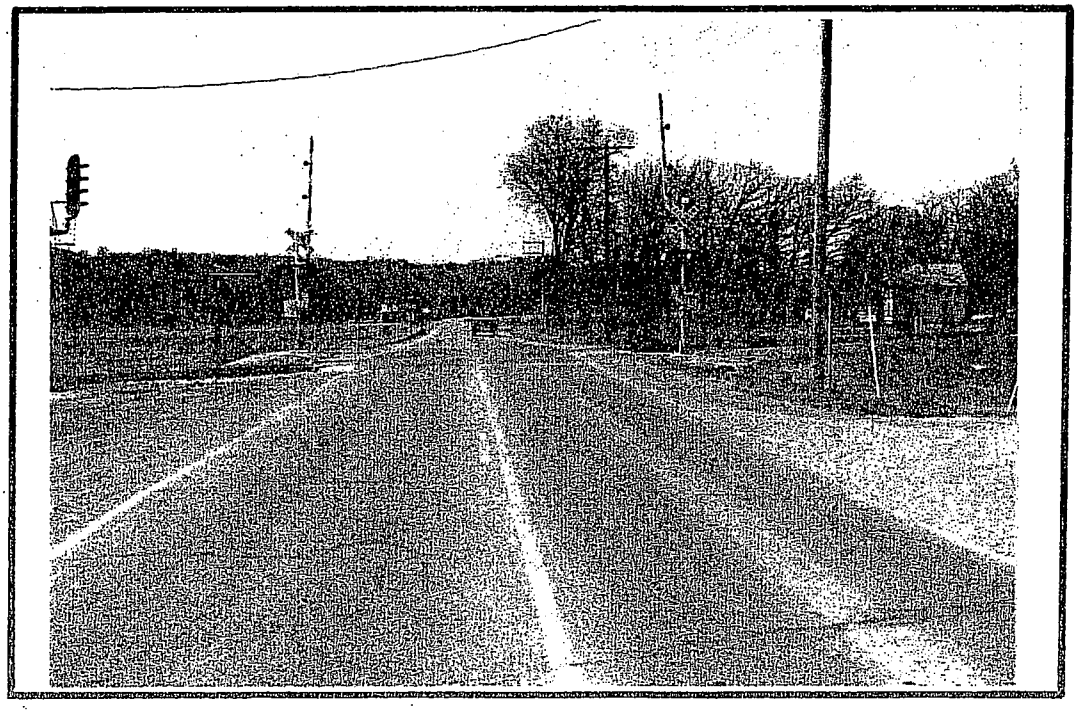


1. AERIAL VIEW OF STURGEON LAKE ROAD LOOKING EAST TOWARD CASINO

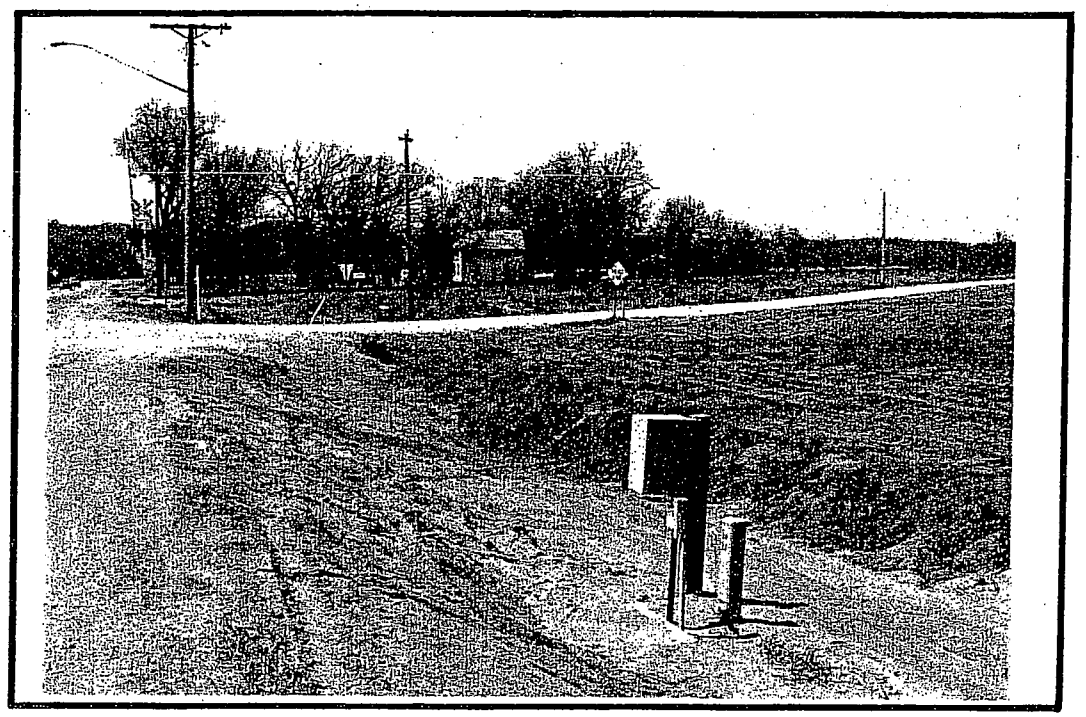


2. CONNECTION OF NSP ENTRANCE ROAD TO STURGEON LAKE ROAD LOOKING EAST

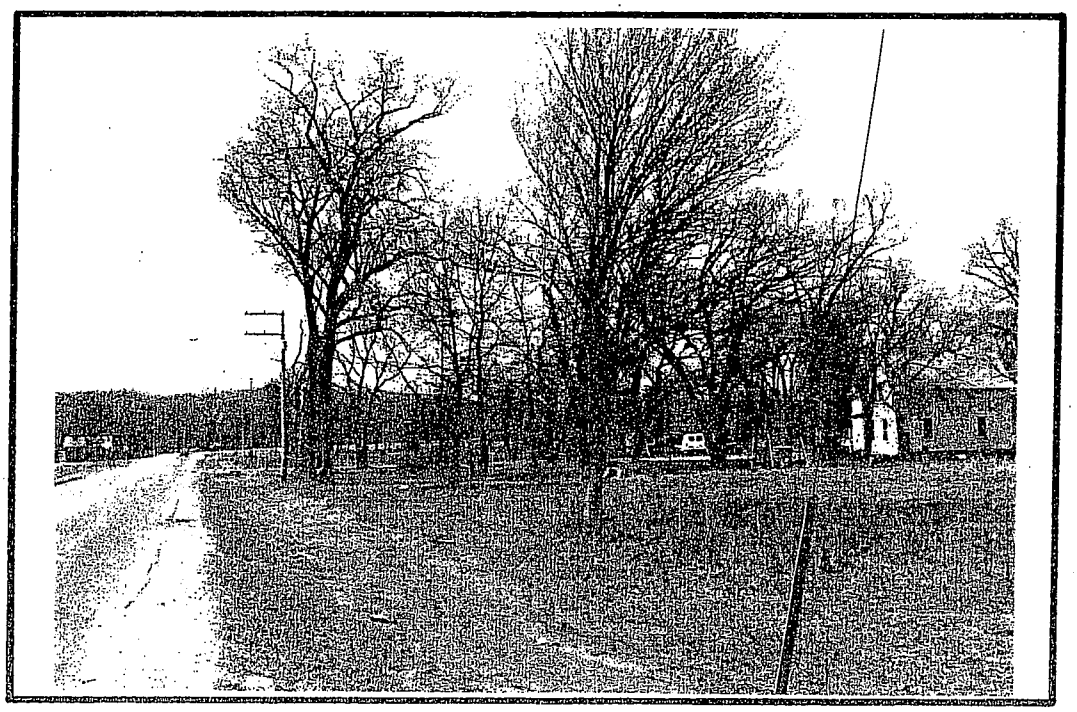
3. APPROACH TO RAILROAD CROSSING LOOKING EAST



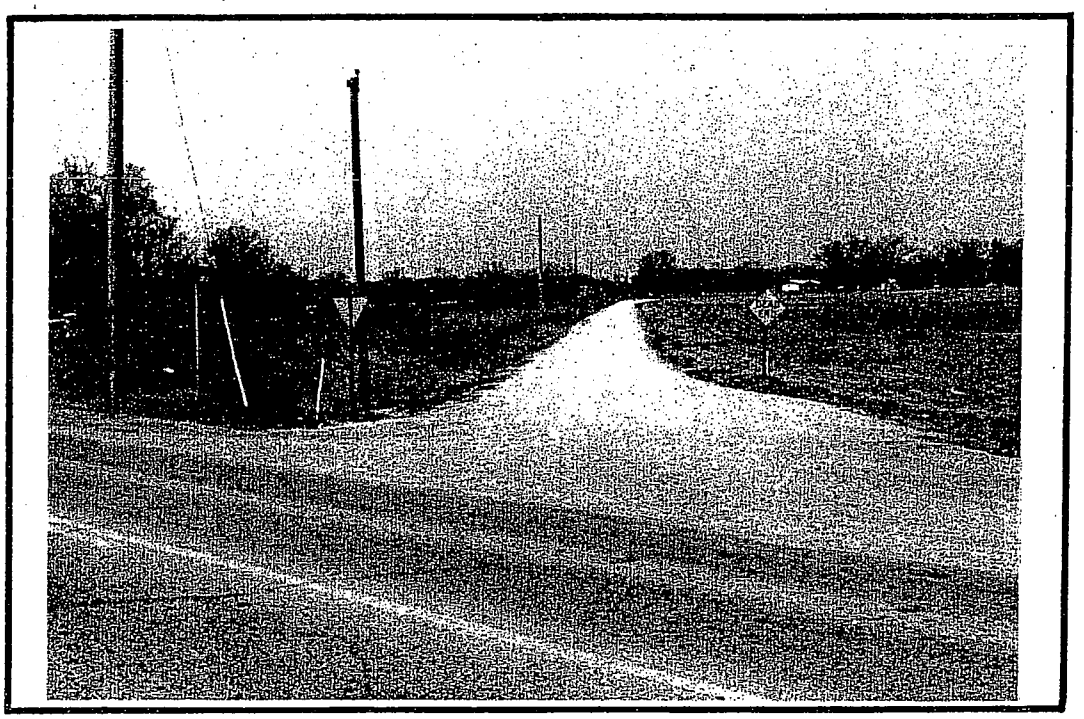
4. APPROACH TO RAILROAD CROSSING LOOKING WEST



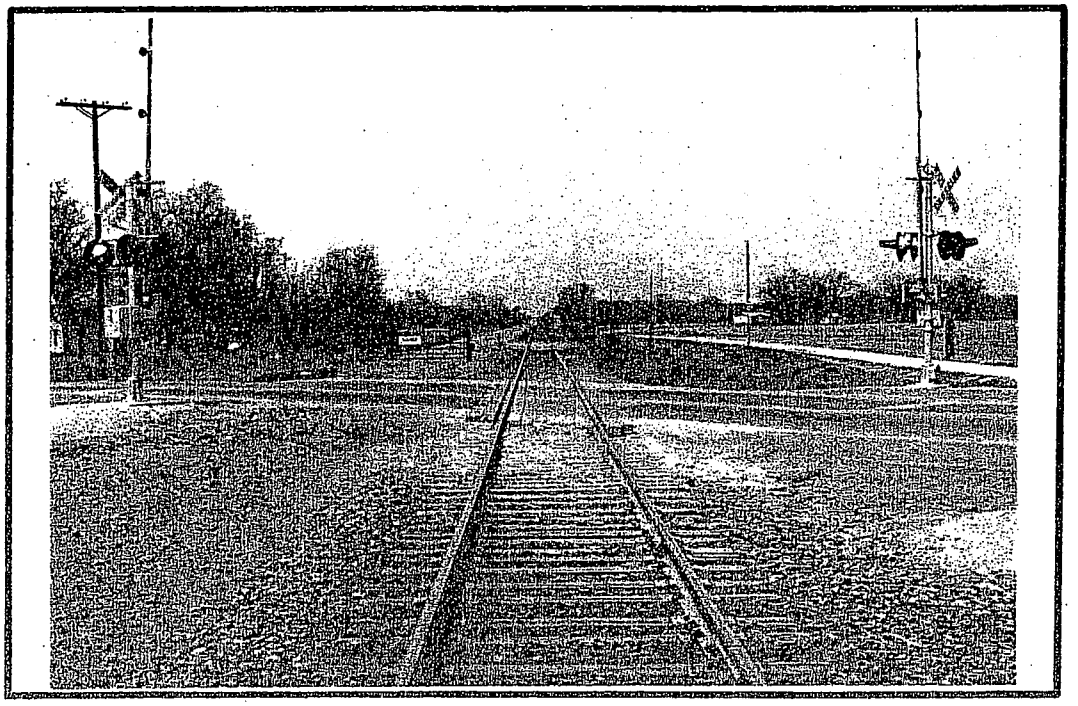
5. HOLMQUIST ROAD CONNECTION TO STURGEON LAKE ROAD EAST OF RAILROAD TRACK LOOKING NORTHWEST



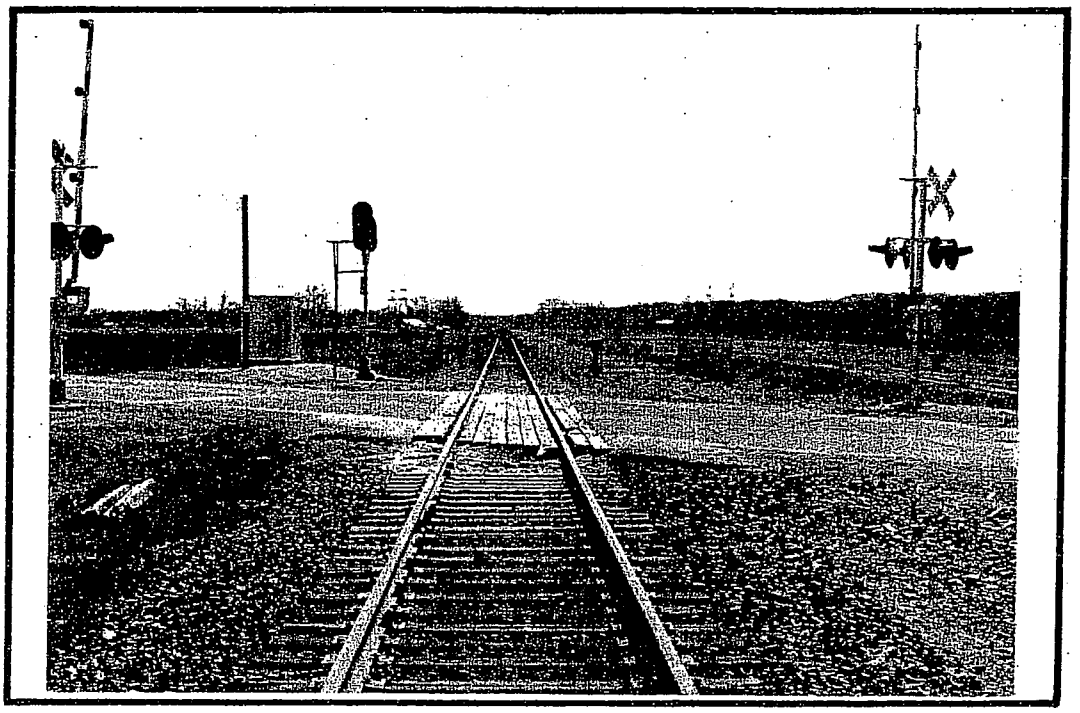
6. RESIDENTIAL PROPERTY NORTHEAST OF RAILROAD CROSSING LOOKING WEST



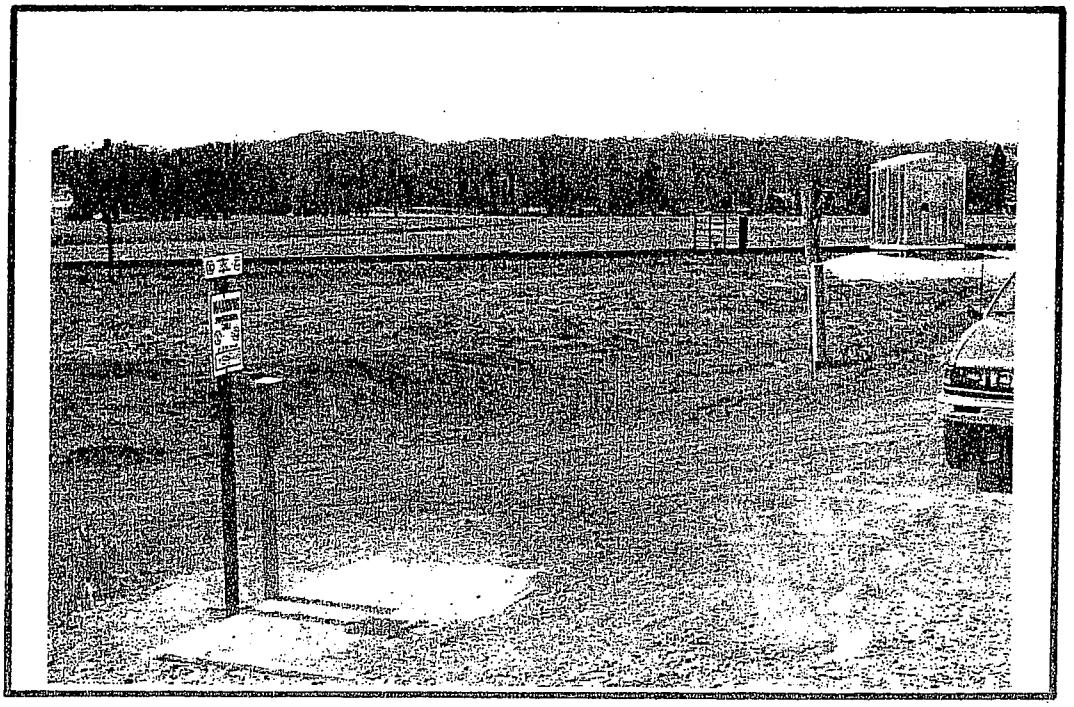
7. HOLMQUIST ROAD EAST OF RAILROAD LOOKING NORTHWEST FROM STURGEON LAKE ROAD



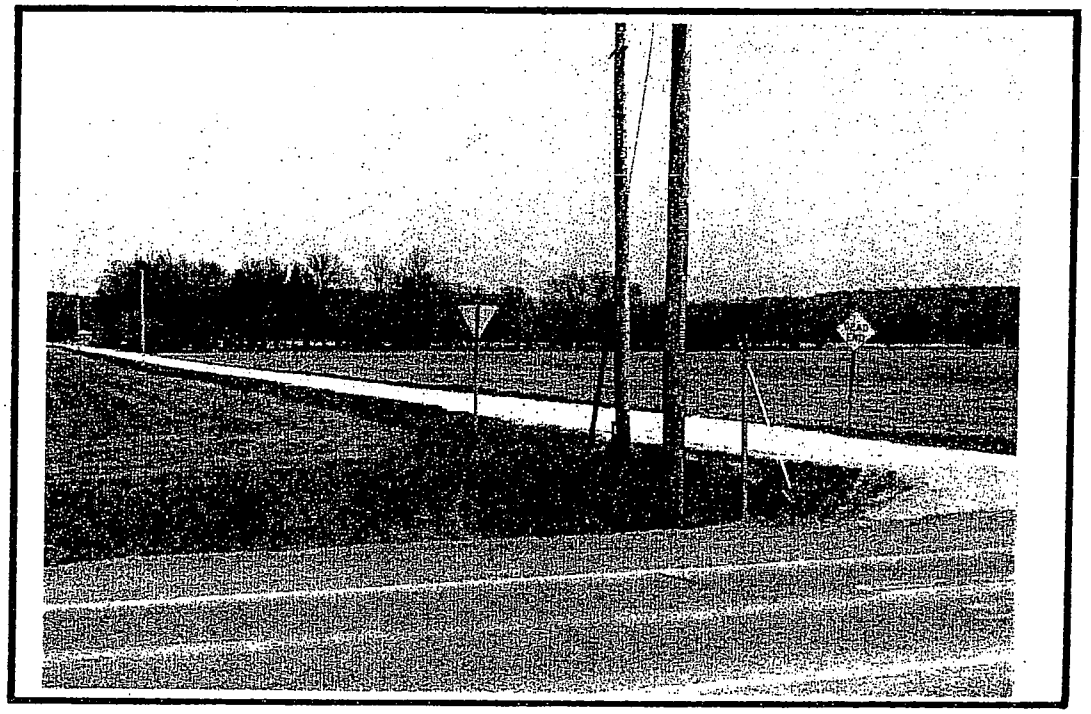
8. CPRS TRACK AND MAINTENANCE ROAD LOOKING NORTHWEST



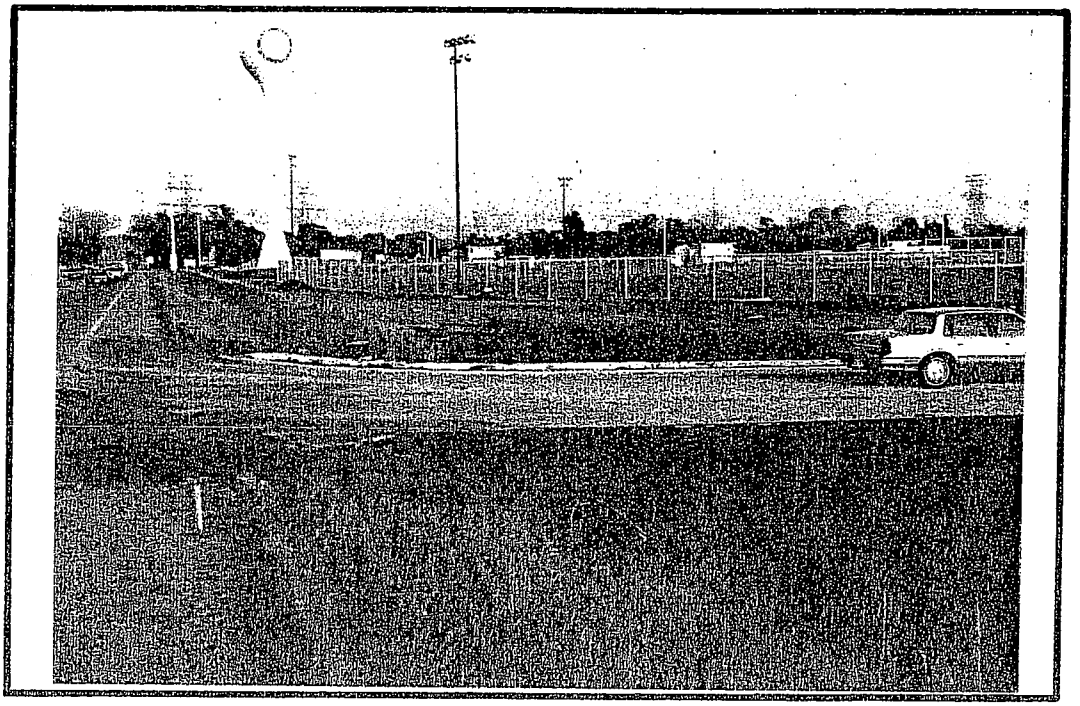
9. CPRS TRACK AND MAINTENANCE ROAD LOOKING SOUTHEAST



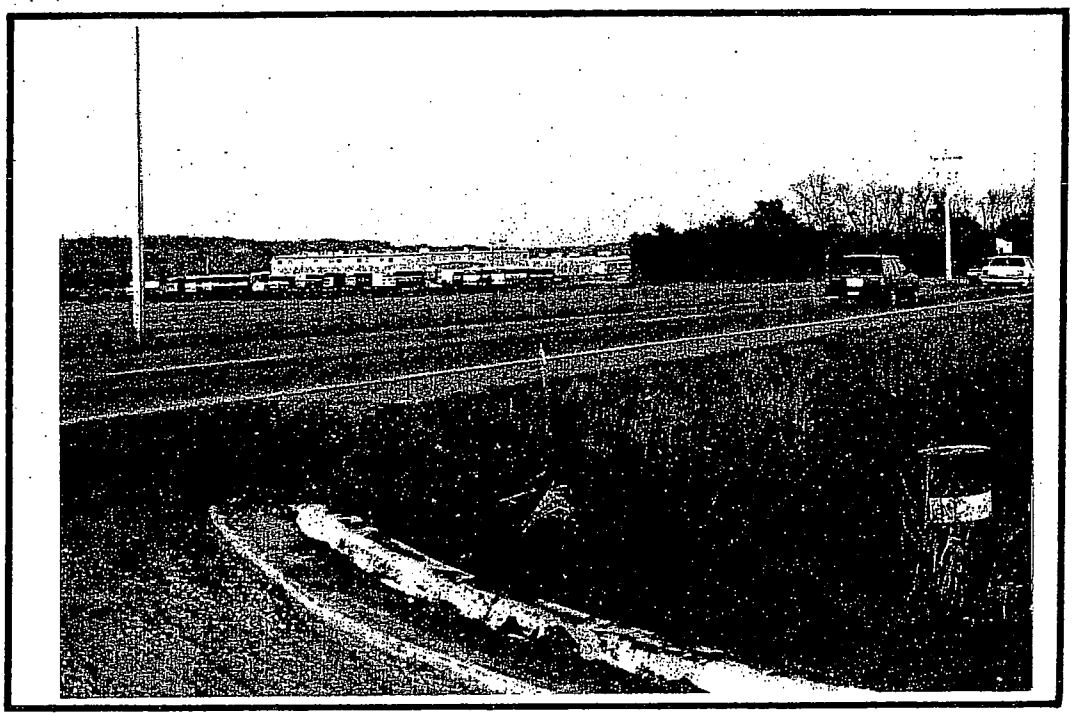
10. UNDERGROUND UTILITIES LOOKING SOUTHWEST FROM SOUTH SHOULDER OF STURGEON LAKE ROAD



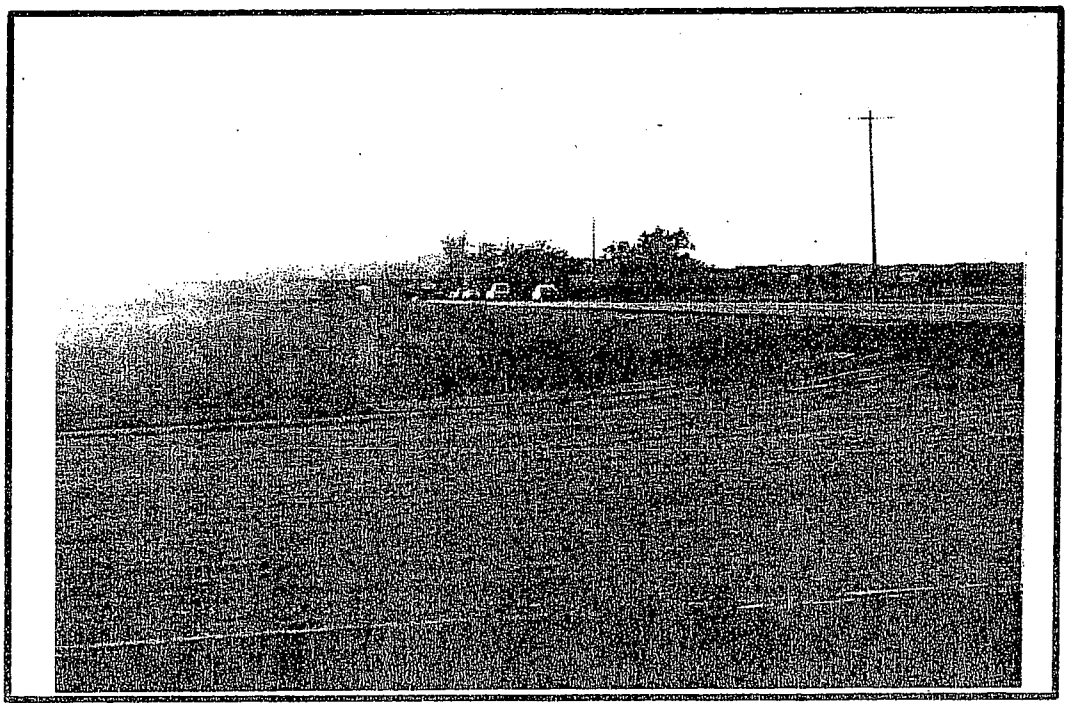
11. OTHER DAY ROAD CONNECTION TO STURGEON LAKE ROAD LOOKING NORTH



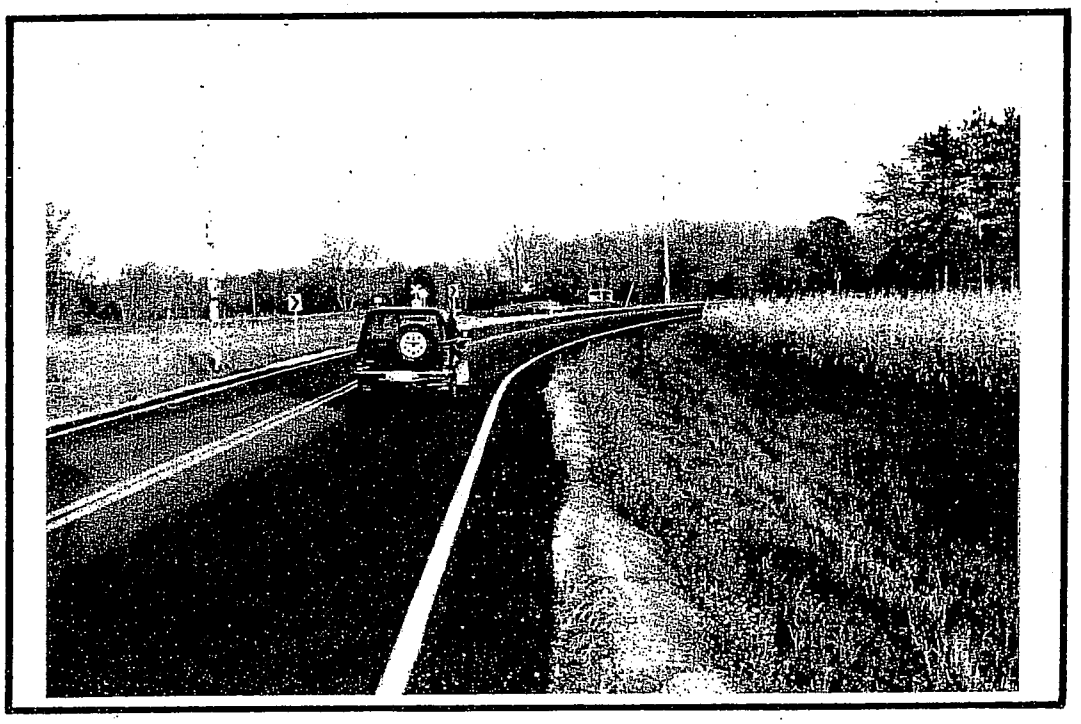
12. RING ROAD CONNECTION TO STURGEON LAKE ROAD ON WEST SIDE OF COMMUNITY RECREATION CENTER LOOKING EAST



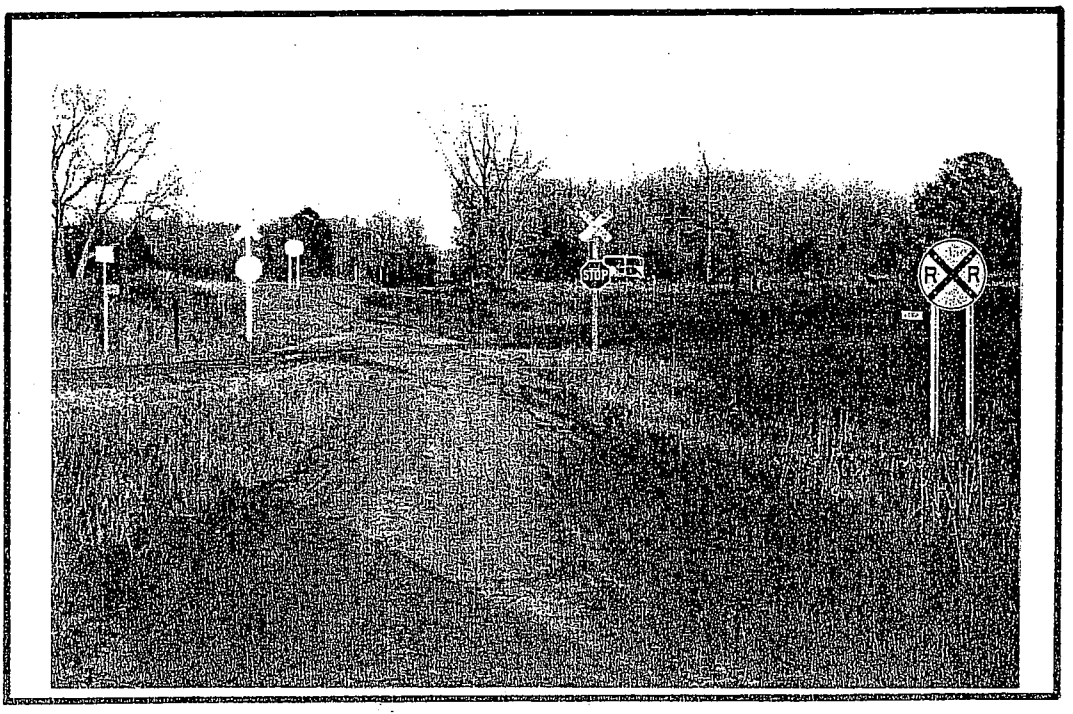
13. VIEW OF CASINO FROM ACCESS ROAD ON EAST SIDE OF COMMUNITY CENTER COMPLEX LOOKING NORTHEAST



14. VIEW OF RAILROAD CROSSING FROM RING ROAD ON EAST SIDE OF COMMUNITY CENTER COMPLEX LOOKING WEST



15. CSAH 18 APPROACH TO CHURCH ROAD CONNECTION ONE MILE NORTH OF STURGEON LAKE ROAD LOOKING EAST



16. CROSSING OF CHURCH ROAD WITH CPRS TRACK ONE MILE NORTH OF STURGEON LAKE ROAD LOOKING EAST