

***WHITETOPPING PROJECT
ON M-46 BETWEEN
CARSONVILLE AND
PORT SANILAC***

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**MICHIGAN DEPARTMENT OF TRANSPORTATION
MDOT**

**WHITETOPPING PROJECT ON M-46 BETWEEN CARSONVILLE
AND PORT SANILAC**

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**Testing and Research Section
Construction and Technology Division
Research Project 98 G-0322
Research Report R-1387**

**Michigan Transportation Commission
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<p>16. Abstract: In 1999, The Michigan Department of Transportation (MDOT) constructed its first whitetopping project. The whitetopping consisted of 150 mm thick sections with and without fibers, a 125 mm thick section with fibers, and a 75 mm thick inlay section with fibers. The locations are on M-46 outside Carsonville to Port Sanilac.</p> <p>Adjacent to the whitetopping (from Carsonville to the whitetopping) a bituminous project was built, which consisted of three standard fixes: milling and resurfacing; overlay only; and a crush and shape with overlay. The performances of these fixes will be compared to the whitetopping project to judge long term cost effectiveness.</p> <p>This report summarizes the construction of both projects.</p>			
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EXECUTIVE SUMMARY

This report summarizes the construction of thin and ultra-thin concrete overlays (a.k.a. whitetopping) on M-46 between Carsonville and Port Sanilac. This is the first whitetopping project constructed in Michigan by the Michigan Department of Transportation (MDOT). The purpose of this trial project is to study whitetopping as an alternative to our standard bituminous fixes for rehabilitating deteriorated bituminous pavements. A project to the west of the whitetopping project was constructed using several of MDOT's standard bituminous methods.

The test sections are as follows:

Bituminous Fixes

- Section 1. Mill and resurface with 90 mm of bituminous.
- Section 2. Minor surface repair with 75 mm bituminous overlay.
- Section 3. Crush and shape and overlay with 90 mm of bituminous.

Concrete Whitetopping Fixes

- Section 4. 150 mm whitetopping without fibers.
- Section 5. 150 mm whitetopping with fibers.
- Section 6. 125 mm whitetopping with fibers.
- Section 7. Mill and overlay (inlay) with 75 mm whitetopping with fibers.

Section 1 is the control for section 7, section 2 is the control for section 6, and section 3 is the control for sections 4 and 5.

Construction went per plan with no significant changes to report for either fix type. The only deviation from plan was thickness of the whitetopping sections. The 150 mm proposed sections were paved at 203 mm (average of 15 cores), and the proposed 75 mm inlay was paved at 106 mm (average of 3 cores). The increase was due to necessary grade and crown corrections.

INTRODUCTION

Historically, when flexible or composite pavements require rehabilitation, the selected fix results in a new bituminous surface. These fixes typically consist of three alternatives: (1) existing pavement repair and bituminous overlay, (2) milling with a bituminous overlay, or (3) crushing and shaping the existing pavement followed by a bituminous overlay. These rehabilitation fixes typically have varying service lives of seven to fifteen years depending on the pavement's existing condition and deterioration rate.

Nationally, other states have constructed alternative concrete rehabilitation designs, such as whitetopping and ultra-thin whitetopping. Until 1999, concrete whitetopping had not been used on any Michigan trunklines. Whitetopping is the term used for paving with Portland cement concrete (PCC) over an existing bituminous pavement¹. The first whitetopping project occurred in 1918 in Terre Haute, Indiana. Since then, nearly 200 projects have been constructed nationally in at least 28 states.

Many states are reporting satisfactory results with whitetopping. Some western states have reported that whitetopping projects have performed for more than 20 years. In particular, Iowa has many miles of whitetopping, which are providing excellent service with low maintenance needs after 25 years². A recent cost comparison study in Iowa showed:

“...a 5 to 6 in. (127 to 152 mm) concrete overlay costs up to 50 percent more than a 2 or 3 inch (51 to 76 mm) asphalt overlay, but that the concrete pavement can last twice as long as asphalt.”²

There are three locations in Michigan where whitetopping was previously used on local or private roads:

- September 1996 - An entrance drive to a steel company and concrete redi-mix plant in Traverse City.
- October 1996 - A short portion of Schaefer Hwy. at the Coolidge Yard bus terminal in Detroit.
- October 1997 - The intersection of Ann Arbor-Saline Road and Pleasant Lake Road in Washtenaw County.

¹*Whitetopping - State of the Practice*, EB210P, American Concrete Paving Association, 1998.

²*No Longer an Experiment*, Roads & Bridges, April 1997.

A visual evaluation of each location in September 1998 indicated that the Washtenaw County and Traverse City sites are performing well, while the bus terminal section had extensive panel cracking.

A site on M-46 from east of Carsonville to Port Sanilac was selected to try the whitetopping because a project on M-46 from the Village of Carsonville to the east was already being designed using a standard method of rehabilitation. This site would provide similar existing pavement cross sections, pavement conditions, and traffic conditions for both materials. Average Annual Daily Traffic is 2800 with about 12 percent being commercial. The standard-method fix project (herein referred to as the bituminous project), was changed to three sections using bituminous fixes. The bituminous project starts at the west village limits and continues east from Carsonville for approximately 4 km to just west of Goetze Road. The whitetopping project (Control Section 74062, Job Number 47172A) begins where the bituminous project ends and continues east for approximately 7.3 km to the junction of M-46 and M-25 in the village of Port Sanilac. A location and test section map are shown in Figure 1.

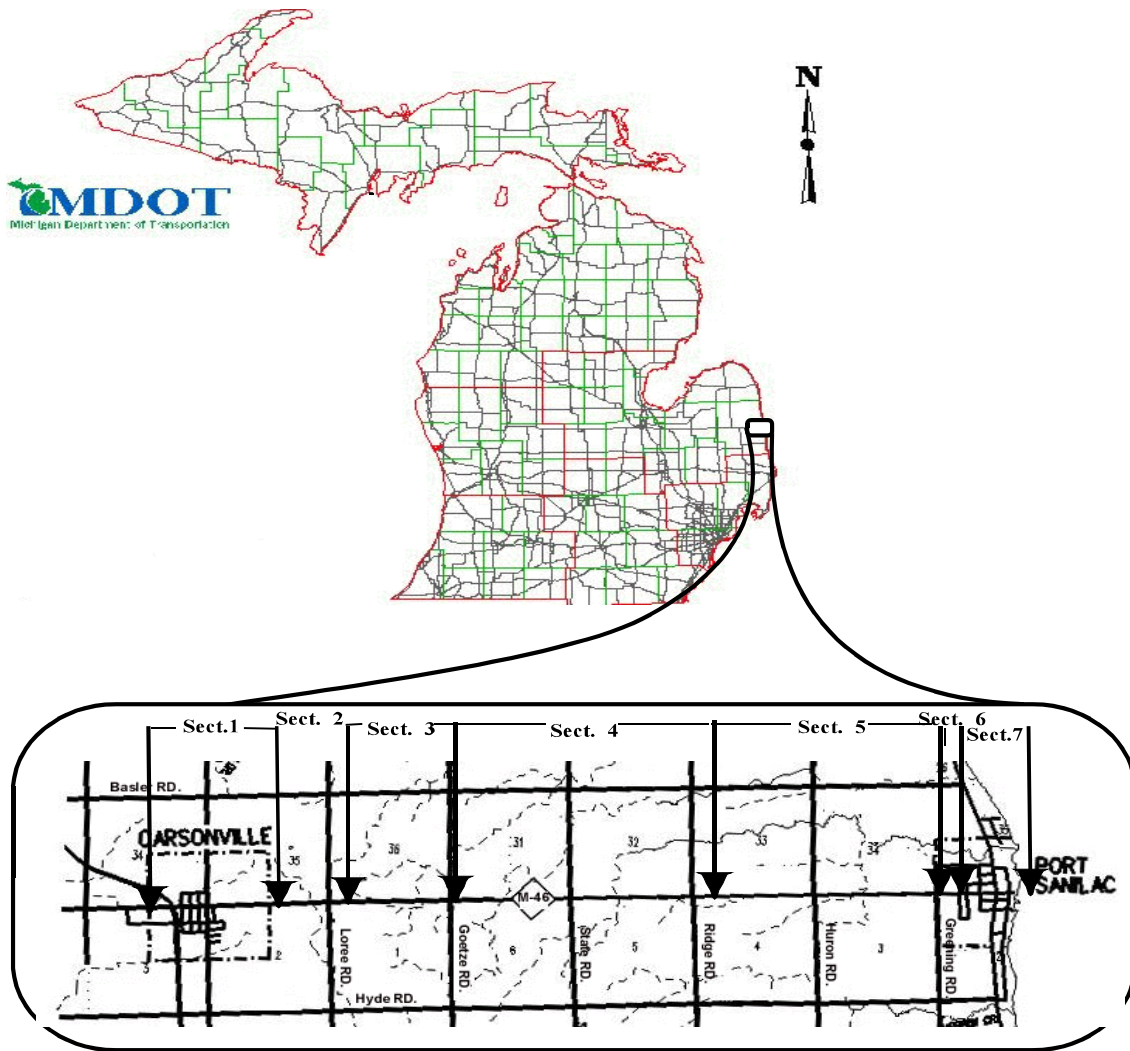


Figure 1. Project and Test Section Locations

The study sections are as follows:

Bituminous Fixes

- Section 1. Village of Carsonville - mill 40 mm (minimum) of existing bituminous and resurface with 90 mm of bituminous - existing pavement is composite.
- Section 2. East village limits to Loree Road - minor surface repair with 75 mm bituminous overlay - existing pavement is flexible.
- Section 3. Loree Road to Goetze Road - crush and shape with new 89 mm bituminous pavement - existing pavement is flexible.

Concrete Whitetopping Fixes

- Section 4. Goetze Road to Ridge Road - 150 mm whitetopping without reinforcing fibers - existing pavement is flexible.
- Section 5. Ridge Road to 305 m west of west village limits of Port Sanilac - 150 mm whitetopping with fibers - existing pavement is flexible.
- Section 6. 305 m west of west village limits of Port Sanilac to the west village limits - 125 mm whitetopping with reinforced fibers - existing pavement is flexible.
- Section 7. West village limits to M-25 - mill 50 mm of existing bituminous and overlay (inlay) with 75 mm whitetopping with fibers - existing inner lanes are composite & outer lanes are flexible.

In test section 1, the existing pavement was 100 mm of bituminous over 200 mm non-reinforced concrete. The base consisted of anywhere from 300 to 700 mm of sand or in some spots the pavement was constructed directly on the clay subgrade. In test sections 2 through 6, the existing pavement was 100 mm of bituminous over 200 mm of gravel and about 300 mm of sand. In test section 7, the existing pavement averaged 123 mm of bituminous over 203 mm of concrete. The subbase averaged 170 mm of gravelly sand.

Expected design lives of the various fixes are found in Table 1. Section 1 is the control for section 7, section 2 is the control for section 6, and section 3 is the control for sections 4 and 5.

The project objectives and future evaluation timetable are described in Work Plan 146, under Research Project 98 G-0322, *Evaluation of Concrete Rehabilitation Alternatives on Low-Volume Michigan Routes*.

Table 1. Expected Design Lives			
Concrete fix	Design Life	Bituminous Fix (control)	Design Life
Section 7, inner lanes	8 yrs.	Section 1	10 yrs.
Section 7, outer lanes	8 yrs.	Section 2	15 yrs.
Section 6	8 yrs.		
Section 4	15 yrs.	Section 3	15 yrs.
Section 5	15 yrs.		

DESIGN

Originally, the limits of the bituminous job were within the village limits of Carsonville and the scope of work involved only coldmilling and resurfacing. The whitetopping would then be constructed from the east village limits of Carsonville to M-25 in Port Sanilac. However, two more standard bituminous fixes were added to compare performance with the whitetopping. Standard AASHTO design procedures were used to determine overlay thicknesses. Examples of pavement cross-sections can be found in the Appendix.

Design of the concrete whitetopping test sections was initiated in consultation with the Michigan Concrete Paving Association. Originally, there were to be two 125 mm thick sections outside the village limits of Port Sanilac, one with reinforcing fibers and one without. Several other states have reported better performance of their whitetopping pavements when fibers are used. Michigan decided to try a section without fibers to verify this.

After further consultation with the Michigan Concrete Paving Association, the thickness was increased to 150 mm. A small 125 mm section with fibers to judge the original 125 mm design, was included between the 150 mm sections and the 75 mm inlay.

Outside of the village limits is very open farmland with only four intersections and few driveways spaced over 6.4 kilometers. This area lent itself to a straight overlay. However, within the village limits it was desirable to limit changes in pavement elevations due to the number of driveways and intersections, plus curb and gutter in one section. Therefore, it was decided to mill off 50 mm of the bituminous surface and replace it with 75 mm of whitetopping with fibers. This would provide 75 mm of concrete over approximately 50 mm of bituminous on top of 207 mm of old concrete pavement.

The original 1924 concrete pavement is just 6 meters wide. The new concrete surface was designed to be 7.2 meters wide with 1 meter shoulders, except in the curb and gutter area where it would be 12 m wide (curb to curb). This meant that outside the area of the 6 meter original concrete, the whitetopping would be supported by a variable thickness of bituminous (50 mm down to 0) and a gravel shoulder. This would provide insufficient support, so a thickened section was adopted where the bituminous and gravel would be excavated an additional 100 mm. The area outside the original concrete would then be paved monolithically with the inner portion. This resulted in a 175 mm (75 mm plus 100 mm) section.

Joint spacing was designed using the recommendations of the American Concrete Paving Association. In the 150 mm and 125 mm sections, transverse joints were spaced at 3 meters with the longitudinal joints spaced at 3.6 meters. In the inlay section joints were spaced at 1.0 to 1.25 meters in both the transverse and longitudinal directions. This range was used so that spacing could be adjusted to ensure that a longitudinal joint would be placed over the edge where the normal inlay section meets the thickened edge. Low-modulus, hot-poured rubber would be used as the joint sealant in the 150 mm and 125 mm sections. The inlay would be unsealed based on the recommendation of the Michigan Concrete Paving Association, which cited numerous examples of successful unsealed ultra-thin whitetopping pavements in other states.

A three-year warranty on materials and workmanship was required on both the whitetopping and the bituminous fixes. Details on the warranty can be found in the Appendix.

PRE-CONSTRUCTION EVALUATION

Examples of the existing condition of the pavement prior to construction can be found in Figures 2 through 5. As can be seen from the figures, all sections had rutting, potholes, and alligator cracking of various severity levels.



Figure 2. Typical pavement condition between Carsonville and Port Sanilac.



Figure 3. Typical pavement condition between Carsonville and Port Sanilac.



Figure 4. Typical edge deterioration.



Figure 5. Typical pavement condition in Port Sanilac village limits.

Falling weight deflectometer (FWD) testing was conducted in the eastbound lane prior to construction in order to backcalculate layer moduli. The department's KUAB FWD was used to collect the data every 100 meters. These data were then run through the MICHBACK computer program to backcalculate the layer moduli. Existing layer thicknesses were required as input for the backcalculation. These thicknesses were taken from the log of soil borings (in the Appendix). The cross-section of the pavement was consistent in three different areas: within the village limits of Carsonville, between Carsonville and Port Sanilac, and within the village limits of Port Sanilac. The layer thicknesses from the soil boring log were averaged for each of these three areas. Each of the test sections is located in one of these three areas, so that area's average layer thickness was used for the backcalculation. Average layer moduli for each of the test sections can be found in Table 2. Due to sewer work occurring in the village of Carsonville, test section 1 could not be tested.

Section	Pavement	Agg. Base	Subgrade
1	No tests	No tests	No tests
2	3311 MPa	112 MPa	135 MPa
3	4153 MPa	149 MPa	169 MPa
4	4267 MPa	136 MPa	168 MPa
5	3724 MPa	130 MPa	134 MPa
6	3920 MPa	134 MPa	118 MPa
7	3141 MPa	146 MPa	143 MPa

Ride quality was also measured prior to construction. Michigan uses its own Ride Quality Index (RQI). Table 3 has the average RQI numbers before construction. An RQI of 0 to 30 is considered excellent, 31 to 54 is considered good, 55 to 70 is considered fair, and greater than 70 is considered poor.

Section	Direction	
	Eastbound	Westbound
1	114	95
2	70	62
3	56	68
4	62	66
5	73	67
6	63	63
7	81	84

Table 4 contains the average Distress Index (DI) numbers for each test section from our Pavement Management System (PMS). Each pavement within the jurisdiction of MDOT is videotaped every two years. These videotapes are reviewed and all visual distresses are logged. Points are assigned to each distress based on its extent and severity levels. The points for a 160 meter section were totaled and then averaged to arrive at a DI for each section. The DI scale starts at 0 (no distress) and increases with no upper limit. A DI over 50 is treated as a pavement that is no longer suitable for

preventative maintenance. Videotaping for all test sections was done in the spring of 1998. The next taping is scheduled for late in 2000.

Table 4. Distress Index Numbers for Each Section	
Section	Dist. Index
1	311
2	111
3	132
4	61
5	46
6	23
7	111

CONSTRUCTION

Bituminous Project

Work on the bituminous project began in May 1999. The project called for sewer pipe and water main upgrading, which was completed first. Once this work was completed, the contractor then began work on the bituminous fixes in July. All three test sections used Michigan 4E3 mix design for the leveling course and Michigan 5E3 for the surface course, in the mainline. The asphalt mix design properties and aggregate gradations can be found in Tables 5 and 6. Some 4E3 was used for wedging where needed. No specific problems were encountered during the construction of this job.

Table 5. Asphalt mix design properties.		
Property	4E3	5E3
Asphalt Cement grade	PG 58-28	PG 58-28
Asphalt Cement content, %	5.6	5.9
Air Voids, %	4.0	4.0
V.M.A., %	14.6	15.5
Aggregate angularity	42.5	42.8

Table 6. Asphalt mix aggregate gradations.		
Sieve Size	4E3	5E3
19 mm	100	100
12.5 mm	95.2	100
9.5 mm	87.5	96.4
No. 4	80.8	84.4
No. 8	57.5	60.3
No. 16	40.2	42.5
No. 30	29.9	31.9
No. 50	18.9	20.3
No. 100	6.8	7.3
No. 200	4.8	5.3

To facilitate faster construction on both M-46 projects, a detour route was used on a parallel county road. Local traffic was allowed to drive on the shoulders.

Concrete Project

Work on the concrete whitetopping began in late May, 1999 with some shoulder work, ditch work, and driveway culvert improvements. Once this work was completed, the contractor began paving the whitetopping. The existing asphalt surface did not have ruts greater than 50 mm, open potholes, or shoving present, so no preparation repairs were required prior to paving.³

Concrete paving began on June 19, 1999, near Geotze Road on the west end of the project. The intersection was gapped out for maintaining traffic. The entire 9.2 meter width was paved in one pass. In areas where widths were tight (at guardrail, etc.) the shoulder was not paved. These gapped areas were formed and poured at a later date. Lane turning tapers were also formed and poured at a later date.

³*Whitetopping - State of the Practice*, EB210P, American Concrete Paving Association, 1998

The whitetopping design called for no reinforcement and no dowels at the joints. However, lane ties at the shoulder joint and the centerline joint were specified. The lane ties at the shoulder joint were held in place with spikes like those shown in Figure 6. One spike was typically in the aggregate shoulder and one was in the existing asphalt. In some cases, a pilot hole needed to be drilled in order to place the spike into the asphalt. The 760 mm long deformed No. 16 bars were offset so that 530 mm were embedded in the lane. The lane ties at the centerline joint were placed with a “rocket launcher” tie bar inserter attachment on the paving machine (Figure 7).



Figure 6. Tie bars setup used at shoulder joints.



Figure 7. Method for placing tie bars at centerline.

The concrete was mixed in a mobile mix plant set up on site. It had the capacity to mix 6.8 m³ every four minutes. The concrete was then dumped into agitator-type trucks (Figure 8), which then placed it on the pavement in front of the spreader. The time from batch plant to placement on the pavement was generally less than 10 minutes.



Figure 8. Trucks used for hauling the concrete.

Following is the concrete mix design used per cubic meter. The mix design was developed by the contractor and approved by the department since this was a contractor quality control project.

Portland Cement	310 kg
2NS fine agg.	846 kg
6AA coarse agg.	971 kg
Water	141 kg
Air Entrainment adm.	110-130 ml/100 kg
Water-Reducing adm.	130 ml/100 kg

Immediately in front of the paving train, the existing asphalt pavement was sprayed with water from a water truck to cool it off as seen in Figure 9. The paving train consisted of a spreader, paver, and finisher. Following the paving train the concrete was hand-finished and a curing compound was applied.

A few problems were encountered during construction. Traffic was being maintained on the gravel shoulders during construction. One morning, construction workers returned to find about a kilometer of stringline had been knocked down. It took most of the day to get it back to the correct level. Fortunately, it was ahead of where the paving was taking place so that operation was not held up.



Figure 9. Water on bituminous just prior to paving. Note the rutting.

On several occasions, the plant went down and paving was held up. This was never usually more than a half-hour in duration, so paving could continue per the progress schedule.

A section of the existing composite pavement in the ultra-thin inlay in Port Sanilac was so badly deteriorated that it was totally removed and replaced with only concrete. The length of the removed concrete was 18 meters and was located at the Church Street intersection.

After milling off 75 mm of the bituminous surface in the ultra-thin inlay section, the edge was severely deteriorated as seen in Figure 10. This could be a potential support problem for the ultra-thin whitetopping.



Figure 10. Edge condition after milling.

Another problem was the need for cross slope correction. The planned pavement thickness was held on the shoulder joint of the eastbound lane. Crown correction was referenced from that point. At some locations, the existing westbound pavement was severely flattened and deformed from truck traffic. This resulted in the whitetopping being 300 to 350 mm thick in the westbound shoulder, as seen in Figure 11 (150 mm test sections only). Random cores were taken from shoulder to shoulder along the length of the project. These cores showed that the 150 mm proposed sections were paved

at 203 mm (average of 15 cores), and the proposed 75 mm inlay was paved at 106 mm (average of 3 cores).

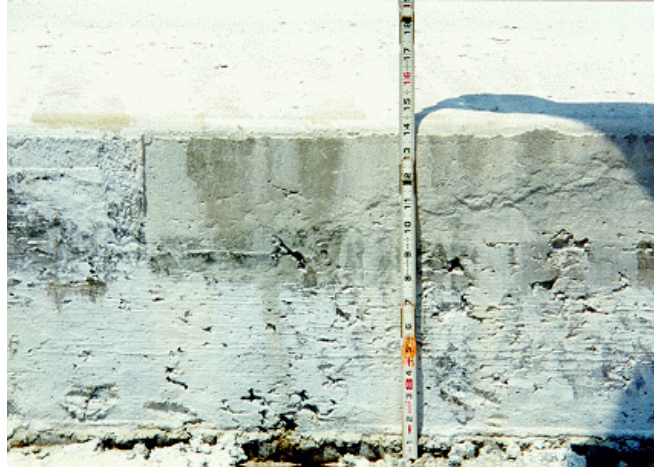


Figure 11. Example of a thick shoulder due to grade correction (not typical).

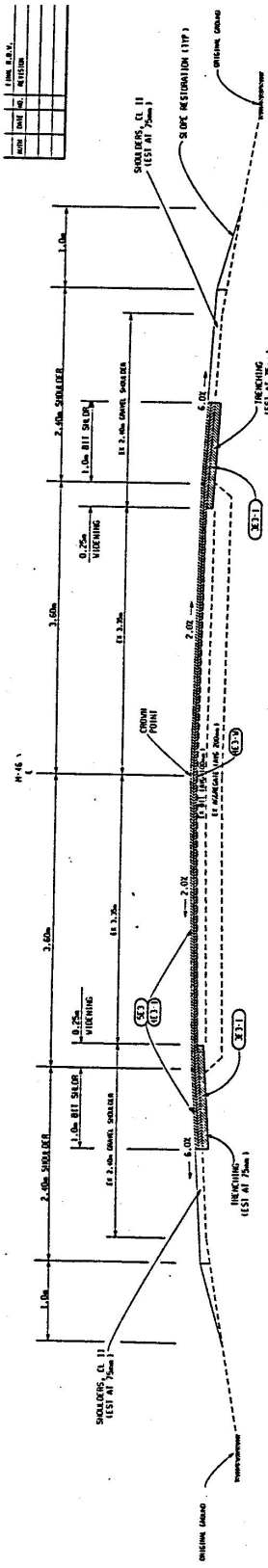
CONCLUSIONS

Based on observations made during construction, the following conclusions were drawn:

- The construction of both the bituminous project and the whitetopping project went very well.
- Rehabilitation of a deteriorated bituminous pavement can be done quickly with whitetopping. This was especially true on this job since there was no prep work done on the pavement, traffic was detoured, and the contractor chose to pave full-width, including both shoulders.
- Finishing and texturing the concrete containing fibers requires a little more effort because the fibers tend to pull and drag.
- The whitetopping test sections were paved much thicker than planned, which will likely help provide a longer fatigue life for the pavement. Because this is not a typical design for this whitetopping, another test site should be chosen where the pavement will see more traffic and the cross-section is typical thickness. This will better judge the cost effectiveness of whitetopping as a pavement rehabilitation alternative.

Appendix

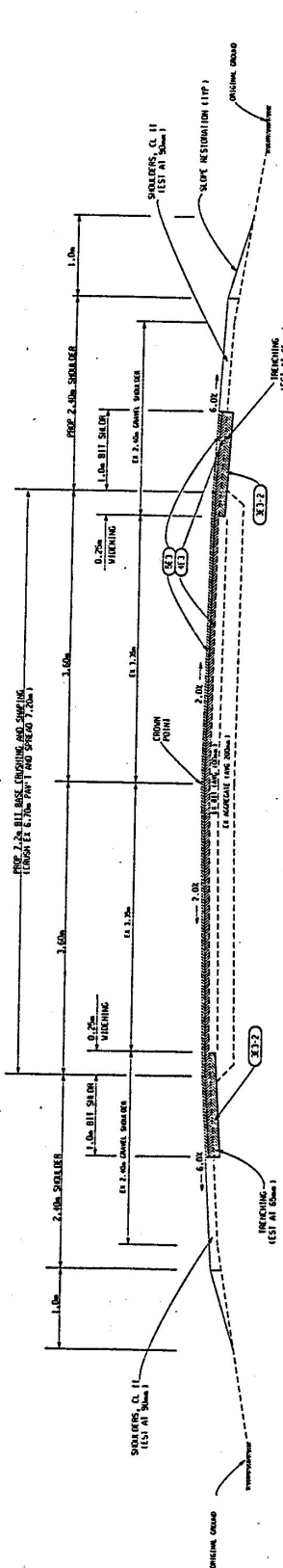
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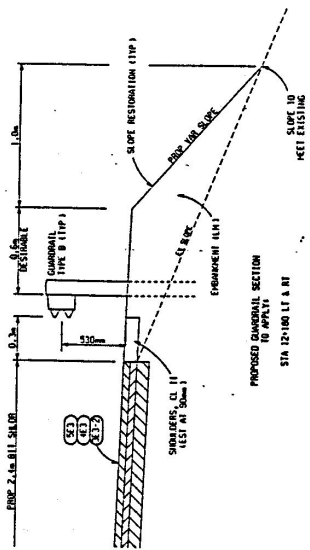
Section 2

NOTE: PAYMENT FOR GRADING OR EMBANKMENT MEZED SHOULD BE INCLUDED IN THE PAY ITEM WHICH WILL BE PAID FOR SEPARATELY.



PROP SECTION TO APPLY
 STA. 12+145.000 TO STA. 14+000.000 (TYP)

Section 3



PROPOSED CROSS SECTION
 STA. 12+140.11 & RT

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 (STA 11+620.000 TO STA 14+000.000)

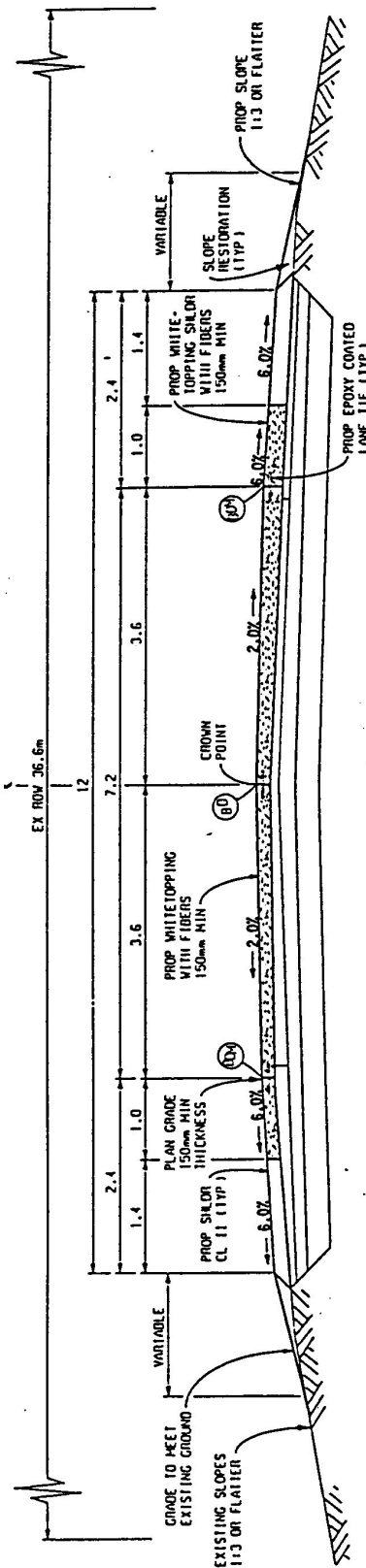
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433	BITUMINOUS MIXTURE X3	50% 50-70	50.0	LEVELING COURSE
434	BITUMINOUS MIXTURE X3	50% 50-70	50.0	WEARING
523	BITUMINOUS MIXTURE X3	100% 50-70	100.0	LEVELING COURSE
524	BITUMINOUS MIXTURE X3	100% 50-70	100.0	BASE COURSE
134	BIT MIXTURE 134	50% 50-70	50.0	TOP COURSE APPROACH
134-1	BIT MIXTURE 134-1	50% 50-70	50.0	LEVELING COURSE APPROACH
134-1	BIT MIXTURE 134-1	50% 50-70	50.0	APPROACHES (LOOSE & C&T)
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FOR INFORMATION ONLY

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 Michigan Department of Transportation

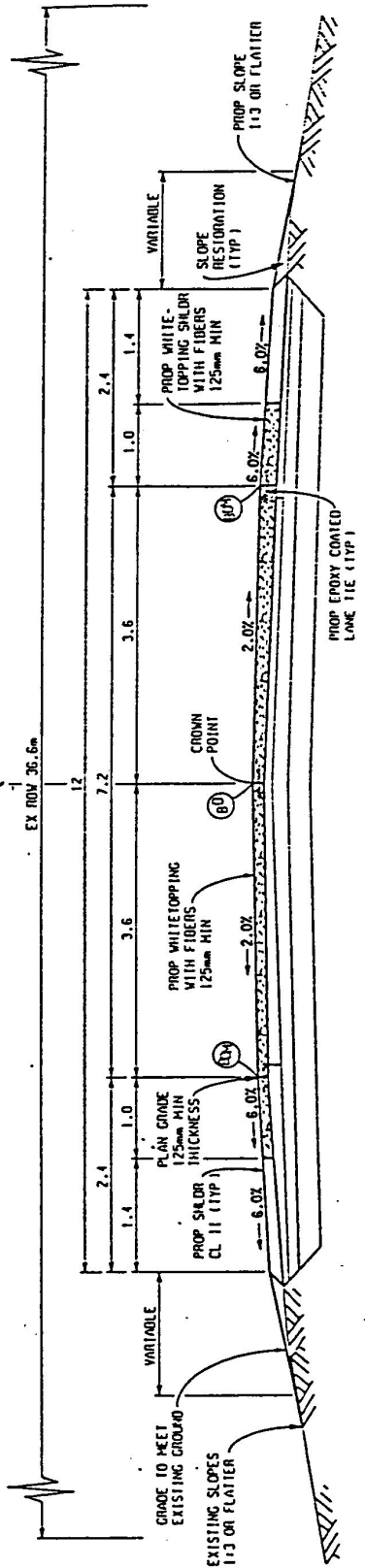
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12/04/98	1:1 NONE	74062	36023	8-0-37

TYPICAL CROSS SECTIONS



PROPOSED MAINLINE SECTION TO APPLY:
 STA 17+320 TO STA 20+190

Section 5 (Section 4 similar, but without fibers.)

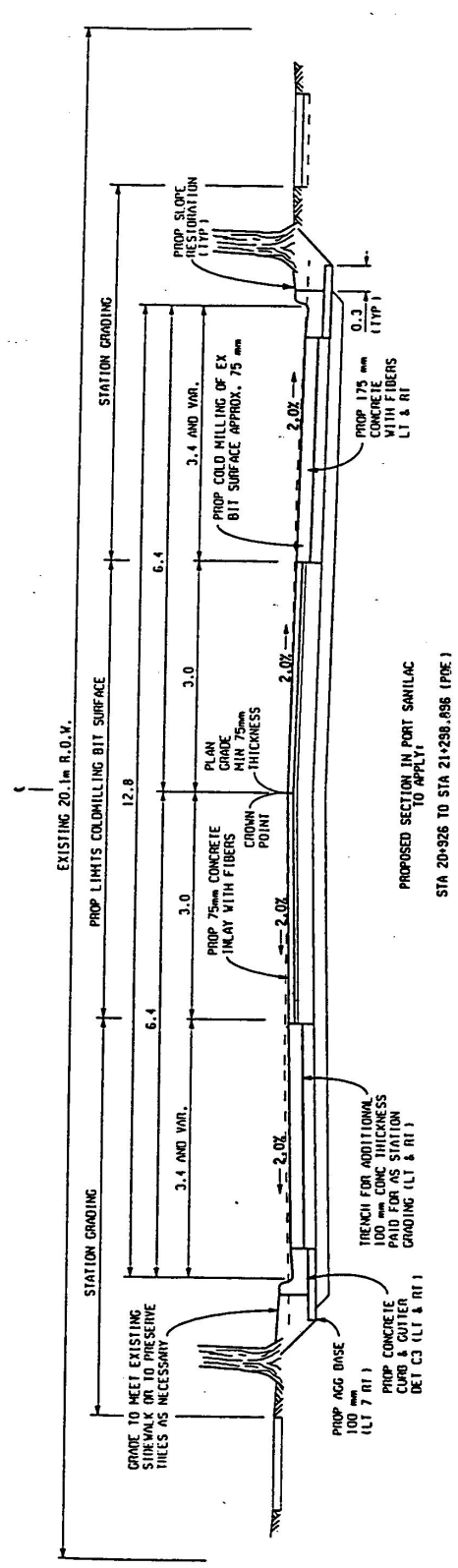
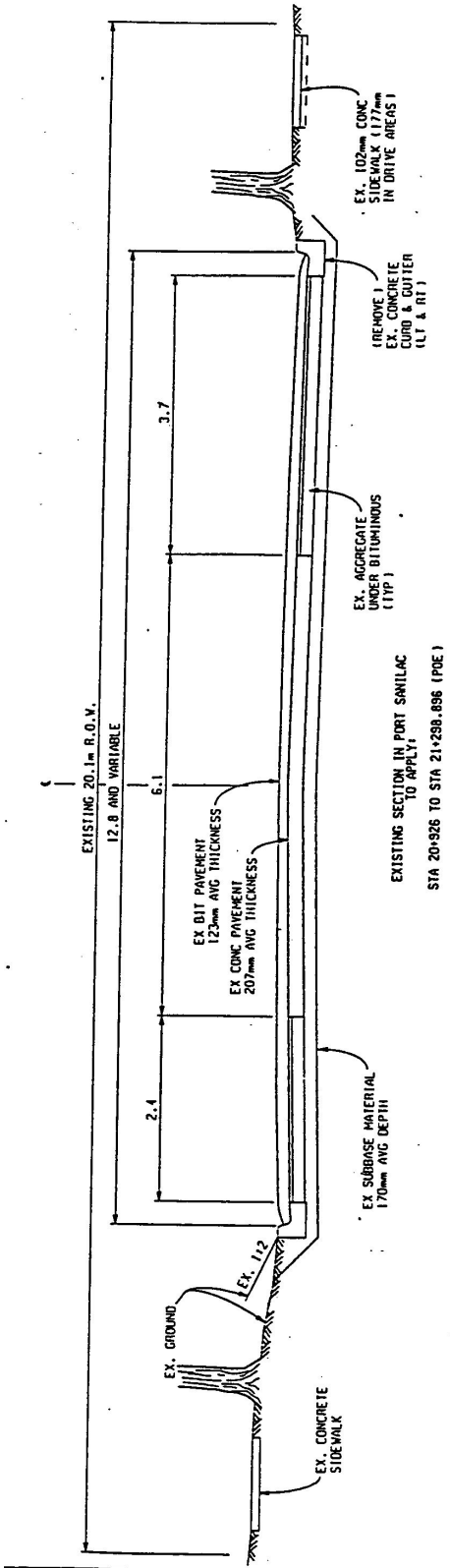


PROPOSED MAINLINE SECTION TO APPLY:
 STA 20+190 TO STA 20+494

Section 6

JOINT LEGEND
 (A) ... OPTIONAL JOINT ACCORDING TO STD PLAN R-41-B
 (B) ... OPTIONAL JOINT MODIFIED OR MODIFIED JOINT ACCORDING TO SPEC PROVISION

PROP CONC OVERLAY M-46		
CONTROL SECTION: 74062	JOB NUMBER: 47172 A	
DATE: 07/14/98	DESIGN UNIT: RICK	SHEET NO.

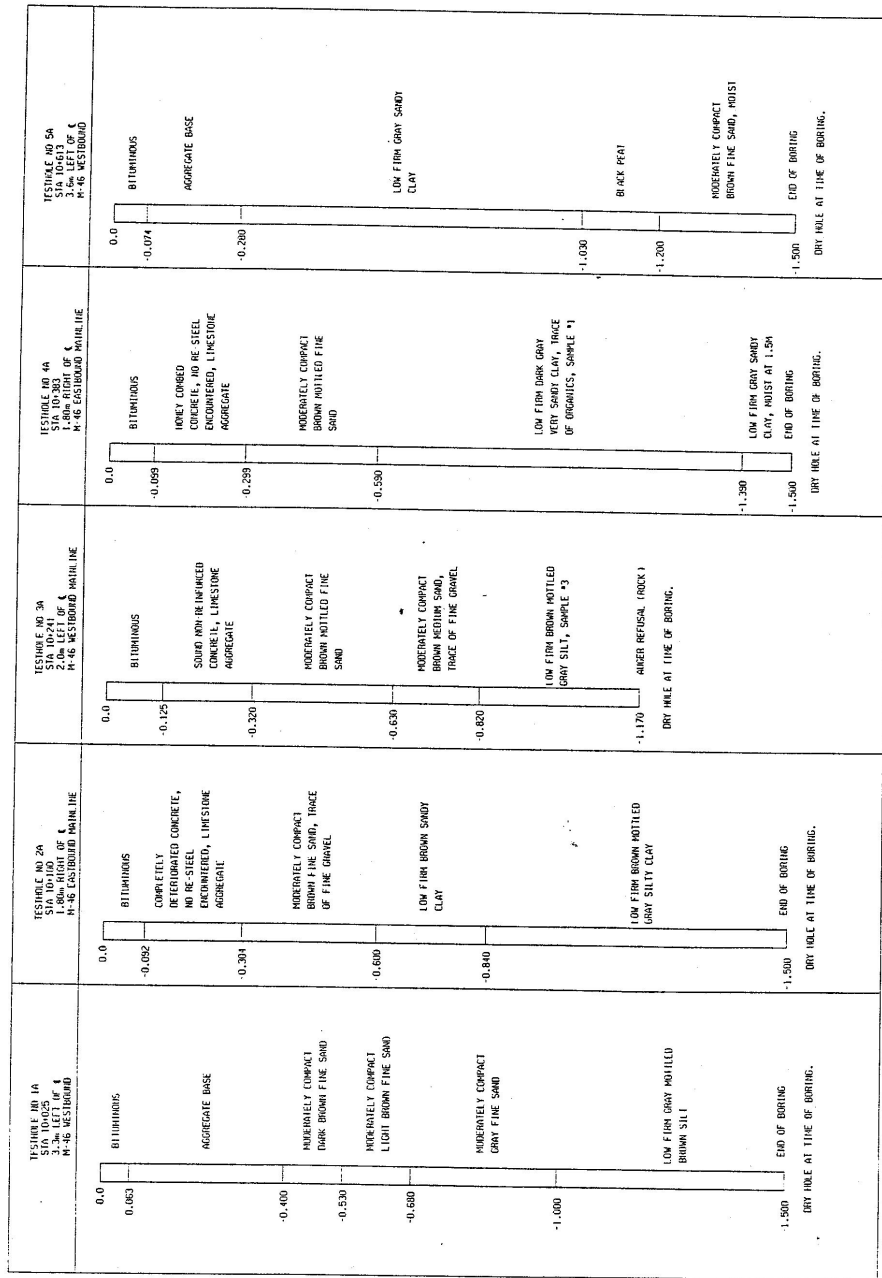


Section 7 (Both Typical)

PROP CONC INLAY - PORT SANILAC		
CONTROL SECTION: 74062	JOB NUMBER: 47172 A	
DATE: 07/14/98	DESIGN UNIT: RICK	SHEET NO.

Log of Soil Borings

DATE	NO.	REVISION

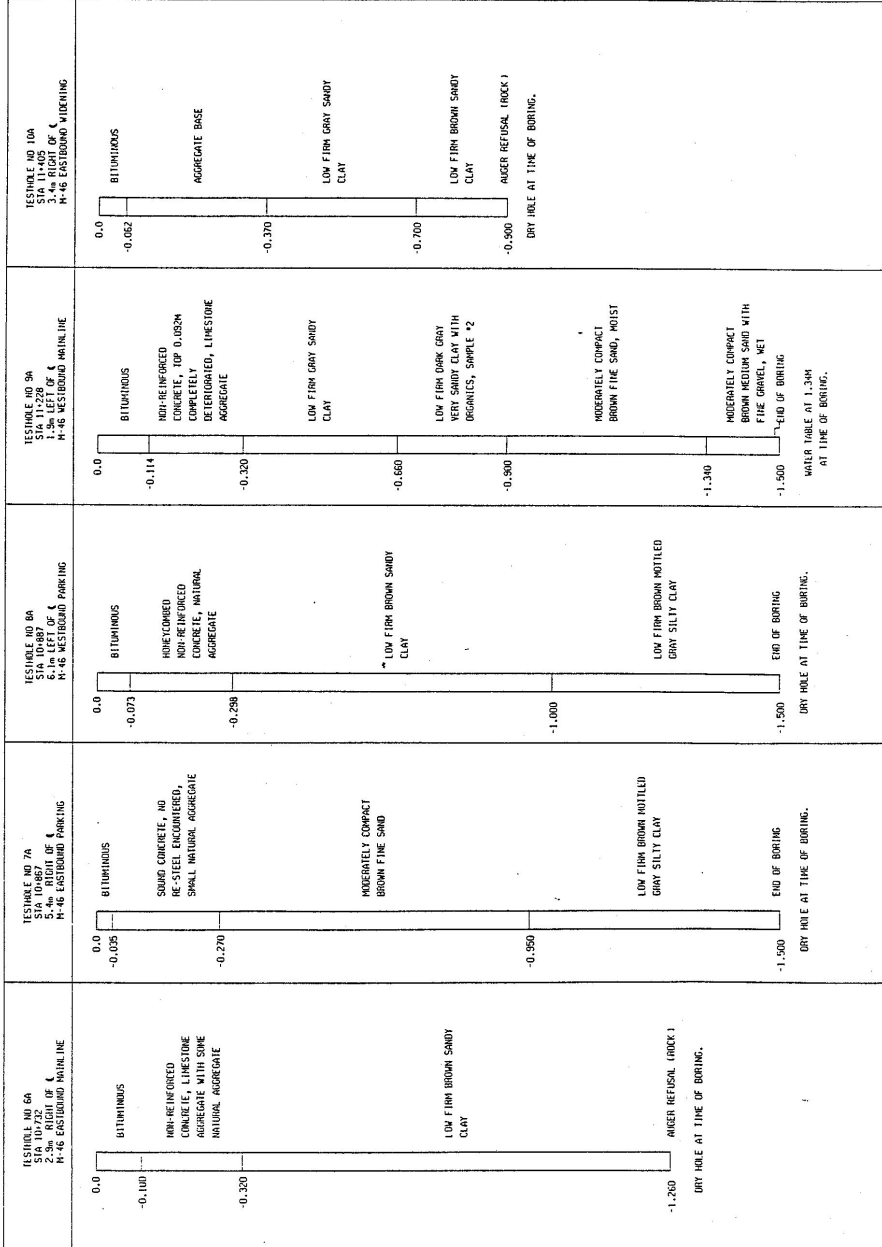


ALL BORING DEPTHS ARE IN METERS.
 NUMBERS IN CIRCLES (TOTAL NUMBER OF BLADES DIVIDED TO GIVE A 50.8 mm SPLIT SPAN SAMPLER) IS SUCCESSIVE 0.15 m INCREMENTS USING A 6.35 mm HAWNER FALLING 0.26 m.
 CONSISTENCY WAS DETERMINED BY INSPECTION OF SAMPLES AND SUBSTANTIATED BY SOILS RESISTANCE TO DRILLING TOOLS.
 THE SOIL BORING LOGS REPRESENT POINT INFORMATION. PRESERVATION OF THIS INFORMATION IS THE RESPONSIBILITY OF THE USER. LOCATIONS OF THE SHAFTS AT LOCATIONS OTHER THAN THE EXACT LOCATION OF THE BORING.

NOTES:

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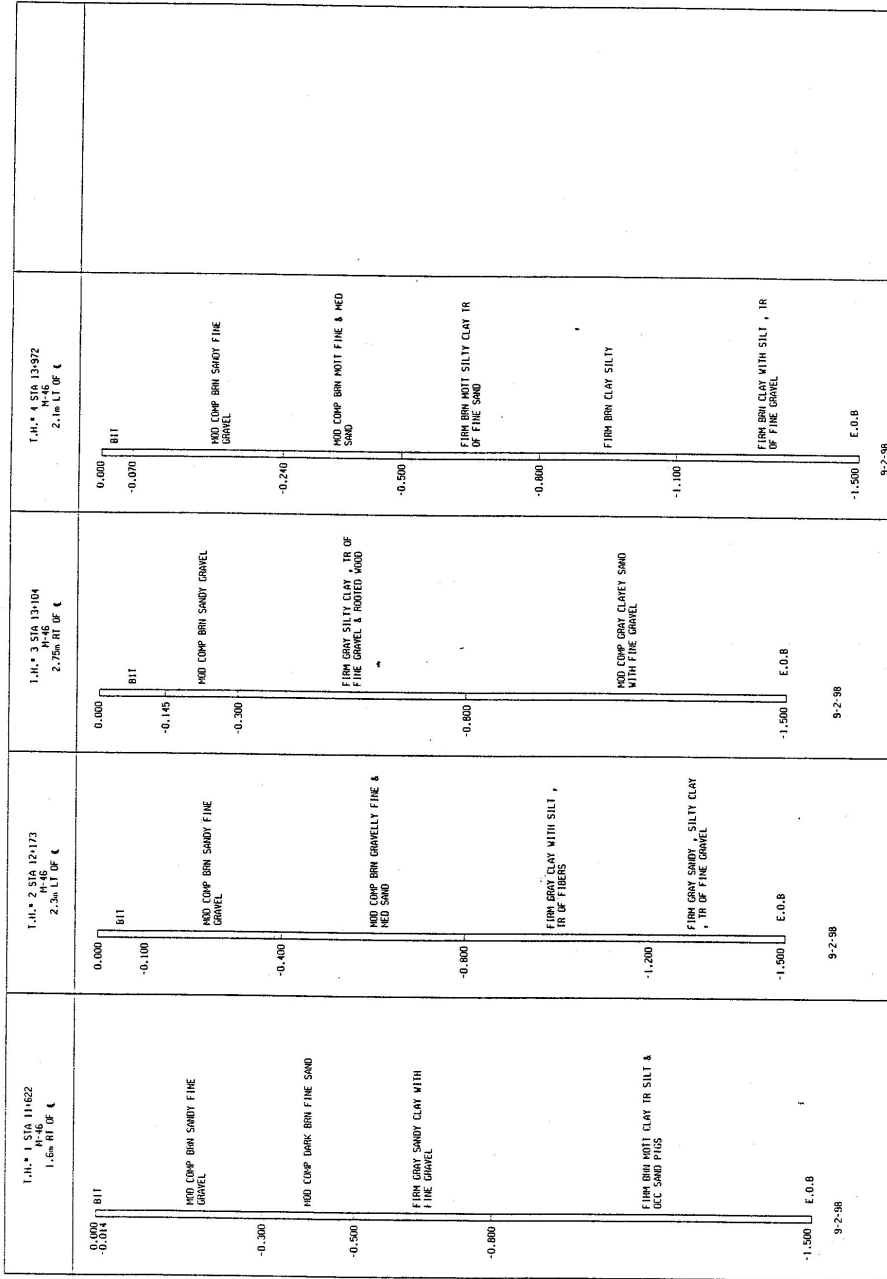


NOTES:

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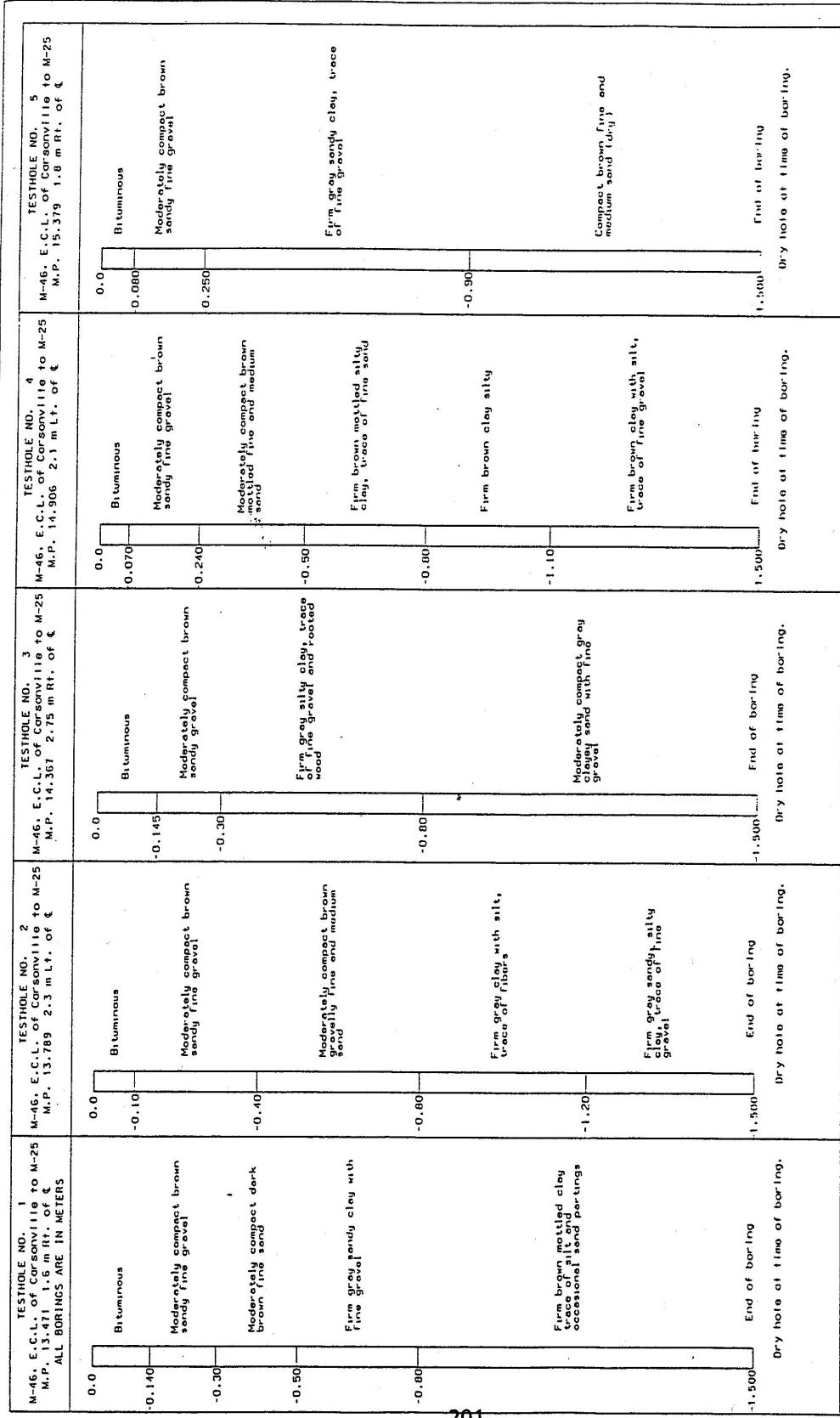
ALL BORING DEPTHS ARE IN METERS.
 NUMBERS IN CIRCLES INDICATE NUMBER OF BLOW COUNTS IN VALUE A 20.8 mm
 SPLIT SPIN SAMPLER TO SUCCESSIVE 0.15 m INTERVALS USING A 63.5mm
 WIPPER FALLING 0.76 m.
 CONSISTENCY WAS DETERMINED BY INSPECTION OF SAMPLES AND SUBSTANTIATED
 BY SOILS RESISTANCE TO DRILLING TOOLS.
 THE SOIL BORING LOGS REPRESENT POINT INFORMATION. PRESENTATION OF THIS
 INFORMATION IS NOT INTENDED TO REPRESENT A CONTINUOUS SECTION OF THE BORING
 AT LOCATIONS OTHER THAN THE EXACT LOCATION OF THE BORING.

DATE	NO.	REVISION



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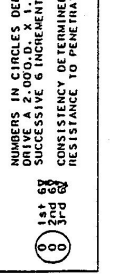
ALL BORING DEPTHS ARE IN METERS.
 NUMBERS IN CIRCLES DENOTE NUMBER OF BLOWS REQUIRED TO DRIVE A 50.8 mm
 (2 IN) STANDARD PENETROMETER POINT A SUCCESSIVE 0.15 m INCREMENTS USING A 60.3 kg
 (135 LB) HAMMER FALLING 0.76 m (2 FT 6 IN).
 CONSISTENCY WAS DETERMINED BY INSPECTION OF SAMPLES AND SUBSTANTIATED
 BY SOIL RESISTANCE TO DRILLING TOOLS.
 THE SOIL BORING LOGS REPRESENT POINT INFORMATION. PRESENTATION OF THIS
 INFORMATION IN NO WAY IMPLIES THAT SUBSURFACE CONDITIONS ARE THE SAME
 AT LOCATIONS OTHER THAN THE EXACT LOCATION OF THE BORING.

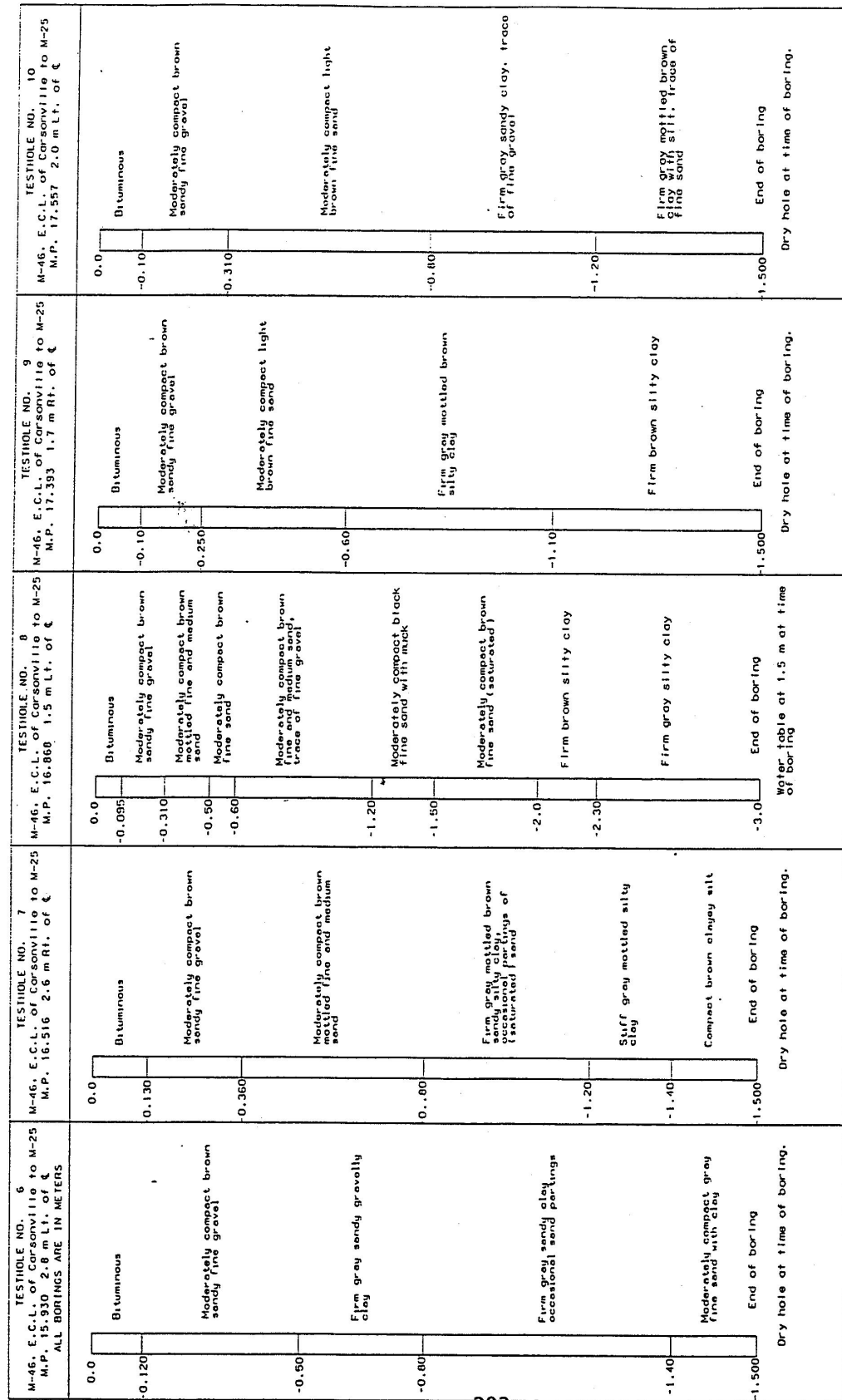


SOIL BORING DATA			
DATE	SCALE	CONTR. SEC.	JOB NO.
11/05/98	NONE	74062	47172A
DESIGN UNIT		SHEET NO.	
RANCK		1 of 1	

NUMBERS IN CIRCLES DENOTE NUMBER OF BLOWS REQUIRED TO DRIVE 2,000 LBS. (1,500 OZ.) SPLIT SPOON SAMPLER 30" SUCCESSIVE 6 INCHES USING A 140# TANNER FALLING 30". CONSISTENCY DETERMINED BY INSPECTION OF SAMPLES AND BY SOIL. THE SURFACE CONDITIONS ARE THE SAME AT LOCATIONS RESISTANCE TO PENETRATION BY JET ROD AND CASING OR AUGER, OTHER THAN THE EXACT LOCATION OF THE BORING.

WATER LEVELS MAY BE INFLUENCED BY RESIDUAL BORING WATER. THE SOIL BORING LOGS REPRESENT POINT INFORMATION. THE SURFACE CONDITIONS ARE THE SAME AT LOCATIONS OTHER THAN THE EXACT LOCATION OF THE BORING.





TESTHOLE NO. 6
M-46, E.C.L. of Carsonville to M-25
M.P. 15.930 2.8 m Lt. of ϵ
ALL BORINGS ARE IN METERS

TESTHOLE NO. 7
M-46, E.C.L. of Carsonville to M-25
M.P. 16.516 2.6 m Lt. of ϵ

TESTHOLE NO. 8
M-46, E.C.L. of Carsonville to M-25
M.P. 16.860 1.5 m Lt. of ϵ

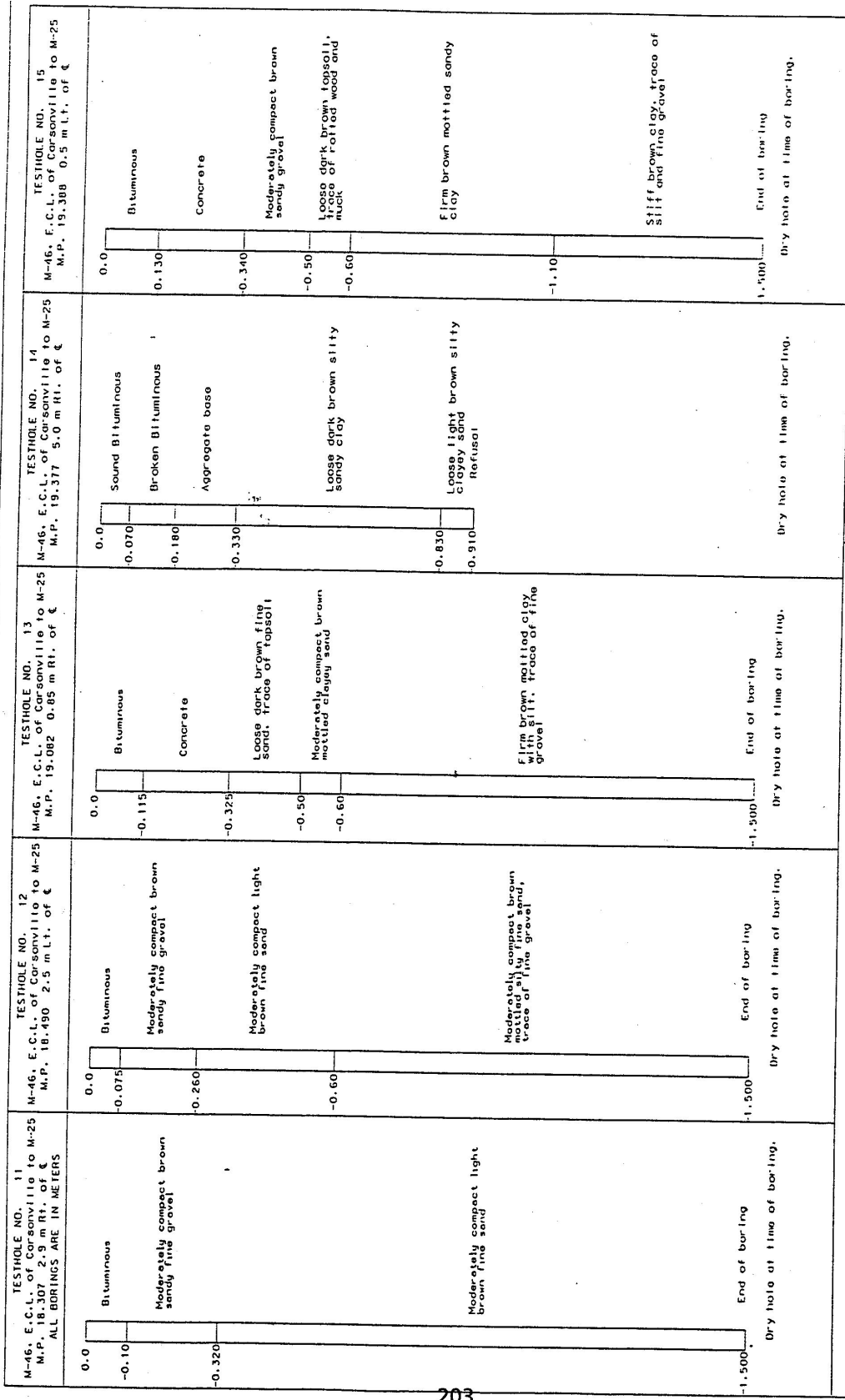
TESTHOLE NO. 9
M-46, E.C.L. of Carsonville to M-25
M.P. 17.393 1.7 m Lt. of ϵ

TESTHOLE NO. 10
M-46, E.C.L. of Carsonville to M-25
M.P. 17.557 2.0 m Lt. of ϵ

NUMBERS IN CIRCLES DENOTE NUMBER OF BLOWS REQUIRED TO DRIVE A 2,000-D. X 1,301-D. SPLIT SPOON SAMPLER 3 SUCCESSIVE 6 INCREMENTS USING A 140# HAMMER FALLING 30'. PRESENTATION OF THIS INFORMATION IN NO WAY IMPLIES CONSISTENCY DETERMINED BY INSPECTION OF SAMPLES AND BY SOIL CONSISTENCY TO PENETRATION BY JET ROD AND CASING OR AUGER. OTHER THAN THE EXACT LOCATION OF THE BORING.

SOIL BORING DATA

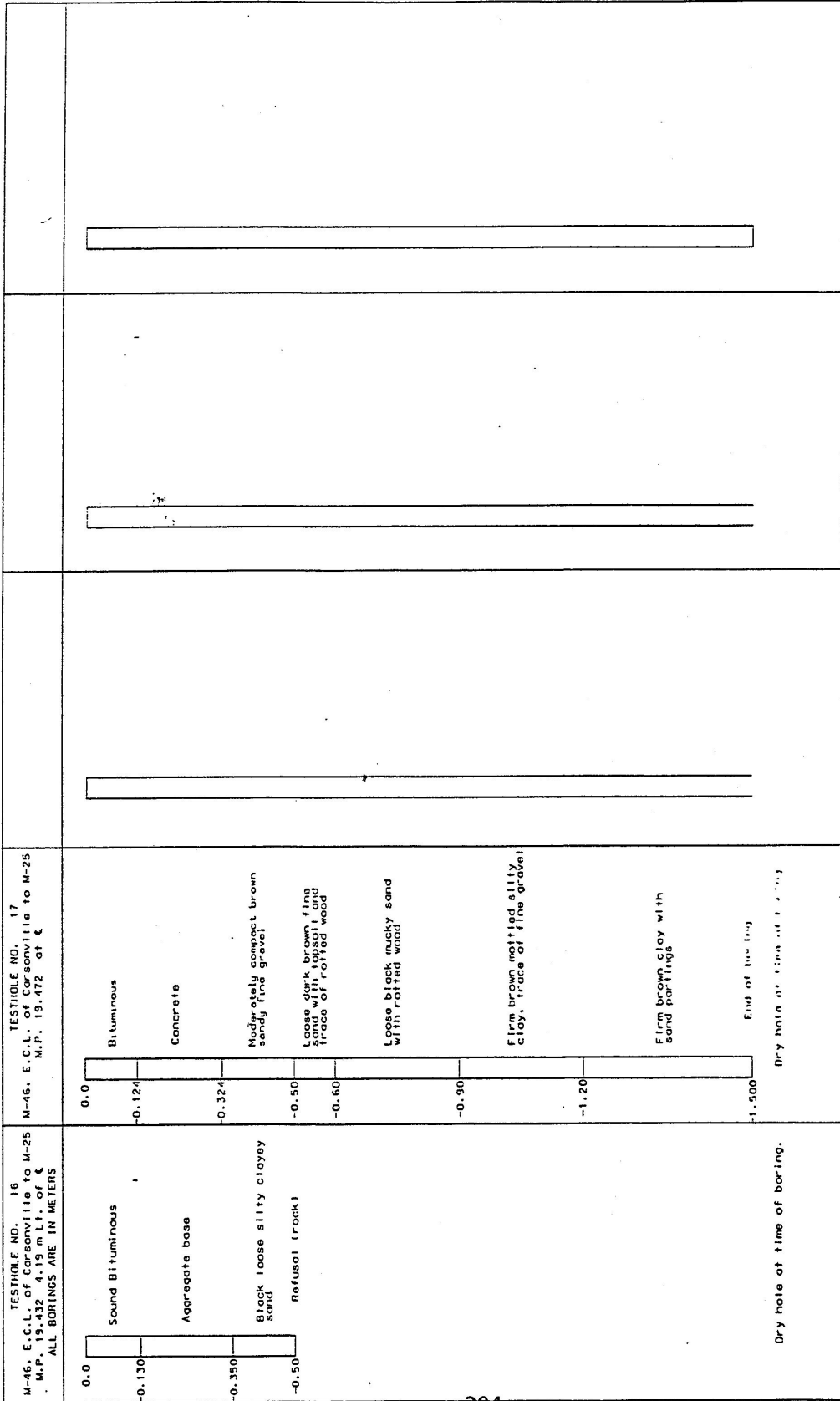
DATE: 11/05/98
SCALE: NONE
CONT. SEC.: 74062
JOB NO.: 47172A
DESIGN UNIT: RANCK
SHEET NO.: 1 OF 1



TESTHOLE NO.	DATE	SCALE	CONV. SEC.	JOB NO.	DESIGN UNIT	SHEET NO.
11	11/05/98	NONE	74062	47172A	PLANCK	1 of 1
12						
13						
14						
15						

NUMBERS IN CIRCLES DENOTE NUMBER OF BLOWS REQUIRED TO DRIVE A 2,000-D. X 1,501-D. SPLIT SPOON SAMPLER 3' SUCCESSIVE 6 INCHES USING A 140# HAMMER FALLING 30'. CONSISTENCY DETERMINED BY INSPECTION OF SAMPLES AND BY SOIL RESISTANCE TO PENETRATION BY JET ROD AND CASING OR AUGER. OTHER THAN THE EXACT LOCATION OF THE BORING.

WATER LEVELS MAY BE INFLUENCED BY RESIDUAL BORING WATER. THE SOIL BORING LOGS REPRESENT POINT INFORMATION. PRESENTATION OF THIS INFORMATION IN NO WAY IMPLIES THAT THE SUBSURFACE CONDITIONS ARE THE SAME AT LOCATIONS OTHER THAN THE EXACT LOCATION OF THE BORING.



NUMBERS IN CIRCLES DENOTE NUMBER OF BLOWS REQUIRED TO PENETRATE TO THE FOLLOWING DEPTHS IN SUCCESSIVE 6 INCREMENTS USING A 140P HAMMER FALLING 30". CONSISTENCY IS DETERMINED BY INSPECTION OF SAMPLES AND BY SOIL TESTS. PENETRATION BY JET ROD AND CASING OR AUGER, OTHER THAN THE EXACT LOCATION OF THE BORING.

WATER LEVELS MAY BE INDICATED BY THE SYMBOLS IN THE SOIL BORING LOGS WHERE POINT INFORMATION IS PRESENTATION OF THIS INFORMATION IN NO WAY IMPLIES THAT THE SUBSURFACE CONDITIONS ARE THE SAME AT LOCATIONS OTHER THAN THE EXACT LOCATION OF THE BORING.

1st 60
2nd 60
3rd 60

SOIL BORING DATA

DATE 11/05/98
SCALE NONE
JOB NO. 471172A
COURT. SEC. 74062
SHEET NO. 1 OF 1

Bituminous Warranty Information

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
**CONTRACTOR QUALITY CONTROL (CQC) FOR
PAVEMENT WARRANTY**

C&T:KJH

1 of 3

12-15-98

C&T:APPR:JTL:MF 12-15-98

1. **Introduction**

Except as modified herein, this work shall be in accordance with the 1996 Standard Specifications for Construction, Special Provisions, Supplemental Specifications and other documents referenced in this special provision. The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with current Department procedures contained in, but not limited to, the Michigan Construction Manual and the MDOT Quality Assurance Procedures Manual. The quality control system shall detail plans, procedures, and organization necessary to produce an end product that complies with the contract requirements. The system shall cover all warranty related construction operations under the control of the Contractor both on-site and off-site.

2. **Contractor Quality Control Plan**

Contractor Quality Control (CQC) shall be the means by which the Contractor ensures that the warranty related construction, including that done by subcontractors, fabricators, and suppliers, complies with the requirements of the contract. This applies only to those warranted items within this contract. The controls shall be adequate to cover all construction operations, including both on-site and off-site, and will be keyed to the proposed construction sequence.

The Engineer shall be allowed access to all work in progress and all phases of the ongoing CQC plan for the purpose of Assurance review and testing. Assurance reviews and testing will be used for the purpose of making independent checks on the reliability of the Contractor's testing and acceptance procedures in accordance with the CQC plan and not for determining the quality and acceptability of the materials and workmanship directly.

The CQC plan shall include, as a minimum, the following to cover on-site and off-site aspects of all construction operations under the control of the Contractor.

1. **CQC System Manager (CQCSM).**-The CQC plan shall identify one person as the CQCSM who shall be the sole contact with MDOT regarding quality control. The CQCSM shall be responsible for quality control on all construction phases of the project. The CQCSM must be on site during the active portion of the contract involving the warranty related items.

2. **Construction & Warranty.**-The Construction and Warranty portion of the CQC plan shall contain a listing of the procedures and records to be used to properly inspect and test the project in accordance with the contract. The construction portion of the CQC plan shall include, as a minimum, the following:
 - A) A list of work items covered by the warranty to be tested.
 - B) A list of standard test procedures (ASTM, AASHTO or MDOT).
 - C) Frequency of test.
 - D) Quantity represented by test and location of item on the project.
 - E) Method used to document that items have been tested and/or constructed to conform to project plans and specifications.
 - F) Procedure for handling any detected noncompliance with the CQC requirement.
 - G) Time frame for distribution of test results and project documentation.
 - H) Name and address of the testing facility(s) to be used.

3. **Approval of CQC Plan.**-Acceptance of the Contractor's CQC plan is required prior to start of the work items covered by the warranty. The Department will have five work days to review the Contractor's CQC Plan to determine acceptability. The start of the construction of the items of work covered by the warranty will not be allowed until the CQC Plan is accepted in writing by the Engineer. Delays due to the Contractor's inability to submit an acceptable CQC Plan shall not be a basis for an extension of time without liquidated damages.

4. **Changing the CQC Plan.**- If the Department determines after final approval of the CQC plan that the Contractor's performance on the project is unsatisfactory, the Department reserves the right to require the Contractor to make changes in its CQC plan at no additional cost to the department. The Contractor may be required to suspend all work operations until the plan is changed and approved.

After final approval of the CQC plan, the Contractor can not change the plan without prior written approval of the Engineer. Any requested changes must be done in writing.

5. **Measurement and Payment**

Contractor Quality Control, as specified in this Special Provision, will be included in the cost of the project.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
**MODIFICATIONS TO SECTION 502
OF THE 1996 STANDARD SPECIFICATIONS
(BITUMINOUS PAVEMENT WARRANTY)**

C&T:MF

1 of 1

REVISED: 12-21-98
C&T:APPR:MF:JTL 02-26-98

a. Description.-This special provision redefines all references to “Inspector” and/or “Engineer” within Sections 502 of the 1996 Standard Specifications for Construction to conform with the bituminous overly warranty and Contractor quality control provisions of this contract. The authority of the Engineer detailed in Subsection 104.01 shall not change in any way as a result of these modifications. These changes will not invalidate in any way the warranty provisions stated within this contract.

b. Modification.-All references to “Inspector” and/or “Engineer” within these specifications shall be deleted and replaced with “Contractor” for the items referenced in the Bituminous Overlay Pavement Warranty.

c. Addition.-**The Contractor is hereby notified that “Contractor”, within the above specifications, will replace “Inspector” and/or “Engineer”. This portion of the Specification, formerly the primary responsibility of the Inspector or Engineer as defined in Division 1, shall become the initial responsibility of the Contractor, with the secondary responsibility of the Inspector or Engineer.**

The Contractor’s additional responsibility will be to inform the Engineer of any actions taken by him as a result of the above changes.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
**DOCUMENTATION OF BITUMINOUS CONSTRUCTION ITEMS
(English)**

C&T:MF

1 of 4

REVISED: 06-15-99
C&T:APPR:JTL:MLL 02-20-98

a. Description.-This special provision outlines the documentation that will be required from the Contractor to fulfill the contract requirements. This documentation is in addition to the requirements for the Contractor's Quality Control plan outlined within this proposal.

b. Materials.-None.

c. Pre-Production Meeting.-A pre-paving meeting between the Contractor and Engineer will be held prior to beginning work. The agenda for this meeting will include:

- - Review of the Contractor's detailed work schedule.
 - Review of the traffic control plan.
 - Review of the Contractor's Daily Report, and associated documentation to be submitted to project office.
 - Review of QC/QA requirements.

c. Documentation.-The Contractor shall provide the Engineer with a daily report including the following information:

- Control Section, Project Number, County, Route, Resident Engineer
- Date, Air Temperature, Weather (a.m., p.m.)
- Beginning and Ending Stations for the Day
- Length (ft), Width (ft), Area (ft²), tons of mixture placed, average yield for the day
- (#/syd), Yields for five (5) truckloads, Gallons of emulsion placed
- Traffic control setup, Checks of traffic control and any modifications or deficiencies corrected
- Any unique or different situations on the project
- Contractor's Signature

This is in addition to the documentation that is required for the Contractor's Quality Control plan as outlined in the **Manual for the Certification of "The Hot Mix Asphalt Plants"** and the special provision for Bituminous Mixture and Pavement Density Acceptance.

Items which are not under the warranty will require either certification or testing and proper documentation.

e.

Traffic Control.-Traffic control shall be in accordance with the specifications and special provisions in this contract.

f. Measurement and Payment.-There will be no payment for documentation. It is considered to be included in other items of contract work.

Equipment/Number

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Preparer's Name	Preparer's Signature	Report Date	Day	Report No.
------------------------	-----------------------------	--------------------	------------	-------------------

SKETCHES, COMPUTATIONS, REMARKS, ETC.
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TRAFFIC CONTROL DEVICES AND PLACEMENT (Include modifications, staging, and lines checked)

YIELD CALCULATIONS							
Load	Station-Station	Length	W	ea	Ar	Net Weight	Yield
DAILY TOTALS							

UNUSUAL CONDITIONS, ACCIDENTS OR INCIDENTS

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
BITUMINOUS PAVEMENT WARRANTY ON M-46

DES:SCB

1 of 12 12-10-98

C&T:APPR:MF:JTL 12-16-98

1.0 General.

This special provision describes a materials and workmanship warranty. This warranty applies to the bituminous pavement surface from the east village limits of Carsonville to Goetze Road.

The pavement surface, as addressed by this special provision, includes the total thickness of bituminous material placed on the driving lanes and shoulders.

The warranty documents shall include the warranty form, initial acceptance form, warranty bond form along with this special provision.

This Special Provision shall not be construed as extending or otherwise affecting the claim process and statute of limitation applicable to the contract.

This Special Provision references the 1996 Standard Specifications for Construction.

2.0 Warranty Bond.

Warranty Bond. - The security, furnished by the contractor and the contractor's surety, guarantees that the pavement surface installed under the contract will be free of defects in materials and/or workmanship during the specified warranty period.

The warranty bond shall be a single term three (3) year warranty bond with an effective starting date of the Acceptance Date of Construction.

The contractor shall furnish a warranty bond for a period of three (3) years per above conditions in an amount equal to 25 percent of the contract value of the items listed below. The warranty period shall be three (3) years.

<u>Pay Item</u>	5E3	<u>Pay Unit</u>	Bituminous Mixture - ton
Bituminous Mixture - 4E3		ton	
Bituminous Mixture - 3E3		ton	

3.0 Rights and Responsibilities of the Department.**The Department:**

- a. is responsible for monitoring the pavement, defined above in Section 1.0 during the warranty period and will provide the contractor copies of all written reports of the observed condition as it relates to the warranty requirements.
- b. is responsible for notifying the contractor, in writing, of any required corrective action as specified by the warranty.
- c. reserves the right to approve the date(s) requested by the contractor to perform corrective action as specified by the warranty.

- d.** reserves the right to approve all materials and methods used in the corrective action as specified by the warranty.
- e.** reserves the right to determine if corrective action performed by the contractor meets Department specifications.
- f.** reserves the right to perform, or have performed, routine maintenance during the warranty period. Any such routine maintenance will not relieve the contractor from meeting the warranty requirements of this Special Provision.
- g.** reserves the right, if the contractor is unable, to make immediate emergency repairs to the pavement to prevent an unsafe road condition as determined by the Department. The department will attempt to notify the contractor that action is required to address an unsafe condition. However, should the contractor be unable to comply with this requirement, to the Department's satisfaction and within the time frame required by the Department, the Department will perform, or have performed any emergency repairs deemed necessary. Any such emergency repairs undertaken will not relieve the contractor from meeting the warranty requirements of this Special Provision. Any costs associated with the emergency repairs will be paid by the contractor if it is determined the cause was from defective materials and/or workmanship.
- h.** shall document the condition of the pavement prior to emergency repairs.
- i.** is responsible for notifying the contractor, in writing, of any required joint field investigation that may result in corrective action.

4.0 Responsibilities of the Contractor.

The Contractor:

- a.** shall unconditionally warrant to the Department that the pavement shall be free of defects in materials and workmanship, as defined by the warranty requirements as set forth in this special provision, for the specified warranty period. This warranty and the Warranty Bond, shall be on forms furnished by the Department. These completed forms shall be submitted to the Department prior to award of contract.
- b.** is responsible for performing all corrective action; including but not limited to traffic control and restoring all associated pavement features, such as pavement marking, shoulders, and adjacent lanes, at no additional cost to the Department.
- c.** is responsible for replacing all temporary repairs, with Department approved materials and methods, resulting from the pavement being in noncompliance with the warranty requirements.
- d.** shall notify the Department and shall submit a written course of action proposing appropriate corrective measures for five (5) calendar days prior to commencement of any corrective action, unless this work requires immediate emergency repairs as determined by the Department.
- e.** shall maintain traffic, for corrective action, as approved by the Department.
- f.** shall complete all corrective action in a neat and uniform manner and shall meet the requirements specified in the contract.
- g.** is required to supply to the Department original documentation pursuant to subsection 107.10 of the 1996 Standard Specifications for Construction that all insurance required by the contract is in effect during the period(s) that any warranty work is being performed.
- h.** shall furnish to the Department, in addition to the regular performance and lien bond for the contract, supplemental performance and lien bonds covering any corrective action being performed. These supplemental bonds shall be furnished to the Engineer, using Department approved forms, prior to beginning any corrective action in the amount required by the Department to cover said corrective action and be in all respects satisfactory and acceptable to the Department.
- i.** shall make repairs to the pavement prior to conclusion of the warranty period or within such other time frame as agreed to by the Department and the contractor after receiving notification from the Department that required corrective action is necessary, unless the Department notifies the contractor that immediate emergency repairs are necessary to prevent an unsafe road condition, in which event the contractor shall make said emergency repairs within a time frame required by the Department.

- j. is responsible for all costs of all emergency repairs to the pavement deemed necessary by the Department to prevent an unsafe road condition.
- k. shall be liable during the warranty period in the same manner as the contractor is currently liable for construction related activities with the Department pursuant to the Department's 1996 Standard Specifications for Construction, including but not limited to subsections 103.06, 107.10 and 107.11 of said Standard Specifications. This liability shall arise and continue only during the period when the contractor is performing corrective action associated with the warranty. This liability is in addition to the contractor performing and/or paying for any of the required corrective action, and shall include liability for injuries and/or damages and any expenses resulting therefrom which are not attributable to normal wear and tear of traffic and weather, but which are due to defective materials, faulty workmanship, and to the operations of the contractor as set forth more fully in subsections 103.06, 107.10, and 107.11 of the 1996 Standard Specifications for Construction.

5.0 Initial Acceptance.

Acceptance Date of Construction. - The date when the pavement surfaces described in Section 1.0 are completely constructed, accepted for traffic, and determined by the Department to be in compliance with the contract plans and specifications. This date will constitute initial acceptance and will be the start date for the warranty period. Generally, that portion of the proposed full-width or part-width roadway that fulfills the Accepted For Traffic criteria per Section 107.21 will qualify on this start date. Initial acceptance may occur on different dates for different parts of the pavement depending on varying acceptance for traffic dates or stage construction sequences as applicable to the maintaining traffic requirements for this contract.

For projects staged with future open to traffic dates on adjacent projects that are not a part of this contract, the acceptance date of construction will be the date that the pavement surfaces described in Section 1.0 are available for traffic as determined by the Engineer.

In addition, the Engineer may accept the pavement if the Department has not determined compliance with specifications within a six week period after the pavement is available for traffic.

At the completion of each portion of the roadway qualifying for acceptance for traffic, the Department and contractor shall review the completed portion for compliance with the contract plans and specifications. If the completed portion is determined by the Department to be in noncompliance, then the contractor shall repair and make good, at his own expense, any and all defects in materials or workmanship. When the completed portion is determined by the Department to be in compliance, the Department and the contractor shall document and execute the initial acceptance on a form furnished by the Department. The date on which this document is executed is the Acceptance Date of Construction. The Department will send a copy of this initial acceptance document to the contractor's Warranty Bond surety agent.

Acceptance of pavement surfaces by the Department that used material from penalized lots will not relieve the contractor of meeting the warranty requirements for the pavement surface.

6.0 Conflict Resolution Team.

Conflict Resolution Team (CRT). - Shall be solely responsible for resolving disputes between the Department and the contractor regarding any noncompliance during the warranty period. The CRT will render a decision based on a majority vote.

The CRT will consist of five members:

- a. Two-selected, provided, and compensated by the Department.
- b. Two-selected, provided, and compensated by the contractor.
- c. One (third party) mutually selected by the Department and the contractor. Compensation and expenses for the third party member will be equally shared by the Department and the contractor.

Changes in the membership of the CRT will be allowed subject to approval by the Department and the contractor.

7.0 Warranty Requirements

The contractor will warranty the pavement against defects in materials and/or workmanship. Two pavement condition parameters, surface distress and rutting will be monitored by the department to determine whether warranty action may be required.

Corrective action will be required when all three criteria listed below are met.

1. The specified threshold limit for a condition parameter is exceeded.
2. The specified minimum number of segments are exceeded.
3. A joint field investigation by the department and the contractor determines that the pavement condition parameter has been caused by defects in materials and/or workmanship. A forensic investigation, if necessary, may consist of pavement removal, reviewing initial project records, extensive pavement coring and/or laboratory analysis to determine the specific cause(s) and deterioration rates for the distress. The selection of the party to do a forensic investigation will be agreed to jointly by the Department and the contractor. All costs related to the forensic investigation will be shared proportionately, based on cause of condition, between the contractor and the Department. Any corrective action will also be shared proportionately, based on cause of condition, between the contractor and the Department.

Threshold Limits

The condition parameters used to monitor the condition of the bituminous pavement during the warranty period will be surface distress features and rutting. The threshold limit for each parameter will be determined separately. Threshold limits are based on a pavement segment. A segment is defined as a 160 meter length of the driving lane and adjacent shoulder. The length is measured along the roadway centerline. If any threshold limit is exceeded on a segment, the segment will be counted toward the specified segment limit.

Surface Distress

The distress types that will be used during the warranty period are defined as follows:

Transverse Crack - A crack, at least 1.5 meters in length, that is oriented primarily in the transverse direction versus the longitudinal direction. It can be either straight or irregular in direction.

Longitudinal Crack - A crack that extends primarily parallel to the pavement centerline and is at least 1.5 meters in length. It can exist anywhere in the driving lane; ie: at the pavement centerline joint, wheel path, center of lane, or lane/shoulder joint.

Delamination - A physical separation of the new pavement surface from the previous pavement surface. Delamination will be visually present as shoving, or the loss of the new surface course. Surface potholes, regardless of depth, will also be classified as delamination, if the condition was derived from delamination of the new surface course.

Raveling - Surface disintegration due to the loss of course or fine aggregate material that occurs over an area or in longitudinal 'strips'.

Flushing - Excess asphalt binder that occurs on the pavement surface that creates a shiny, reflective condition that becomes tacky to the touch at higher temperatures.

The following list indicates the threshold limit for each distress type that may exist at the end of the three year warranty period. The threshold limits apply to each segment. An area percentage should be calculated based on the total area of a segment.

<u>Distress Type</u>	<u>Threshold Limit</u>
Transverse Cracking	2 per segment **
Longitudinal Cracking	25% - segment length **
Delamination	25% - segment length
Raveling	20% - segment area
Flushing	5% - segment area

** A crack in the new surface will be excluded if it is determined to be 'reflective'.

Rutting

The pavement surface will be inspected for rutting on all driving lanes through the warranty period and before the end of the warranty period or as solely required by the Department should it determine there are safety concerns that require immediate corrective action. The Department reserves the right to determine the frequency and intensity of individual measurements to quantify rutting for a particular 160m segment.

The measurement procedure shall consist of extending a 'straightedge' across the pavement surface perpendicular to the direction of travel. The straightedge shall contact the surface on at least two bearing points with one located on either side of the rut. The straightedge is properly located when sliding the straightedge along its axis does not change the location of the contact points. Rut depth is defined as the greatest perpendicular distance from the bottom of the straightedge to the pavement surface.

The average rut depth shall not exceed 7mm for any 160 meter segment at anytime during the project's three year warranty period. Any driving lane is subject to the 7 mm limitation, whether there is rutting present in one or both wheel paths.

Corrective Action - Minimum Segments:

<u>Parameter</u>	<u>Segment Limit Per Direction</u>
Surface Distress (one or more types)	
Transverse Cracking	(2) 160 meter segments
Longitudinal Cracking	(4) 160 meter segments
Raveling	(4) 160 meter segments
Delamination	(2) 160 meter segments
Flushing	(2) 160 meter segments
Rutting	(1) 160 meter segment

The segment limits apply separately to each direction of the pavement surface. For all parameters except rutting, the 160 meter segments do not have to be contiguous to be counted toward the segment limit. Rutting must exist

continually for a 160 meter segment. The starting point for the segments shall be consistent for every year that the pavement is monitored.

Any pavement surface corrective action taken to correct deficiencies with any condition parameter shall be placed full-width across the driving lane, except for diamond grinding and transverse crack sealing. Only asphalt or a similar material shall be used for pavement patching.

At the end of the warranty period the warranty bond will only be released after corrective actions, necessary to meet the threshold limits, have been completed.

Situations Affecting Warranty. - During the warranty period, the contractor will not be held responsible for pavement distresses that are caused by factors not related to materials and workmanship. These include, but are not limited to: chemical and fuel spills, vehicle fires, snow plows, other Department maintenance activities, and testing such as coring. Other factors considered to be beyond the control of the contractor which may contribute to pavement distress will be considered by the Engineer on a case by case basis upon receipt of a written request from the contractor.

8.0 Corrective Actions (Suggested).

The following corrective actions are suggested for various warranty items. The contractor may use these recommended methods or propose an alternate method for Department approval.

<u>Warranty Item</u>	<u>Recommended Action</u>
Transverse Crack	Cut & Seal
Longitudinal Crack	Cut & Seal
Rutting	Microsurface
Delamination	Mill & Resurface
Raveling	Mill & Resurface
Flushing	Mill & Resurface

9.0 Measurement and Payment.

All contractor costs associated with the performance of this special provision, including but not limited to, maintaining traffic, corrective treatments with associated work, materials, and engineering will not be paid for separately. All costs associated with providing the required warranty bond, documentation and conflict resolution team members will be considered as included in the items of work covered by the warranty as detailed in Section 3.0 of this special provision. In addition, the contractor shall make all measurements involving the determination of final quantities for the items of work covered by the warranty and payments subject to verification by the Michigan Department of Transportation.

INITIAL ACCEPTANCE OF WARRANTY WORK APPROVAL

CONTRACTOR'S SIGNATURE:

ENGINEER'S SIGNATURE:

ACCEPTANCE DATE:

cc: Surety Company, Financial Services - Payments

Concrete Warranty Information

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
CONCRETE WHITETOPPING WARRANTY ON M-46

DES:SCB

1 of 11 12-16-98

C&T:APPR:MF:JTL 12-16-98

1.0 General.

This special provision describes a materials and workmanship warranty. This warranty applies to the concrete whitetopping from Goetze Road to the west village limits of Port Sanilac.

The pavement surface, as addressed by this special provision, includes the concrete driving lanes and concrete shoulders.

The warranty documents shall include the warranty form, initial acceptance form, warranty bond form along with this special provision.

This Special Provision shall not be construed as extending or otherwise affecting the claim process and statute of limitation applicable to the contract.

This Special Provision references the 1996 Standard Specifications for Construction.

2.0 Warranty Bond.

Warranty Bond. - The security, furnished by the contractor and the contractor's surety, guarantees that the concrete pavement installed under the contract will be free of defects in materials and/or workmanship during the specified warranty period.

The warranty bond shall be a single term three (3) year warranty bond with an effective starting date of the Acceptance Date of Construction.

The contractor shall furnish a warranty bond for a period of three (3) years per above conditions in an amount equal to 25 percent of the contract value of the items listed below. The warranty period shall be three (3) years.

<u>Pay Item</u>	<u>Pay Unit</u>
Concrete Furnishing	cubic meter
Fiber Concrete Furnishing	cubic meter
Concrete Whitetopping - Placing, Finishing, and Curing	square meter
Concrete Whitetopping - Misc, Placing, Finishing, and Curing	square meter
Concrete Whitetopping - Shoulder, Placing, Finishing, and Curing	square meter
Joint, Contraction, C3p - Modified	meter
Joint, Expansion, E3 - Modified	meter
Joint, External Longitudinal Edge of Pavement, Modified	meter

3.0 Rights and Responsibilities of the Department.

The Department:

- a.** is responsible for monitoring the pavement, defined above in Section 1.0 during the warranty period and will provide the contractor copies of all written reports of the observed condition as it relates to the warranty requirements.
- b.** is responsible for notifying the contractor, in writing, of any required corrective action as specified by the warranty.
- c.** reserves the right to approve the date(s) requested by the contractor to perform corrective action as specified by the warranty.
- d.** reserves the right to approve all materials and methods used in the corrective action as specified by the warranty.
- e.** reserves the right to determine if corrective action performed by the contractor meets Department specifications.
- f.** reserves the right to perform, or have performed, routine maintenance during the warranty period. Any such routine maintenance will not relieve the contractor from meeting the warranty requirements of this Special Provision.
- g.** reserves the right, if the contractor is unable, to make immediate emergency repairs to the pavement to prevent an unsafe road condition as determined by the Department. The department will attempt to notify the contractor that action is required to address an unsafe condition. However, should the contractor be unable to comply with this requirement, to the Department's satisfaction and within the time frame required by the Department, the Department will perform, or have performed any emergency repairs deemed necessary. Any such emergency repairs undertaken will not relieve the contractor from meeting the warranty requirements of this Special Provision. Any costs associated with the emergency repairs will be paid by the contractor if it is determined the cause was from defective materials and/or workmanship.
- h.** shall document the condition of the pavement prior to emergency repairs.
- i.** is responsible for notifying the contractor, in writing, of any required joint field investigation that may result in corrective action.

4.0 Responsibilities of the Contractor.

The Contractor:

- a.** shall unconditionally warrant to the Department that the pavement shall be free of defects in materials and workmanship, as defined by the warranty requirements as set forth in this special provision, for the specified warranty period. This warranty and the Warranty Bond, shall be on forms furnished by the Department. These completed forms shall be submitted to the Department prior to award of contract.
- b.** is responsible for performing all corrective action; including but not limited to traffic control and restoring all associated pavement features, such as pavement marking, shoulders, and adjacent lanes, at no additional cost to the Department.
- c.** is responsible for replacing all temporary repairs, with Department approved materials and methods, resulting from the pavement being in noncompliance with the warranty requirements.
- d.** shall notify the Department and shall submit a written course of action proposing appropriate corrective measures for five (5) calendar days prior to commencement of any corrective action, unless this work requires immediate emergency repairs as determined by the Department.
- e.** shall maintain traffic, for corrective action, as approved by the Department.
- f.** shall complete all corrective action in a neat and uniform manner and shall meet the requirements specified in the contract.

- g.** is required to supply to the Department original documentation pursuant to subsection 107.10 of the 1996 Standard Specifications for Construction that all insurance required by the contract is in effect during the period(s) that any warranty work is being performed.
- h.** shall furnish to the Department, in addition to the regular performance and lien bond for the contract, supplemental performance and lien bonds covering any corrective action being performed. These supplemental bonds shall be furnished to the Engineer, using Department approved forms, prior to beginning any corrective action in the amount required by the Department to cover said corrective action and be in all respects satisfactory and acceptable to the Department.
- i.** shall make repairs to the pavement prior to conclusion of the warranty period or within such other time frame as agreed to by the Department and the contractor after receiving notification from the Department that required corrective action is necessary, unless the Department notifies the contractor that immediate emergency repairs are necessary to prevent an unsafe road condition, in which event the contractor shall make said emergency repairs within a time frame required by the Department.
- j.** is responsible for all costs of all emergency repairs to the pavement deemed necessary by the Department to prevent an unsafe road condition.
- k.** shall be liable during the warranty period in the same manner as the contractor is currently liable for construction related activities with the Department pursuant to the Department's 1996 Standard Specifications for Construction, including but not limited to subsections 103.06, 107.10 and 107.11 of said Standard Specifications. This liability shall arise and continue only during the period when the contractor is performing corrective action associated with the warranty. This liability is in addition to the contractor performing and/or paying for any of the required corrective action, and shall include liability for injuries and/or damages and any expenses resulting therefrom which are not attributable to normal wear and tear of traffic and weather, but which are due to defective materials, faulty workmanship, and to the operations of the contractor as set forth more fully in subsections 103.06, 107.10, and 107.11 of the 1996 Standard Specifications for Construction.

5.0 Initial Acceptance.

Acceptance Date of Construction. - The date when the pavement surfaces described in Section 1.0 are completely constructed, accepted for traffic, and determined by the Department to be in compliance with the contract plans and specifications. This date will constitute initial acceptance and will be the start date for the warranty period. Generally, that portion of the proposed full-width or part-width roadway that fulfills the Accepted For Traffic criteria per Section 107.21 will qualify on this start date. Initial acceptance may occur on different dates for different parts of the pavement depending on varying acceptance for traffic dates or stage construction sequences as applicable to the maintaining traffic requirements for this contract.

For projects staged with future open to traffic dates on adjacent projects that are not a part of this contract, the acceptance date of construction will be the date that the pavement surfaces described in Section 1.0 are available for traffic as determined by the Engineer.

At the completion of each portion of the roadway qualifying for acceptance for traffic, the Department and contractor shall review the completed portion for compliance with the contract plans and specifications. If the completed portion is determined by the Department to be in noncompliance, then the contractor shall repair and make good, at his own expense, any and all defects in materials or workmanship. When the completed portion is determined by the Department to be in compliance, the Department and the contractor shall document and execute the initial acceptance on a form furnished by the Department. The date on which this document is executed is the Acceptance Date of Construction. The Department will send a copy of this initial acceptance document to the contractor's Warranty Bond surety agent.

6.0 Conflict Resolution Team.

Conflict Resolution Team (CRT). - Shall be solely responsible for resolving disputes between the Department and the contractor regarding any noncompliance during the warranty period. The CRT will render a decision based on a majority vote.

The CRT will consist of five members:

- a. Two-selected, provided, and compensated by the Department.
- b. Two-selected, provided, and compensated by the contractor.
- c. One (third party) mutually selected by the Department and the contractor. Compensation and expenses for the third party member will be equally shared by the Department and the contractor.

Changes in the membership of the CRT will be allowed subject to approval by the Department and the contractor.

7.0 Warranty Requirements

The contractor will warranty the pavement against defects in materials and/or workmanship. Two pavement condition parameters, surface distress and joint sealant integrity, will be monitored by the department to determine whether warranty action may be required.

Corrective action will be required when all three criteria listed below are met.

1. The specified threshold limit for a condition parameter is exceeded.
2. The specified number of slabs are exceeded (surface distress only).
3. A joint field investigation by the department and the contractor determines that the pavement condition parameter has been caused by defects in materials and/or workmanship. A forensic investigation, if necessary, may consist of pavement removal, reviewing initial project records, extensive pavement coring and/or laboratory analysis to determine the specific cause(s) and deterioration rates for the distress. The selection of the party to do a forensic investigation will be agreed to jointly by the Department and the contractor. All costs related to the forensic investigation will be shared proportionately, based on cause of condition, between the contractor and the Department. Any corrective action will also be shared proportionately, based on cause of condition, between the contractor and the Department.

Threshold Limits and Number of Slabs

a. Surface Distress. - Surface distresses to be measured are spalling and cracking. Threshold limits are based on a pavement slab. A slab is defined as the area of the concrete pavement that includes the concrete driving lane and adjacent concrete shoulder between two successive transverse joints (approximately 3 meters).

Spalling - Spalling is defined as cracking, breaking, chipping, or fraying along the slab edge.

The threshold limit for spalling is 0.3m/edge, transversely, and 0.1m/edge, longitudinally. Non-contiguous areas along an edge will be totaled against the threshold limit.

Cracking - Cracking is defined as a fissure or discontinuity in the slab surface not necessarily extending the entire thickness of the slab. Cracking may consist of single or multiple cracks originating and

ending at a slab edge, or 'map-cracking' which forms interconnecting pieces with random orientation. 'Map-cracking' is readily visible if the surface is drying after wetting, without free water being present. Surface scaling or spalling (non-contiguous with a joint) will be considered as map-cracking in determining threshold limits. Scaling is defined as deterioration of the slab surface between 3 mm and 13 mm in depth. Surface spalling is similar deterioration that exceeds 13 mm in depth.

The threshold limit for cracking per slab is any one of the following three criteria:

- (1) The slab is visibly broken into two or more pieces, with the smaller piece exceeding 0.2 square meters.
- (2) No map cracking is present during the warranty period.
- (3) Scaling or spalling, when combined, must be less than 0.2 square meters, including all non-contiguous areas.

A maximum limit of fifty slabs, exceeding any of the distress threshold values, will be allowed. The slab limit is applied separately to each direction of the pavement surface. The slabs do not have to be contiguous to be included in the limit.

b. Joint Sealant Integrity. - Failure of sealant integrity is defined as a loss of sealant integrity caused by adhesive failure (debonding) and/or cohesive failure (material splitting), or a completely missing seal. The threshold limit for joint sealant integrity is based on the percent of sealant failure.

<u>Year</u>	<u>Percentage</u>
1	5.0
3	7.5

Any pavement surface corrective action taken to correct deficiencies with either condition parameter shall be placed full-width across the driving lane, except for diamond grinding, joint resealing (hot-poured only), and spall repair. Only concrete or a similar material shall be used for pavement patching. Asphalt patching may be used only as a temporary repair until a permanent material repair is made. Joint resealing must utilize the same material already present in the joint.

At the end of the warranty period the warranty bond will only be released after corrective actions have been completed.

Situations Affecting Warranty. - During the warranty period, the contractor will not be held responsible for pavement distresses that are caused by factors not related to materials and workmanship. These include, but are not limited to: chemical and fuel spills, vehicle fires, snow plows, other Department maintenance activities, and testing such as coring. Other factors considered to be beyond the control of the contractor which may contribute to pavement distress will be considered by the Engineer on a case by case basis upon receipt of a written request from the contractor.

8.0 Corrective Actions (Suggested).

The following corrective actions are suggested for various warranty items. The contractor may use these recommended methods or propose an alternate method for Department approval.

<u>Warranty Item</u>	<u>Severity</u>	<u>Recommended Action</u>
Transverse Cracks	One per slab	Seal with Hot Poured Rubber

Transverse Cracks	> One per slab	Remove & Replace Slab
Longitudinal Cracks *	Two or less per slab	Seal With Hot Poured Rubber
Longitudinal Cracks *	> Two per slab	Remove & Replace Slab
Joint Sealant Integrity	All cases	Remove and replace seal material
Spalling and Scaling	All cases	Surface Repair
Map Cracking	<1/3 depth of slab	Surface Seal
Map Cracking	>1/3 depth of slab	Remove & Replace Slab

*Corrective action for longitudinal cracks is dependent on cause; i.e., late sawing or structural as applied to the pavement section support mechanism. Removal and replacement is dependent on a cost analysis and the service life of an alternate repair.

Note: All full depth cracks will require replacement of the driving lane, shoulder or both depending on crack location.

9.0 Measurement and Payment.

All contractor costs associated with the performance of this special provision, including but not limited to, maintaining traffic, corrective treatments with associated work, materials, and engineering will not be paid for separately. All costs associated with providing the required warranty bond, documentation and conflict resolution team members will be considered as included in the items of work covered by the warranty as detailed in Section 3.0 of this special provision. In addition, the contractor shall make all measurements involving the determination of final quantities for the items of work covered by the warranty and payments subject to verification by the Michigan Department of Transportation.

MICHIGAN DEPARTMENT OF TRANSPORTATION

INITIAL ACCEPTANCE FOR PAVEMENT WARRANTY

CONTRACT ID:

CONTRACT SECTION: _____ JOB NUMBER:

SURETY NAME:

SURETY ADDRESS:

CONTRACTOR NAME:

CONTRACTOR ADDRESS:

IDENTIFY EACH JOB NUMBER, LOCATION AND WORK SEPARATELY

Table with 6 columns: JOB NUMBER, ROUTE NUMBER, CONTROL SECTION, WORK TYPE, DATE ACCEPTED, PROJECT ENGINEER. Contains 10 empty rows for data entry.

INITIAL ACCEPTANCE OF WARRANTY WORK APPROVAL

CONTRACTOR'S SIGNATURE:

ENGINEER'S SIGNATURE:

ACCEPTANCE DATE:

cc: Surety Company, Financial Services - Payments

Michigan Department of Transportation

WARRANTY FOR

(TYPE OF WORK)

THIS WARRANTY, made by _____
(CONTRACTOR)

of _____ hereinafter called "WARRANTOR",
(ADDRESS)

in favor of the MICHIGAN DEPARTMENT OF TRANSPORTATION, hereinafter called "DEPARTMENT":

WITNESSETH:

RECITAL:

Under the provision of Contract ID _____, pertaining in part to _____ (type of work) work entered into by the WARRANTOR and the DEPARTMENT. The WARRANTOR is required to furnish the DEPARTMENT a written warranty for the _____ (type of work) warranting against defect as stated in the said contract for a period(s) of _____ years from the date(s) of the Acceptance Date of Construction by the DEPARTMENT, of the WARRANTOR'S work under said contract.

NOW, THEREFORE, in consideration of the foregoing, the WARRANTOR hereby agrees and warrants that in every case in which any defect, as described in Contract ID _____, occurs within said year period(s), the WARRANTOR forthwith upon receipt of written notice of such defect, repair said defective area.

It is expressly understood and agreed that the warranty and obligations herein set forth are made and undertaken by the WARRANTOR for the benefit of the DEPARTMENT.

IN WITNESS WHEREOF, the WARRANTOR have set his/her hands as of the _____ date of _____, 19 ____.

(Contractor)

By:

Title:

**MICHIGAN
DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS
WARRANTY BOND**

Item #

Bond Number _____

KNOWN ALL MEN BY THESE PRESENTS:

That we, Contractor Name (hereinafter called the "Principal"), and _____, a corporation duly organized under the laws of the State of _____ and duly licensed to transact business in the State of Michigan (hereinafter called "Surety"), are held and firmly bound unto the Michigan Department of Transportation (hereinafter called the "Obligee"), in the sum of _____ Dollars, for the payment of which sum well and truly to be made, we, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said Principal has heretofore entered into a contract with the Michigan Department of Transportation dated _____ under Contract ID _____ and;

WHEREAS, the said Principal is required to guarantee the Type of Bonds installed under said contract, against defects in materials or workmanship which may develop during the period(s) of # of years years beginning the date(s) of the Acceptance Date of Construction by the Obligee.

In no event shall losses paid under this bond aggregate more than the amount of the bond.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if said Principal shall faithfully carry out and perform the said guarantee, and shall, on due notice, repair and make good at its own expense any and all defects in materials or workmanship in the said work which may develop during the period specified above or shall pay over, make good and reimburse to the said Obligee all loss and damage which said Obligee may sustain by reason of failure or default of said Principal so to do, then this obligation shall be null and void; otherwise shall remain in full force and effect.

PROVIDED HOWEVER, that in the event of any default on the part of said Principal, a written statement of the particular facts showing such default and the date thereof shall be delivered to the Surety by registered mail, promptly in any event within ten (10) days after the Obligee or his representative shall learn of such default and that no claim, suit or action by reason of any default of the Principal shall be brought hereunder after the expiration of thirty (30) days from the end of the warranty period as herein set forth.

Signed this _____ day of _____, _____.

Contractor	Contractor Name _____ a Corporation
By	_____
Surety	_____
By	_____ Attorney-In-Fact

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
**CONTRACTOR QUALITY CONTROL (CQC) FOR
PAVEMENT WARRANTY**

C&T:KJH

1 of 3

12-15-98

C&T:APPR:JTL:MF 12-15-98

1. Introduction

Except as modified herein, this work shall be in accordance with the 1996 Standard Specifications for Construction, Special Provisions, Supplemental Specifications and other documents referenced in this special provision. The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with current Department procedures contained in, but not limited to, the Michigan Construction Manual and the MDOT Quality Assurance Procedures Manual. The quality control system shall detail plans, procedures, and organization necessary to produce an end product that complies with the contract requirements. The system shall cover all warranty related construction operations under the control of the Contractor both on-site and off-site.

2. Contractor Quality Control Plan

Contractor Quality Control (CQC) shall be the means by which the Contractor ensures that the warranty related construction, including that done by subcontractors, fabricators, and suppliers, complies with the requirements of the contract. This applies only to those warrantied items within this contract. The controls shall be adequate to cover all construction operations, including both on-site and off-site, and will be keyed to the proposed construction sequence.

The Engineer shall be allowed access to all work in progress and all phases of the ongoing CQC plan for the purpose of Assurance review and testing. Assurance reviews and testing will be used for the purpose of making independent checks on the reliability of the Contractor's testing and acceptance procedures in accordance with the CQC plan and not for determining the quality and acceptability of the materials and workmanship directly.

The CQC plan shall include, as a minimum, the following to cover on-site and off-site aspects of all construction operations under the control of the Contractor.

- 1. CQC System Manager (CQCSM).**-The CQC plan shall identify one person as the CQCSM who shall be the sole contact with MDOT regarding quality control. The CQCSM shall be responsible for quality

control on all construction phases of the project. The CQCSM must be on site during the active portion of the contract involving the warranty related items.

2. **Construction & Warranty.**-The Construction and Warranty portion of the CQC plan shall contain a listing of the procedures and records to be used to properly inspect and test the project in accordance with the contract. The construction portion of the CQC plan shall include, as a minimum, the following:

A) A list of work items covered by the warranty to be tested.

B) A list of standard test procedures (ASTM, AASHTO or MDOT).

C) Frequency of test.

D) Quantity represented by test and location of item on the project.

E) Method used to document that items have been tested and/or constructed to conform to project plans and specifications.

F) Procedure for handling any detected noncompliance with the CQC requirement.

G) Time frame for distribution of test results and project documentation.

H) Name and address of the testing facility(s) to be used.

3. **Approval of CQC Plan.**-Acceptance of the Contractor's CQC plan is required prior to start of the work items covered by the warranty. The Department will have five work days to review the Contractor's CQC Plan to determine acceptability. The start of the construction of the items of work covered by the warranty will not be allowed until the CQC Plan is accepted in writing by the Engineer. Delays due to the Contractor's inability to submit an acceptable CQC Plan shall not be a basis for an extension of time without liquidated damages.

4. **Changing the CQC Plan.**- If the Department determines after final approval of the CQC plan that the Contractor's performance on the project is unsatisfactory, the Department reserves the right to require the Contractor to make changes in its CQC plan at no additional cost to the department. The Contractor may be required to suspend all work operations until the plan is changed and approved.

After final approval of the CQC plan, the Contractor can not change the plan without prior written approval of the Engineer. Any requested changes must be done in writing.

5. **Measurement and Payment**

Contractor Quality Control, as specified in this Special Provision, will be included in the cost of the project.

**WARRANTY
FOR**

(TYPE OF WORK)

THIS WARRANTY, made by _____
(CONTRACTOR)

of _____ hereinafter called
"WARRANTOR",
(ADDRESS)

in favor of the MICHIGAN DEPARTMENT OF TRANSPORTATION, hereinafter called
"DEPARTMENT":

WITNESSETH:

RECITAL:

Under the provision of Contract ID _____, pertaining in part to ___ (type of work) _____ work entered into by the WARRANTOR and the DEPARTMENT. The WARRANTOR is required to furnish the DEPARTMENT a written warranty for the ___ (type of work) _____ warranting against defect as stated in the said contract for a period(s) of years from the date(s) of the Acceptance Date of Construction by the DEPARTMENT, of the WARRANTOR'S work under said contract.

NOW, THEREFORE, in consideration of the foregoing, the WARRANTOR hereby agrees and warrants that in every case in which any defect, as described in Contract ID _____, occurs within said _____ year period(s), the WARRANTOR forthwith upon receipt of written notice of such defect, repair said defective area.

It is expressly understood and agreed that the warranty and obligations herein set forth are made and undertaken by the WARRANTOR for the benefit of the DEPARTMENT.

IN WITNESS WHEREOF, the WARRANTOR have set his/her hands as of the

_____ date of _____, 19 ____.

(Contractor)

By:
Title:

**MICHIGAN
DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS
WARRANTY BOND**

Bond Number _____

KNOWN ALL MEN BY THESE PRESENTS:

That we, Contractor Name (hereinafter called the "Principal"), and _____, a corporation duly organized under the laws of the State of _____ and duly licensed to transact business in the State of Michigan (hereinafter called "Surety"), are held and firmly bound unto the Michigan Department of Transportation (hereinafter called the "Obligee"), in the sum of _____ Dollars, for the payment of which sum well and truly to be made, we, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said Principal has heretofore entered into a contract with the Michigan Department of Transportation dated _____ under Contract ID _____ and;

WHEREAS, the said Principal is required to guarantee the Type of Bonds installed under said contract, against defects in materials or workmanship which may develop during the period(s) of # of years years beginning the date(s) of the Acceptance Date of Construction by the Obligee.

In no event shall losses paid under this bond aggregate more than the amount of the bond.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if said Principal shall faithfully carry out and perform the said guarantee, and shall, on due notice, repair and make good at its own expense any and all defects in materials or workmanship in the said work which may develop during the period specified above or shall pay over, make good and reimburse to the said Obligee all loss and damage which said Obligee may sustain by reason of failure or default of said Principal so to do, then this obligation shall be null and void; otherwise shall remain in full force and effect.

PROVIDED HOWEVER, that in the event of any default on the part of said Principal, a written statement of the particular facts showing such default and the date thereof shall be delivered to the Surety by registered mail, promptly in any event within ten (10) days after the Obligee or his representative shall learn of such default and that no claim, suit or action by reason of any default of the Principal shall be brought hereunder after the expiration of thirty (30) days from the end of the warranty period as herein set forth.

Signed this _____ day of _____, _____.

Contractor **Contractor Name**

a Corporation
By

Surety

By

Attorney-In-Fact

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
DOCUMENTATION OF CONCRETE CONSTRUCTION ITEMS

C&T:JTL

1 of 2

07-23-01
C&T:APPR:SB:DS:08-01-01

a. Description.-This special provision outlines the documentation that will be required from the Contractor to fulfill the contract requirements. This documentation is in addition to the requirements for the Contractor's Quality Control plan outlined within this proposal.

b. Materials.-None.

c. Documentation.-

1. The Contractor will be responsible for keeping a project log that defines each location, where construction relating to the warranted concrete pay items were constructed on the project, in descriptive commentary and/or standard stationing. A copy of the log is to be turned over to the Engineer. The general content and format of the project log must be acceptable to the Engineer prior to initial acceptance of the work.
2. In addition, the contractor shall provide the Engineer a daily report that includes the following information:
 - Control Section, Project Number, County, Route, Resident Engineer.
 - Date, Air Temperature, Weather (a.m., p.m.).
 - Beginning and Ending Stations for the Day.
 - Length (m), Width, (m), Area (m²), cubic meters of Concrete Placed (this quantity shall also be broken down into its separate contract pay items with code numbers)
 - Any unique or different situations on the project.
 - Contractor's signature.
 - Fully completed Concrete Proportioning Plant Report (form 1174M) or its equivalent submitted at least once per day and with every change of mix design.
 - Fully completed Inspector's Report of Concrete Placed (form 1174A-M) or its equivalent submitted at least once per day and with every change of mix design.

- Fully completed Report of Modulus of Rupture (form 1160A) or its equivalent submitted for all beams required to document open to traffic strengths.

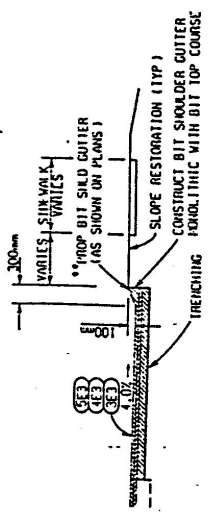
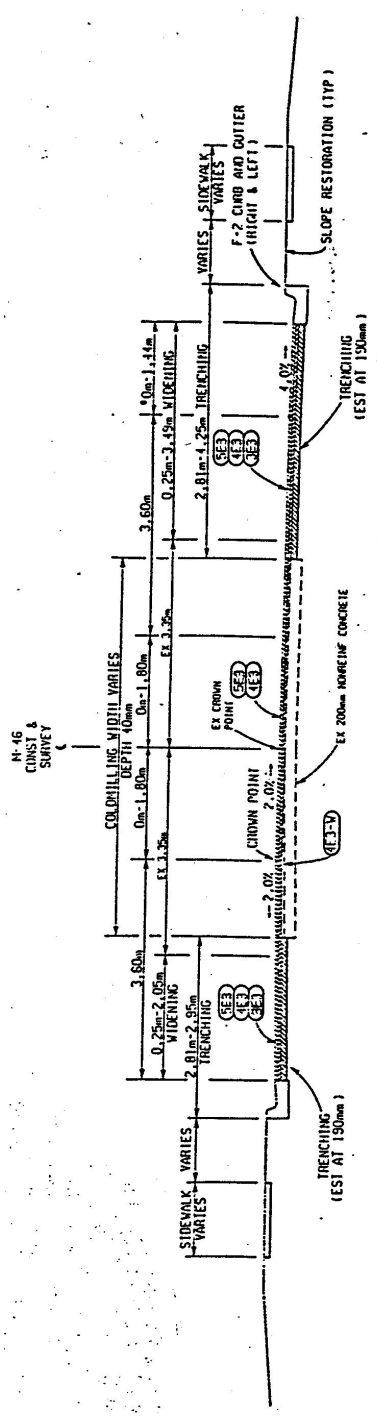
d. Prepaving On-Site Meeting.-A prepaving meeting between the Contractor and the Engineer will be held prior to beginning work. The agenda for this meeting will include:

1. Review of the Contractor's detailed work schedule.
2. Review of the CQC plan.
3. Review of the Contractor's Daily Report and associated documentation and submittal to project office.

e. Traffic Control.-Traffic control shall be in accordance with the specifications and special provisions in this contract.

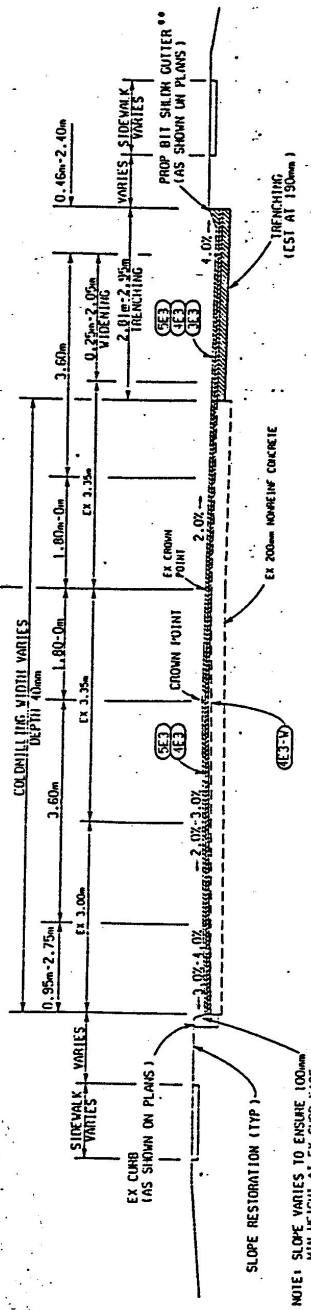
f. Measurement and Payment.-There will be no payment for documentation. It is considered to be included in other items of contract work.

Typical Cross-Sections



PROP SECTION TO APPLY:
 M46
 STA 10+186.000 TO 10+645.000
 • STA 10+369.000 TO 10+455.000

** BIT SILDH GUTTER DETAIL TO APPLY:
 M-46
 STA 11+155.000 TO STA 11+380.000



PROP SECTION TO APPLY:
 M46
 STA 11+095.000 TO 11+200.000

Section 1 (Both Typical)

NOTE: SLOPE VARIES TO ENSURE 100mm MIN HEIGHT AT EX CURB FACE