APPENDIX B

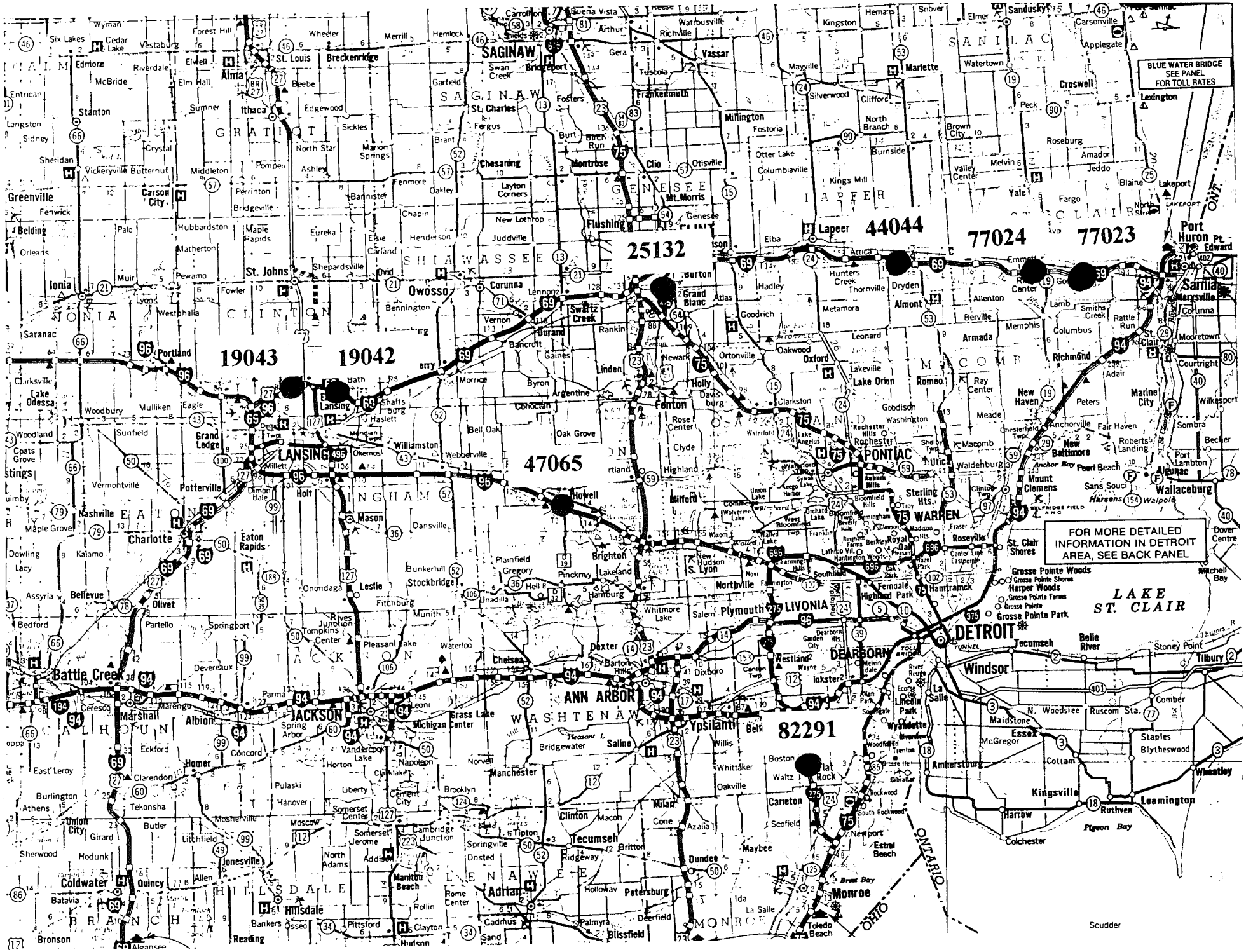
Section Summaries and Control Section Logs

Appendix B. Section Summaries and Control Section Logs

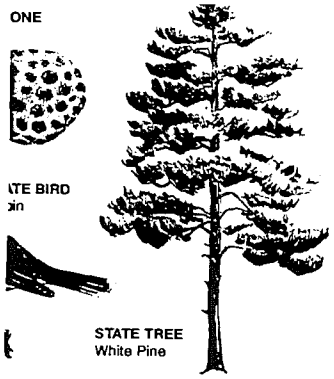
The purpose of this appendix is to give the reader a quick overview of all test sections associated with this project. The appendix begins with two overview maps of the site locations around Michigan, followed by a brief summary of each section tested, including a control section log, a pavement system profile, and a two page section summary.

The summary sheet for each section contains information such as site location, age, construction conditions, testing information, observed distresses, and material properties.

In this appendix, as in all of the appendices, the sites are listed in increasing numerical order by control section number and job number.


BLUE WATER BRIDGE
SEE PANEL
FOR TOLL RATES
FOR MORE DETAILED
INFORMATION IN DETROIT
AREA, SEE BACK PANEL
25132
44044
77024
77023
19043
19042
47065
82291
SAGINAW
LANSING
PONTIAC
DETROIT
ANN ARBOR
JACKSON
Battle Creek
Port Huron
Sarnia
Windsor
LAKE ST. CLAIR
ONTARIO
OHIO

ONE



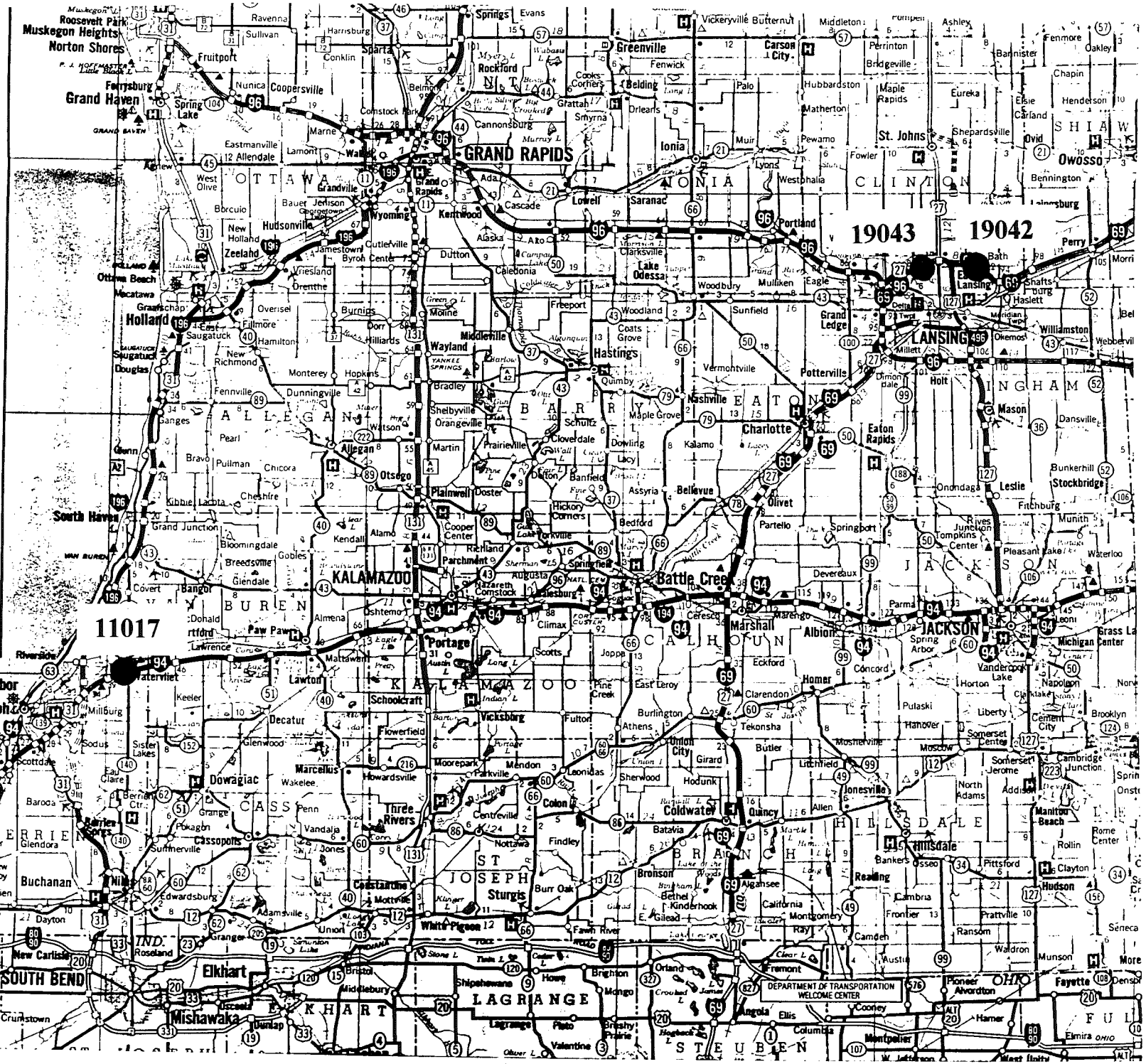
ATE BIRD
ain

STATE TREE
White Pine

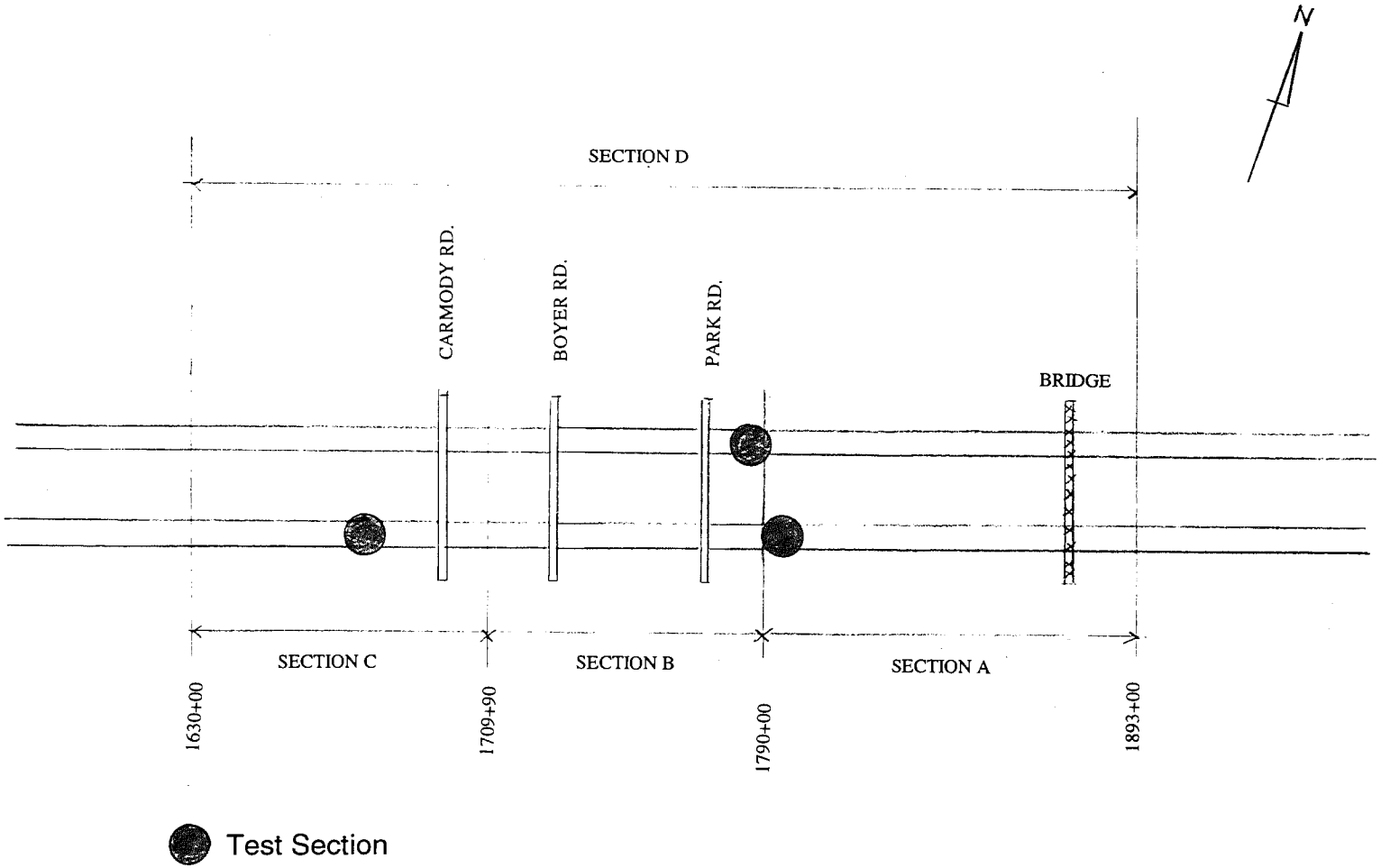
RICAL MARKERS

your Michigan travels into interesting
y lessons by reading the more than 1,100
ical markers at registered sites across the
. Since 1955, the Michigan Historical
mission and the Bureau of History,
gan Department of State, have erected
markers to commemorate Michigan's
se history. Historical events such as the
al of the British and French and early
igan industries such as mining, lumbering
agriculture are chronicled. You'll find
ers noting the growth of the state's
ational institutions, the history of important
ings like the newly restored State Capitol,
biographies on adventurous Michiganians
as early aviatrix Harriet Quimby of
water. Markers can be found along
igan's scenic highways, in roadside parks
n villages and urban centers. They are
nd by private donations.

de to the markers and their locations may
urchased from the Bureau of History,
gan Department of State, 1-800/366-3703.



I-94 11017-32516A



SECTION OVERVIEW

CSN/JN: 11017-32516A (Section A)

Site Information:

Job Location:	I-94, East Bound, Near Park Road Overpass
Total lane ESAL's/Year:	406,500

Construction Information:

Date Constructed:	August, 1995
Contractor:	Interstate Highway Construction
Slab Length:	16 ft (14 ft widened truck lane)
Pavement System:	
Concrete	12 in
Base	4 in OGDC
Subbase	Class II Sand
Placing Temperature:	
Concrete	85 F
Air	High 86 F and low 60 F
Intermediate Shoulder Joints?	NO
Other:	Asphalt Shoulders, Filter seperator between base and subbase

Testing Information

Date Tested:	4/23/97
Stations Tested:	1790+09.5 to 1795+08
Job Miles Tested:	3.924 to 4.019
Weather Conditions:	Mostly Sunny
Air Temperature:	50 to 60 F
Field Testing :	
Pavement System:	FWD - morning, afternoon; Distress Survey; Drainage Survey
Concrete:	Concrete Coring
Foundation:	Soil Sampling - base, subbase; DCP
Laboratory Testing:	
Concrete:	Compressive Strength; Split Tensile Strength; Elastic Modulus
Foundation:	Sieve Analysis - gradation of base, subbase Loss on Wash - subbase

Field Observations

Distress Noted:	High distress for age of section, 11 of 31 slabs have full width cracks, beginnings of spalling, some longitudinal cracks, numerous partial width transverse cracks near longitudinal joints, small amount of plastic shrinkage cracking observed
Drainage System:	Drains were clear and working. Water was seen flowing from outlets after coring
Other:	

System Performance

Distresses:	
PMS:	N/A
RQI:	N/A
FWD:	

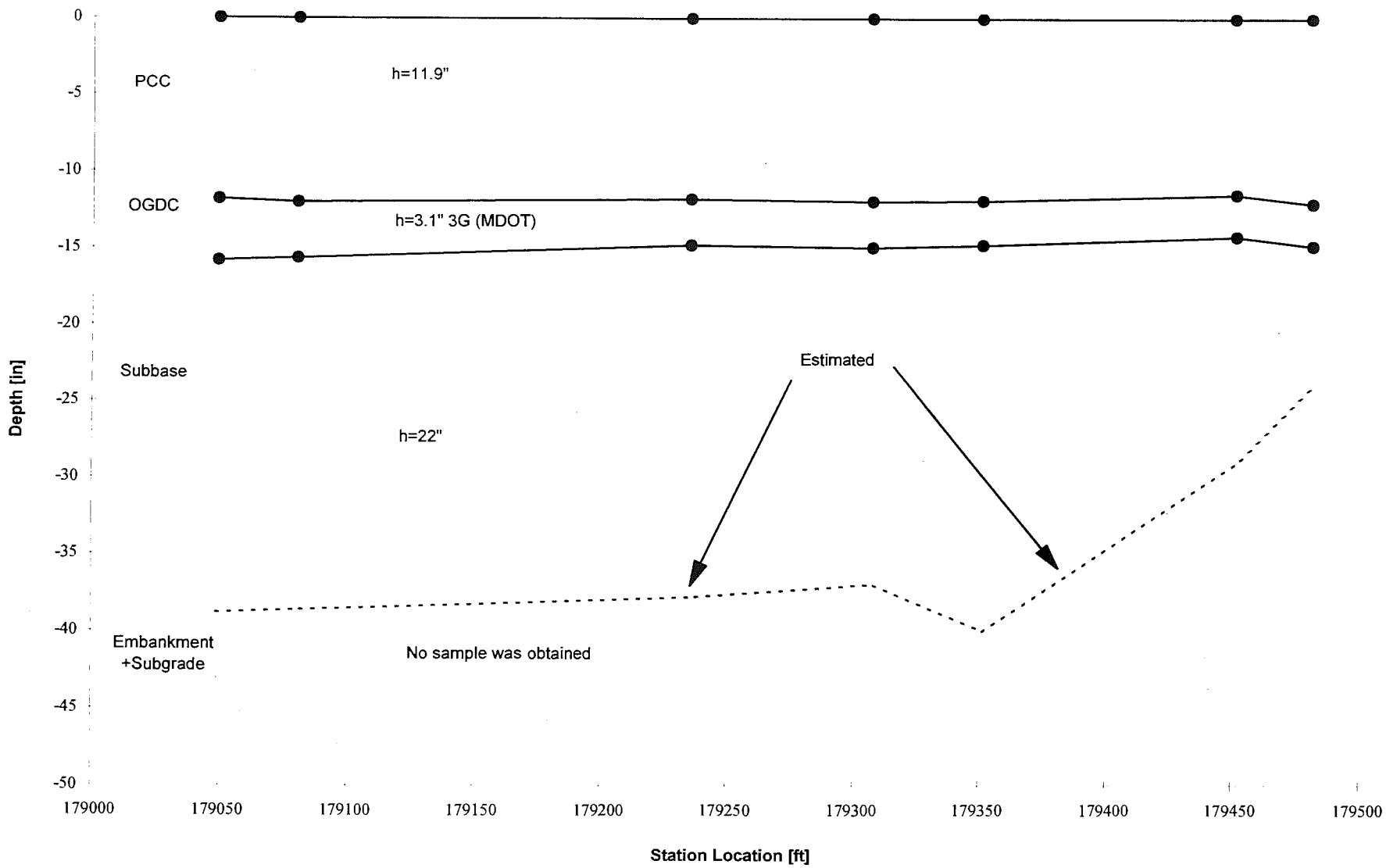
Concrete Properties

Avg. Thickness:	11.9 in
Avg. Compressive Strength:	6520 psi
Avg. Split Tensile Strength:	640 psi
Avg. Elastic Modulus:	4.64E+06 psi

Foundation

Gradation:	
Base:	3G crushed lime stone
Subbase:	Class II sand
Filter Criteria	Not met, subgrade samples were unattainable
DCP	
Base:	10 - 24 mm/blow
Subbase:	5 - 10 mm/blow
Other	

I-94 11017-32516A (Section A) Profile



SECTION OVERVIEW

CSN/JN: 11017-32516A (Section C)

Site Information:

Job Location:	I-94, East Bound, West of Carmody Road Overpass
Total lane ESAL's/Year:	406,500

Construction Information:

Date Constructed:	September, 1995
Contractor:	Interstate Highway Construction
Slab Length:	15, 16, 17 ft variable (14 ft widened truck lane)
Pavement System:	
Concrete	12 in
Base	4 in OGDC, specified 3G crushed limestone
Subbase	
Placing Temperature:	
Concrete	81 F
Air	High 87 F and low 43 F
Intermediate Shoulder Joints?	NO
Other:	Asphalt shoulders, Filter seperator between base and subbase

Testing Information

Date Tested:	4/30/97
Stations Tested:	1682+62 to 1690+15
Job Miles Tested:	1.889 to 2.032
Weather Conditions:	Partly Cloudy
Air Temperature:	45 to 50 F
Field Testing :	
Pavement System:	FWD - morning, afternoon; Distress Survey; Drainage Survey
Concrete:	Concrete Coring
Foundation:	Soil Sampling - base, subbase; DCP
Laboratory Testing:	
Concrete:	Compressive Strength; Split Tensile Strength; Elastic Modulus
Foundation:	Sieve Analysis - gradation of base, subbase Loss on Wash - subbase

Field Observations

Distress Noted:	Low to Moderate distress for age of section, 2 of 47 slabs have full width cracks, low to moderate spalling, numerous partial width cracks extending from longitudinal joint
Drainage System:	
Other:	

System Performance

Distresses:	
PMS:	N/A
RQI:	N/A
FWD:	Low load transfer efficiency at cracks and joints

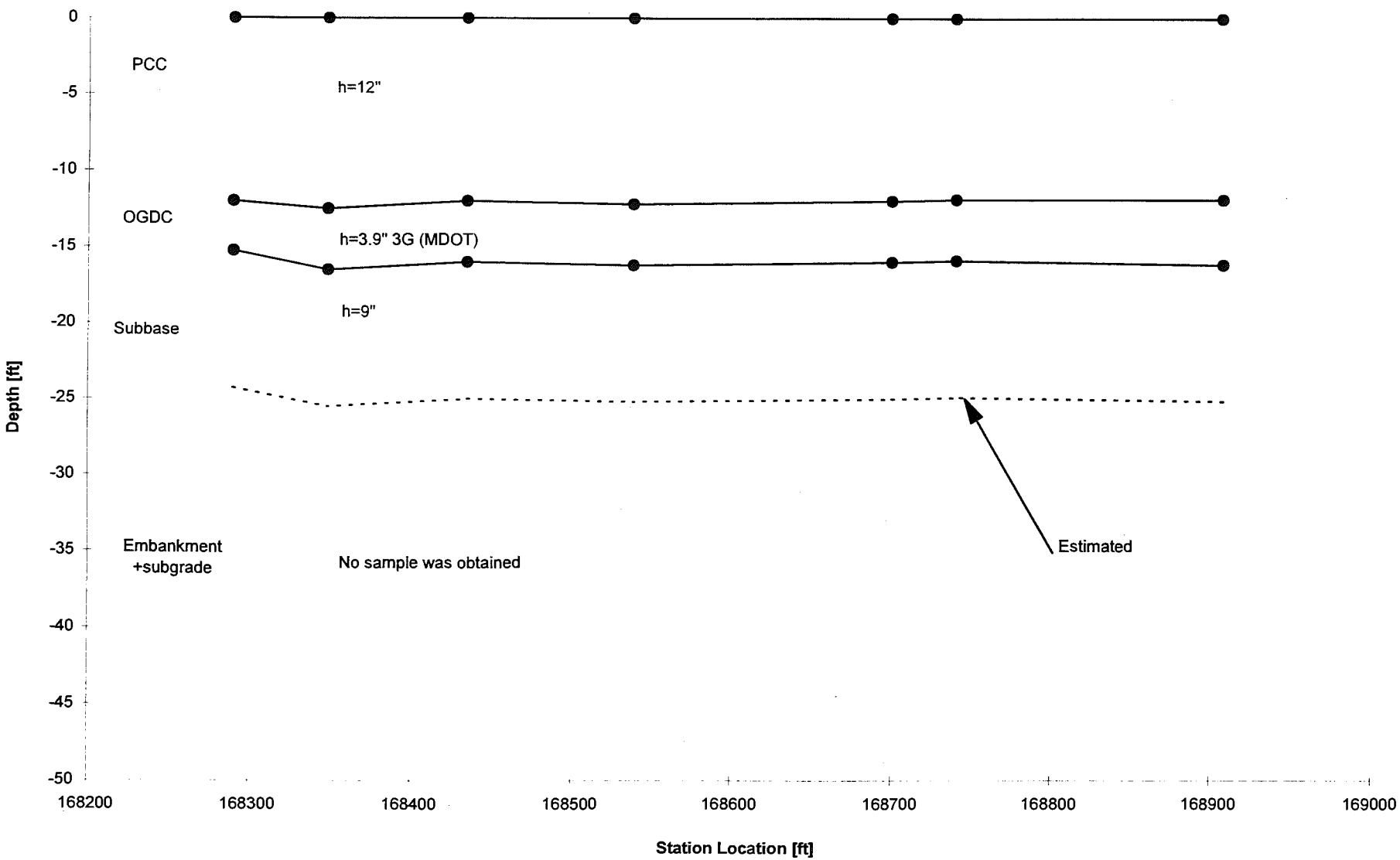
Concrete Properties

Average Thickness:	11.8 in.
Avg. Compressive Strength:	7030 psi
Avg. Split Tensile Strength:	580 psi
Avg. Elastic Modulus:	4.30E+06 psi

Foundation

Gradation:	
Base	Measured 4 in.
Subbase:	Measured 9 in.
Filter Criteria	Not met, subgrade samples were unattainable
DCP	
Base:	10 - 23 mm/blow
Subbase:	3 - 5 mm/blow
Other	.

I-94 11017-32516A (Section C) EB Profile



SECTION OVERVIEW

CSN/JN: 11017-32516A (Section D)

Site Information:

Job Location:	I-94, Westbound, East of Park Road Overpass
Total lane ESAL's/Year:	406,500

Construction Information:

Date Constructed:	May, 1996
Contractor:	Interstate Highway Construction
Slab Length:	15 ft. (14 widened truck lane)
Pavement System:	
Concrete	12 in.
Base	4 in. OGDC specified 3G
Subbase	Class II Sand
Placing Temperature:	
Concrete	75 F
Air	High 80 F and low 40 F
Intermediate Shoulder Joints?	NO
Other:	Asphalt Shoulders

Testing Information

Date Tested:	5/29/97
Stations Tested:	1793+08 to 1782+98
Job Miles Tested:	3.981 to 3.791
Weather Conditions:	Mostly Cloudy
Air Temperature:	45 to 50 F
Field Testing :	
Pavement System:	FWD - morning, afternoon, Distress Survey, Drainage Survey
Concrete:	Concrete Coring
Foundation:	Soil Sampling - base, subbase, embankment/subgrade, DCP
Laboratory Testing:	
Concrete:	Compressive Strength, Split Tensile Strength, Elastic Modulus
Foundation:	Sieve Analysis - gradation of base, subbase, subgrade Loss on Wash - subbase, subgrade

Field Observations

Distress Noted:	Low distress, minor spalling at some joints, longitudinal cracks present near longitudinal joint
Drainage System:	
Other:	Joints saw-cut to 2.5 in depth

System Performance

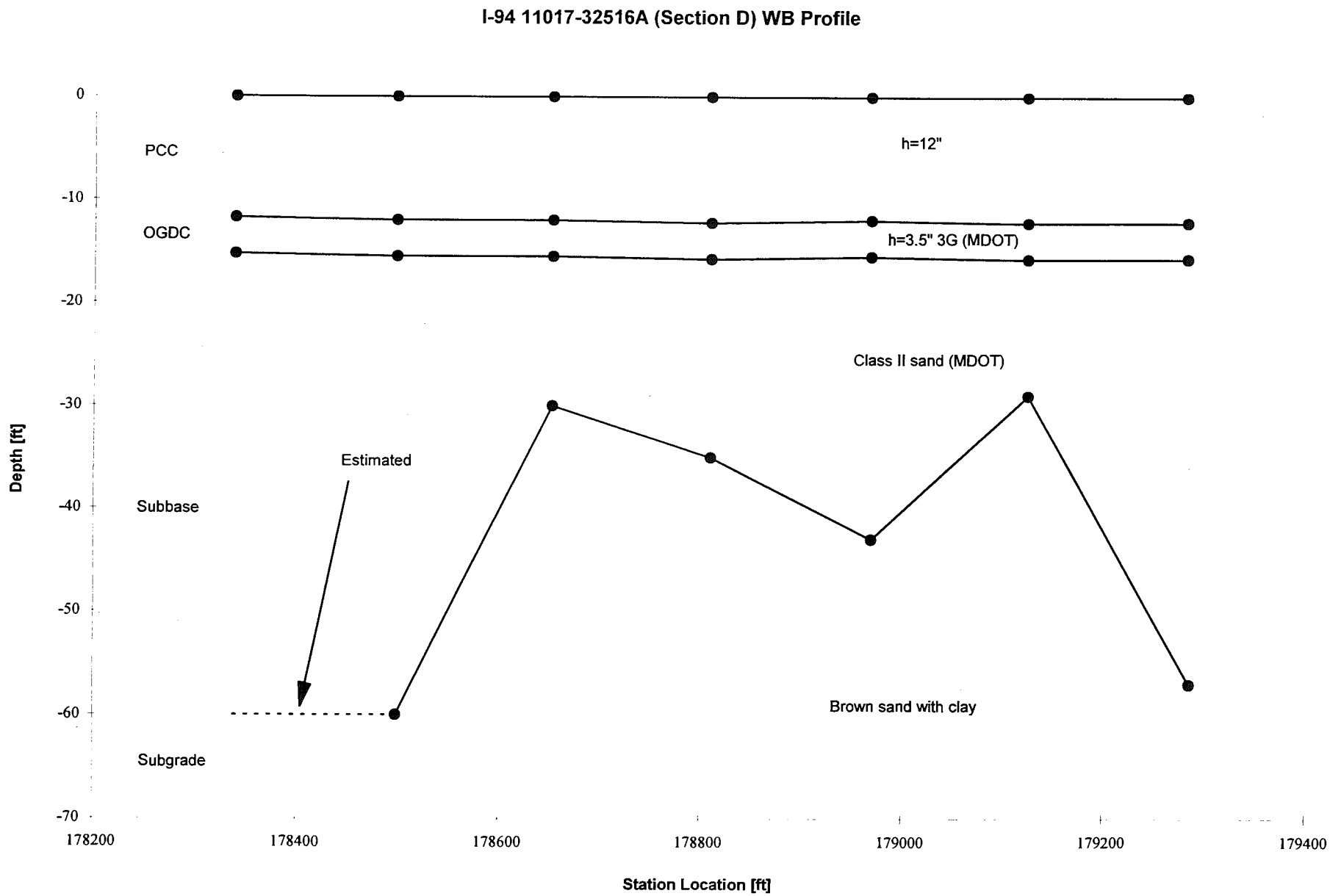
Distresses:	
PMS:	N/A
RQI:	N/A
FWD:	

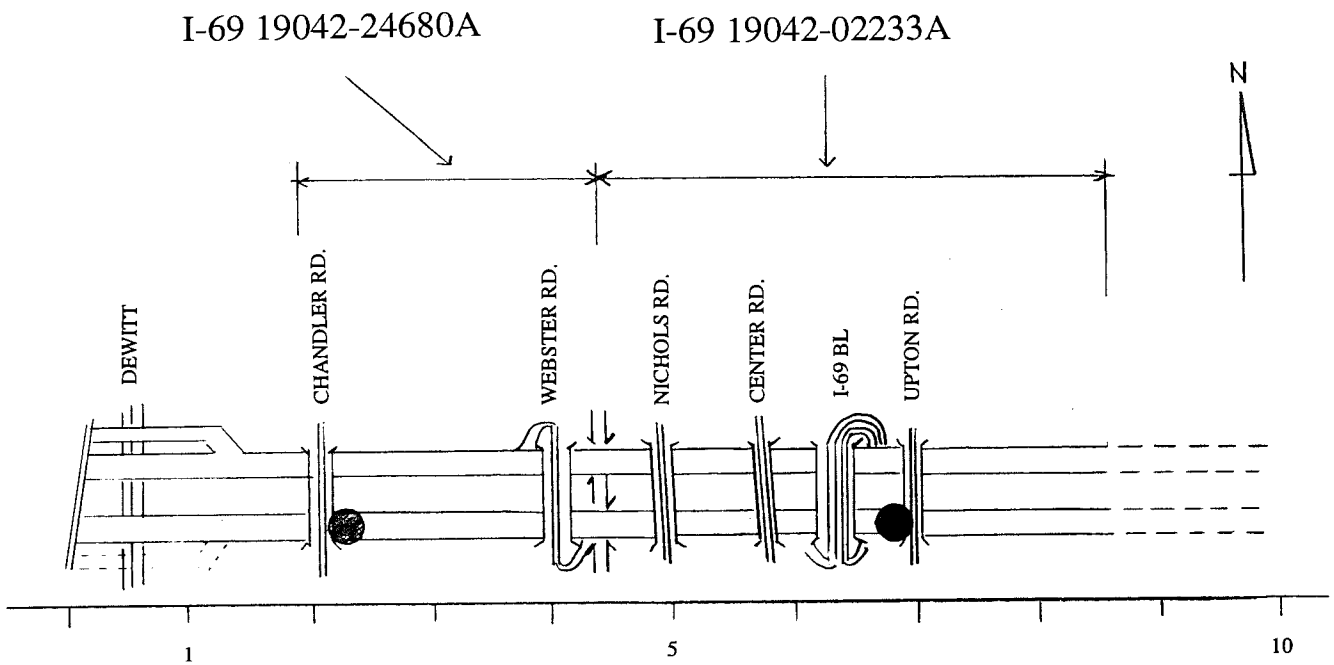
Concrete Properties

Average Thickness:	12.0 in.
Avg. Compressive Strength:	5690 psi
Avg. Split Tensile Strength:	555 psi
Avg. Elastic Modulus:	4.84E+06 psi

Foundation

Gradation:	
Base	Measured thickness 3-4 in.
Subbase:	Measured thickness 29-45 in.
Filter Criteria	Not met
DCP	
Base:	18 - 25 mm/blow
Subbase:	4 - 6 mm/blow
Other	.


I-94 11017-32516A (Section D) WB Profile
PCC
OGDC
Subbase
Subgrade
h=12"
h=3.5" 3G (MDOT)
Class II sand (MDOT)
Estimated
Brown sand with clay
Depth [ft]
0
-10
-20
-30
-40
-50
-60
-70
178200
178400
178600
178800
179000
179200
179400
Station Location [ft]



Test Section

SECTION OVERVIEW

CSN/JN: 19042-24680A (Section B)

Site Information:

Job Location:	I -69, East Bound, East of Chandler Road
Total lane ESAL's/Year:	406,500

Construction Information:

Date Constructed:	September, 1986
Contractor:	Tony Angelo
Slab Length:	41 ft.
Pavement System:	
Concrete	9 in.
Base	4 in. OGDC, specified ????
Subbase	8 in, specified ???
Placing Temperature:	
Concrete	68 F
Air	77 F
Intermediate Shoulder Joints?	NO
Other:	1 ft. embankment beneath subbase cut to fill section expansion joints spaced at 328 ft.

Testing Information

Date Tested:	8/14/96
Stations Tested:	275+00 to 281+72
Mileposts Tested:	2.077 to 2.204
Weather Conditions:	Cloudy in the morning, sunny at mid-day
Air Temperature:	65 - 95 F
Field Testing :	
Pavement System:	FWD - morning, noon, afternoon, Distress Survey, Drainage Survey
Concrete:	Concrete Coring
Foundation:	Soil Sampling - base, subbase, embankment/subgrade, DCP
Laboratory Testing:	
Concrete:	Compressive Strength, Split Tensile Strength, Elastic Modulus
Foundation:	Sieve Analysis - gradation of base, subbase, subgrade Loss on Wash - subbase, subgrade

Field Observations

Distress Noted:	Minor transverse cracking, minor spalling Few very thin transverse cracks initiated in outer wheel path Network of very small shrinkage cracks detected
Drainage System:	Drain outlets spaced at 500 ft.
Other:	Joint sealants in poor condition Tining of surface was very rough

System Performance

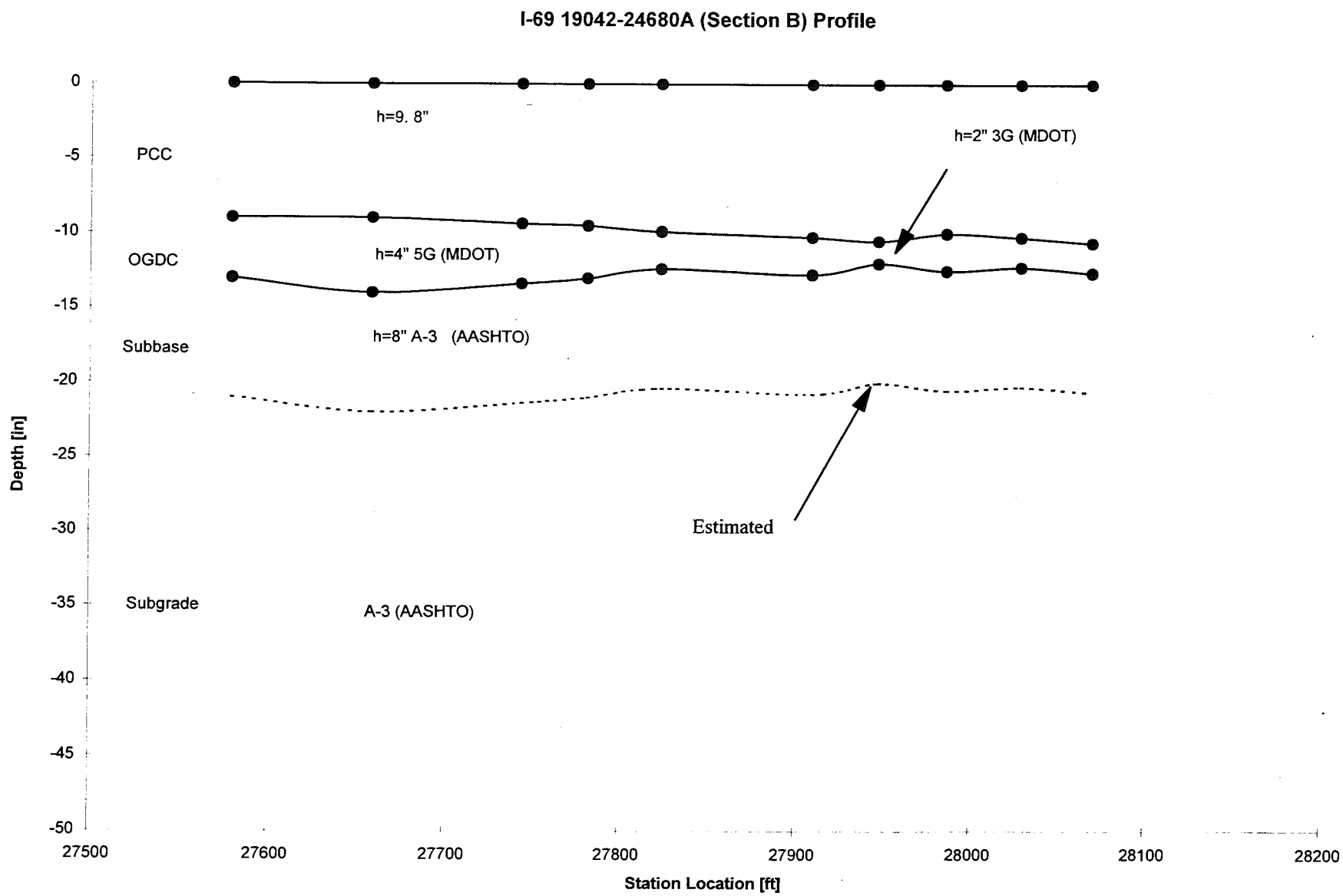
Distresses:	
PMS:	Entire CSN = 0.4 Job tested = 0.328
RQI:	1995 average = 52.074 Average growth = 0.02536
FWD:	High load transfer efficiency at joints and cracks High composite subgrade reaction calculated High corner deflections, low midslab deflections

Concrete Properties

Avg. Thickness:	in.
Avg. Compressive Strength:	6360 psi
Avg. Split Tensile Strength:	600 psi
Avg. Elastic Modulus:	4.60E+06 psi
Other:	Concrete thickness increases as base gradation changes

Foundation

Gradation:	
Base	OGDC Crushed Stone varies from 5G to 3G classification thickness varies from 4 to 2 in as gradation gets coarser
Subbase:	1 ft thick
Filter Criteria	Core M1 to M5 meet criteria and M6 to M10 do not
DCP	
Base:	3 - 6 mm/blow (large diameter DCP)
Subbase:	1 - 2 mm/blow (large diameter DCP)
Other:	Subgrade light brown silty clay with trace gravel Near bridge, embankment sand changes color indicating different origin


I-69 19042-24680A (Section B) Profile
h=9. 8"
h=2" 3G (MDOT)
PCC
OGDC
h=4" 5G (MDOT)
Subbase
h=8" A-3 (AASHTO)
Estimated
Subgrade
A-3 (AASHTO)
Depth [in]
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
27500
27600
27700
27800
27900
28000
28100
28200
Station Location [ft]

SECTION OVERVIEW

CSN/JN: 19042-02233A (Section C)

Site Information:

Job Location:	I-69, East Bound, East of Upton Road
Total lane ESAL's/Year:	455,300

Construction Information:

Date Constructed:	August,1987
Contractor:	Holloway/Denton
Slab Length:	41 ft.
Pavement System:	
Concrete	9 in.
Base	4 in. OGDC specified 3G
Subbase	Specified 8 in.
Placing Temperature:	
Concrete	86 F
Air	81 F
Intermediate Shoulder Joints?	NO
Other:	1 ft embankment below subbase Cut Section

Testing Information

Date Tested:	8/7/96
Stations Tested:	527+20 to 533+00
Job Miles Tested:	6.863 to 6.973
Weather Conditions:	Hot and Sunny
Air Temperature:	70-105 F
Field Testing :	
Pavement System:	FWD - morning, noon, afternoon, Distress Survey, Drainage Survey
Concrete:	Concrete Coring
Foundation:	Soil Sampling - base, subbase, embankment/subgrade, DCP
Laboratory Testing:	
Concrete:	Compressive Strength, Split Tensile Strength, Elastic Modulus
Foundation:	Sieve Analysis - gradation of base, subbase, subgrade Loss on Wash - subbase, subgrade

Field Observations

Distress Noted:	1-3 Transverse cracks per slab Some cracks propagate into shoulder Minor spalling at transverse cracks. Joints are in good conditions
Drainage System:	Drain outlets spaced at every 500 ft. At station 527+50 drain was 1/2 clogged At station 532+50 drain was in good condition Swamp plants partly cover drains in ditch
Other:	

System Performance

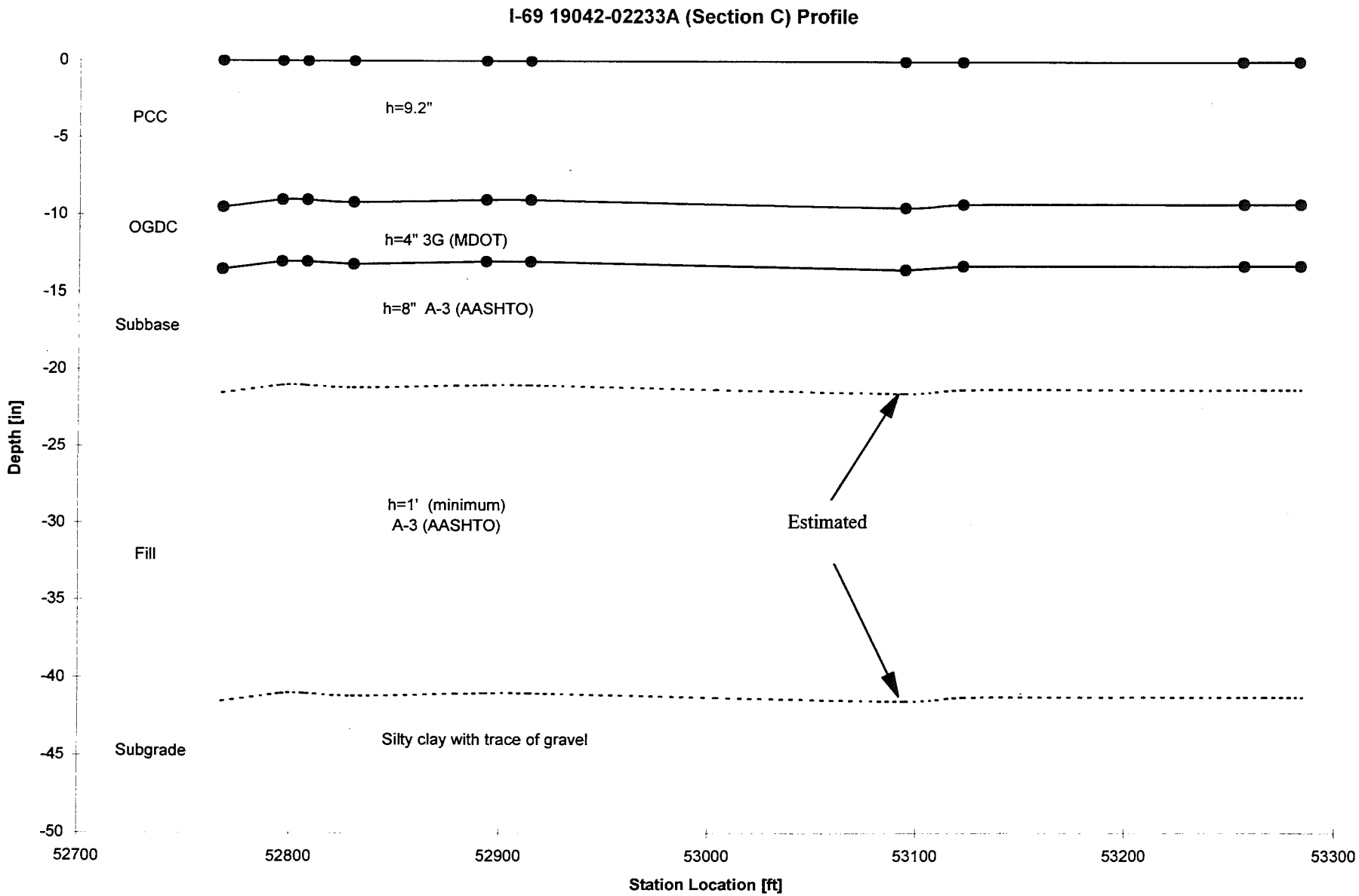
Distresses:	Minor distress level - transverse cracking + minor spalling
PMS:	Entire CSN = 0.4 Job tested = 0.472
RQI:	1995 average = 53.429 Average growth = 0.05636
FWD	

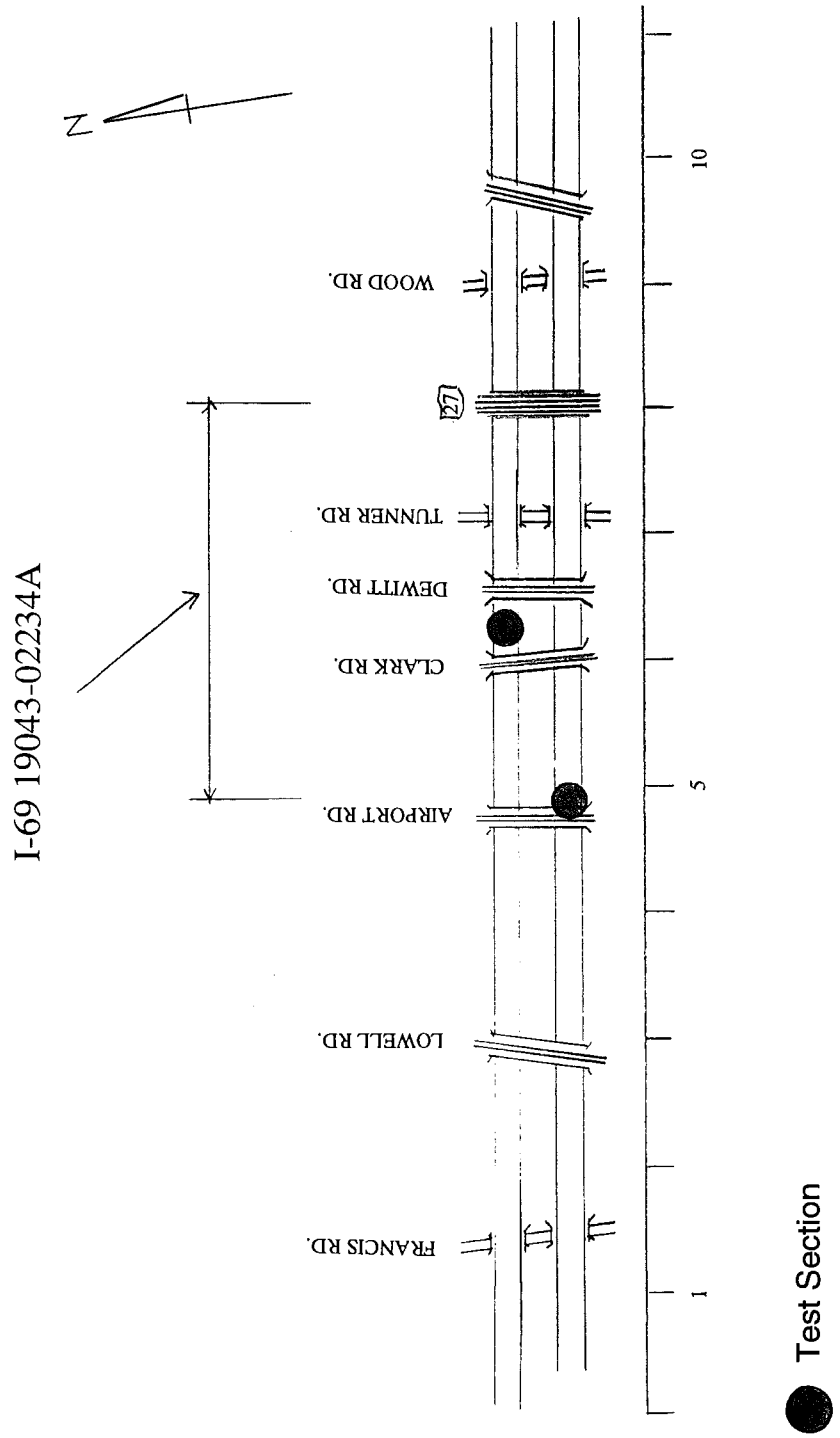
Concrete Properties

Avg. Compressive Strength:	6600 psi
Avg. Split Tensile Strength:	660 psi
Avg. Elastic Modulus:	4.73E+06 psi

Foundation

Gradation:	
Base	Classifies as 3G
Subbase:	Sand
Filter Criteria	Criteria is met on one out of the five core holes
DCP	
Base:	6 - 11 mm/blow
Subbase:	2 - 3 mm/blow
Other	Base thickness varies slightly Subbase + embankment approx. 2 ft thick.


I-69 19042-02233A (Section C) Profile
PCC
h=9.2"
OGDC
h=4" 3G (MDOT)
Subbase
h=8" A-3 (AASHTO)
Fill
h=1' (minimum)
A-3 (AASHTO)
Estimated
Subgrade
Silty clay with trace of gravel
Depth [in]
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
52700
52800
52900
53000
53100
53200
53300
Station Location [ft]


I-69 19043-02234A
N
FRANCIS RD.
LOWELL RD.
AIRPORT RD.
CLARK RD.
DEWITT RD.
TUNNER RD.
WOOD RD.
1
5
10
Test Section

SECTION OVERVIEW

CSN/JN: 19043-02234 EB

Site Information:

Job Location:	I69, East Bound, Between Airport and Clark Road
Total lane ESAL's/Year:	374,000

Construction Information:

Date Constructed:	
Contractor:	M & B
Slab Length:	41 ft
Pavement System:	
Concrete	9 in
Base	4 in DGBC
Subbase	8 in
Placing Temperature:	
Concrete	53 F
Air	45 F
Intermediate Shoulder Joints?	YES
Other:	1 ft embankment below subbase

Testing Information

Date Tested:	8/15/96
Stations Tested (metric):	136+98 to 138+97
Miles Tested:	4.943 to 4.980
Weather Conditions:	Cloudy in morning, sunny at mid-day
Air Temperature:	60-80 F
Field Testing :	
Pavement System:	FWD - morning, noon, afternoon, Distress Survey, Drainage Survey
Concrete:	Concrete Coring
Foundation:	Soil Sampling - base, subbase, embankment/subgrade, DCP
Laboratory Testing:	
Concrete:	Compressive Strength, Split Tensile Strength, Elastic Modulus
Foundation:	Sieve Analysis - gradation of base, subbase, subgrade Loss on Wash - subbase, subgrade

Field Observations

Distress Noted:
Drainage System:
Other:

System Performance

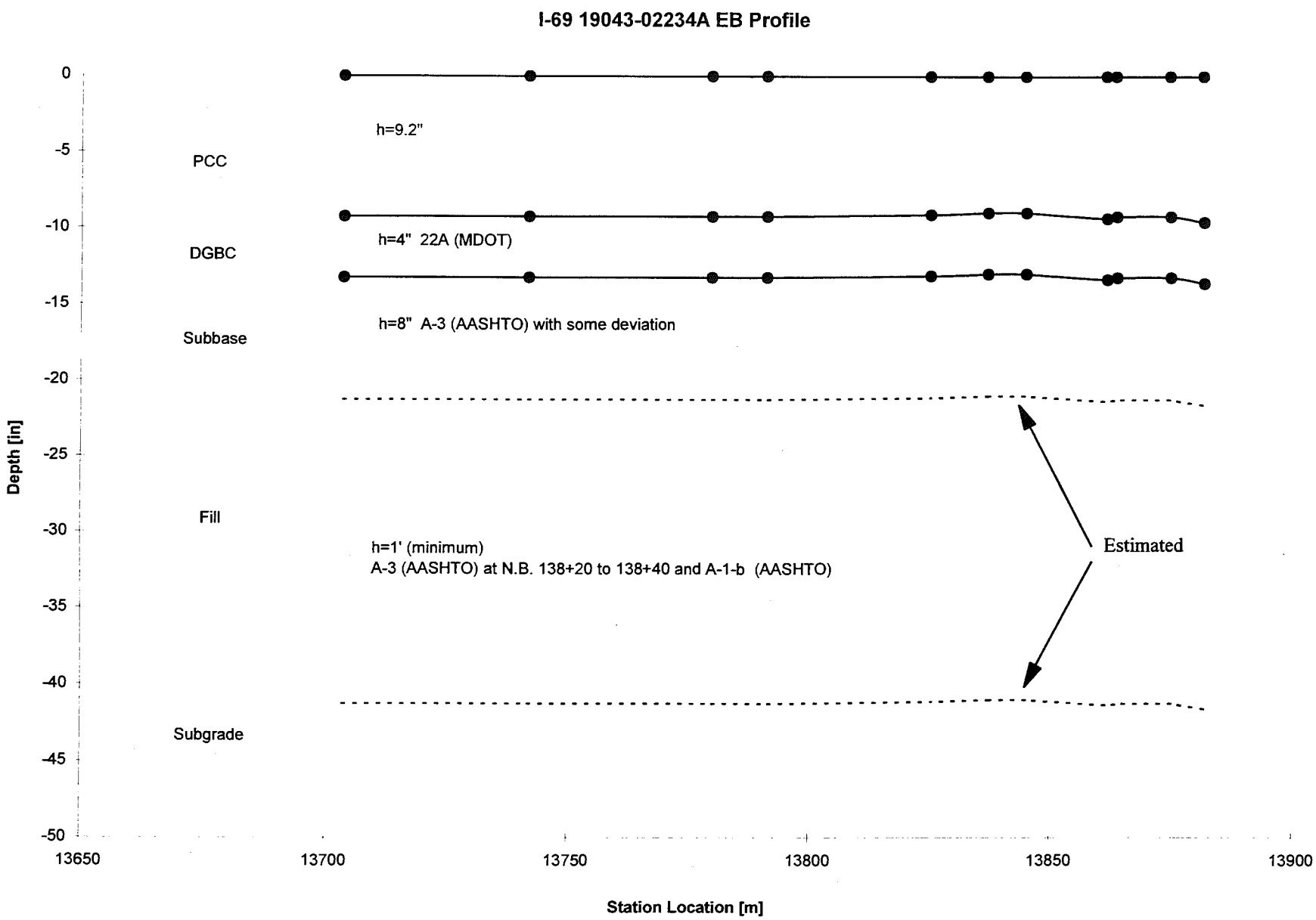
Distresses:
PMS: Entire CSN = 4.6 Job tested = 1.32
RQI: 1995 average = 54.4 Average growth = 0.02379
FWD

Concrete Properties

Average Thickness:
Avg. Compressive Strength: 7110 psi
Avg. Split Tensile Strength: 550 psi
Avg. Elastic Modulus: 5.23E+06

Foundation

Gradation:
Base Measured 4 in 22A
Subbase: Measured 8 in. with some deviations
Filter Criteria Criteria is met
DCP
Base: 2 - 4 mm/blow (large diameter DCP)
Subbase: 1 - 2 mm/blow (large diameter DCP)
Other .


I-69 19043-02234A EB Profile
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
Depth [in]
PCC
DGBC
Subbase
Fill
Subgrade
h=9.2"
h=4" 22A (MDOT)
h=8" A-3 (AASHTO) with some deviation
h=1' (minimum)
A-3 (AASHTO) at N.B. 138+20 to 138+40 and A-1-b (AASHTO)
Estimated
13650
13700
13750
13800
13850
13900
Station Location [m]

SECTION OVERVIEW

CSN/JN: 19043-02234A WB

Site Information:

Job Location:	I-69, West Bound, between Dewitt and Clark Road
Total lane ESAL's/Year:	374,000

Construction Information:

Date Constructed:	
Contractor:	M & B
Slab Length:	41 ft
Pavement System:	
Concrete	9 in
Base	4 in DGBC
Subbase	8 in
Placing Temperature:	
Concrete	52 F
Air	43 F
Intermediate Shoulder Joints?	YES
Other:	1 ft embankment beneath subbase

Testing Information

Date Tested:	10/2/96
Stations Tested (metric):	150+82 to 147+80
Miles Tested:	
Weather Conditions:	Cloudy in Morning, Sunny at mid-day
Air Temperature:	35-65 F
Field Testing :	
Pavement System:	FWD - morning, noon, afternoon, Distress Survey, Drainage Survey
Concrete:	Concrete Coring
Foundation:	Soil Sampling - base, subbase, embankment/subgrade, DCP
Laboratory Testing:	
Concrete:	Compressive Strength, Split Tensile Strength, Elastic Modulus
Foundation:	Sieve Analysis - gradation of base, subbase, subgrade Loss on Wash - subbase, subgrade

Field Observations

Distress Noted:	Very Low level of Transverse cracking Transverse cracks initiated at intermediate shoulder joints Not all intermediate joints had transverse cracks # and width of cracks decreased going west Joints in good condition
Drainage System:	
Other:	

System Performance

Distresses:	
PMS:	Entire CSN = 3.3 Job tested = 4.22
RQI:	1995 average = 53.1667 Average growth = 0.02542
FWD	Fair load transfer efficiency at joints Good load transfer efficiency at transverse cracks Low composite subgrade reaction K

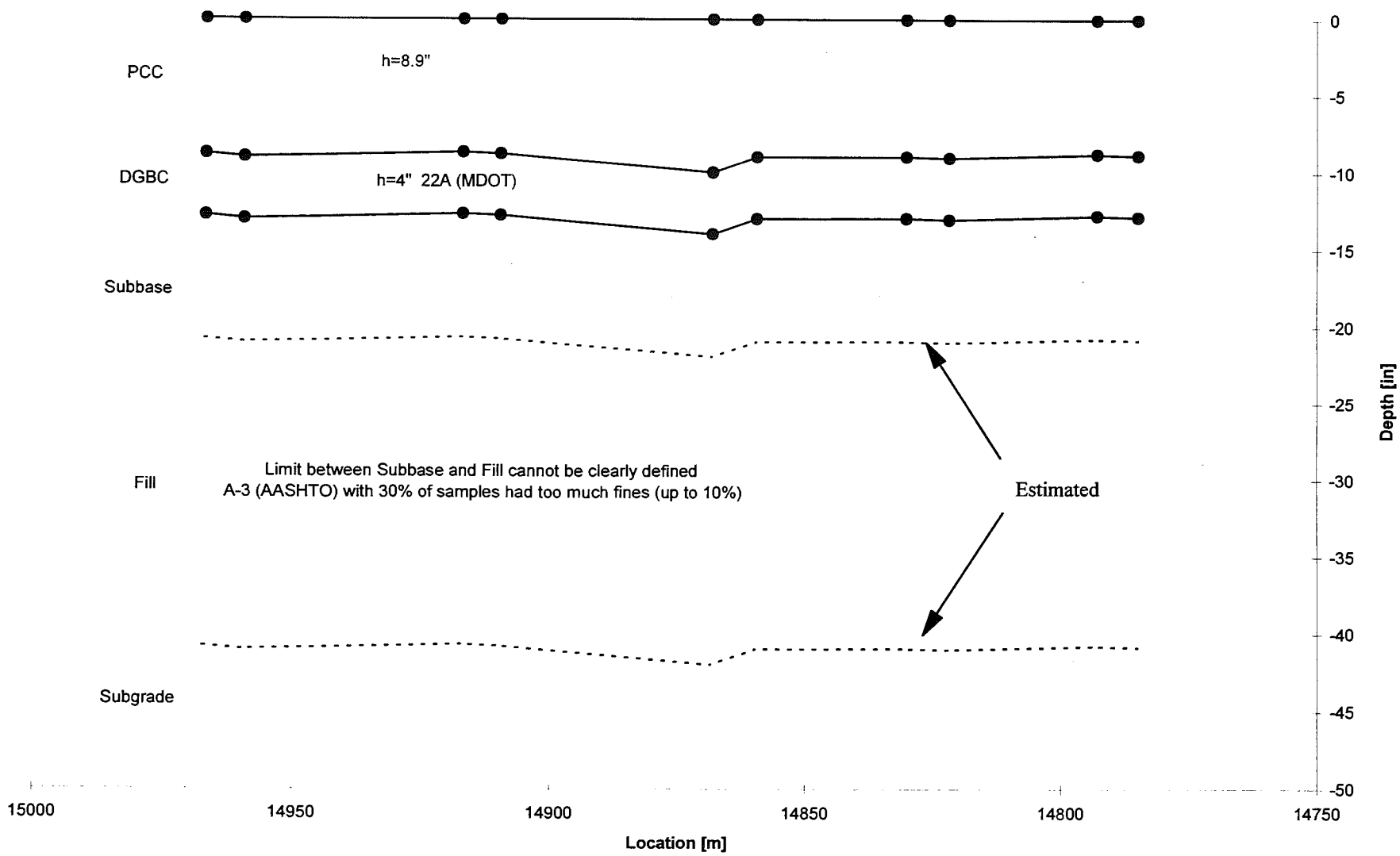
Concrete Properties

Avg. Thickness:	8.9 in
Avg. Compressive Strength:	6720
Avg. Split Tensile Strength:	590
Avg. Elastic Modulus:	5.49E+06

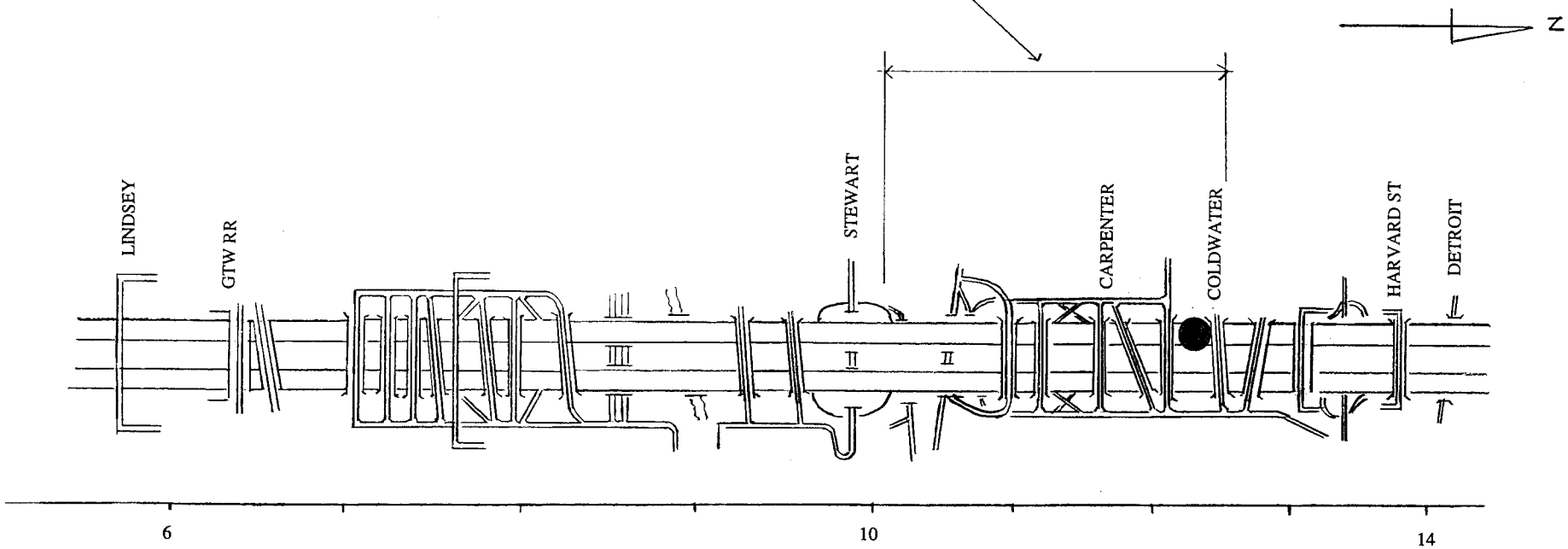
Foundation

Gradation:	
Base	Measured 4 in. 22A
Subbase:	Measured 8 in.
Filter Criteria	No samples (for subbase)
DCP	
Base:	4 - 10 mm/blow
Subbase:	2 - 3 mm/blow
Other	.

I-69 19043-02234A WB Profile



I-475 25132-06582A



Test Section

SECTION OVERVIEW

CSN/JN: 25132-06582A

Site Information:

Job Location:	I-475, South Bound, South of Coldwater Road Overpass
Total lane ESAL's/Year:	316,200

Construction Information:

Date Constructed:	1981
Contractor:	
Slab Length:	44 ft.
Pavement System:	
Concrete	9 in
Base	4 in DGBC
Subbase	
Placing Temperature:	
Concrete	
Air	
Intermediate Shoulder Joints?	YES
Other:	Sewers for Drainage

Testing Information

Date Tested:	6/26/97
Stations Tested:	660+30 to 649+97
Mileposts Tested:	
Weather Conditions:	Mostly Sunny
Air Temperature:	80 to 85 F
Field Testing :	
Pavement System:	FWD - morning, afternoon, Distress Survey, Drainage Survey, Faultmeter
Concrete:	Concrete Coring
Foundation:	Soil Sampling - base, subbase, subgrade, DCP
Laboratory Testing:	
Concrete:	Compressive Strength, Split Tensile Strength, Elastic Modulus
Foundation:	Sieve Analysis - gradation of base, subbase, subgrade Loss on Wash - base, subbase, subgrade

Field Observations

Distress Noted:	Moderate Distress. Sympathy cracks from shoulder joints, transverse cracks initiated by sewer grates, moderate spalling, some faulting, Joints are in good condition
Drainage System:	Sewer system provides drainage, sewers every 300 ft.
Other:	

System Performance

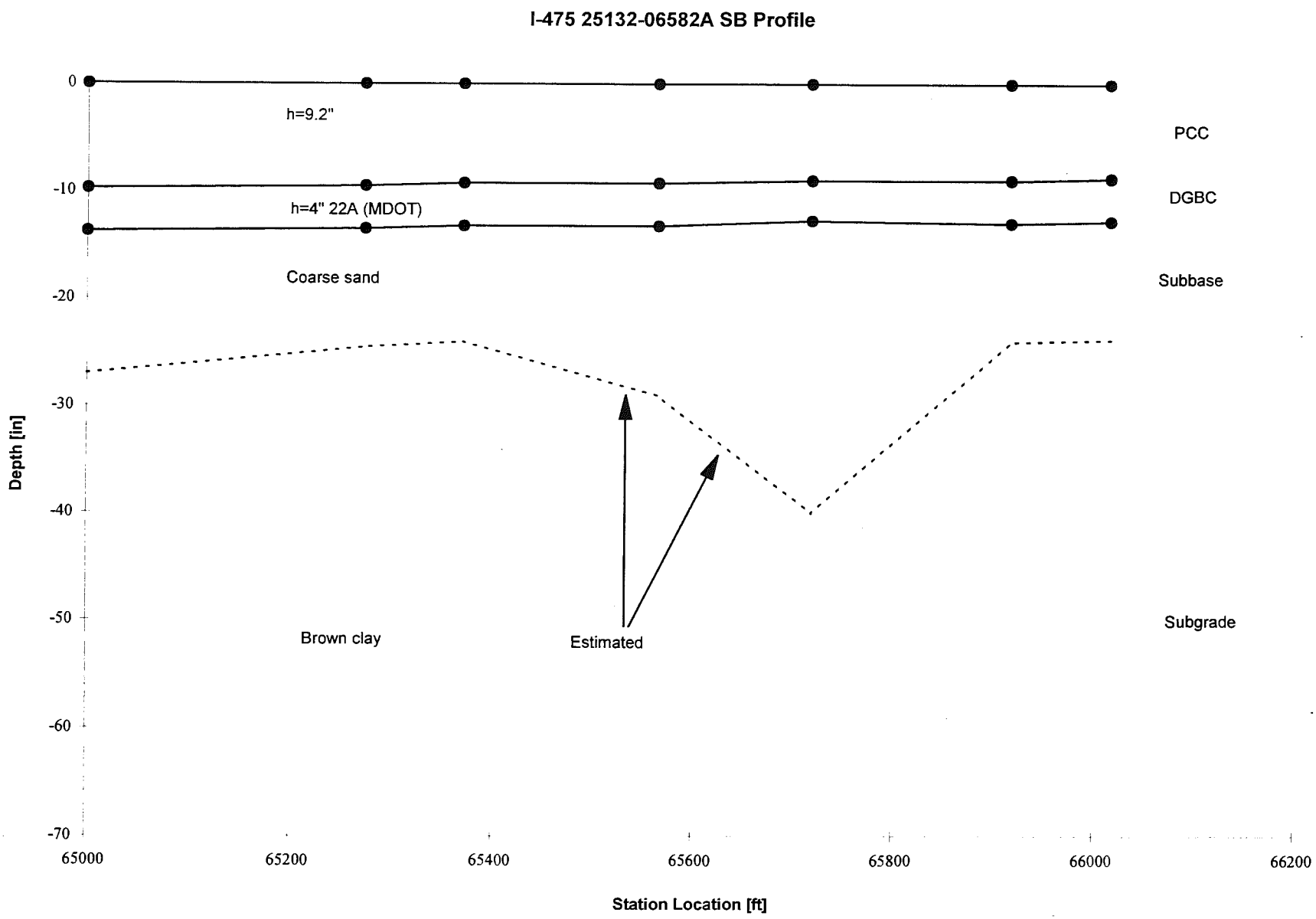
Distresses:	
PMS:	Entire CSN = 11.2 Job tested = 3.16
RQI:	1995 average = 55.88 Average growth = 0.01181
FWD	Good load transfer at joints and cracks

Concrete Properties

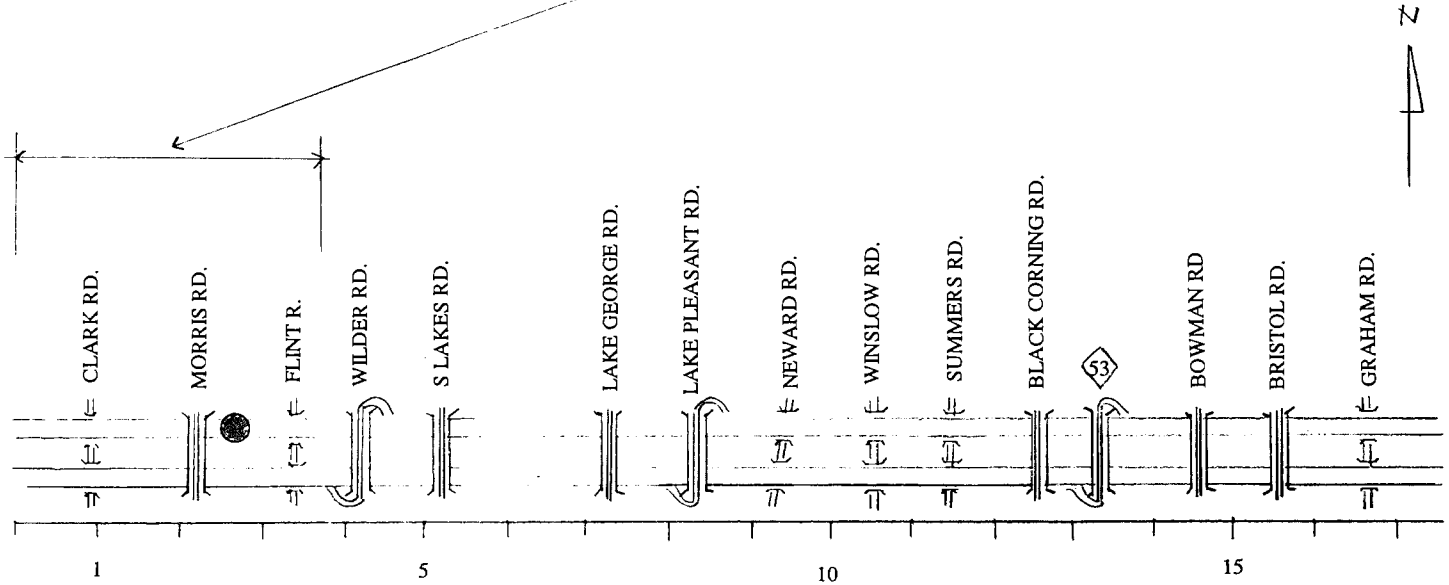
Average Thickness:	
Avg. Compressive Strength:	5670 psi
Avg. Split Tensile Strength:	680 psi
Avg. Elastic Modulus:	5.69E+06 psi

Foundation

Gradation:	
Base	Measured 4 in. 22A
Subbase:	Measured 10 in.
Filter Criteria	Criteria is met
DCP	
Base:	7 - 12 mm/blow
Subbase:	4 - 7 mm/blow
Other	.


I-475 25132-06582A SB Profile
0
-10
-20
-30
-40
-50
-60
-70
Depth [in]
h=9.2"
PCC
h=4" 22A (MDOT)
DGBC
Coarse sand
Subbase
Brown clay
Estimated
Subgrade
65000
65200
65400
65600
65800
66000
66200
Station Location [ft]

I-69 44044-18804A



● Test Section

SECTION OVERVIEW

CSN/JN: 44044-18804A

Site Information:

Job Location:	I-69, West Bound, Between Morris Road and Clark Road
Total lane ESAL's/Year:	243,900

Construction Information:

Date Constructed:	September, 1984
Contractor:	Denton Construction
Slab Length:	41 ft
Pavement System:	
Concrete	9 in
Base	4 in OGDC
Subbase	8 in
Placing Temperature:	
Concrete	71 F
Air	69 F
Intermediate Shoulder Joints?	YES
Other:	1 ft embankment beneath subbase

Testing Information

Date Tested:	7/23/96
Stations Tested:	671+70 to 666+04
Miles Tested:	1.732 to 1.839
Weather Conditions:	Warm and Sunny
Air Temperature:	60 - 95 F
Field Testing :	
Pavement System:	FWD - morning, noon, afternoon, Distress Survey, Drainage Survey
Concrete:	Concrete Coring
Foundation:	Soil Sampling - base, subbase, embankment/subgrade, DCP
Laboratory Testing:	
Concrete:	Compressive Strength, Split Tensile Strength, Elastic Modulus
Foundation:	Sieve Analysis - gradation of base, subbase, subgrade Loss on Wash - subbase, subgrade

Field Observations

Distress Noted:	High Distress Level, transverse cracking, spalling, and some faulting Transverse cracks propagate from shoulder joints Decreasing spalling and avg. crack width going west Faulting of 0.25 in at station 669+00 Joints in good condition
Drainage System:	
Other:	

System Performance

Distresses:		
PMS:	Entire CSN = 2.6	Job tested = 0.883
RQI:	1995 average = 50.83	Average growth = 0.07307
FWD	Good load transfer efficiency of joints. Low composite subgrade reaction K	

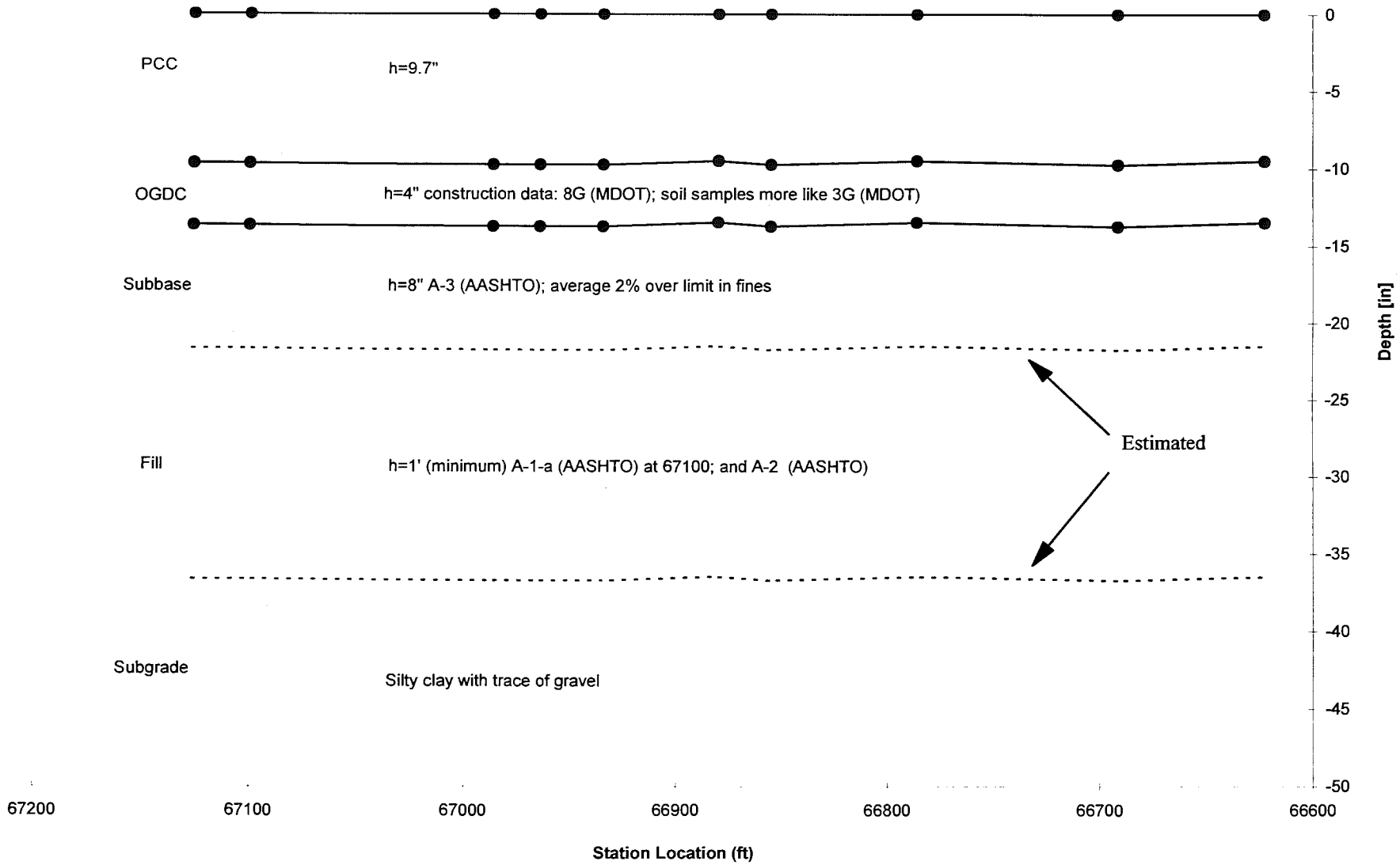
Concrete Properties

Avg. Compressive Strength:	7450 psi
Avg. Split Tensile Strength:	555 psi
Avg. Elastic Modulus:	4.72E+06 psi

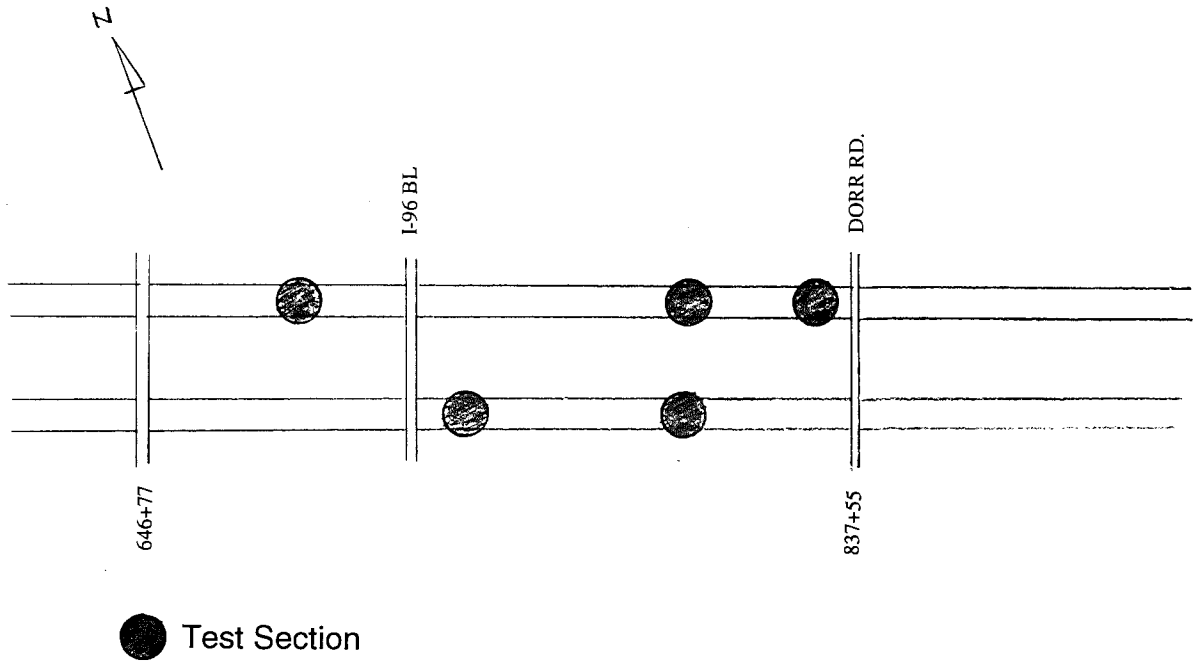
Foundation

Gradation:	
Base	Measured 4 in. 3G
Subbase:	Measured 8 in. sand
Filter Criteria	Not met
DCP	
Base:	9 - 25 mm/blow
Subbase:	3 - 5 mm/blow
Other	.

I-69 44044-18804A WB Profile



I-96 47065-28215A



SECTION OVERVIEW

CSN/JN: 47065-28215A

Site Information:

Job Location:	I-96 East Bound and West Bound
Total lane ESAL's/Year:	657,700

Construction Information:

Date Constructed:	Westbound, Fast lane and Shoulder, 4/30/97 to 5/14/97
	Eastbound, Fast Lane and Shoulder, 7/14/97 to 7/21/97
Contractor:	Interstate Highway Construction
Slab Length:	15 ft.
Pavement System:	
Concrete	10 in.
Base	4 in OGDC
Subbase	10 in Granular
Placing Temperature:	
Concrete	
Air	
Intermediate Shoulder Joints?	NO
Other:	3 in aggregate seperator specified 22A below base.

Testing Information

Date Tested:	WB 6/3/97, EB 7/31/97
Stations Tested:	Westbound 680+00 to 686+00 3G Slag
	Westbound 785+55 to 796+00 350 AA Limestone
	Westbound 820+65 to 829+84 350 AA Slag
	Eastbound 728+00 to 733+66 3G Slag
	Eastbound 784+88 to 795+07 3G Limestone
Weather Conditions:	Mostly Sunny
Air Temperature:	80-85 F
Field Testing :	
Pavement System:	FWD - morning, afternoon; Distress Survey
Concrete*(EB only)*:	Concrete Coring
Foundation*(EB only)*:	Soil Sampling - base, subbase, subgrade, DCP
Laboratory Testing*(EB only)*:	
Concrete:	Compressive Strength, Split Tensile Strength, Elastic Modulus
Foundation:	Sieve Analysis - gradation of base, subbase, subgrade
	Loss on Wash - subbase, subgrade

Field Observations

Distress Noted:	None
Drainage System:	
Other:	

System Performance

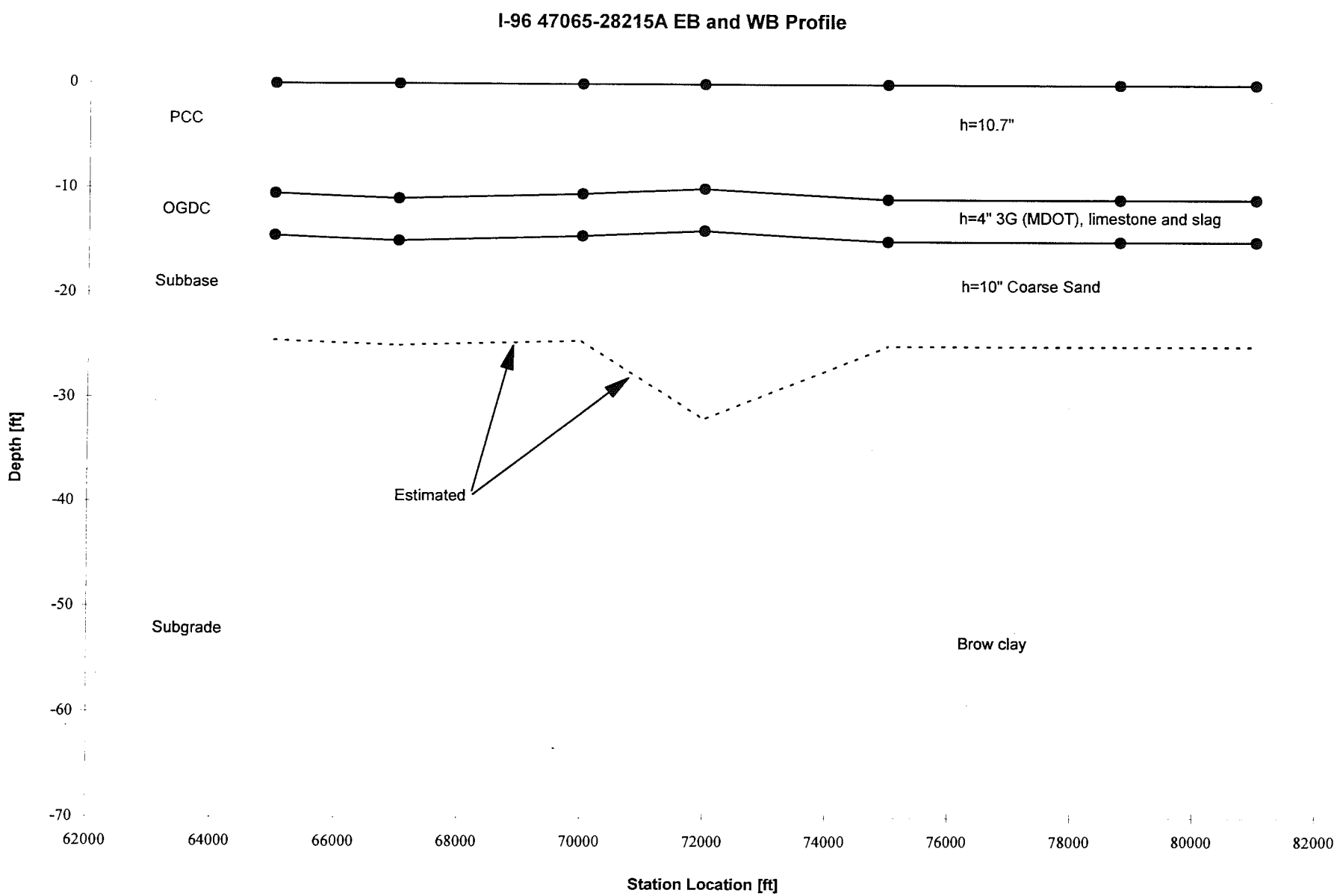
Distresses:	
PMS:	N/A
RQI:	N/A
FWD:	

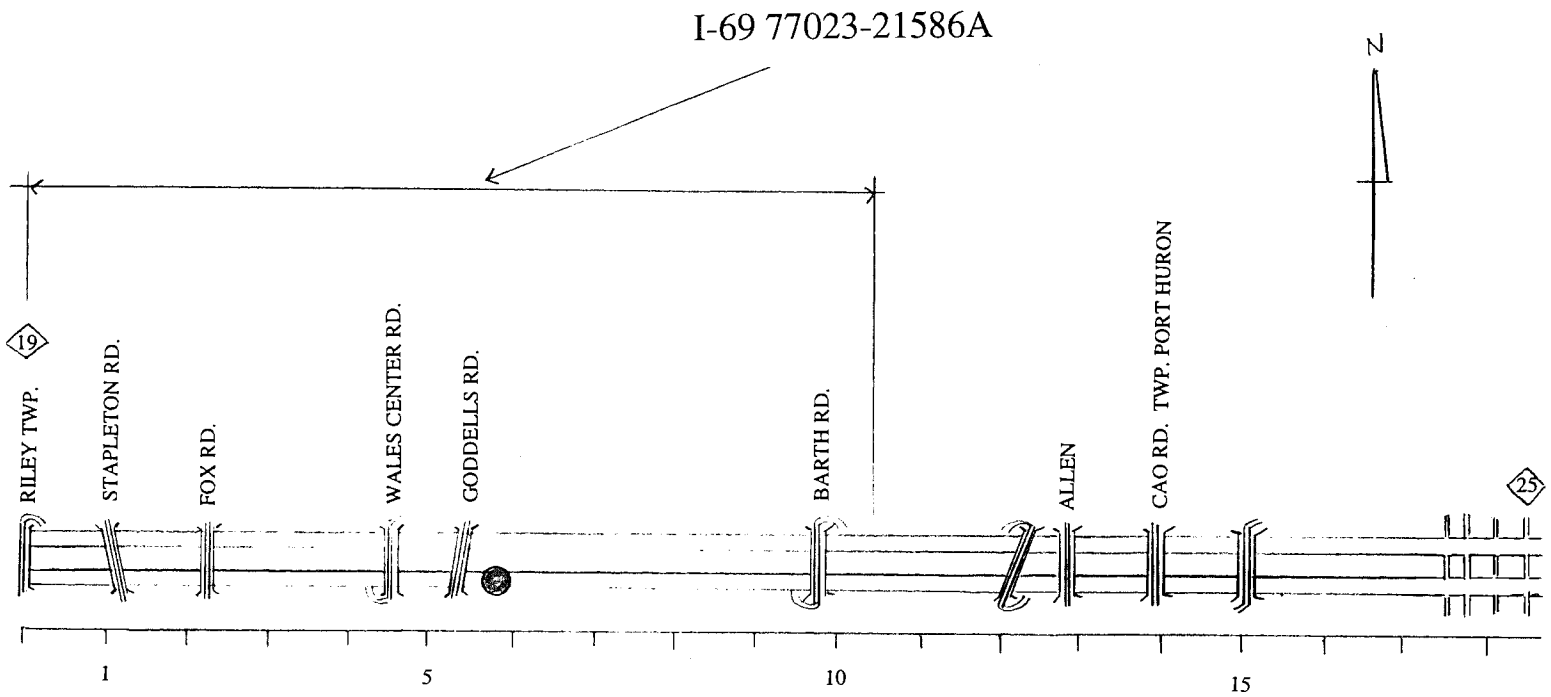
Concrete Properties

Average Thickness:	
Avg. Compressive Strength:	4370 psi
Avg. Split Tensile Strength:	570 psi
Avg. Elastic Modulus:	3.51E+06 psi

Foundation

Gradation:	
Base	Measured 4 in. 3G linestone and slag
Subbase:	Measured 10 in. coarse sand subbase
Filter Criteria	
DCP	
Base:	12 - 24 mm/blow
Subbase:	4 - 7 mm/blow
Other	.


I-96 47065-28215A EB and WB Profile
PCC
h=10.7"
OGDC
h=4" 3G (MDOT), limestone and slag
Subbase
h=10" Coarse Sand
Estimated
Subgrade
Brow clay
Depth [ft]
0
-10
-20
-30
-40
-50
-60
-70
62000
64000
66000
68000
70000
72000
74000
76000
78000
80000
82000
Station Location [ft]



Test Section

SECTION OVERVIEW

CSN/JN: 77023-21586A

Site Information:

Job Location:	I-69, East Bound, East of Goodells Road Overpass
Total lane ESAL's/Year:	178,900

Construction Information:

Date Constructed:	1984
Slab Length:	41 ft
Pavement System:	
Concrete	9 in
Base	4 in OGDC, specified 8G
Subbase	
Placing Temperature:	
Concrete	
Air	
Intermediate Shoulder Joints?	YES
Other:	

Testing Information

Date Tested:	7/2/97
Stations Tested:	1819+87 to 1835+03
Mileposts Tested:	
Weather Conditions:	Foggy and Overcast in the Morning, Clear in the Afternoon
Air Temperature:	65-90 F
Field Testing :	
Pavement System:	FWD - morning, afternoon, Distress Survey, Drainage Survey, Faultmeter
Concrete:	Concrete Coring
Foundation:	Soil Sampling - base, subbase, subgrade, DCP
Laboratory Testing:	
Concrete:	Compressive Strength, Split Tensile Strength, Elastic Modulus
Foundation:	Sieve Analysis - gradation of base, subbase, subgrade Loss on Wash - subbase, subgrade

Field Observations

Distress Noted:	Severe transverse cracking, faulting and spalling for first 1/3 of section. Slight improvement in performance in second 2/3 of section
Drainage System:	Drain outlets severely clogged with sand
Other:	Cold patching is wearing off cracks, Joints are in good condition

System Performance

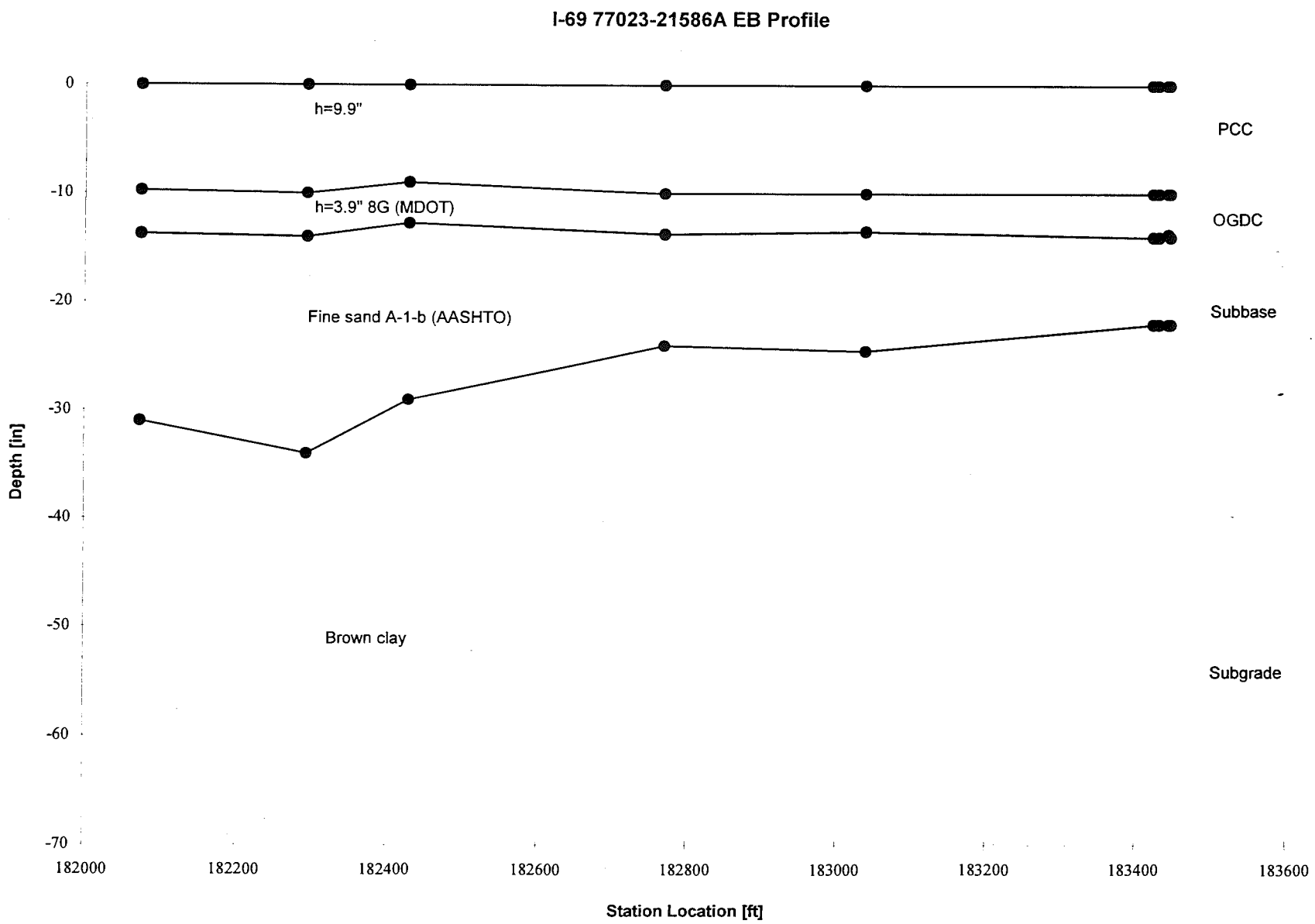
Distresses:		
PMS:	Entire CSN = 8.1	Job tested = 3.96
RQI:	N/A	
FWD	Low load transfer at joints and cracks	

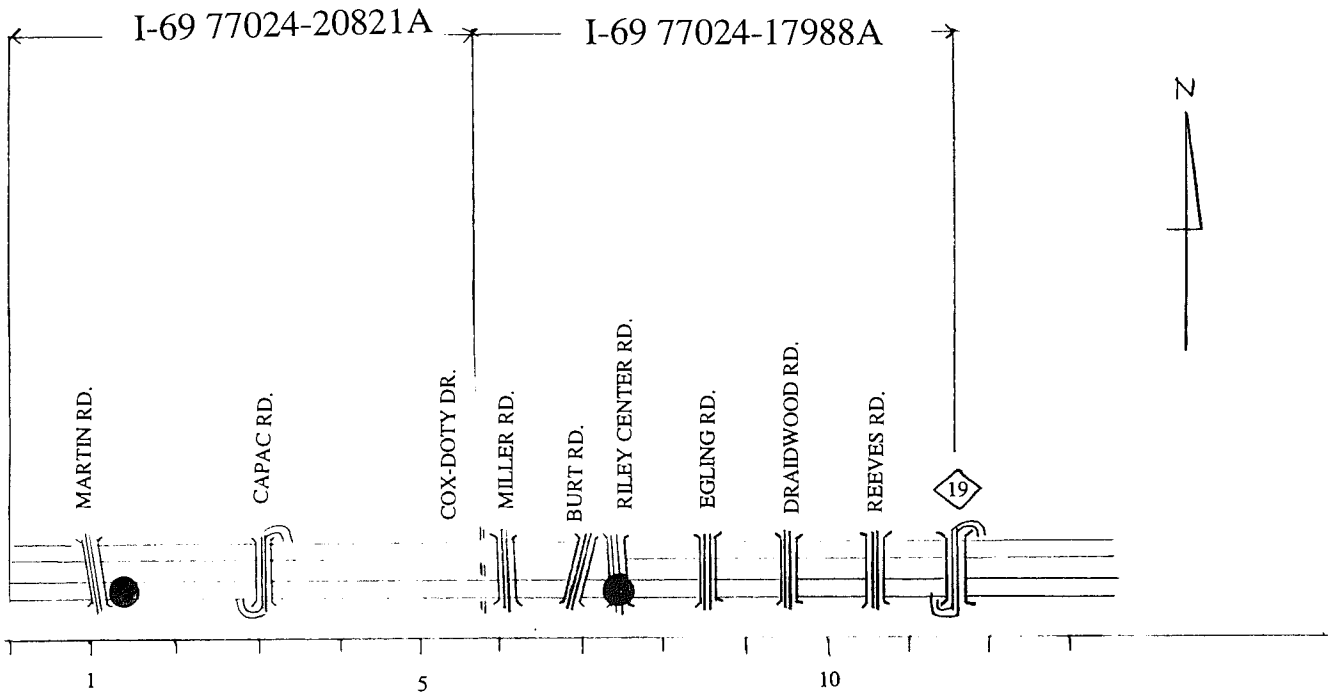
Concrete Properties

Average Thickness:	
Avg. Compressive Strength:	7070 psi
Avg. Split Tensile Strength:	725 psi
Avg. Elastic Modulus:	5.34E+06 psi

Foundation

Gradation:	
Base	Measured 3.9 in. most closely fits 3G
Subbase:	Measured 10-13 in.
Filter Criteria	Not met
DCP	
Base:	16 - 25 mm/blow
Subbase:	8 - 14 mm/blow
Other	.


I-69 77023-21586A EB Profile
0
-10
-20
-30
-40
-50
-60
-70
Depth [in]
h=9.9"
PCC
h=3.9" 8G (MDOT)
OGDC
Fine sand A-1-b (AASHTO)
Subbase
Brown clay
Subgrade
182000
182200
182400
182600
182800
183000
183200
183400
183600
Station Location [ft]



Test Section

SECTION OVERVIEW

CSN/JN: 77024-20821A (Section A)

Site Information:

Job Location:	I-69, East Bound, Between Martin Road and Exit 176
Total lane ESAL's/Year:	178,900

Construction Information:

Date Constructed:	July, 1983
Contractor:	Denton Construction
Slab Length:	41 ft
Pavement System:	
Concrete	Specified 9 in.
Base	Specified 4 in.
Subbase	Specified 8 in.
Placing Temperature:	
Concrete	82 F
Air	75 F
Intermediate Shoulder Joints?	YES
Other:	Lowland swampy area, cut to fill section

Testing Information

Date Tested:	10/17/96
Stations Tested:	83+50 to 90+00
Miles Tested:	1.312 to 1.430
Weather Conditions:	Partly Sunny
Air Temperature:	50 to 70 F
Field Testing :	
Pavement System:	FWD - morning, noon, afternoon, Distress Survey, Drainage Survey
Concrete:	Concrete Coring
Foundation:	Soil Sampling - base, subbase, embankment/subgrade, DCP
Laboratory Testing:	
Concrete:	Compressive Strength, Split Tensile Strength, Elastic Modulus
Foundation:	Sieve Analysis - gradation of base, subbase, subgrade Loss on Wash - subbase, subgrade

Field Observations

Distress Noted:	Very high distress, transverse cracking, spalling and faulting
	Transverse cracks initiated from intermediate shoulder joints
Drainage System:	Drain outlets spaced at 500 ft
	Drains in shoulder were 1/2 clogged with standing water
	Drains in median were 1/2 clogged, but no standing water
	Drains in shoulder were covered by vegetation
Other:	Joints in good condition.
	Severe faulting coincides with heavy spalling at cracks
	Silt pockets found in subgrade near areas of high faulting

System Performance

Distresses:		
PMS:	Entire CSN = 1.9	Job tested = 0.448
RQI:	1995 average = 53.33	Average growth = 0.0488
FWD:	Low corner deflections	
	Low load transfer efficiency at transverse cracks and joints	

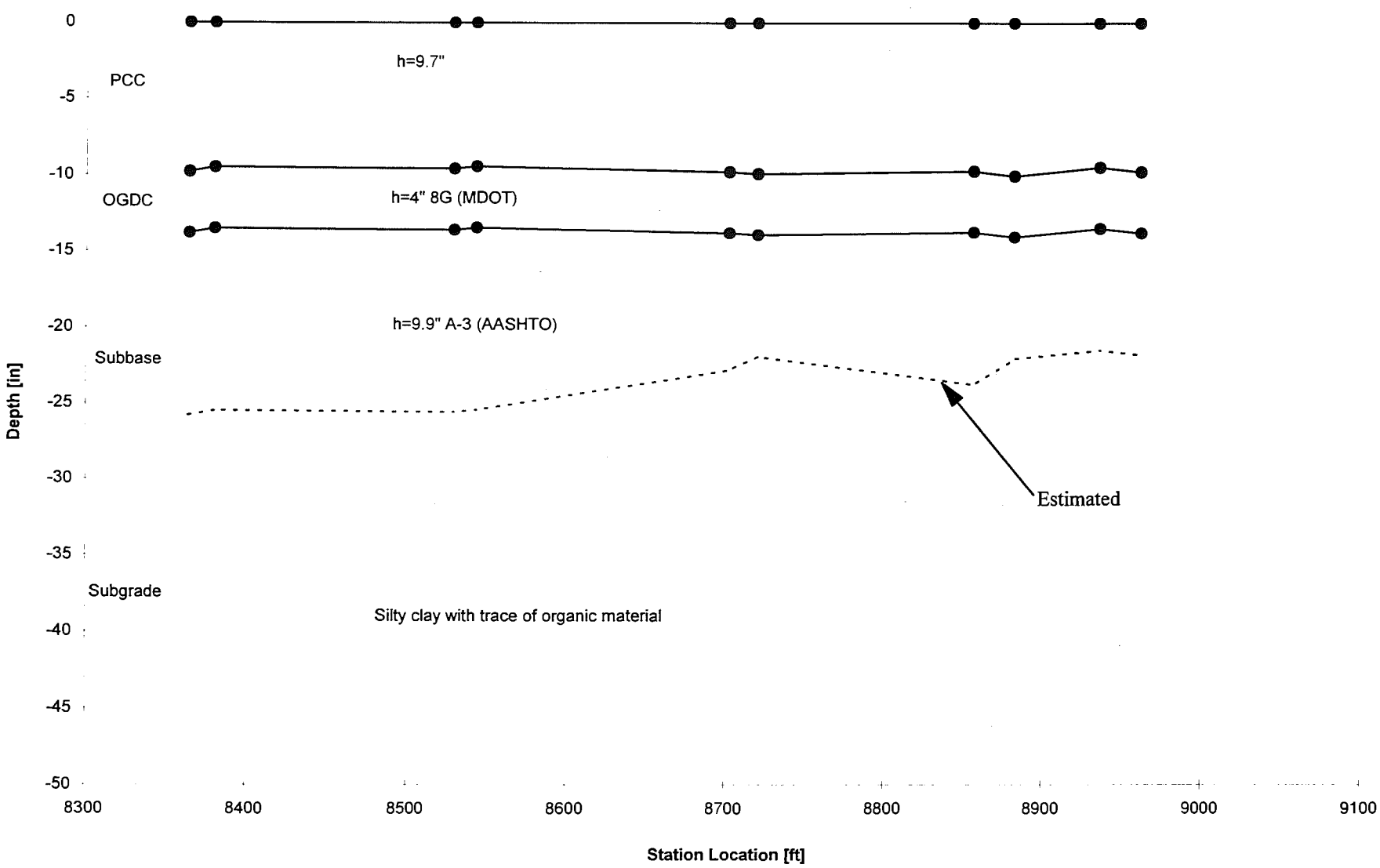
Concrete Properties

Avg. Compressive Strength:	6640
Avg. Split Tensile Strength:	725
Avg. Elastic Modulus:	5.63E+06

Foundation

Gradation:	
Base	Measured 4 in. 8G as specified
Subbase:	Measured 9.9 in
Filter Criteria	Subgrade is too fine for filter criteria
DCP	Very low throughout job
Base:	18 - 25 mm/blow
Subbase:	9 - 38 mm/blow
Other	Very high moisture content in base and subbase.
	Very stiff clay subgrade

I-69 77024-20821A (Section A) Profile



SECTION OVERVIEW

CSN/JN: 77024-17988A (Section B)

Site Information:

Job Location:	I-69 East Bound, Between Cox-Doty Drain and M19
Total lane ESAL's/Year:	195,100

Construction Information:

Date Constructed:	June, 1984
Contractor:	John Carlo
Slab Length:	41 ft.
Pavement System:	
Concrete	Specified 9 in.
Base	Specified 4 in. OGDC 8G classification
Subbase	Specified 8 in.
Placing Temperature:	
Concrete	75 F
Air	70 F
Intermediate Shoulder Joints?	YES
Other:	

Testing Information

Date Tested:	10/29/96
Stations Tested:	408+06 to 418+29
Mileposts Tested:	7.452 to 7.646
Weather Conditions:	Windy and Showers, Rain the night before
Air Temperature:	40 to 50 F
Field Testing :	
Pavement System:	FWD - morning, noon, afternoon, Distress Survey, Drainage Survey
Concrete:	Concrete Coring
Foundation:	Soil Sampling - base, subbase, embankment/subgrade, DCP
Laboratory Testing:	
Concrete:	Compressive Strength, Split Tensile Strength, Elastic Modulus
Foundation:	Sieve Analysis - gradation of base, subbase, subgrade Loss on Wash - subbase, subgrade

Field Observations

Distress Noted:	Transverse cracking at shoulder joints. Low to moderate spalling
Drainage System:	Pea stone edge drain located beneath shoulder
Other:	Very wet in ditches and low lying areas Joints in good condition

System Performance

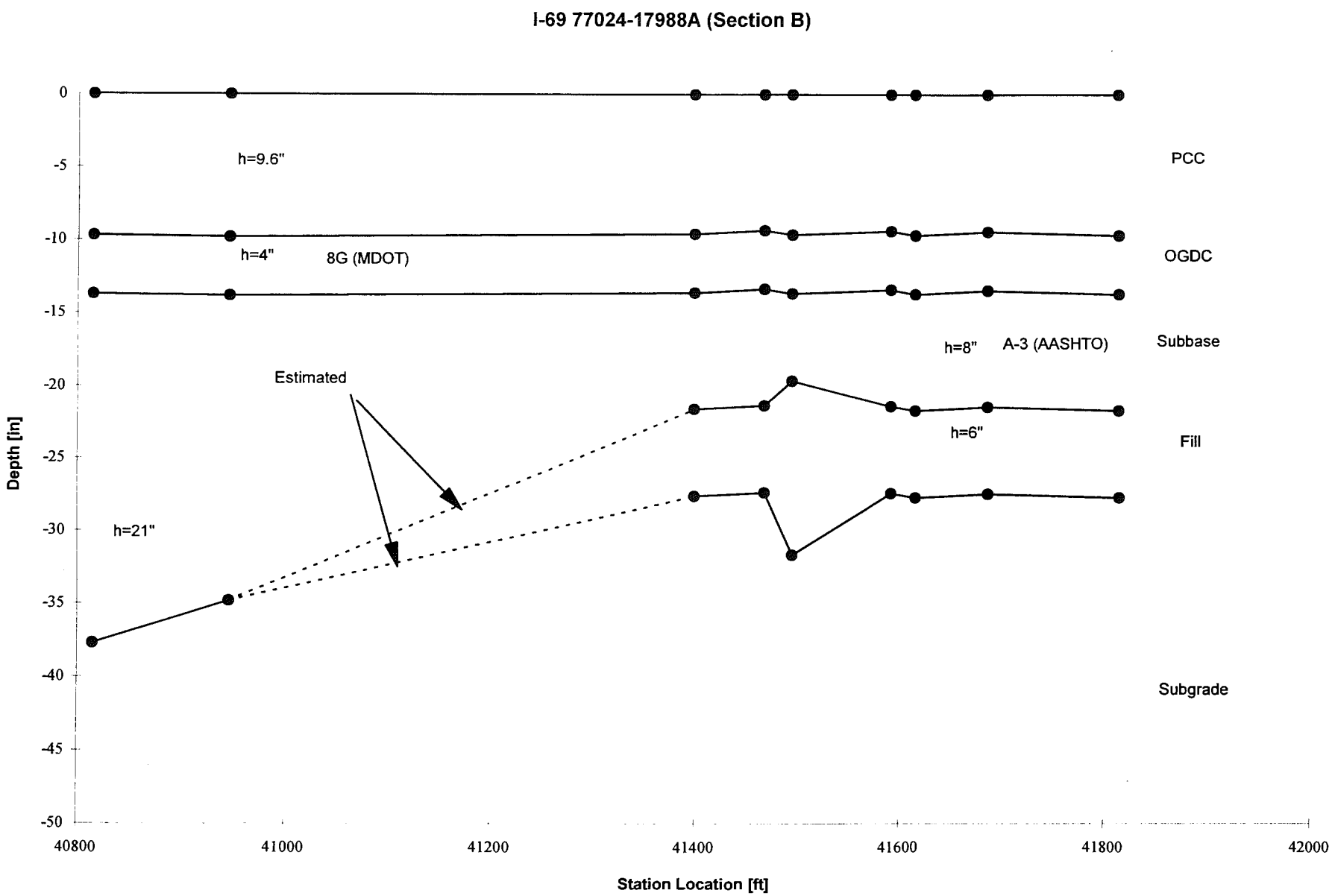
Distresses:	
PMS:	Entire CSN = 1.9 Job tested = 3.25
RQI:	1995 average = 55.897 Average growth = 0.0351
FWD:	Good load transfer efficiency at cracks and joints

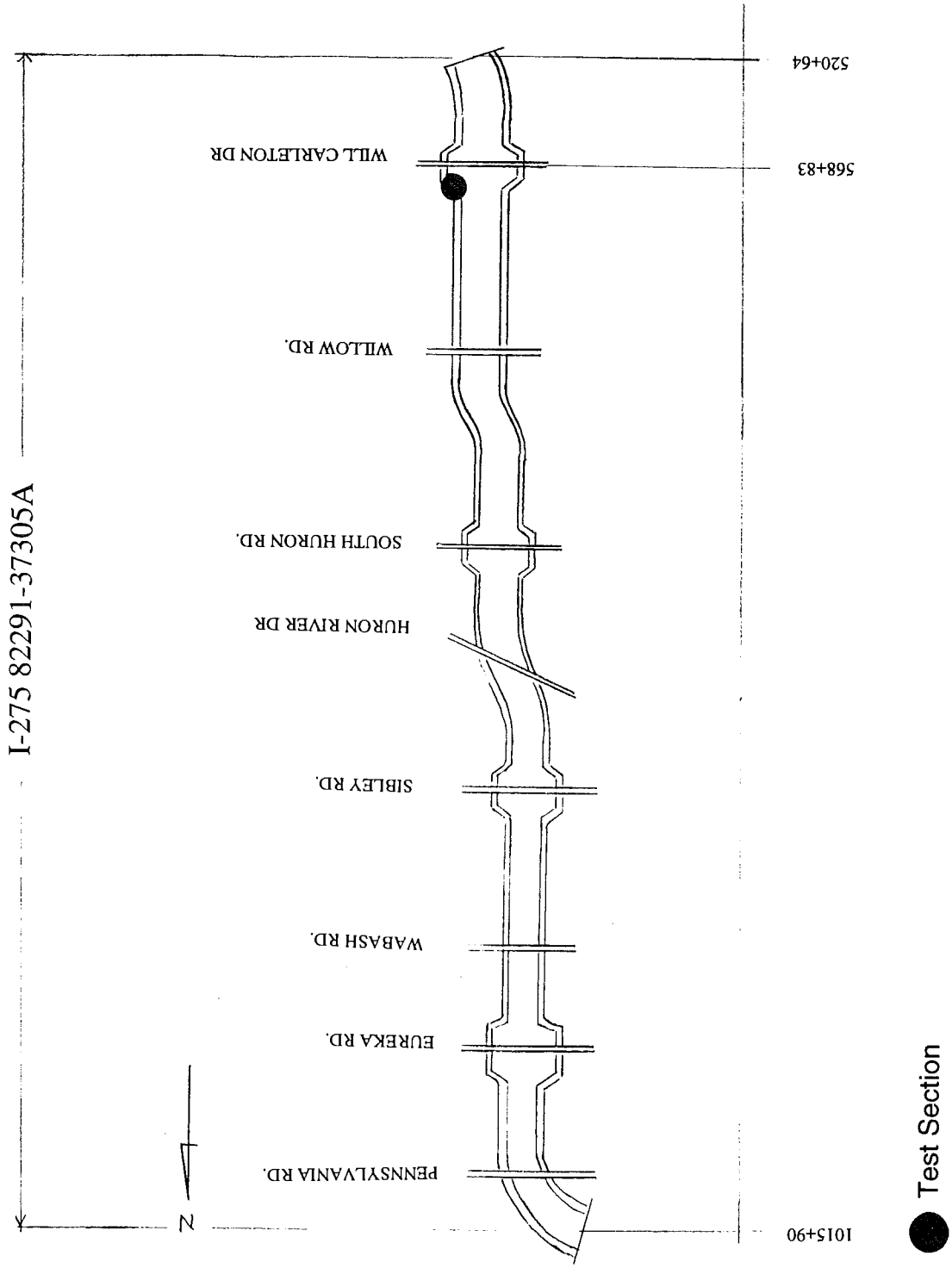
Concrete Properties

Avg. Compressive Strength:	5960
Avg. Split Tensile Strength:	610
Avg. Elastic Modulus:	4.46E+06

Foundation

Gradation:	
Base	Measured 4 in. 8G as specified, high fines content passing #200 sieve
Subbase:	Measured 8-21 in.
Filter Criteria	Not met
DCP	
Base:	19 - 26 mm/blow
Subbase:	3 - 15 mm/blow
Other	


I-69 77024-17988A (Section B)
Depth [in]
Station Location [ft]
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
40800
41000
41200
41400
41600
41800
42000
h=9.6"
PCC
h=4"
8G (MDOT)
OGDC
h=8"
A-3 (AASHTO)
Subbase
Estimated
h=6"
Fill
h=21"
Subgrade


I-275 82291-37305A
N
PENNSYLVANIA RD.
EUREKA RD.
WABASH RD.
SIBLEY RD.
HURON RIVER DR
SOUTH HURON RD.
WILLOW RD.
WILL CARLETON DR
1015+90
568+83
520+64
Test Section

SECTION OVERVIEW

CSN/JN: 82291-37305A

Site Information:

Job Location:	I-275, North Bound,
Total lane ESAL's/Year:	392,100

Construction Information:

Date Constructed:	July and August 1997
Contractor:	Interstate Highway Construction
Slab Length:	27 ft
Pavement System:	
Concrete	Specified 11 in.
Base	Specified 4 in. 350AA crushed limestone
Subbase	Specified 10 in. sand
Placing Temperature:	
Concrete	
Air	
Intermediate Shoulder Joints?	No
Other:	- 4 in. separator between base and subbase - Three lanes - Between Will Carleton and Williw Road approx. 2-3 in. of old slag base course was left in place and new base was placed on top of this

Testing Information

Date Tested:	8/7/97 (FWD)
Stations Tested:	572+08 to 577+72
Mileposts Tested:	
Weather Conditions:	Mostly sunny
Air Temperature:	90 F to 95 F
Field Testing :	
Pavement System:	FWD - morning, noon, and afternoon
Concrete:	
Foundation:	
Laboratory Testing:	
Concrete:	
Foundation:	

Field Observations

Distress Noted:
Drainage System:
Other:

System Performance

Distresses:	
PMS:	N/A
RQI:	N/A
FWD:	

Concrete Properties

Average Thickness:
Avg. Compressive Strength:
Avg. Split Tensile Strength:
Avg. Elastic Modulus:

Foundation

Gradation:	
Base	
Subbase:	
Filter Criteria	
DCP	
Base:	10 - 24 mm/blow
Subbase:	5 - 10 mm/blow
Other	.