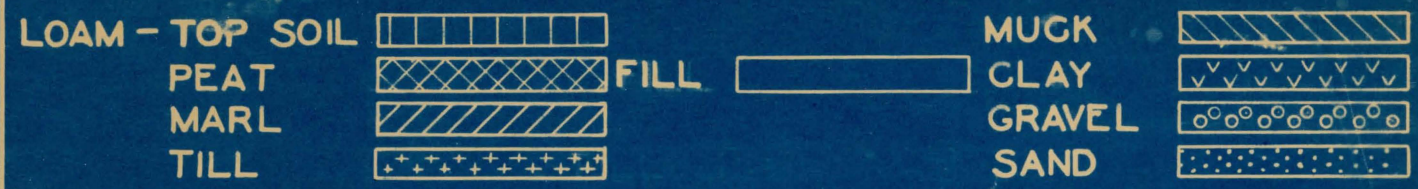
LEGEND

SHOWING

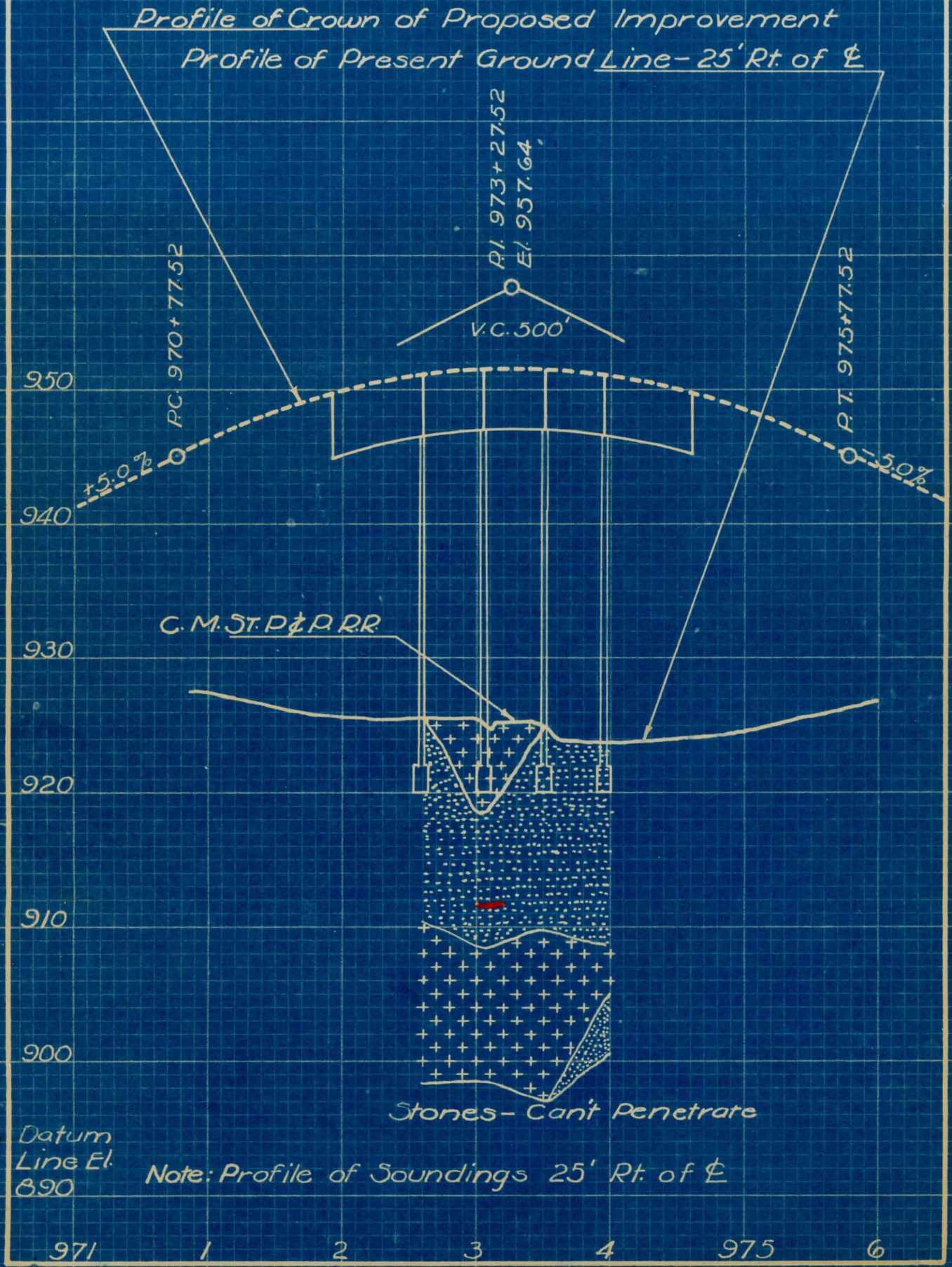
SYMBOLS USED FOR VARIOUS MATERIALS ENCOUNTERED



PEAT PROFILE

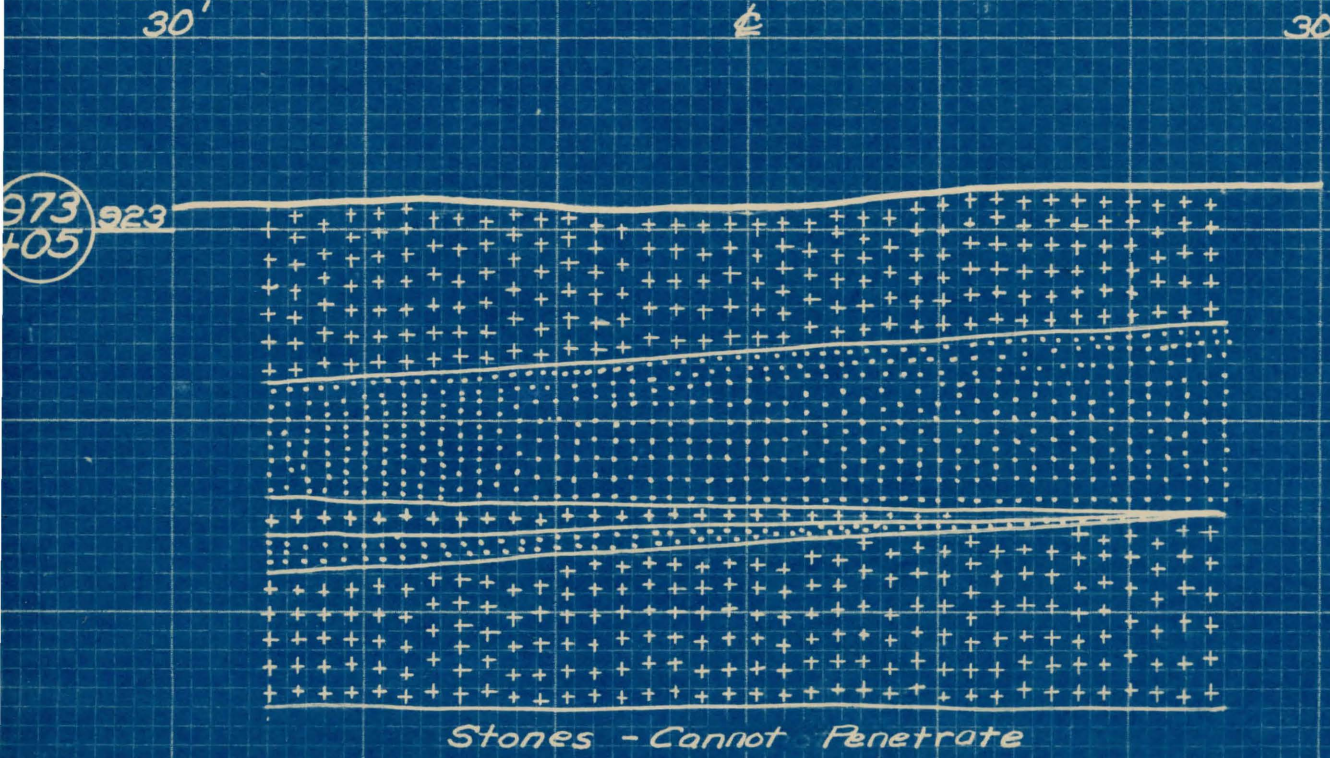
STA. 972+00 - 975+00

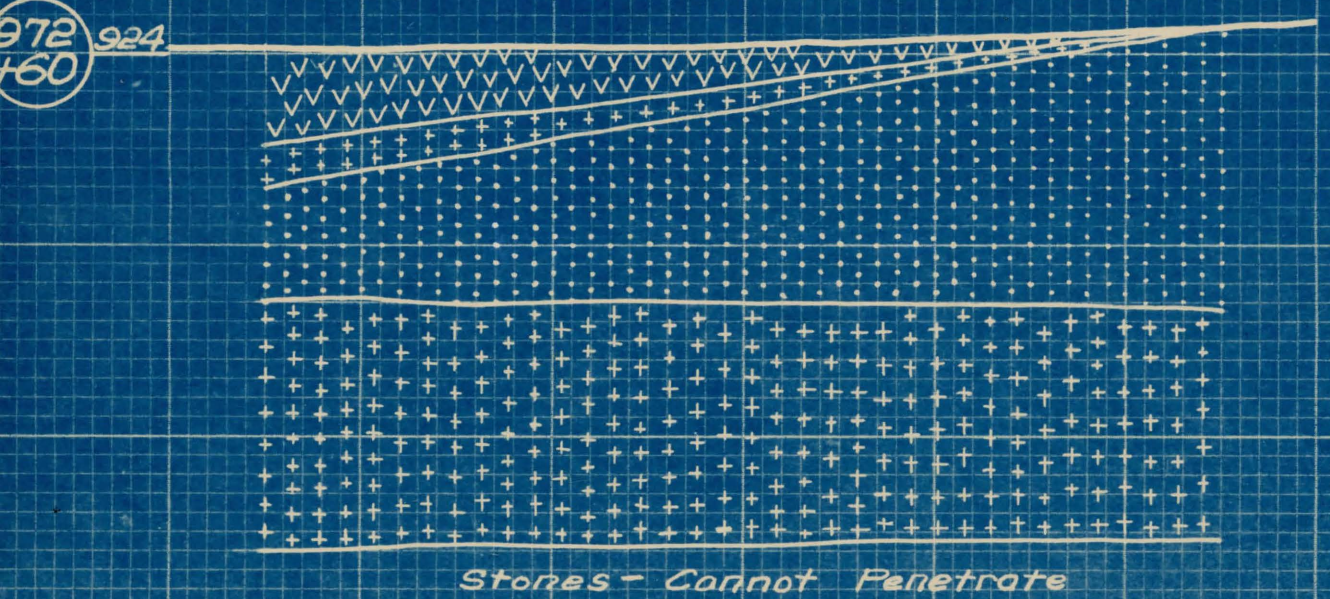
RTE. 47 SEC. 106-V

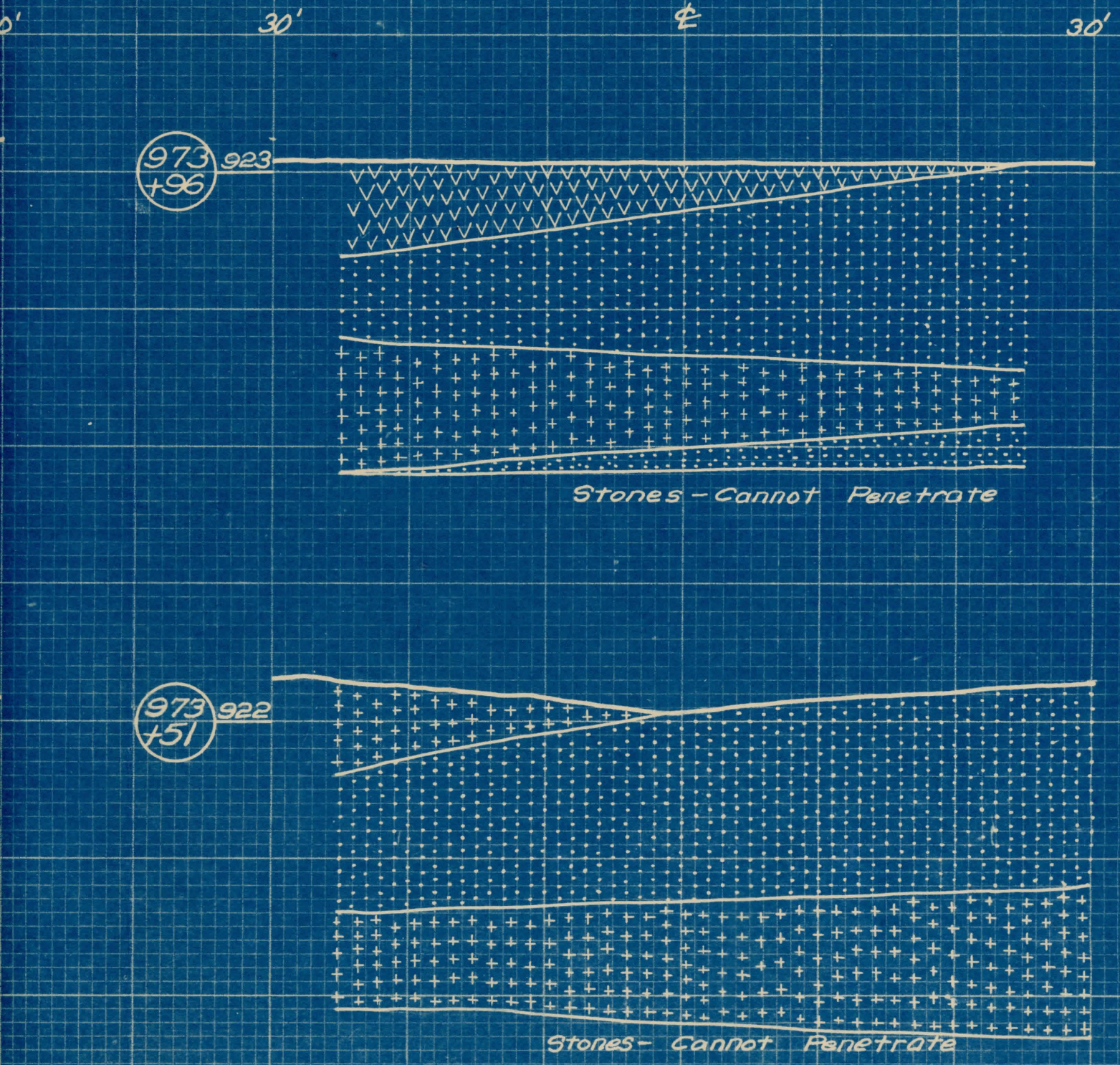


Note: Profile of Soundings 25' Rt. of ℄

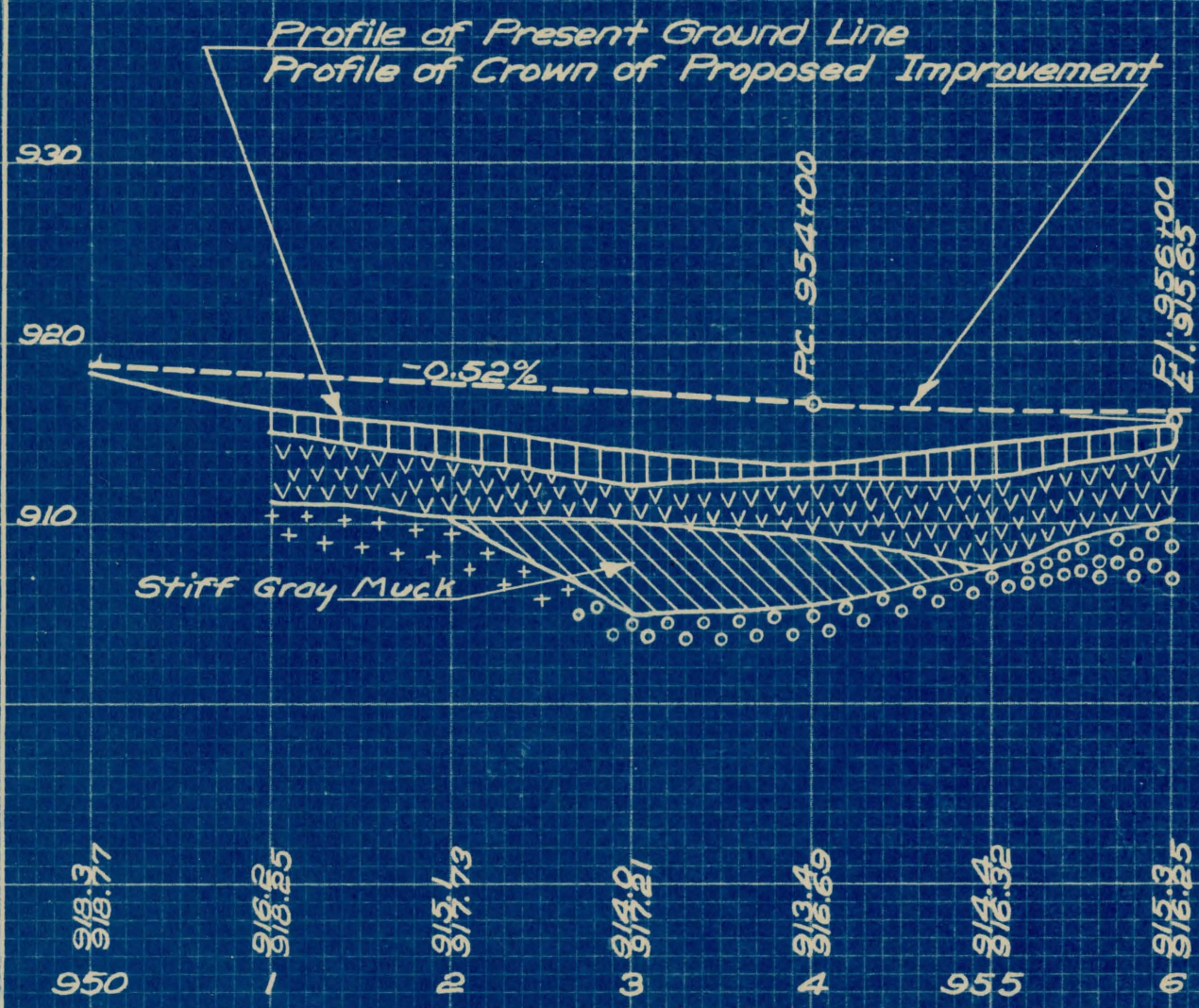
CROSS SECTIONS
RTE. 47. SEC. 106-V
STA. 972+60 - 973+96



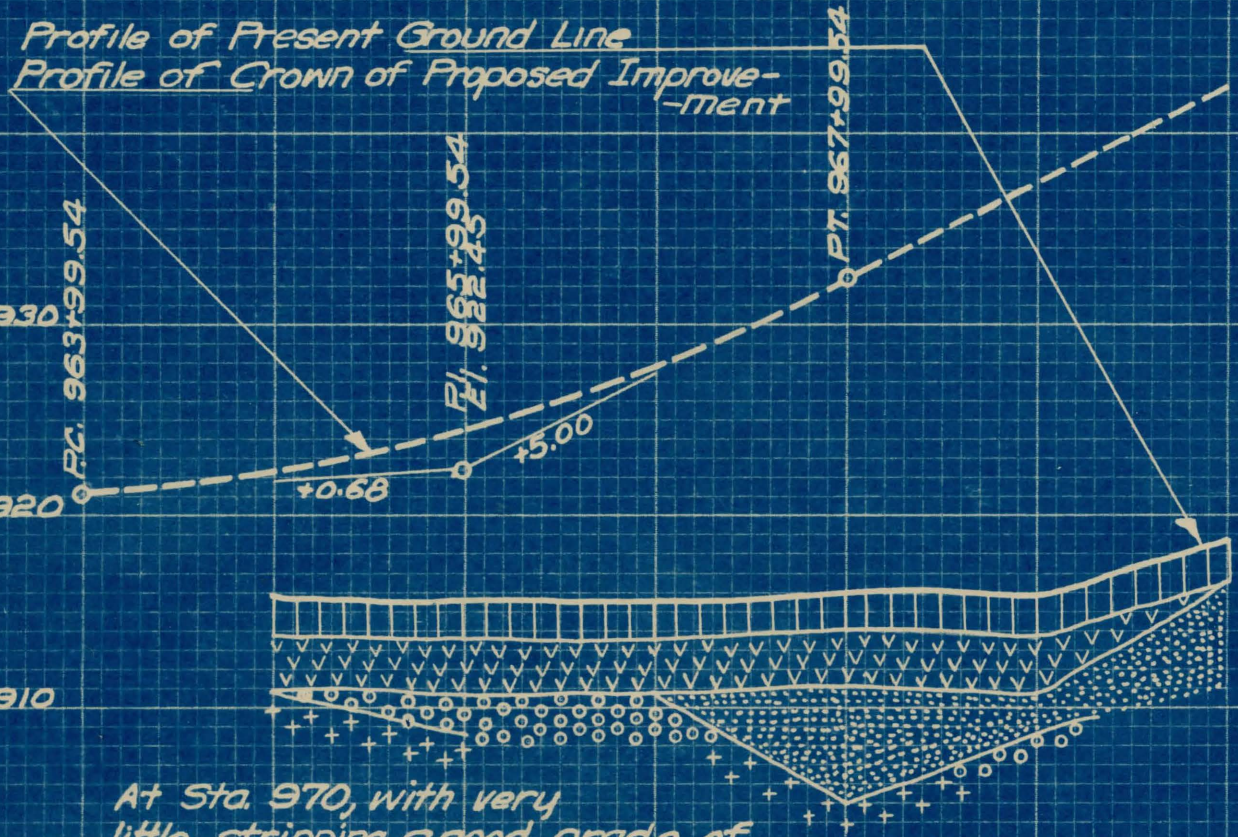



30'
℄
30'
973
+96
923
Stones - Cannot Penetrate
973
+51
922
Stones - Cannot Penetrate

PROFILE OF MATERIALS
RTE. 47 SEC. 106-X
STARK'S STATION
STA. 950+00-956+00



PROFILE OF MATERIALS
RTE. 47 SEC. 106-X
STARK'S STATION
STA. 965+00-970+00



At Sta. 970, with very little stripping, a good grade of sand suitable for construction purposes could be secured. The fine grained silty sand at Sta. 968 and 969 is almost fine enough to be a quicksand. It is silty however, and dries as a hard mass rather than a powder. While not a particurally stable material its overburden and surroundings should hold it in place.

915.9 915.6 915.7 916.0 915.9 918.8

965 6 7 8 9 970


Section Corner
Twp. 42 N., Range 7E
Sta. 67+13.34 Tang. Rte. 5
= Sta. 959+07.16 P.O.T. Rte. 47
℄ Construction Route 47
P.T.-Sta. 72+74.06 Route 5
= P.O.T.-Sta. 967+55.06 Rte 47
P.O.T.-Sta. 973+10.82
P.O.T.-Sta. 970+83.92
CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC R.R.
Top of Rail Elevation Chart
Station | Elevation
973+16.58 | 925.87
+22.38 | 925.86
973+32.66 | 926.14
+38.45 | 926.10
P.O.T.-Sta. 978+68.75
P.C.-Sta. 980+14.91
S.B.I. Route 47
Curve Data
Δ = 46°-38'
D = 5°-18
T = 466.0
L = 879.9
R = 1081.44
P.T. 988+94.81 Route 5 = Sta. 169+02.85 Route 72
℄ construction S.B.I. Rte 5
P.I. 984+80.01 = P.O.T. 164+36.85 Rte 72
Δ = 56°-21'-30"
D = 6°-35'-06"
T = 466.0
L = 855.85
R = 869.85
℄ construction Route 47
P.T. 988+70.76
℄ Construction Route 5
1/4 Section line
Curve Data
Δ = 80°-17'-30"
D = 5°-48'
T = 847.0'
L = 1498.62'
R = 1005.6'
e = 1/2" per ft.
Bridge #Z-142
458 ft. from P.O.T. along ℄ of N. track to face of nearest abutment.
PROPOSED CROSSING OF
C.M.ST. P. & P. R.R. AT
SUNSET, ILL.
B.M. "A" F.N. in 15" oak tree 160' rt. Sta. 960+00 Rte 47 Elev. 918.53
B.M. "B" F.N. in 12" oak 58' Lt. Sta. 970+30 Rte 47 Elev. 920.85
B.M. "C" R.R. Spike in 15" oak 115' Lt. Sta. 972+60 Rte 47 Elev. 923.78
B.M. "D" R.R. Spike in R.O.W. Fence Post 75' Rt. Sta. 973+18 Elev. 925.64
Scale
1" = 10' Vert.
1" = 100' Horiz.
present ground line
Typical Section thru Subway Approaches
Proposed Track
Present ground line
400' V.C.
Profile crown of proposed improvement
Present Ground Elevation
Proposed Crown Elevation
Datum line El. 880
PLAN
PROFILE
PLATE 1 – PLAN-PROFILE
KEUFFEL & ESSER CO. NEW YORK

Tech files
#103

ILLINOIS STATE GEOLOGICAL SURVEY

Urbana, Illinois

Geological Resource Section

Report on:

I. Examination of Geological Conditions at Site of Proposed Underpass at Intersection of State Bond Issue Highway Routes Nos. 5 and 47 with Chicago, Milwaukee, St. Paul, and Pacific Railroad near Starks.

and

II. Examination of Geological Conditions Possibly Contributing to Cracking of Pavement in State Bond Issue Highway No. 53 South of Lisle.

January 16, 1933

Approved:

M. M. Leighton

M. M. Leighton, Chief

Signed:

George E. Ekblaw

George E. Ekblaw
Geologist and Head
Engineering and Areal
Geology Division.

Purpose. At the request of Mr. G. N. Lamb, District Highway Engineer, Elgin, Illinois, an examination of the geological conditions (1) at the site of the proposed underpass at the intersection of State Bond Issue Highway Routes Nos. 5 and 47 and Chicago, Milwaukee, St. Paul and Pacific Railroad near Starks and (2) along State Bond Issue Highway Route No. 53 south of Lisle was made in order to ascertain in the first case whether or not they might contribute serious troubles and in the second case whether or not they might cause the cracking of the recent pavement. Mr. Lamb accompanied me during the examination at both localities and his Engineer of Materials, Mr. Bollig, was also present during the examination south of Lisle.

I. Proposed Underpass near Starks

Geologic Situation. The proposed underpass is located in the S.E.$\frac{1}{4}$, sec. 30, T.42N., R.7E., about a quarter of a mile east of the village of Starks. It is situated in a low undulatory ridge trending northeast-southwest and related to the large Marengo Ridge which trends north-south west of Starks. A subordinate ridge of the Marengo Ridge runs northwest-southeast through Starks and its northeast slope is abrupt. A swampy area occupying nearly forty acres lies behind the Starks ridge and northwest of the ridge in which the underpass will be constructed, and is bounded on the northeast by a low ridge. The swamp is transected and drained by Tyler Creek, which rises in bogs in the Marengo Ridge and flows past Starks and generally eastward to empty into Fox River in the north part of Elgin. Its channel

across the low ridge that forms the northeast boundary of the swampy area has been artifically excavated or deepened. A subordinate swampy area is separated from the main swamp by a low ridge, so that a little water may be retained in it. The swamp is used for pasture land.

Test-borings reveal that the surface material in the swamp consists of about 2 feet of soil overlying about 3 feet of clay. It lies on sand and gravel whose maximum thickness is about 6 feet. Test-borings at the site of the proposed underpass reveal that the earth material generally consists of about 15 feet of sand overlying till, although some of them show a local lenticular deposit of clay on top of the sand. As observed during the examination, this pocket of clay occurs in a slight depression between two low knobs on the ridge.

Geological Interpretation. The Marengo Ridge is a large terminal moraine built at the margin of one of the Wisconsin glaciers at the time of its maximum advance. As the ice retreated, the water from its melting was impounded in a lake between the moraine and the ice-front. The northwest-southeast ridge at Starks and a similar ridge which the road northwest of Pingree Grove follows were built at the front of the glacier during halts in its retreat and consist mainly of gravel and sand. The steep northeast slopes of these ridges reflect the ice wall against which the material lay and the more gentle southwest slopes represent the slope of deposition that the coarser material assumed as it washed out into the lake. The finer material, such as silt and clay, was scattered through the lake and settled over

the lake bottom, so that it composes the present black loam and clay soil that fills depressions and covers the flats between the ridges. The ridge in which the underpass will be situated is apparently a ridge of gravelly sand deposited in a glacial channel or crevasse running normal to the ice-front, and the clay which locally mantles it is apparently finer material either deposited in the glacial lake or later washed in from the adjacent slopes.

Significance. The gravelly sand that composes the ridge in which the underpass is situated is probably sufficiently porous that water can readily seep through it. It apparently extends continuously out to the margin of the adjacent swamp and even continues as a thin layer beneath part of the swamp at least. Consequently, it is probable that there may be an appreciable amount of subsurface drainage from the higher land east and southeast of Starks towards the swamp and it is conceivable that if water should accumulate in the swamp it would saturate the gravelly sand to a level of equilibrium. The till that underlies the sand is relatively impervious, so that the contact between the sand and the till is potentially a surface along which movement of underground water is concentrated.

Problem. In view of the fact that the proposed underpass will be excavated through the gravelly sand to an elevation about four feet below the level of the adjacent swamp and that the lowest point of the pavement will be only two or three feet above the sand-till contact, the highway engineers desire to know if an excessive seepage or flow of water into the underpass may be expected. They plan to install a pump to remove water

that may collect in the underpass.

Opinion. Some subsurface flow of water, in addition to the expected surficial drainage, will doubtless occur. It may be appreciable but will probably not be excessive, because (1) the upland area that would drain subsurficially through the sand to the depression created by the underpass is not large, and (2) although the underpass will be a few below the level of the swamp, the swamp appears to be reasonably well drained by Tyler Creek. Whether or not there will be an increase in the subsurface flow because the maximum depression lies so near the sand-till contact cannot be predicted, as that depends on (1) whether the contact surface is regular or irregular and (2) whether or not there is or will be a concentration of water at the contact surface, and no data on these questions are available.

Comments. In view of the fact that the surface of the swamp is not more than four feet above the deepest point in the proposed underpass, it may be possible to deepen Tyler Creek sufficiently that it will run lower than the underpass, in which case no water from the swamp could seep into the underpass. This deepening would be particularly desirable through the ridge that forms the northeast boundary of the swamp. It is also possible that such deepening of Tyler Creek might be sufficient to provide an outlet for a drain from the underpass, in which case the installation and operation of a pump would be avoided.

II. Cracked Pavement South of Lisle

Geologic Situation. The portion of State Bond Issue Highway Route No.53 under consideration crosses Sections 10, 15, 14, 23, 26, and 35, T. 38 N., R. 10 E., and Section 2, T. 37 N., R. 10 E.. It is situated along the east side of the valley of East Branch DuPage River, and it generally lies near the foot of the slope or valley-wall. A few shallow cuts in the slope and a few low fills have been made, but most of the route closely follows the natural grades. The valley-wall consists in part of pseudo-laminated glacial till, more or less silty with pockets and lenses of laminated silt and clay, and in part of poorly sorted gravel. The valley-floor consists of gravel washed out from the glaciers and deposited as a valley-train. Several small valleys and gullies interrupt the valley-wall. Small seeps were noted in some of the cuts.

The general character and relations of the material exposed in the cuts in the valley-wall were observed during the field examination. Subsequently 17 samples of the material beneath the pavement were obtained as cores at the same time that core-samples of the pavement were taken. These samples have been examined and described as follows:

Sample 1. Station 1173 + 35. Silty, sandy, clayey, slightly peebly, dark brown to black. Soil and subsoil developed from tilly silt.

Sample 2. Station 1173 + 54. Clay, very silty, very sandy, pebbly, brownish-black. Soil developed from sandy silt.

Sample 3. Station 1183 + 25. Clay, silty, sandy, pebbly, with some laminated clay and silt, brown. Till.

Sample 4. Station 1183 + 99. Clay, silty, sandy, pebbly, with considerable silt and some laminated clay, brown, Till with silt.

Sample 5. Station 1184 + 60. Clay, silty, sandy, pebbly, brown. Till (good)

Sample 6. Station 1205 + 29. Clay, silty, sandy, pebbly, dark brown to dark gray. Subsoil developed from till.

Sample 7. Station 1205 + 61. Clay, silty, pebbly, dense, dark brown. Subsoil developed from till..

Sample 8. Station 1216 +13. Clay and silt, pebbly, brown to black; soil and subsoil developed from silty till.

Sample 9. Station 1216 + 90. Clay and silt, pebbly, dark blackish-brown. Soil developed from silty till.

Sample 10. Station 1224 + 92. Clay and silt, slightly pebbly, brown. Silty till, with isolated silt or clay.

Sample 11. Station 1225 + 36. Silt, clayey, pebbly, brown. Tilly silt.

Sample 12. Station 1237 + 41. Clay, pebbly, crumbly, black. Soil.

Sample 13. Station 1243 + 60. Clay, pebbly, brown. Till.

Sample 14. Station 1203 + 35. Clay, very silty, pebbly, light brown. Silty till.

Sample 15. Station 1174 + 83. Clay, pebbly, silty, wet and gummy, dark brown. Subsoil developed from silty till.

Sample 16. Station 1165 + 49. Clay, pebbly, crumbly, brownish-black. Soil developed from till.

Sample 17. Station 1194 + 50. Clay, silty, pebbly, brown. Silty till.

The materials in the samples were so mixed and disturbed that their actual relationships could not be determined.

Significance. The east wall of East Branch DuPage River valley is not only the natural slope bounding the valley, but is also the west slope of a morainic ridge. Consequently there is considerable westward drainage. The silty, gravelly character of the glacial drift provides an unusual opportunity for subsurface drainage so that seeps are likely to occur wherever layers of silt and gravel are intercepted by artificial cuts.

Problem. Although the pavement was laid only during the fall of 1931 and summer of 1932, it is already considerably cracked at several restricted localities. The possible cause of this cracking has been sought along several different lines of investigation, such as variation in materials, variation in time of day when pavement was laid, variation in time of year when pavement was laid, etc., none of which prove wholly correlative with the cracking. The possible effect of differences in character of the subgrade is now under consideration.

Opinion. The field examination showed that at a large proportion of the places where the pavement was badly cracked there was a silt lens in the till in the adjacent cut, interception of a small gully, or other condition suggesting the possibility of subsurface seepage, and at some places the seepage was apparent. Some of the cracking occurred on fills, in which the material was taken from adjacent cuts that contained silt lenses. Therefore, a functional relation between actual seepage or potential absorptive powers of the material in the subgrade and the adverse cracking in the pavement is strongly suggested.

Some of the samples of material, especially Nos. 4, 10, and 11, contain silt that supports the suggested relation, but most of them are too disturbed or consist of soil so that their possible significance is lost. Even if the functional relation exists, the exact procedure by which it is effected has not been determined, and consequently no positive conclusion can be made.

Recommendation. If further laboratory tests confirm the suggestion already set forth, it will be desirable to determine just how the moisture content affects the pavement. If it appears desirable to eliminate the moisture, drains may be installed along the east side of the pavement to intercept subsurface drainage from the valley-slope and under the pavement wherever a silt lens is transected.

DATE	STATION TO STATION		TEMP. NOON	WEATHER A.M.	WEATHER P.M.	Daily REPORT	HAIR CHECKING A.M.	HAIR CHECKING P.M.	SLUMP	CURING	
9-14-31	1278/00	1281/51	80°	Cloudy	Rain	None	--	Yes	2"	Chloride	Note: Wet sub-grade
9-18-31	1281/51	1289/10	75°	Cloudy		Yes	Yes 60'	--	1¾"	"	
9-19-31	1289/10	1298/76	80°	Cloudy & Windy		No	--	--	1 5/8"	"	
9-21-31	1298/76	1308/76	89°	Clear & Windy		No	Yes	--	1¾"	"	Sub-grade shows tendency to dry on surface
9-22-31	1308/76	1318/56	85°	Clear & Calm		No	--	--	1¾"	"	
9-23-31	1318/56	1328/50	85°	Cloudy	Clear	No	Yes	--	1 5/8"	"	
9-24-31	1328/50	1339/03	75°	Clear & Calm		No	--	--	1¾"	"	Good looking Pavement
9-26-31	1339/03	1345/97	65°	Clear & Calm		No	--	--	1¾"	"	Rain Previous Day - Sub-grade wet)
9-28-31	1345/97	1354/47	70°	Clear & Calm		No	--	--	1¾"	"	) Note: No hair checking on 5 consecutive days following rain on 9-25-31) Temp. average about 70°.
9-29-31	1354/47	1364/17	75°	Clear & Calm		No	--	--	1¾"	"	
9-30-31	1364/17	1375/28	70°	Clear & Windy		No	--	--	1¾"	"	Sub-Grade - Tends to dry on Surf.)
10-1-31	1375/28	1387/52	85°	Clear & Windy		No	--	--	1¾"	"	Sub-Grade - Tends to dry on Surf.)
10-2-31	1387/52	1398/76	80°	Clear & Windy		No	At noon	Yes	1¾"	"	Hair checking middle of run and late in P.M. (Checking light)
10-3-31	1398/76	1410/21	85°	Clear & Windy		No	Yes	Yes	1¾"	"	Very little checking up to noon
10-5-31	1410/21	1423/21	80°	Clear & Calm		No	Yes	Yes	1¾"	"	Majority of Hair Checking occurred late in A.M. (Sub-Grade - Tends to dry on Surface)
10-6-31	1423/21	1434/98	70°	Cloudy		No	Yes	--	1½"	"	Hair Check in A.M. only. Rain in P.M. of short duration - Checking stopped abruptly within 200 feet of location of rain.

DATE	STATION TO STATION	TEMP. NOON	WEATHER A.M.	WEATHER P.M.	DAILY REPORT	HAIR CHECKING A.M.	HAIR CHECKING P.M.	SLUMP	CURING		
10-8-31	1434/98 1446/77	70°	Windy & Cloudy		No	Yes	--	1¾"	Chloride		Checking - Lt. 1440 - Bad spot. Other checking negligible. Rain previous day (10-7-31)
10-9-31	1446/77 1460/53	70°	Clear & Windy		No	--	Yes	1¾"	"		Hair checking occurred on last hour's run. Negligible rest of day.
10-22-31	1278/00 1269/19	70°	Clear & Windy		No	Yes	--	2"	"		Checking in late A.M.
10-23-31	1269/19 1268/55	60°	Cloudy		--	--	--	1¾"	"		Mixer down. Wet Sub-grade. Rain.
10-26-31	1268/55 1259/10	60°	Cloudy & Windy		No	--	--	1½"	"		Sub-grade apparently wet. Rain 23rd.
10-28-31	1259/10 1253/94	55°	Clear		No	--	--	1¾"	7½"	Straw	Rain 27th. Sub-grade wet. Rain 5 hrs.
10-29-31	1253/94 1244/04	43°	Cloudy & Windy		No	--	--	1½"	7½"	"	
10-30-31	1244/04 1240/05	?	Cloudy	Rain	No	--	--	1½"	7"	"	Rain at 11:20
11-2-31	1240/05 1229/20	46°	Cloudy		No	Yes	No	1½"	7"	"	Checking occurred about 10:00 for 200 feet.
11-3-31	1229/20 1218/44	54°	Cloudy Windy	Clear	No	Yes	No	1¾"	7"	"	All checking for day occurred on 150 feet of slab laid about noon.
11-4-31	1218/44 1207/68	58°	Clear & Windy		No	Yes	No	1¾"	9"	"	All checking for day during first 2 hours in morning. Started late due to low temp. 7:00 A.M. = 30°. Start Mixer 7:45.
11-5-31	1207/68 1195/90	48°	Clear & Windy		No	Yes	No	1½"	10"	"	Practically all checking occurred in A.M. Run at low temperature.
11-6-31	1195/90 1186/95	50°	Clear		No	Yes	Yes	1½"	10"	"	Very slight checking in P.M.
11-7-31	1186/95 1176/20	48°	Cloudy & Windy		No	Yes	No	1½"	9"	"	
11-9-31	1176/20 1164/70	54°	Windy, clear, dusty		No	Yes	Yes	1¾"	8"	"	Checking all day long

No burlap used with Straw

DATE	STATION TO STATION		TEMP. NOON	WEATHER A.M.	WEATHER P.M.	DAILY REPORT	HAIR CHECKING A.M.	HAIR CHECKING P.M.	SLUMP	CURING	
11-10-31	1164/70	1152/15	50°	Cloudy & Windy		No	Yes	--	1¼"	8" Straw	Checking in first few hours of A.M.
11-17-31	1152/15	1149/63	63°	Cloudy & Windy		No	--	--	1¼"	7" "	Last day in Fall 1931. Wet Season. (11-10 to 11-17)
	1149/63	1053/00					--	--			Poured in Spring 1932. (Checking in 3 small patches)

Straw not placed until 2:00 P.M.

Aggregates Not Heated

STARKS STATION

Starks Station located on Route 5 is near the proposed junction of the three Routes 5, 47 and 72.

The geologic situation at Starks Station is complicated by the area covered by the three roads. The poorly drained terminal moraine occupying the district provides numerous low places to be investigated.

Route 72 can best be described separately. It leaves its present location not far from the end of the concrete and curves through the fields to join the end of the concrete of present Route 5. The ground covered by the curve is on terminal moraine at each end with an ill defined drainage channel separating the two ridges. Soundings on the ridges and in the hollow between indicate that the curve as designed is on stable ground except for 100 feet at Station No. 126 (?) where an unusual condition is disclosed. Below 6 feet of quite stable material from one to two feet of marl is encountered. Under the marl is a very unusual muck formation some 14 feet thick. Bottom could not be reached with hand augers. The muck is unusual in that it is so stiff, almost as stiff as a clay. Soundings 50 feet on each side of the station indicate that the east west area of the muck is quite limited. The most reasonable explanation for such an occurence seems to be a small kettle hole in which the muck accumulated gradually as it was supplied by the present ill defined drainage channel. The stiffness of the muck should render it quite stable under the small fill planned.

The western end of the proposed line change on Route 5 lies on moraine material and is quite stable. As the new line nears its crossing with old Route 5, the ground lowers so that a small slough is formed. Soundings indicate that the bottom is good, however. Soundings in the two other low placed before the junction of Routes 5 and 47 show good bottom in each case. Soundings in the slough crossed by Routes 5 and 47 south of their junction show no unstable material within 12 feet of the surface. Route 5 should give no trouble with unstable material.

Route 47 north of its junction with Route 5 crosses a low spot with no surface drainage. At Station and Station soundings disclose a stiff gray muck underlying the proposed road bed and below 6 or

7 feet of quite stable material. Like that found on Route 72, the muck is stiff and should support a small fill with no trouble.

C. G. Dickinson

File with G.E. Ekblaw #103

COPY

March 13, 1933

Mr. C. M. Hathaway
Engineer of Construction
Division of Highways
Springfield, Illinois

Dear Sir:

In accordance with your request, I am submitting a report on the apparent pavement failure on Route 53, Section 534 (south of Lisle) which you requested on one of your recent visits to this District.

The prints attached to this report have been prepared showing the exact condition of the slab at the present time. All checking or cracking other than contraction joints are shown as dotted lines.

At the time the data for these prints was obtained, the pavement was covered at night with a light frost. During the early morning the pavement dried off, leaving a wet spot at each check and crack. Some of this checking is so minute that it is not noticeable under ordinary conditions. This condition is especially true of the slab from Station 1244 to Station 1465. The locations at which core specimens were taken are also shown.

The attached detailed report gives all available information covering dates placed, station to station of day's run, weather conditions, method of curing and noon-day temperatures, together with additional remarks that might be of interest.

I am also attaching a report which I requested of Dr. Ekblaw concerning the soil conditions on this section. The soil samples which he analyzed and included in his report were taken in the sub-grade directly below the cores.

COPY

The possible cause of this apparent pavement failure has been sought along several different lines. The first to come under consideration was the possibility of one or more of the constituents of the concrete having some bearing on this condition. Next in line was the mixing, placing and curing of the slab, and later a study was made to determine if any relation existed between the time of day of placing and curing the slab with the failure.

No information has been uncovered to indicate that either the materials or the mixing and placing of the concrete entered into this problem. Compressive tests of the cores taken from this pavement show an average strength of 5666 pounds per square inch at an age of 370 days. It has been found possible, however, to connect some of the very fine hair checking on this Section between Station 1245 and Station 1467 + 23 with the last named study; that is, a relation seems to exist between the time of day of placing the concrete and the hair checking. You will notice that on practically all days that checking occurred between these stations, it was on concrete placed in the morning and occasionally on the last 100 feet of the day's run.

As this concrete was placed during a period of the year when the day temperatures ran fairly high and temperatures in the evening were relatively cool, it was thought possible that the slab did not receive the proper curing conditions in the morning. There is no suggestion, however, of pavement failure between these points, all checking being typical fine hair checking.

The cracking of the pavement between Station 1163 and Station 1238 cannot in any way be connected with the above mentioned hair checking. Here the slab appears to be badly cracked with about 30% of the cores taken over cracks, showing a crack from top

COPY

to bottom of the slab.

It is believed a coincidence that this cracking should occur on the morning's run of each day, for a study of the soil condition shows evidence of silt and silty clay at each point where failure has occurred. A study of the attached prints will bring this out clearly.

Cores of the silty sub-grade material taken this past winter showed ice lenses of about 1/8 inch in thickness at an average distance of 1 inch apart. If this condition existed uniformly in this silty sub-soil material, it is possible that a vertical movement of the slab would result, or the slab would be required to resist this vertical force if it was more or less concentrated. I believe consideration should also be given to the possibility of this vertical force occuring before the concrete had gained its strength; that is, the pavement on which all bad cracking occurred was laid during cold and sometimes wet weather, the last placement of concrete being made on the 17th of November.

We are continuing a study of the problem presented by this apparent pavement failure, however, no equipment is available to run tests to show the behavior of this silty sub-grade material under various conditions. It is possible that Mr. Glover would be interested in making an additional study of this problem.

Very truly yours

G. N. Lamb
District Engineer

GNL-OW
Encl.