

Alaska Department of Transportation and Public Facilities Central Region



NHS STORM DRAIN INSPECTION REPAIR RECOMMENDATIONS PROJECT NO. 0A31055 / Z591280000

Dimond Boulevard from Jewel Lake Road to Old Seward Highway
Muldoon Road from Boundary Avenue to Northern Lights Boulevard
Debarr Road from Bragaw Street to Muldoon Road
Downtown: 5th and 6th Avenue from Gambell Street to Orca Street and
Ingra Street from 6th Avenue to 9th Avenue

May 20th, 2019

Prepared By:

Stephl Engineering LLC
3900 Arctic Blvd., Suite 204
Anchorage, AK 99503
907.562.1468

Table of Contents

- 1 Report Memorandum
- 2 Appendix A – Pipe and Manhole Recommendations
 - Pipe Repair Recommendation Tables
 - Manhole Repair Recommendation Tables
- 3 Appendix B – Project Area Maps

SECTION 1

PURPOSE AND BACKGROUND

Storm drain pipe inspections and manhole (structure) inspections were completed on storm drain systems that are located under National Highway System (NHS) streets and roads that are owned and maintained by the Alaska Department of Transportation and Public Facilities (AKDOT&PF). The work was completed by Stephl Engineering LLC and Construction Unlimited Inc. (CUI). The data developed during the inspections is compiled into the NHS Storm Drain Inspection Condition Assessment Report.

The purpose of this report is to provide study level recommendations for the repair or replacement of defects that were observed during the inspections and to provide site-specific, rough order of magnitude cost estimates for the recommended upgrades. This 2019 report is a continuation of a previous repair recommendation report completed in 2018.

SECTION 2

PROJECT AREAS

The storm drain pipe project locations are shown in Figure No. 1. Storm drain pipes and structures that have been inspected in 2018 are located in the following areas:

- Dimond Boulevard from Jewel Lake Road to Old Seward Highway (supplementary to 2017 inspections)
- Debarr Road from Bragaw Street to Muldoon Road
- Muldoon Road from Boundary Avenue to Northern Lights Blvd.
- Downtown: 5th and 6th Avenue from Gambell Street to Orca Street
- Downtown: Ingra Street from 6th Avenue to 8th Avenue

The total length of storm drain pipe inspected along these highways is approximately 30,500 feet. There are 252 storm drain pipe segments contained in the pipes that were inspected. The total number of manholes (structures) inspected is approximately 83.

Previous storm drain inspections were completed in 2016 and 2017 in the following areas:

- A Street from 36th Avenue to Fireweed Lane
- Old Seward Highway from International Airport Road to 48th Avenue
- International Airport Road from Cambridge Way to Old Seward Highway
- Dimond Boulevard from Jewel Lake Road to Old Seward Highway
- Minnesota Drive from Tudor Road to Hillcrest Drive
- C Street from Dimond to 76th and Tudor to 40th

The total length of storm drain pipe inspected along these highways in 2016 and 2017 is approximately 33,400 feet. There are 227 storm drain pipe segments contained in the pipes that were inspected. The total number of manholes (structures) inspected is approximately 143.

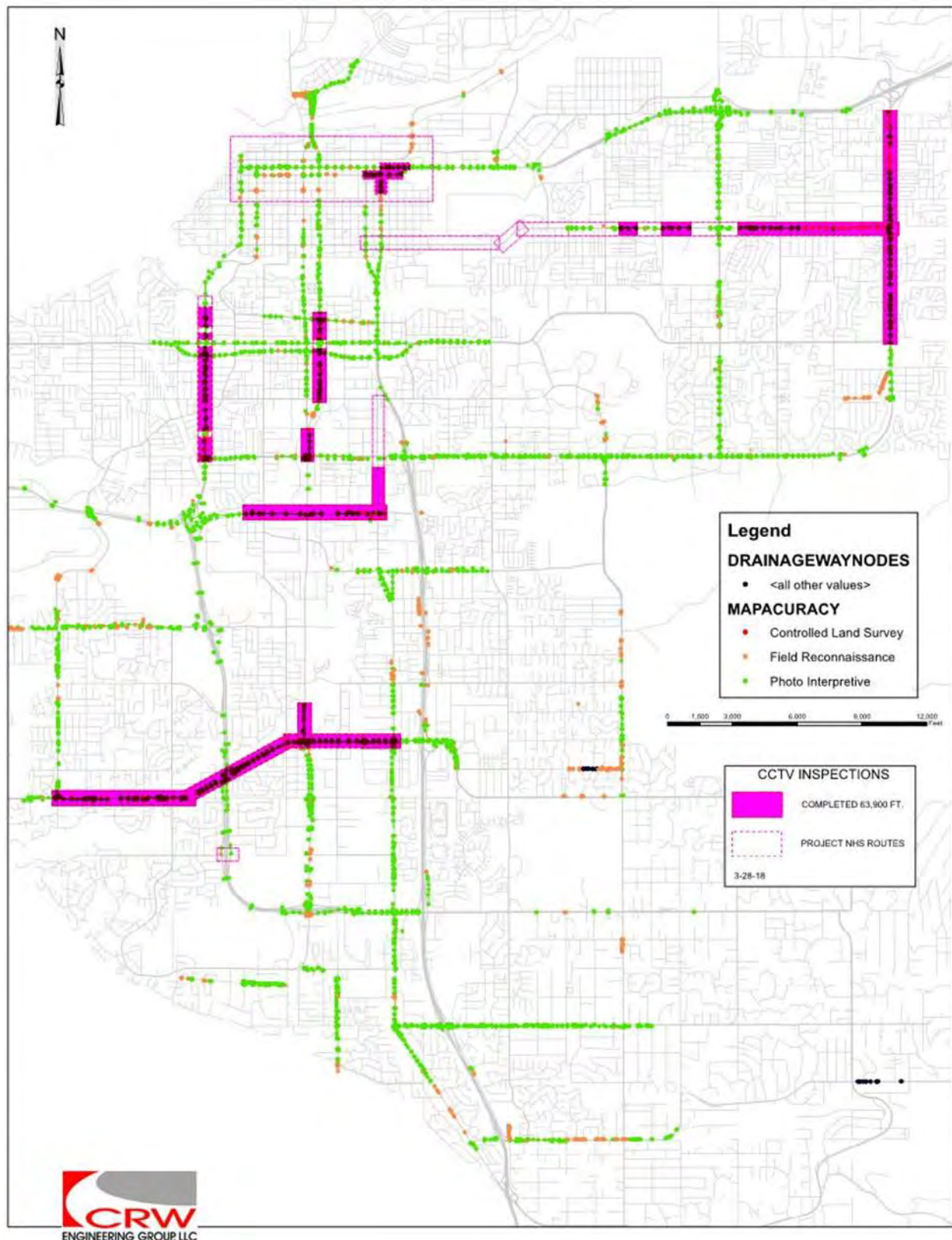


Figure No. 1

SECTION 3

PIPE AND MANHOLE REPAIR METHODS

Defects Observed

Significant deficiencies or defects found in the NHS storm drain pipes and manholes during the inspection work are listed below. Details on the specific defects can be found in the NHS Storm Drain Inspection Condition Assessment Report.

Defects observed in pipes and manholes included:

- Corrosion and metal loss in pipes
- Inverts in metal pipes corroded with metal loss and structural failure
- Debris accumulation
- Deformation (collapsing) of the pipe wall
- Separated joints
- Cracks and broken parts in manholes
- Grout missing in manholes

Recommended methods for repairing the defects observed in the NHS storm drain system include:

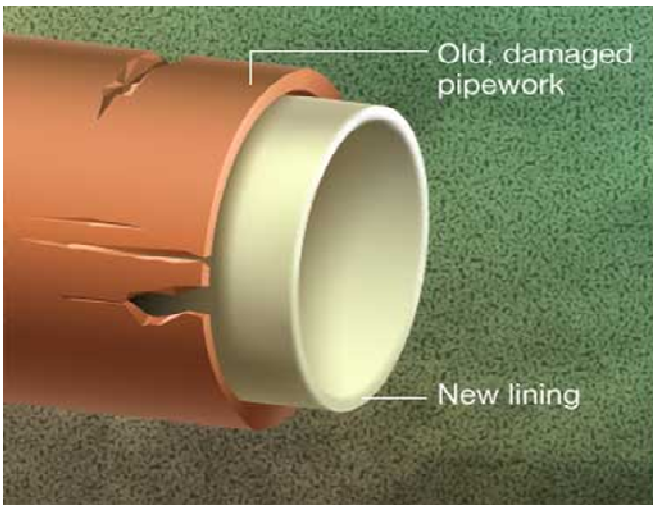
- Cured in place pipe (CIPP) lining
- Open-cut excavation remove and replace pipe
- Trenchless point repair
- Excavation point repair
- Storm pipe cleaning and inspection
- General manhole repairs
- New storm drain manhole installation
- Abandon storm drain pipe

Cured in Place Pipe (CIPP)

Description

The cured in place lining method is an economical and feasible trenchless solution for upgrading storm drain pipes. The benefits of CIPP include minimal impact to pipe capacity, installation without excavation, and competitive costs. It is a proven technology. In Alaska, there are contractors and equipment available locally to complete this work. A CIPP liner is estimated to have a minimum 50-year life. It was developed in 1974 and is the most popular pipe rehabilitation method in use in the world today. Hundreds of miles of CIPP liner are installed each year.

On this project, a CIPP liner would be designed for either the “partially deteriorated” or “fully deteriorated” condition. In most cases, the wall thickness of a new liner is thicker (and more expensive) for the fully deteriorated design condition. When designed for the fully deteriorated condition, a CIPP liner has the structural capacity to replace the deteriorated host pipe that is around it. The engineers who are responsible for the pipe rehabilitation design would decide which condition is applicable. In most cases the fully deteriorated condition is applied when metal host pipes are corroded or have metal loss occurring in the invert.



Cured in Place Liner

The CIPP process uses a flexible nonwoven or woven material liner and thermosetting epoxy resin to form a durable pipe within the old pipe. The liner is inserted through an existing manhole and may be inverted or winched into place. The resin impregnated lining is cured by circulating hot water, or with ultraviolet light. The CIPP lining will fit tightly against the host pipe, will follow the invert grade of the existing pipe and will conform to irregularities in the host pipe wall. The process is often accomplished in a 24-hour period for a typical segment from one manhole to the next.

Storm water flows would be bypassed around the pipe to be lined. Bypassing would be accomplished by installing pumps and a temporary bypass pipe between manholes that are upstream and downstream of the pipe being upgraded. Often CIPP lining of storm drains is scheduled during dry weather periods to minimize the amount of bypassing equipment needed.

On storm drain pipes 48-inch and larger, solutions other than CIPP should be evaluated on a case by case basis during design. Options may include sliplining, spiral-wound, or fiber reinforced polymer (FRP). For study purposes, the cost for these other methods would be similar to the CIPP estimate.

Estimated Unit Construction Cost

For this study, a unit cost of \$15/inch-diameter/LF for 24-inch pipes and smaller and \$12/inch-diameter/LF for pipes larger than 24-inch diameter will be used for the rough order of magnitude construction cost estimate of CIPP lining work. This estimated construction cost includes the materials and equipment to install a CIPP liner complete including flow controls and the additional cost of working overtime hours at night and during weekends. Traffic control can be a significant part of the cost to perform the repair work. Traffic costs were estimated separately for each site and added to the CIPP lining cost. This estimated cost does not include engineering design, project management, owner fees and markups and engineer inspection/quality control.

Open-Cut Excavation Remove and Replace

Description

This storm drain pipe upgrade process includes the traditional construction method of excavating to remove the existing storm drain pipe and replace it with a new storm drain pipe. In most cases a new

storm pipe is installed from one existing manhole to the next. The work would be performed according to the construction standards of the AKDOT&PF.

Estimated Unit Construction Cost

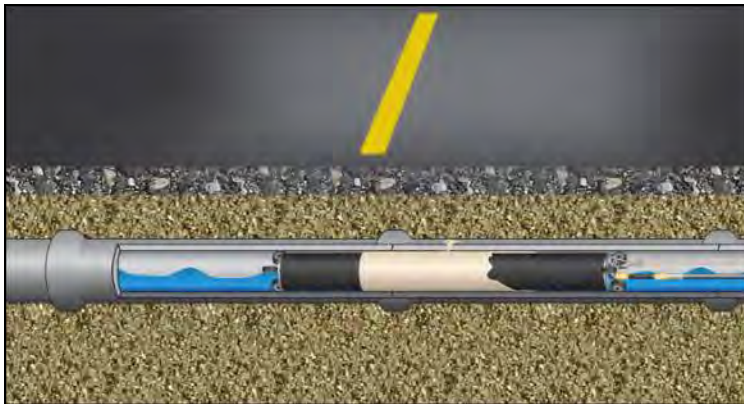
For this study, a unit cost of \$35/inch-diameter/LF will be used for the rough order of magnitude construction cost estimate of the open cut pipe remove and replacement work. This estimated construction cost includes the materials and equipment to install a new storm pipe complete including the additional cost of working overtime hours at night and during weekends. Traffic control can be a significant part of the cost to perform the repair work. Traffic costs were estimated separately for each site and added to the CIPP lining work estimated cost. This estimated cost does not include engineering design, project management, Owner fees and markups and engineer inspection/quality control.

Trenchless Point Repair

Description

A trenchless point repair is described as a short section of CIPP liner that is installed inside of a host pipe to repair a single defect. No digging is required; the work can be accomplished from the manholes. The repair consists of a resin impregnated fabric tube (usually 2 feet to 8 feet long) that is positioned over the defective area and pressed against the host pipe with an inflatable bladder and then cured until hard. Some systems use hot water to cure the resin. Most trenchless point repair systems cure in ambient temperatures. Trenchless point repairs are very beneficial for repairing a single defect in a host pipe that is in overall good condition.

The technology has been in use for over 20 years and has been used in Alaska many times. There are a number of utilities and contractors in Alaska who own equipment to install trenchless point repairs.



Trenchless point repair (courtesy of Pipe Patch).

Estimated Unit Construction Cost

A unit cost of \$450/inch-diameter/each will be used for the rough order of magnitude construction cost estimate of installing a trenchless point repair. This estimated construction cost includes the materials and equipment to install a new trenchless point repair complete including the additional cost of working overtime hours at night and during weekends. Traffic control can be a significant part of the cost to perform the repair work. Traffic costs were estimated separately for each site and added to the CIPP lining work estimated cost. This estimated cost does not include engineering design, project management, Owner fees and markups and engineer inspection/quality control.

Excavation Point RepairDescription

This includes the traditional construction method of excavating to perform a repair on an existing storm drain pipe. This method is used when the host pipe is collapsed or is damaged to the degree that a trenchless point repair cannot be installed. In most cases, a single excavation is needed at a specific location. The work would be performed according to the construction standards of the AKDOT&PF.

Estimated Unit Construction Cost

A unit cost of \$32,000 each will be used for the rough order of magnitude construction cost estimate of completing an excavation point repair. This estimated construction cost includes the materials and equipment to repair a pipe defect complete including the additional cost of working overtime hours at night and during weekends. Traffic control can be a significant part of the cost to perform the repair work. Traffic costs were estimated separately for each site and added to the CIPP lining work estimated cost. This estimated cost does not include engineering design, project management, Owner fees and markups and engineer inspection/quality control.

Storm Pipe Cleaning and InspectionDescription

Storm drain pipes that contained a significant amount of debris and were not inspected during the condition assessment phase of this project will be designated for cleaning and inspection.

Estimated Unit Construction Cost

A unit cost of \$20 per foot will be used for the rough order of magnitude construction cost estimate of cleaning a storm drain pipe and completing a CCTV camera inspection. This estimated construction cost includes the materials and equipment to complete the work and the additional cost of working overtime hours at night and during weekends. Traffic control costs were estimated for each location as added to the cleaning and inspection costs. This estimated cost does not include engineering design, project management, Owner fees and markups and engineer inspection/quality control.

General Manhole RepairsDescription

General manhole repairs include items such as cracked concrete repairs, frame and lid replacement, concrete riser replacement, manhole step replacement, pipe penetration, grout repair, etc. The work would be performed according to the construction standards of the AKDOT&PF.

Estimated Unit Construction Cost

A unit cost of \$3,000 per each manhole will be used for the rough order of magnitude construction cost estimate of this work. This estimated construction cost includes the materials and equipment to complete the work including traffic controls. This estimated cost does not include engineering design, project management, Owner fees and markups and engineer inspection/quality control.

New Storm Drain Manhole InstallationDescription

This upgrade includes the installation of a new storm drain manhole and also includes removal of an existing manhole where applicable. The work would be performed according to the construction standards of the AKDOT&PF.

Estimated Unit Construction Cost

The following rough order of magnitude construction costs would be applied for this item:

- New 48-inch diameter manhole - \$30,000 each
- New 72-inch diameter manhole - \$36,000 each
- New 120-inch diameter manhole - \$46,000 each

This estimated construction cost includes the materials and equipment to complete the work including the additional cost of working overtime hours at night and during weekends. Traffic control costs were added to the manhole installation cost. This estimated cost does not include engineering design, project management, Owner fees and markups and engineer inspection/quality control.

Abandon Storm Drain Pipe**Description**

This upgrade includes abandoning existing storm drain pipes by filling them completely with a flowable cement grout. Designers should perform a thorough investigation of each of the pipes designated for abandonment to confirm for sure that they no longer function.

Estimated Unit Construction Cost

A unit cost of \$500 per cubic yard of flowable grout will be used for the rough order of magnitude construction cost estimate of this work. This estimated construction cost includes the materials and equipment to complete the work. Traffic control work was added on top of the pipe abandonment cost. This estimated cost does not include engineering design, project management, Owner fees and markups and engineer inspection/quality control.

SECTION 4

REPAIR RECOMMENDATIONS AND ESTIMATED COSTS

Appendix A contains a list of the pipe and manhole upgrades and the rough order of magnitude construction costs for the recommended work. Appendix B contains maps that show the project areas and the pipes and manholes that are recommended for repairs.

The recommendations in this report are based on the pipe and manhole characteristics observed in the inspection data. Designers who are utilizing the study level recommendations in this report should review all available data when deciding how to repair the project pipes. Gathering additional information is recommended. Designers are urged to review all the CCTV video inspection data for those pipes being upgraded. Additionally, the CCTV video data may not provide a complete picture of how to repair a pipe or structure. Other factors that may affect the pipe upgrade design include vehicle traffic, geotechnical characteristics, and proposed repairs on nearby pipes, access to manholes, potential soil or groundwater contamination, nearby buried utilities, and other construction projects.

Metal loss and corrosion in the CMP pipe inverts were observed in the CCTV inspection work and in physical inspections of pipes in select manholes. There is a limitation in the accuracy of this work. The entire invert was not probed and often the invert is obscured with water during the CCTV work. It is very likely that the amount of corrosion in the pipe inverts is more widespread than what was observed in the CCTV inspections and physical inspections.

A summary of the estimated construction repair costs is shown in the table below:

NHS Storm Drain Inspection Project Areas	Rough Order of Magnitude Construction Repair Costs		
	Storm Pipes	Structures	Subtotal
Dimond: Jewel Lake Road to Old Seward Highway	\$1,058,600	\$6,000	\$1,064,600
Debarr: Bragaw St. to Muldoon Road	\$898,900	\$12,000	\$910,900
Muldoon: Boundary Ave. to Northern Lights	\$939,800	\$24,000	\$963,800
5th and 6th: Gambell St. to Orca St.	\$15,600	\$0	\$15,600
Ingra: 6th Ave. to 8th Ave.	\$32,000	\$6,000	\$38,000
TOTAL	\$2,944,900	\$48,000	\$2,992,900

Appendix A

Pipe and Manhole Recommendations

CR NHS Storm Drain Condition Report
Proj. No. 0A31055 / Z591280000

	NHS Storm Drain Inspections Dimond Blvd. (Jewel Lake to Old Seward)				Defect grades: 0=No Defect, 1=Minor Defect, 2=Minor to Moderate Defect, 3=Moderate Defect, 4=Significant Defect, 5=Most Significant Defect						2017 Inspections	Repair Recommendations and Costs						
											2018 Inspections							
Page # in Appendix A	Upstream Structure No.	Downstream Structure No.	Location	Pipe Dia. (in.)	Material	CCTV Complete	CCTV Date	CCTV Length (ft.)	GIS Length (ft.)	CCTV Direction	General Condition Grade Score	Flow Depth (in.)	Additional Comments	Reviewed By	Repair Required	Repair Method: CIPP, Open Cut, Point Repair(s)	Repair Summary	ROM Estimated Construction Cost
1	1492-26	1492-25	North Dimond at Jewel Lake Rd.	30	CMP	Yes	5/25/2018	136	127	Upstream	3	1" to 2"	Pipe is curved. Invert probed, signs of corrosion, evidence of infiltration throughout pipe, possible hole, debris throughout pipe	JM	Y	Remove and Replace, CIPP	Numerous places where it appears ground water is infiltrating pipe, possible hole in invert and deteriorating invert condition warrant CIPP repair, possible belly may require excavation	\$57,000
	1492-24	1492-23	Dimond Blvd. east of Jewel Lake Rd.	30	CMP	Yes	7/24/2017	151	159	Upstream	3	1" & 2" mud	Numerous corrosion spots w/material loss, some w/pin holes, 7:00 to 5:00 position, Sta. 0+00 to 0+80. Joints have leaks with mineral buildup.	KS	Y	CIPP	Numerous corrosion spots w/material loss, some w/pin holes, 7:00 to 5:00 position, Sta. 0+00 to 0+80. The spot will soon corrode through the metal resulting in structural issues.	\$62,400
	1492-23	1492-21	South Dimond Blvd. east of Jewel Lake Rd.	30	CMP	Yes	7/24/2017	356	361	Downstream	3	1" & 2" mud	Numerous corrosion spots w/material loss, & w/pin holes, Sta. 0+00 to 0+97. Joints have leaks with mineral buildup.	KS	Y	CIPP	Numerous corrosion spots w/material loss & w/pin holes, Sta. 0+00 to 0+97. Joints have leaks with mineral buildup.	\$136,200
	1492-20	1492-18	South Dimond Blvd. east of Noble Circle	30	CMP	Yes	7/24/2017	231	232	Downstream	3	1"	Corrosion spots w/material loss & w/weight plus pin holes. Half of the joints have leaks with mineral buildup.	KS	Y	CIPP	Numerous corrosion spots w/material loss & pin holes. Joints have leaks with mineral buildup.	\$91,200
2	Unknown	1492-4	South Dimond Blvd. east of Blackberry St.	12	CMP	QuickView	7/24/2017	N/A - QuickView	51	Upstream	3	None	Perforated Drain Pipe, organic matter buildup in pipe, root protrusion visible	JM	N	Clean and Inspect	Major repair not necessary, clean pipe to remove organic buildup and CCTV.	\$5,000
	1492-15	1492-4	Dimond Blvd. west of Dewberry St.	18	CMP	QuickView	7/24/2017	N/A - QuickView	71	Upstream	3	0-1"	Unidentified debris in pipe with possible protrusion in pipe possible corrosion or mineral buildup, requires further inspection, visible grade break	JM	N	Clean and Inspect	Clean and inspect. Determine if unidentified pipe obstruction is removable and further assess damage to pipe.	\$5,400
3	585-50	585-48	North Dimond Blvd. at Roy St.	18	CMP	Yes	7/22/2017	341	348	Downstream	3	1"	All joints w/leaks & mineral buildup. Fractures/holes & pin holes at some joints.	KS	Y	CIPP	Multiple fractures/holes & pin holes.	\$100,100
	585-37	585-36	Dimond Blvd. west of Washburn St.	18	CMP	Yes	7/21/2017	111	118	Upstream	3	1" to 6"	Corrosion w/metal loss & holes. Approx. 6" high point from Sta. 0+42 to 0+52. w/reverse grade Sta. 0+52 to Sta. 0+62.	KS	Y	Clean/Inspect and CIPP	Depth of water precludes full exposure of pipe to determine extent of corrosion. Drain & clean pipe to determine damage repairs & if high point is to be fixed.	\$39,000
5	17-4	17-3	Dimond Blvd. west of Victor Road	18	CMP	No	7/9/2018	15	98	Upstream	4	None	Large pipe deformation at 15 LF, unable to inspect whole pipe	JM	Y	Excavation Point Repair	CCTV from upstream structure to determine if there are any other defects, excavation point repair to fix crushed pipe	\$57,000
	17-8	17-6A	North Dimond Blvd. at Victor Road	24	CMP	No	7/9/2018	107	267	Upstream	4	1"	Large pipe deformation, possible surface corrosion in invert, mineralization at joints	JM	Y	Excavation Point Repair	Invert condition does not warrant CIPP at this time, excavation point repair required to fix deformation in pipe	\$40,000
	17-17A	17-13	North Dimond Blvd. east of Victor Road	18	CMP	No	8/4/2017	31	89	Downstream	4	None	Too much debris to complete inspection. Hole in bottom of upstream invert. See inspection report for full defect descriptions.	JM	Y	Remove and Replace	Remove and replace is the most appropriate method of repair due to pipe deformations	\$68,100
8	548-15A	548-15	South Dimond Blvd. at Carnelian Street	18	CMP	No	7/31/2017	17	56	Upstream	3	Minimal	Hole at 6:00 position Sta. 0+01. Survey abandoned to due debris. Two bend to the west w/some corrosion.	KS	Y	Trenchless Point Repair	Repair hole at Sta. 0+01. Remaining pipe, using camera zoom, appeared acceptable.	\$14,100
	548-8	548-9	South Dimond Blvd. east of Carnelian Street	48	CMP	Yes	7/31/2017	264	272	Upstream	3	2" to 4"	10% Ovality Sta.1+37 to 1+81. Multiple holes Sta. 1+70, 1+78, 1+81 & 2+62. Possible invert fractures covered w/water.	KS	Y	CIPP	Holes & ovality issues justify lining pipe. Investigate additional fractures in invert.	\$160,100
9	548-26	548-25	Dimond Blvd. west of Ange Street	18	CMP	Yes	7/31/2017	97	105	Upstream	3	Minimal	Heavy corrosion w/metal loss, Sta. 0+89 to 0+94. Joint separation 1" to 2" gap Sta. 0+30. Debris 5:00 to 7:00 position, length of pipe.	KS	Y	Trenchless Point Repair	One point repair, Sta. 0+30.	\$15,100
	548-27	548-25	South Dimond Blvd. west of Ange Street	36	CMP	Yes	7/31/2017	151	158	Upstream	3	2" to 4"	Multiple deflections at joints to the south. Deep corrosion, 0.5" Dia., pitting 5:00 Sta. 0+18 to 0+20. Corrosion w/pitting along length pipe. Deformations 12:00. No pipe flow reduction.	KS	Y	CIPP	Invert corrosion at lower end, CIPP.	\$73,200
	548-30	548-28	South Dimond Blvd. east of Ange Street	36	CMP	Yes	8/1/2017	304	305	Upstream	3	1" to 2"	Evidence of discoloration/corrosion in invert, evidence of joint infiltration, root intrusion, corrosion pitting in pipe walls	JM	Y	CIPP	Pipe is candidate for CIPP repair, invert corrosion.	\$139,300

CR NHS Storm Drain Condition Report
Proj. No. 0A31055 / Z591280000

	NHS Storm Drain Inspections Dimond Blvd. (Jewel Lake to Old Seward)				Defect grades: 0=No Defect, 1=Minor Defect, 2=Minor to Moderate Defect, 3=Moderate Defect, 4=Significant Defect, 5=Most Significant Defect						2017 Inspections	Repair Recommendations and Costs						
											2018 Inspections							
Page # in Appendix A	Upstream Structure No.	Downstream Structure No.	Location	Pipe Dia. (in.)	Material	CCTV Complete	CCTV Date	CCTV Length (ft.)	GIS Length (ft.)	CCTV Direction	General Condition Grade Score	Flow Depth (in.)	Additional Comments	Reviewed By	Repair Required	Repair Method: CIPP, Open Cut, Point Repair(s)	Repair Summary	ROM Estimated Construction Cost
9	548-264	548-30	Dimond Blvd. west of Arctic Blvd.	18	CMP	Yes	8/1/2017	99	108	Upstream	3	None	Debris at downstream end, various depths throughout, corrosion in downstream end	JM	Y	CIPP	If corrosion becomes worse, pipe could become structurally damaged, CIPP liner recommended	\$37,700
10	548-263	548-31	Dimond Blvd. west of Arctic Blvd.	18	CMP	Yes	8/1/2017	60	71	Upstream	3	None	Corrosion last five feet before upstream structure.	JM	Y	CIPP	Last 10 feet of pipe may require CIPP before condition worsens, verify invert condition to determine if entire pipe qualifies for CIPP	\$27,200
	548-32	548-31	South Dimond Blvd. west of Arctic Blvd.	36	CMP	Yes	8/1/2017	234	220	Upstream	4	2" to 3"	Multiple deformations and holes in pipe, evidence of corrosion in invert	JM	Y	CIPP	Pipe is candidate for CIPP repair, overly deformed sections may require open cut repair, design liner for appropriate structural strength	\$109,100
	548-253	548-32	South Dimond Blvd. west of Arctic Blvd.	24	CMP	No	8/2/2017	10	235	Downstream	4	3-4"	Attempted pipe cleaning 8/2/17. Holes in invert and spring line 9 ft. from upstream manhole	JM	Y	CIPP	Pipe requires cleaning and further inspection, repair necessary if condition similar to defect observed at 9 LF, CIPP recommended	\$92,600
	548-33	548-32	South Dimond at Arctic Blvd.	30	CMP	Yes	8/2/2017	71	98	Downstream	3	0-3"	Multiple deformations throughout pipe, potential sag at 45 FL, corrosion/wear at service connection	JM	Y	Remove and Replace	Horizontal deflection in pipe and potential sag eliminate CIPP, verify invert condition, requires removal and replacement	\$94,600
	548-256	548-255	North Dimond at Arctic Blvd.	18	CMP	Yes	7/22/2017	38	51	Downstream	4	Minimal	Pipe cleaned 7/22/17. Corrosion holes & fractures, between 4:00 to 6:00 position, Sta. 0+06 to 0+10 & Sta. 0+25 to 0+35.	KS	Y	CIPP	Corrosion holes & fractures, Sta. 0+06 to 0+10 & Sta. 0+25 to 0+35. Generally in the 5:00 position.	\$18,300
	548-258A	548-253	South Dimond east of Arctic Blvd.	18	CMP	Yes	8/2/2017	276	286	Downstream	3	Minimal	Evidence of corrosion in invert, multiple deformations, evidence of joint infiltration, possible sag at 33 LF	JM	Y	CIPP	Verify condition of invert, defects and corrosion warrant CIPP repair, investigate for possible sag, invert condition will determine time frame for repair	\$82,500
11	1488-13	1488-12	South Dimond east of C Street	72	CMP	Yes	7/22/2017	245	282	Upstream	3	1" to 2"	Corrosion fracture & holes 7:00 position Sta. 2+26 to 2+30. Minor corrosion 5:00 to 7:00 length of pipe. Metal Structure top pipe 0+55.	KS	Y	CIPP	Corrosion fractures & holes, CIPP recommended.	\$223,700
11	1488-14	1488-13	South Dimond east of C Street	72	CMP	Yes	8/2/2017	305	288	Downstream	3	2" to 3"	Multiple holes in pipe, intermittent corrosion and discoloration, evidence of infiltration at joint, invert appears to be in poor condition	JM	Y	CIPP	Verify invert condition, multiple holes warrants CIPP repair, non-urgent repair, pipe appears structurally stable	\$275,500
	1488-15	1488-14	South Dimond west of King Street	72	CMP	Yes	8/2/2017	264	276	Upstream	3	2" to 3"	Multiple holes in invert, various degrees of corrosion and discoloration throughout pipe	JM	Y	CIPP	Poor invert condition with multiple holes warrants CIPP repair, non-urgent repair, pipe appears structurally stable	\$240,100
12	1488-24	1488-23	North Dimond at Schoon St.	12	CMP	Yes	5/25/2018	370	393	Upstream & Downstream	3	Minimal	Fin Drain, water in pipe from jetter, sag, surface corrosion, offset joints, pipe cleaned to perform inspection	JM	Y	Remove and Replace	Verify metal loss in invert, timetable for repair determined by deterioration of metal, belly present approximately 70 LF from upstream MH, remove and replace entire pipe	\$167,400
13	1488-191	1488-187	South Dimond east of Dimond Center Dr.	64	CMP	Yes	7/6/2018	244	253	Upstream	3	2" to 3"	Spot corrosion/pinholes throughout pipe, evidence of corrosion in invert	JM	Y	CIPP	Verify invert condition, corrosion warrants CIPP repair, non-urgent repair	\$199,400
14	1488-195	1488-191	South Dimond west of Old Seward	64	CMP	Yes	7/6/2018	286	291	Downstream	3	2" to 3"	Spot corrosion/pinholes throughout pipe, invert probed, evidence of corrosion/metal loss in invert	JM	Y	CIPP	Invert probed, corrosion warrants CIPP repair, non-urgent repair	\$231,600
	1488-196	1488-195	South Dimond west of Old Seward	64	CMP	Yes	7/6/2018	286	288	Upstream	3	2" to 3"	Spot corrosion/pinholes throughout pipe, invert probed, evidence of corrosion/metal loss in invert, possible belly	JM	Y	CIPP/Remove and Replace	Invert probed, corrosion warrants CIPP repair, non-urgent repair, belly may require excavation	\$231,600
	1488-213	1488-196	South Dimond at Old Seward	24	CMP	Yes	7/6/2018	185	191	Upstream	3	1" to 2"	Mineralization at joints, pinholes with infiltration, evidence of corrosion in invert	JM	Y	CIPP	Verify invert condition, corrosion warrants CIPP repair, non-urgent repair	\$74,600
																	Total Estimated Construction Cost	\$3,169,100
																	Total Estimated Construction Cost 2018 Inspections	\$1,058,600

CR NHS Storm Drain Condition Report
Proj. No. 0A31055 / Z591280000

	NHS Storm Drain Inspections Debarr Road (Bragaw Street to Muldoon Road)				Defect grades: 0=No Defect, 1=Minor Defect, 2=Minor to Moderate Defect, 3=Moderate Defect, 4=Significant Defect, 5=Most Significant Defect								Repair Recommendations and Costs					
Page # in Appendix A	Upstream Structure No.	Downstream Structure No.	Location	Pipe Dia. (in.)	Material	CCTV Complete	CCTV Date	CCTV Length (ft.)	GIS Length (ft.)	CCTV Direction	General Condition Grade Score	Flow Depth (in.)	Additional Comments	Reviewed By	Repair Required	Repair Method: CIPP, Open Cut, Point Repair(s)	Repair Summary	ROM Estimated Construction Cost
2	577-43	577-42	North Debarr east of Bragaw Street	30	CMP	Yes	11/6/2018	355	358	Downstream	4	2-3"	Inverts probed metal loss observed, discoloration and surface corrosion, high levels of debris, joint infiltration	JM	Yes	CIPP	Unable to evaluate invert due to debris and flow, probing indicated metal loss, verify that high degree of metal loss exists throughout pipe, CIPP repair recommended	\$146,900
	577-44	577-43	North Debarr east of Bragaw Street	30	CMP	Yes	11/6/2018	336	365	Upstream	4	2-3"	Inverts probed metal loss observed, surface corrosion, debris, hole in pipe	JM	Yes	CIPP	Degree of metal loss similar to downstream pipe, verify that high degree of metal loss exists throughout pipe, CIPP repair to entire pipe	\$133,000
4	385-29	385-28	North Debarr Road east of Pine Street	18	CMP	No	9/25/2018	64	276	Downstream	3	0-1"	Unable to complete inspection due to debris, surface corrosion	JM	No	CIPP	Clean pipe and verify condition of invert, degree of metal loss will determine urgency of repair, condition of pipe overall does not warrant repair at time of inspection	\$5,300
11	554-447	554-120	Debarr Road east of Beaver Place	12	CMP	Yes	7/19/2018	55	59	Upstream	3	None	Pipe Cleaned, corrosion visible in invert	JM	Yes	CIPP	Determine degree of metal loss in the pipe invert, pipe is candidate for CIPP repair	\$13,900
	554-121	554-120	South Debarr Road east of Beaver Place	36	CMP	Yes	7/13/2018	491	495	Downstream	3	2-3"	Surface corrosion at flow line and in invert, minor debris at joints, crushed pipe at 386 LF	JM	Yes	Excavation point repair	Excavation repair at 386 LF for crushed pipe, verify condition of invert, corrosion appears to not warrant repair at time of inspection	\$57,000
13	554-128	554-127	South Debarr Road at Marten Street	36	CMP	Yes	7/13/2018	320	322	Downstream	3	2-3"	Leaking joints, corrosion at flow line and invert, debris at joints	JM	Yes	CIPP	Leaking joints, corrosion with pitting visible, CIPP repair recommended, evaluate condition of invert to determine time table for repair	\$150,200
	554-129	554-128	South Debarr Road at Ermine Street	36	CMP	Yes	7/13/2018	301	303	Upstream	3	1-2"	Inverts probed metal loss present, corrosion and discoloration, debris	JM	Yes	CIPP	CIPP repair recommended	\$142,000
14	554-130	554-129	South Debarr west of Patterson Street	36	CMP	Yes	7/16/2018	301	300	Upstream	3	2-3"	Inverts probed metal loss present, corrosion and discoloration, debris	JM	Yes	CIPP	CIPP repair recommended	\$142,000
	554-156	554-130	Debarr Road at Patterson Street	Ellipse	CMP	Yes	9/6/2018	67	73	Downstream	3	4-5"	23x36" oval pipe, surface corrosion, debris	JM	Yes	CIPP	Verify condition of invert, review record drawings to determine if pipe is arch/ellipse, oval pipe will benefit from CIPP lining, improving flow properties and increasing useful life	\$40,200
	554-154	554-131	Debarr east of Patterson Street	12	CMP	Yes	7/19/2018	54	59	Upstream	3	None	Pipe appears abandoned, debris and surface corrosion	JM	Yes	Abandon in place	Verify upstream end is abandoned, completely fill with flowable cement grout if pipe is no longer in use	\$9,400
	554-133	554-132	South Debarr east of Patterson Street	18	CMP	No	N/A	N/A	47	N/A	3	None	Pipe Photographed, appears abandoned, debris and surface corrosion	JM	Yes	Abandon in place	Verify upstream end is abandoned, completely fill with flowable cement grout if pipe is no longer in use	\$11,600
	554-134	554-132	South Debarr east of Patterson Street	24	CMP	Yes	7/16/2018	142	146	Upstream	3	Minimal	Minimal debris and surface corrosion in invert, pipe deformation	JM	Yes	Excavation Point Repair	Excavation point repair for deformed pipe and belly 45 LF from downstream manhole	\$36,000
	554-152	554-134	South Debarr east of Patterson Street	12	CMP	No	N/A	N/A	16	N/A	3	None	Pipe Photographed, surface corrosion and metal loss observed	JM	Yes	CIPP	Verify condition of invert, determine degree of metal loss for timetable of repair, CIPP repair recommended	\$6,900
16	554-144	554-143	North Debarr Road west of Muldoon Road	12	CMP	Yes	9/6/2018	25	25	Downstream	3	Minimal	Debris, surface corrosion, unable to verify condition of invert	JM	No	CIPP	Clean pipe and verify condition of invert, degree of metal loss will determine urgency of repair, condition of pipe overall does not warrant repair at time of inspection	\$4,500
																	Total Estimated Construction Cost	\$898,900

CR NHS Storm Drain Condition Report
Proj. No. 0A31055 / Z591280000

	NHS Storm Drain Inspections Muldoon Road (Boundary Ave. to Northern Lights)				Defect grades: 0=No Defect, 1=Minor Defect, 2=Minor to Moderate Defect, 3=Moderate Defect, 4=Significant Defect, 5=Most Significant Defect								Repair Recommendations and Costs					
Page # in Appendix A	Upstream Structure No.	Downstream Structure No.	Location	Pipe Dia. (in.)	Material	CCTV Complete	CCTV Date	CCTV Length (ft.)	GIS Length (ft.)	CCTV Direction	General Condition Grade Score	Flow Depth (in.)	Additional Comments	Reviewed By	Repair Required	Repair Method: CIPP, Open Cut, Point Repair(s)	Repair Summary	ROM Estimated Construction Cost
1	385-374	385-373	Muldoon Road at Boundary Avenue	12	CMP	Yes	9/20/2018	79	82	Upstream	3	Minimal	Debris, discoloration, surface corrosion visible in invert	JM	Yes	CIPP	Verify condition of invert, degree of metal loss will determine time table of repair, pipe is candidate for CIPP repair	\$22,200
2	385-384	385-378	West Muldoon Road at Peck Avenue	12	CMP	Yes	9/25/2018	28	32	Upstream	4	1-6"	Surface corrosion visible at flow line, belly/sag in pipe at approximately the midspan of pipe, pipe over 1/2 full of water at midspan	JM	Yes	Remove and Replace	Belly present at midspan of pipe, pipe function inhibited, corrosion also visible in pipe, remove and replace pipe via excavation	\$34,400
	385-385	385-378	West Muldoon Road at Peck Avenue	12	CMP	No	9/25/2018	10	31	Upstream	3	2-3"	Surface corrosion, survey stopped by debris, possible belly in pipe	JM	No	Remove and Replace/CIPP	Pipe requires cleaning to examine invert, determine what repair method is required, if large belly exists, pipe may require excavation, CIPP will improve flow qualities and may eliminate need for excavation	\$9,200
	385-379	385-378	West Muldoon Road at Peck Avenue	12	CMP	Yes	9/25/2018	106	49	Upstream	3	0-1"	Surface corrosion, debris	JM	Yes	CIPP	Verify condition of invert, degree of metal loss will determine time table of repair, pipe is candidate for CIPP repair	\$22,100
3	453-162	453-93	Muldoon Road north of E. 3rd Ave.	30	FRP	Yes	8/22/2018	185	188	Downstream	3	2-3"	Fiberglass pipe, debris, hole in pipe	JM	Yes	Trenchless point repair	Repair large hole at upstream end with trenchless point repair	\$17,500
	453-161	453-93	West Muldoon Road at E. 3rd Ave.	12	CMP	Yes	8/23/2018	27	34	Upstream	3	0-1"	Surface corrosion, debris, downstream invert probed, surface corrosion observed	JM	Yes	CIPP	Invert probed, degree of metal loss will determine time table of repair, pipe is candidate for CIPP repair	\$12,900
	453-94	453-93	East Muldoon Road at E. 3rd Ave.	24	CMP	Yes	8/22/2018	62	63	Upstream	3	0-1"	Surface corrosion visible in invert, downstream invert probed, metal loss observed, hole in upstream invert	JM	Yes	CIPP	Invert probed, pipe is candidate for CIPP repair	\$30,300
4	453-85	453-84	West Muldoon Road north of E. 5th Ave.	12	CMP	Yes	8/23/2018	17	21	Upstream	4	Minimal	Corrosion and holes, soil visible, downstream invert probed, metal loss in invert	JM	Yes	CIPP	Metal loss and corrosion, holes with soil visible, recommend CIPP repair	\$7,100
	453-87	453-84	East Muldoon Road north of E. 5th Ave.	12	CMP	Yes	8/23/2018	43	42	Upstream	3	0-2"	Downstream Invert probed, metal appeared soft	JM	Yes	CIPP	Metal loss observed in downstream end of pipe, CIPP repair recommended	\$11,700
	453-84	453-81	Muldoon Road at E. 5th Ave.	30	FRP	Yes	8/22/2018	97	100	Downstream	3	0-1"	Fiberglass pipe, pipe broken/punctured in multiple spots, minimal debris	JM	Yes	CIPP	Fiberglass pipe, multiple occurrences of the interior pipe wall broken through, CIPP repair recommended	\$51,700
	453-83	453-81	West Muldoon Road south of E. 5th Ave.	12	CMP	Yes	8/23/2018	17	21	Upstream	3	0-1"	Surface corrosion, metal loss seen in pipe, downstream invert probed, metal loss observed loss	JM	Yes	CIPP	Surface corrosion and metal loss in pipe, invert probed and metal loss observed, CIPP repair recommended for pipe	\$7,100
5	453-81	453-9	Muldoon Road south of E. 5th Ave.	30	FRP	Yes	8/22/2018	357	359	Downstream	3	0-1"	Fiberglass pipe, minimal debris, large pipe fracture at downstream end	JM	Yes	Trenchless point repair	Fiberglass pipe, interior pipe wall broken through at downstream end, trenchless point repair for short section where hole occurs	\$17,500
	453-173	453-8	West Muldoon Road north of Dover Ave.	12	CMP	Yes	8/23/2018	16	22	Upstream	3	1-2"	Surface corrosion in bottom half of pipe, debris throughout pipe	JM	Yes	CIPP	Surface corrosion throughout pipe in bottom half, verify condition of invert, degree of metal loss will determine time table of repair, pipe is candidate for CIPP repair	\$6,900
	453-172	453-8	East Muldoon Road north of Dover Ave.	12	CMP	Yes	8/23/2018	46	48	Upstream	3	0-1"	Surface corrosion and metal loss observed, minimal debris	JM	Yes	CIPP	Metal loss observed, verify invert condition, degree of defect will determine time table for repair, pipe is a candidate for CIPP repair	\$12,300
6	453-174	453-7	East Muldoon Road south of Dover Ave.	12	CMP	Yes	8/23/2018	35	44	Upstream	3	0-1"	Multiple deformations, inspection stopped by pipe deformation	JM	Yes	Excavation point repair	Large deformation, approximately 50% of pipe, in close proximity to second deformation, cross sectional area loss too great for pipe liner, remove and replace section of pipe	\$57,000
	453-6	453-3	Muldoon Road at Rangeview Trailer Ct.	36	FRP	Yes	8/22/2018	267	271	Downstream	3	1-2"	Fiberglass pipe, minimal debris, hole at 74 LF	JM	Yes	Trenchless point repair	Fiberglass pipe, interior pipe wall broken through at 74 LF, fix using trenchless point repair	\$20,200
7	574-Inlet	574-4	East Muldoon Road south of Old Harbor Ave.	42	CMP	Yes	8/24/2018	68	67	Upstream	3	0-1"	Surface corrosion, debris buildup on inlet structure	JM	Yes	CIPP	Verify condition of invert and degree of metal loss, remove and replace thaw line, pipe is candidate for CIPP repair	\$42,300
	574-4	574-2	Muldoon Road north of Creekside Center Dr.	48	FRP	Yes	8/24/2018	280	284	Upstream	2	3-4"	Fiberglass pipe, thaw pipe, hole in pipe	JM	Yes	Trenchless point repair	Use trenchless point repair to fix hole in pipe from well bore	\$25,600
9	1298-280	1298-279	West Muldoon Road north of Debarr Road	12	CMP	Yes	8/24/2018	24	27	Upstream	3	None	Debris, surface corrosion and metal loss	JM	Yes	CIPP	Verify condition of invert, metal loss observed, pipe is candidate for CIPP repair	\$8,300
11	282-10	282-9	West Muldoon Road north of E. 16th Ave.	24	RCP	Yes	7/31/2018	300	302	Upstream	4	Minimal	Rebar exposed in upstream end, crack and holes at 250 LF, broken pipe	JM	Yes	Trenchless point repairs	Trenchless point repair of holes in pipe with soil voids behind at 250 LF, trenchless point repair to broken pipe at 271 LF	\$25,600

CR NHS Storm Drain Condition Report
Proj. No. 0A31055 / Z591280000

	NHS Storm Drain Inspections Muldoon Road (Boundary Ave. to Northern Lights)				Defect grades: 0=No Defect, 1=Minor Defect, 2=Minor to Moderate Defect, 3=Moderate Defect, 4=Significant Defect, 5=Most Significant Defect								Repair Recommendations and Costs					
Page # in Appendix A	Upstream Structure No.	Downstream Structure No.	Location	Pipe Dia. (in.)	Material	CCTV Complete	CCTV Date	CCTV Length (ft.)	GIS Length (ft.)	CCTV Direction	General Condition Grade Score	Flow Depth (in.)	Additional Comments	Reviewed By	Repair Required	Repair Method: CIPP, Open Cut, Point Repair(s)	Repair Summary	ROM Estimated Construction Cost
11	282-11	282-10	East Muldoon Road north of E. 16th Ave.	12	CMP	Yes	8/20/2018	63	67	Upstream	3	Minimal	Surface corrosion, debris, downstream invert probed, evidence of corrosion	JM	Yes	CIPP	Degree of metal loss will determine time table of repair, pipe is candidate for CIPP repair	\$19,300
	282-13B	282-13	West Muldoon Road at E. 16th Ave.	18	CMP	Yes	7/31/2018	111	112	Downstream	3	Minimal	Downstream invert probed, metal sound, major surface corrosion observed, minor debris	JM	Yes	CIPP	CIPP repair, corrosion throughout pipe, verify condition of invert to determine timetable of repair	\$38,000
	282-20	282-13B	West Muldoon Road south of E. 16th Ave.	18	CMP	Yes	7/31/2018	158	164	Upstream Downstream	4	0-1"	Both directions inspected, hole in downstream end, repaired by DOT in Aug. 2018, upstream invert probed and metal loss observed, surface corrosion throughout pipe	JM	Yes	CIPP	Hole repaired by DOT O&M, August 2018, metal loss in invert and surface corrosion throughout pipe, CIPP repair recommended	\$50,700
	282-31	2282-20	Muldoon Road north of Island Drive	12	CMP	Yes	8/20/2018	63	60	Upstream	3	Minimal	Downstream invert probed, surface corrosion in invert and throughout pipe	JM	Yes	CIPP	Degree of metal loss will determine time table of repair, pipe is candidate for CIPP repair	\$15,300
12	282-21	282-20	West Muldoon Road at Island Drive	18	CMP	Yes	8/20/2018	275	276	Downstream	3	0-1"	Downstream invert probed, surface corrosion in invert and throughout pipe	JM	Yes	CIPP	Degree of metal loss will determine time table of repair, pipe is candidate for CIPP repair	\$82,300
	282-22	282-21	Muldoon Road at Island Drive	12	CMP	Yes	8/20/2018	64	65	Upstream	3	0-1"	Surface corrosion, debris	JM	Yes	CIPP	Verify condition of invert, degree of metal loss will determine time table of repair, pipe is candidate for CIPP repair	\$15,500
16	3-48	3-47	Muldoon Road south of Eastbrook Drive	12	CMP	Yes	7/23/2018	61	65	Upstream	3	Varies	Discoloration and surface corrosion, debris, varied levels of flow	JM	No	CIPP	Unable to evaluate condition of invert, corrosion expected, verify invert condition to determine time table for repair, CIPP	\$16,200
	3-46	3-45	Muldoon Road south of Eastbrook Drive	12	CMP	Yes	7/23/2018	62	65	Upstream	4	None	Surface corrosion, debris, corrosion hole in pipe at upstream end	JM	Yes	CIPP	Verify condition of invert, hole in pipe warrants trenchless repair, repair whole pipe if invert condition is poor	\$15,200
17	3-29	3-28	West Muldoon Road at Ptarmigan Court	30	CMP	Yes	7/20/2018	106	110	Upstream	3	Minimal	Pipe crush, surface corrosion, multiple deformations, minor debris	JM	Yes	Excavation point repair, CIPP	Excavate to repair pipe crush at 97 LF, verify degree of metal loss in invert, pipe is a good candidate for CIPP repair, time table of repair determined by current condition	\$86,200
	3-44	3-29	Muldoon Road south of Ptarmigan Court	18	CMP	Yes	7/23/2018	67	67	Upstream	3	None	Surface corrosion, perforated pipe material used for half of pipe	JM	Yes	CIPP	Check degree of corrosion in invert, ensure that perforations in pipe are unnecessary, CIPP repair	\$26,100
	3-30	3-29	West Muldoon Road at Carrs Muldoon Access Road	30	CMP	Yes	7/20/2018	208	207	Downstream	3	Minimal	Hole in bottom of upstream invert, surface corrosion, minimal debris	JM	Yes	CIPP	Evidence of metal loss in pipe with hole in upstream invert, verify invert condition to warrant CIPP repair	\$86,900
	3-31	3-30	Muldoon Road at Carrs Muldoon Access Road	12	CMP	Yes	7/23/2018	64	69	Upstream	3	None	Downstream invert probed, metal loss observed, surface corrosion, debris	JM	Yes	CIPP	Metal loss observed in downstream invert, corrosion observed when not obscured by debris, pipe is candidate for CIPP	\$15,500
	3-32	3-30	Muldoon Road at Carrs Muldoon Access Road	24	CMP	Yes	7/20/2018	31	35	Downstream	3	Minimal	Minimal debris and flow, corrosion, inverts probed, metal loss downstream, metal sound upstream	JM	Yes	CIPP	Metal loss observed in pipe invert, pipe is candidate for CIPP repair	\$15,200
18	3-43	3-33	Muldoon Road north of Northern Lights Blvd.	12	CMP	Yes	7/23/2018	64	75	Upstream	3	Minimal	Corrosion in invert, corrosion with metal loss, debris	JM	Yes	CIPP	Visible metal loss in pipe, pipe is candidate for CIPP repair	\$15,500
Total Estimated Construction Cost																		\$939,800

CR NHS Storm Drain Condition Report
Proj. No. 0A31055 / Z591280000

	NHS Storm Drain Inspections Downtown (5th and 6th Ave., Gambell to Orca St. and Ingra Street, 6th Ave. to 8th Ave.)				Defect grades: 0=No Defect, 1=Minor Defect, 2=Minor to Moderate Defect, 3=Moderate Defect, 4=Significant Defect, 5=Most Significant Defect								Repair Recommendations and Costs					
Page # in Appendix A	Upstream Structure No.	Downstream Structure No.	Location	Pipe Dia. (in.)	Material	CCTV Complete	CCTV Date	CCTV Length (ft.)	GIS Length (ft.)	CCTV Direction	General Condition Grade Score	Flow Depth (in.)	Additional Comments	Reviewed By	Repair Required	Repair Method: CIPP, Open Cut, Point Repair(s)	Repair Summary	ROM Estimated Construction Cost
15	489-212	489-211	West Ingra Street between 7th and 8th Ave	24	RCP	Yes	11/2/2018	188	190	Upstream	3	Minimal	Possible bellies, pipe broken where pipe bored through	JM	Yes	Excavation Point Repair	Repair section where pipe bored through with excavation point repair, relocate bored pipe, lining solution for bellies in pipe but not required at this time	\$32,000
16	489-242	489-241	6th Avenue at Juneau Street	18	CMP	Yes	10/12/2018	18	378	Downstream	4	0-1"	Stopped by pipe defect, pipe rotting, at considerable risk for collapse	JM	Yes	Trenchless Point Repair/CIPP	Damaged pipe section is a candidate for a liner repair, remaining pipe under 6th Ave. and Juneau Street requires further inspection, if complete pipe repair not required, trenchless point repair of damaged section under 6th Ave. should be completed	\$15,600
																	Total Estimated Construction Cost	\$47,600

CR NHS Storm Drain Condition Report
PROJECT NO. 0A310554 / Z591280000

	NHS Storm Drain Structure Repairs Dimond Blvd. (Jewel Lake to Old Seward)			Defect Grades: 0=No Defect, 1=Minor Defect, 2=Minor to Moderate Defect, 3=Moderate Defect, 4=Significant Defect, 5=Most Significant Defect											2017 Inspections	ROM Estimate Repair Cost
															2018 Inspections	
		Avg. Height	Material	Condition of Components												
Page # in Appendix A	Structure No.	Rim-Invert (in.)	Type	Overall	Cover	Frame	Chimney	Steps	Cone	Reducing Slab	Barrel	Base	Connections (Influent)	Connections (Effluent)	Storm Drain Structure Observations	
2	1492-5	79	Pre-cast Concrete	1	1	1	2	1	1	N/A	1	N/A	3	2	Base submerged, cracked chimneys and grout	\$3,000
4	585-14	87	Pre-cast Concrete	3	1	1	4	1	1	N/A	1	3	3	3	Pieces of chimney broken and missing, grout broken and missing, circumferential crack in base	\$3,000
5	17-17A	40	Pre-cast Concrete	1	1	1	N/A	1	N/A	1	N/A	2	3	3	Crack in base from 12:00 to 2:00 position	\$3,000
6	1367-21	26	Pre-cast Concrete	3	1	1	4	N/A	N/A	N/A	N/A	1	N/A	1	Chimney cracked/broken	\$3,000
8	548-8	70	Pre-cast Concrete	2	1	2	2	1	N/A	1	N/A	2	N/A	N/A	Pipe connections and chimney missing grout	\$3,000
9	548-23	70	Pre-cast Concrete	2	1	1	2	1	N/A	1	N/A	2	N/A	N/A	Pipe connections not scored, circumferential crack in base at top of pipe connections	\$3,000
	548-28	79	Pre-cast Concrete	3	1	1	4	1	N/A	1	1	1	1	1	Chimney cracked/broken	\$3,000
	548-30	82	Pre-cast Concrete	3	1	1	2	2	N/A	1	N/A	3	1	N/A	Only 1 Pipe connection scored, circumferential crack in base at pipe connections	\$3,000
10	548-31	71	Pre-cast Concrete	3	1	1	2	1	N/A	1	N/A	3	3	2	Circumferential crack in base at pipe connections	\$3,000
	548-32	80	Pre-cast Concrete	3	1	1	3	1	N/A	2	N/A	3	N/A	N/A	Pipe connections not scored, circumferential crack in base at pipe connects, offset frame	\$3,000
12	1488-17	164	Pre-cast Concrete	3	1	1	4	2	2	2	2	1	1	1	Chimney grout, no ring	\$3,000
	1488-22	190	Pre-cast Concrete	3	1	2	4	1	N/A	N/A	2	1	1	1	Exposed rebar in chimney	\$3,000
13	1488-24	72	Pre-cast Concrete	3	1	1	N/A	N/A	N/A	N/A	4	1	1	1	Exposed rebar in barrel	\$3,000
															Total Estimated Construction Cost	\$39,000

CR NHS Storm Drain Condition Report
PROJECT NO. 0A310554 / Z591280000

	NHS Storm Drain Structure Repairs Debarr Road (Bragaw Street to Muldoon Road)						Defect Grades: 0=No Defect, 1=Minor Defect, 2=Minor to Moderate Defect, 3=Moderate Defect, 4=Significant Defect, 5=Most Significant Defect									
		Avg. Height	Material	Condition of Components												
Page # in Appendix A	Structure No.	Rim-Invert (in.)	Type	Overall	Cover	Frame	Chimney	Steps	Cone	Reducing Slab	Barrel	Base	Connections (Influent)	Connections (Effluent)	Storm Drain Structure Observations	
5	385-32	92	Pre-cast Concrete	3	2	2	4	1	2	2	2	2	1	N/A		\$3,000
11	554-120	108	Pre-cast Concrete	1	4	1	1	1	1	1	1	1	1	1	Lid cracked	\$3,000
14	554-131	55	Pre-cast Concrete	3	1	1	3	5	N/A	2	N/A	1	1	1	5 grade rings, broken/missing ladder rungs	\$3,000
16	554-144	30	Pre-cast Concrete	3	1	3	N/A	N/A	N/A	N/A	N/A	3	4	3	Frame and base cracked	\$3,000
															Total Estimated Construction Cost	\$12,000

CR NHS Storm Drain Condition Report
PROJECT NO. 0A310554 / Z591280000

	NHS Storm Drain Structure Repairs Muldoon Road (Boundary Ave. to Northern Lights Blvd)					Defect Grades: 0=No Defect, 1=Minor Defect, 2=Minor to Moderate Defect, 3=Moderate Defect, 4=Significant Defect, 5=Most Significant Defect										
		Avg. Height	Material	Condition of Components												ROM Estimate Repair Cost
Page # in Appendix A	Structure No.	Rim-Invert (in.)	Type	Overall	Cover	Frame	Chimney	Steps	Cone	Reducing Slab	Barrel	Base	Connections (Influent)	Connections (Effluent)	Storm Drain Structure Observations	
2	385-441	53	Pre-cast Concrete	3	1	1	1	3	N/A	1	N/A	1	2	1	Steps installed below reducing slab, circumferential crack in base, sump debris	\$3,000
3	453-93	72	Pre-cast Concrete	3	1	1	2	N/A	N/A	1	N/A	3	3	2	Missing ladder rungs, 3 grade rings, crack in base	\$3,000
11	282-20	28	Pre-cast Concrete	3	1	1	3	1	3	N/A	N/A	3	3	1	Cracks in cone and base, broken chimney bricks, too much debris for accurate sump and base depth	\$3,000
15	3-50	56	Pre-cast Concrete	3	1	1	2	1	N/A	1	N/A	3	3	1	Crack in base, 2" bricks broken, 5" chimney below	\$3,000
16	3-47	59	Pre-cast Concrete	3	1	1	3	1	N/A	1	N/A	4	2	2		\$3,000
17	3-28	59	Pre-cast Concrete	3	1	1	1	1	N/A	1	N/A	4	5	2	Steps unusable, bricks between frame and chimney broken, crack in base, missing grout	\$3,000
	3-29	55	Pre-cast Concrete	3	1	1	4	1	N/A	1	N/A	2	3	3	Broken chimney, inverts of pipes soft	\$3,000
	3-30	N/A	Pre-cast Concrete	3	1	1	1	1	1	N/A	N/A	3	3	2	Crack in base, metal loss in inverts	\$3,000
	3-32	66	Pre-cast Concrete	3	1	3	4	1	N/A	1	N/A	3	3	3	Curb inlet broken, chimney broken/missing, crack in base, inverts probed metal sound	\$3,000
															Total Estimated Construction Cost	\$24,000

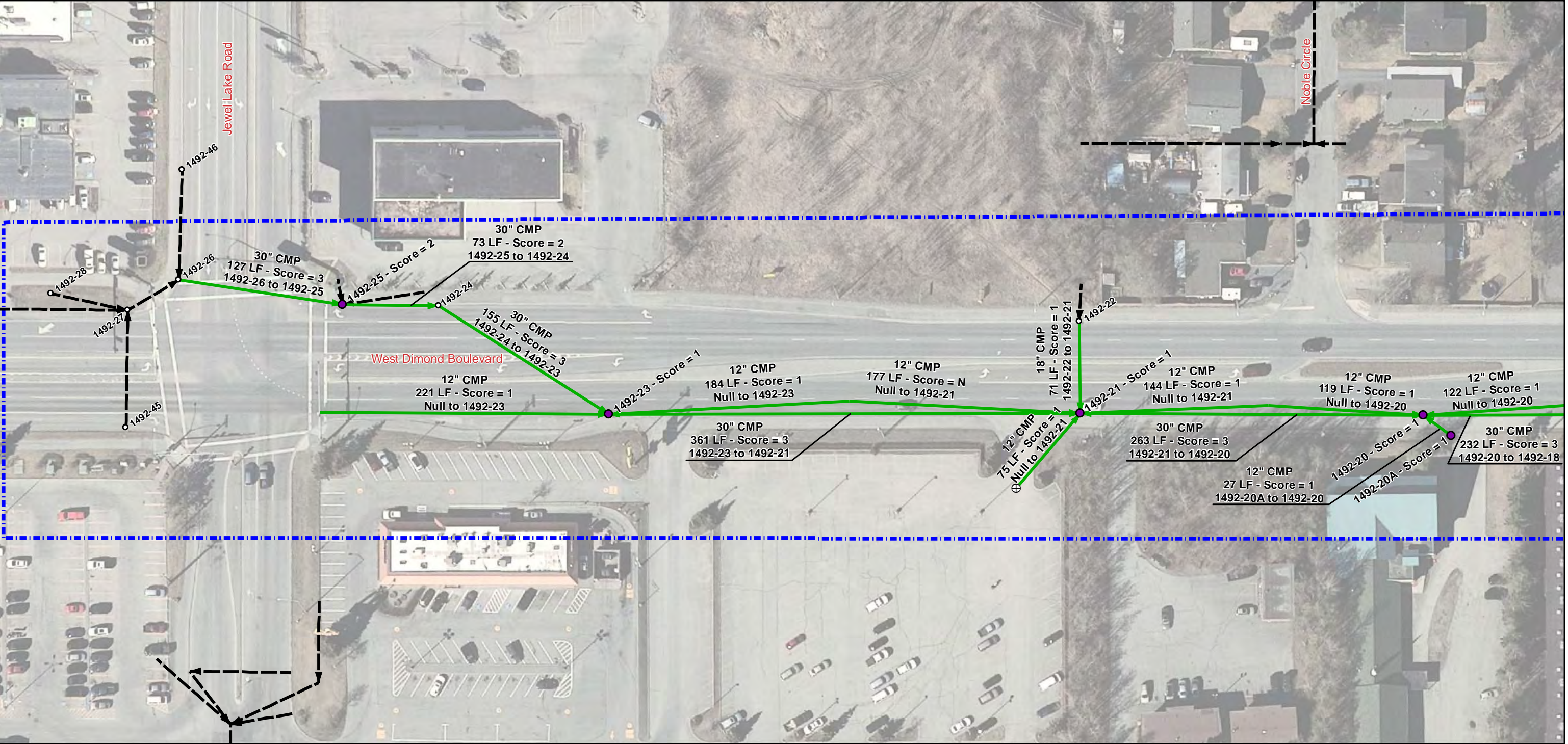
CR NHS Storm Drain Condition Report
PROJECT NO. 0A310554 / Z591280000

	NHS Storm Drain Structure Repairs Downtown (Ingra Street, 6th Ave. to 8th Ave.)						Defect Grades: 0=No Defect, 1=Minor Defect, 2=Minor to Moderate Defect, 3=Moderate Defect, 4=Significant Defect, 5=Most Significant Defect									
		Avg. Height	Material	Condition of Components												
Page # in Appendix A	Structure No.	Rim-Invert (in.)	Type	Overall	Cover	Frame	Chimney	Steps	Cone	Reducing Slab	Barrel	Base	Connections (Influent)	Connections (Effluent)	Storm Drain Structure Observations	
14	489-212	120	Pre-cast Concrete	3	1	1	3	3	3	N/A	N/A	2	2	2	Exposed aggregate in cone, corroded steps not aligned	\$3,000
15	489-211	113	Pre-cast Concrete	3	1	4	2	2	2	N/A	N/A	2	2	1	One step out of line, loose frame, exposed aggregate in cone	\$3,000
Total Estimated Construction Cost																\$6,000

Appendix B

Project Area Maps

West Dimond Boulevard: Jewel Lake Road to Old Seward Highway



0 37.5 75 Feet

Legend

⊕ Not Located

Manhole/Catchbasin

○ Not Inspected

● Inspected without Score

● Inspected with Score

Pipe Segment

--- Not Inspected

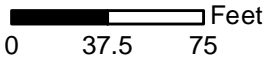
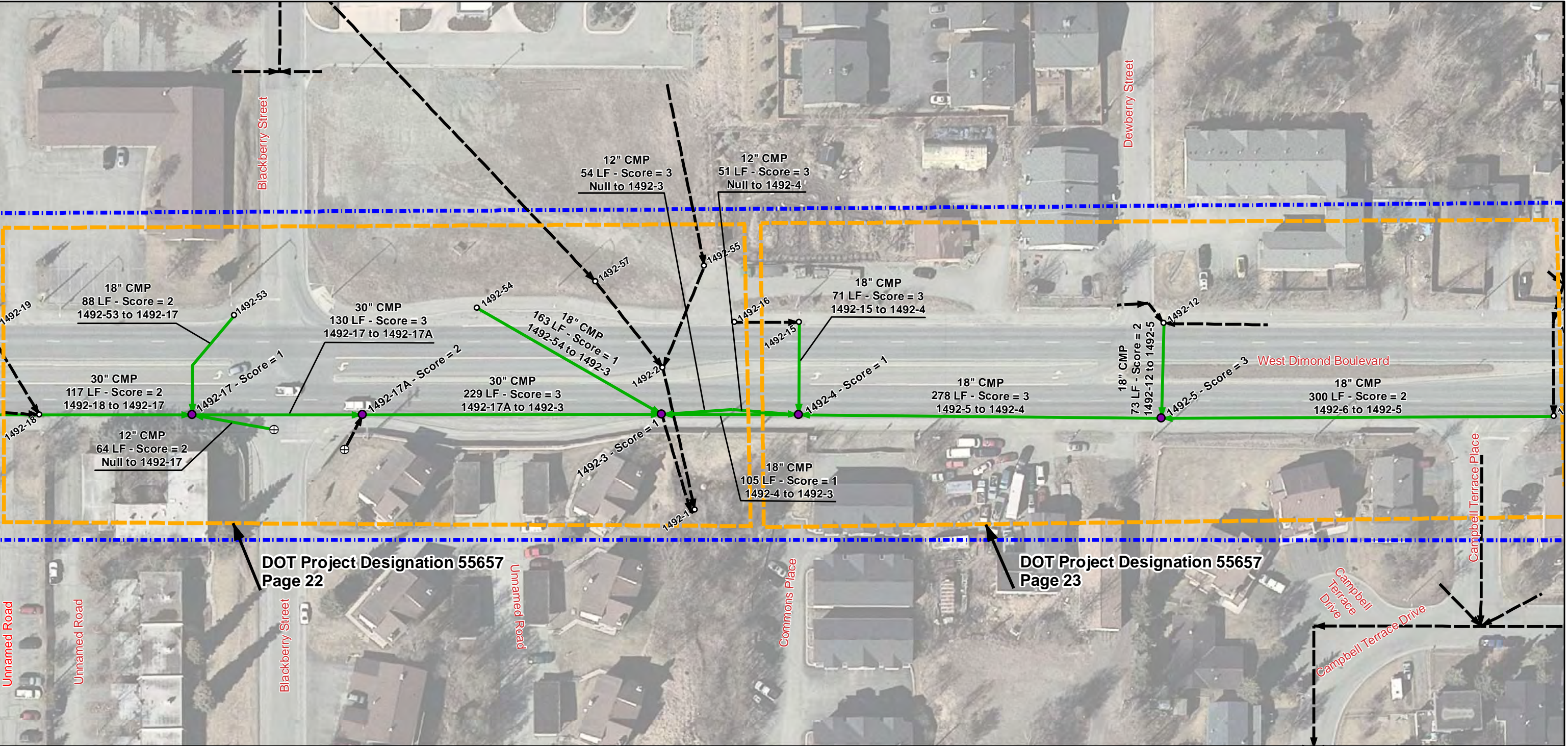
→ Inspected with Score

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect



West Dimond Boulevard: Jewel Lake Road to Old Seward Highway



Legend

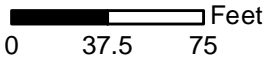
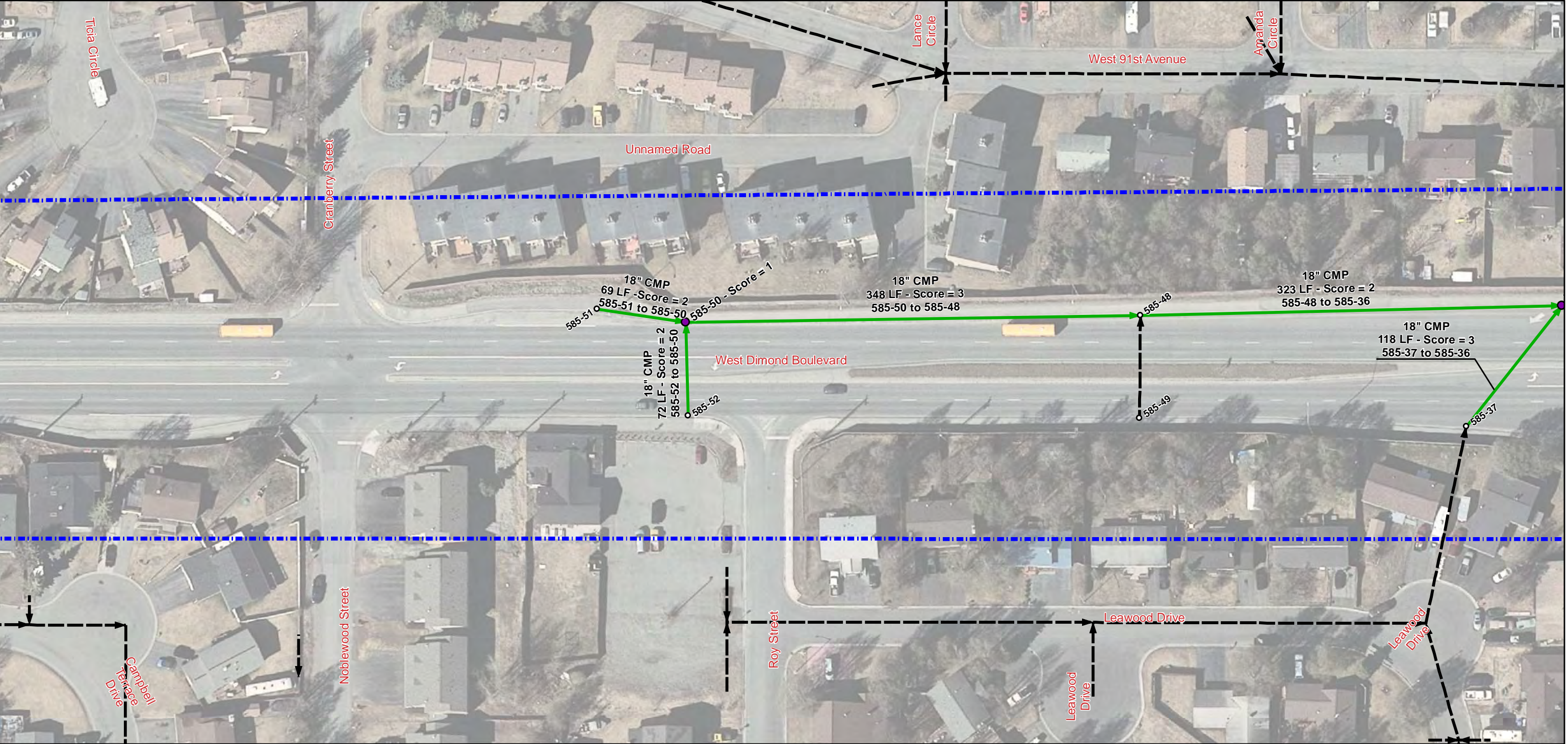
- ⊕ Not Located
- Manhole/Catchbasin**
- Not Inspected
 - Inspected without Score
 - Inspected with Score

- Pipe Segment**
- Not Inspected
 - Inspected with Score

- Score**
- 0 - No Defect
 - 1 - Minor Defect
 - 2 - Minor to Moderate Defect
 - 3 - Moderate Defect
 - 4 - Significant Defect
 - 5 - Most Significant Defect



West Dimond Boulevard: Jewel Lake Road to Old Seward Highway



Legend

⊕ Not Located

Manhole/Catchbasin

- Not Inspected
- Inspected without Score
- Inspected with Score

Pipe Segment

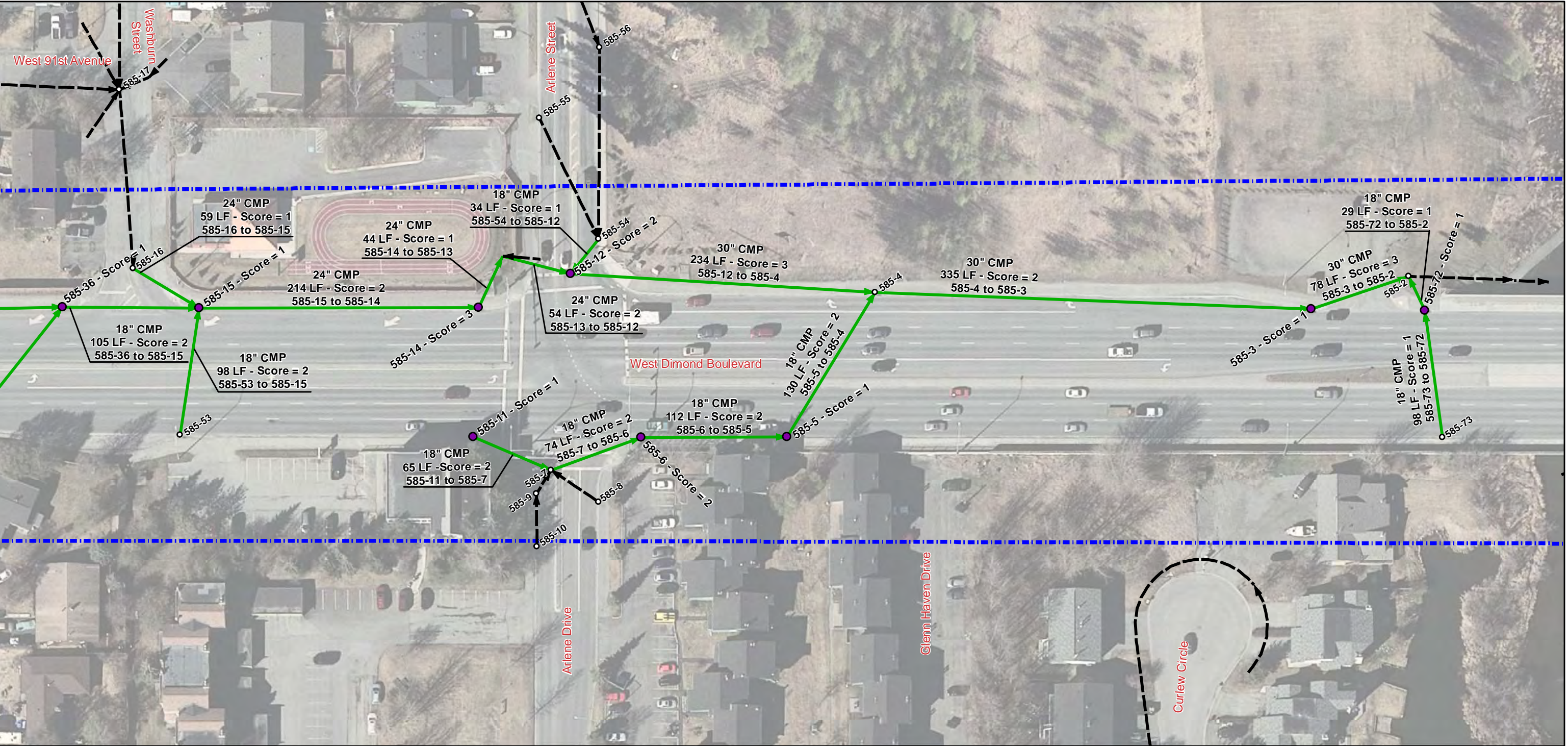
- ▶ Not Inspected
- Inspected with Score

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect



West Dimond Boulevard: Jewel Lake Road to Old Seward Highway



0 37.5 75 Feet

Legend

⊕ Not Located

Manhole/Catchbasin

○ Not Inspected

● Inspected without Score

● Inspected with Score

Pipe Segment

---▶ Not Inspected

→ Inspected with Score

Score

0 - No Defect

1 - Minor Defect

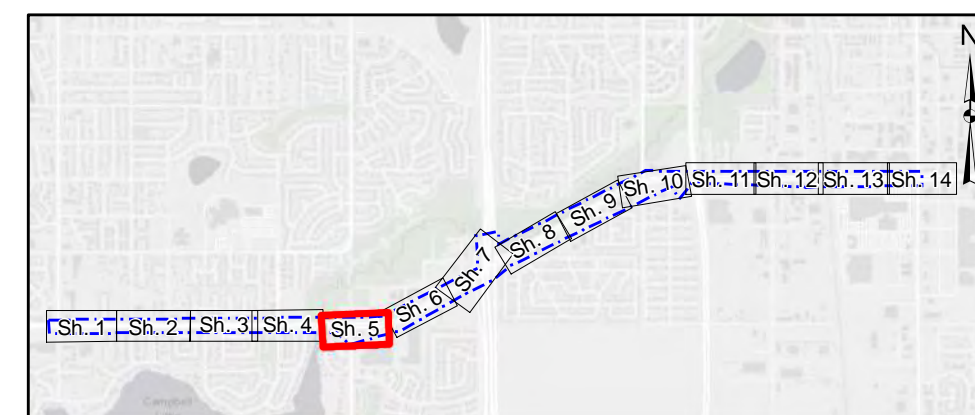
2 - Minor to Moderate Defect

3 - Moderate Defect

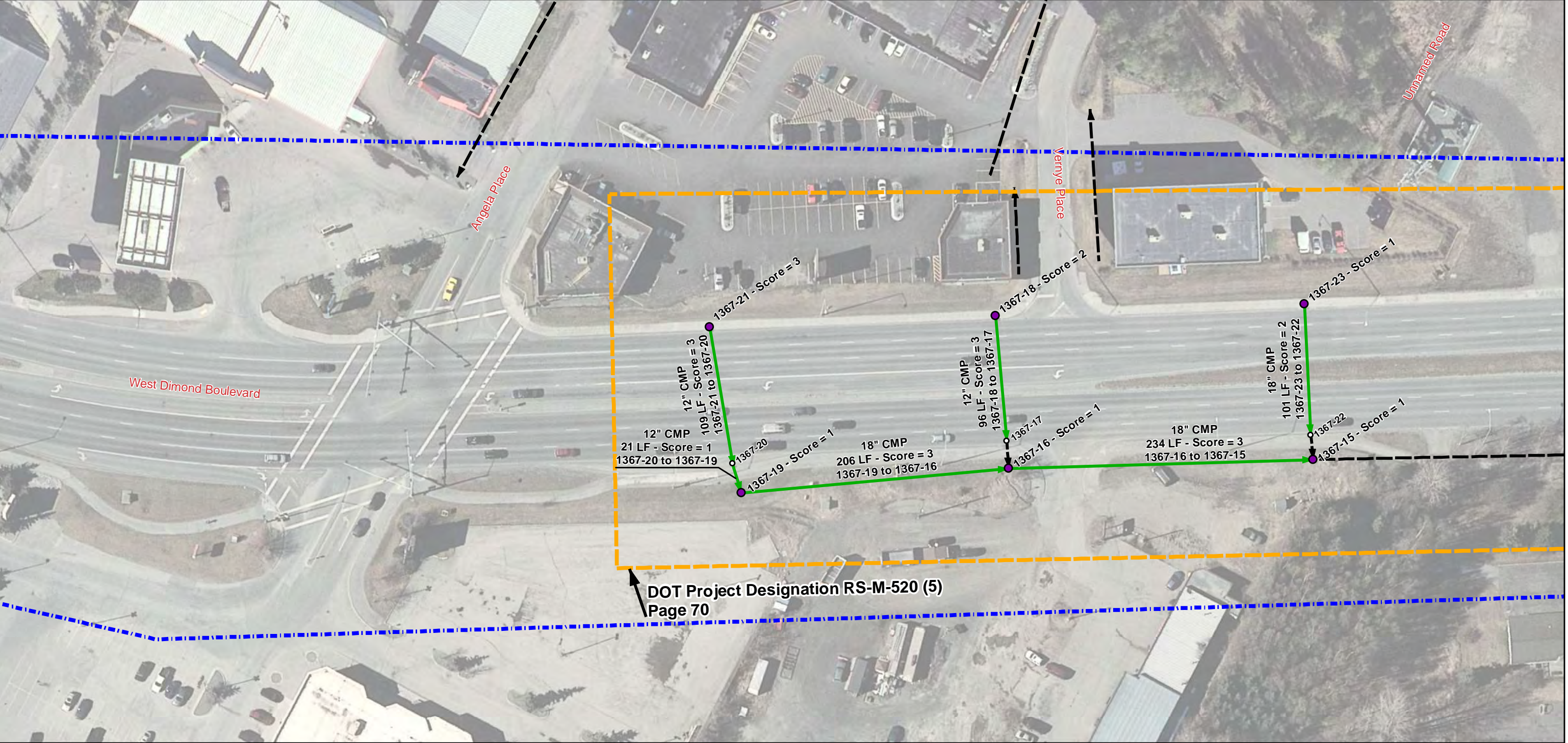
4 - Significant Defect

5 - Most Significant Defect





West Dimond Boulevard: Jewel Lake Road to Old Seward Highway



0 37.5 75 Feet

Legend

⊕ Not Located

Manhole/Catchbasin

○ Not Inspected

● Inspected without Score

● Inspected with Score

Pipe Segment

--- Not Inspected

→ Inspected with Score

Score

0 - No Defect

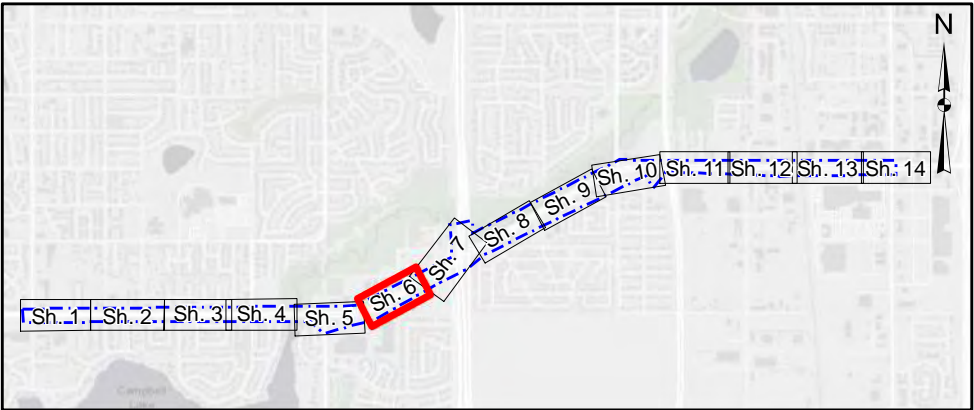
1 - Minor Defect

2 - Minor to Moderate Defect

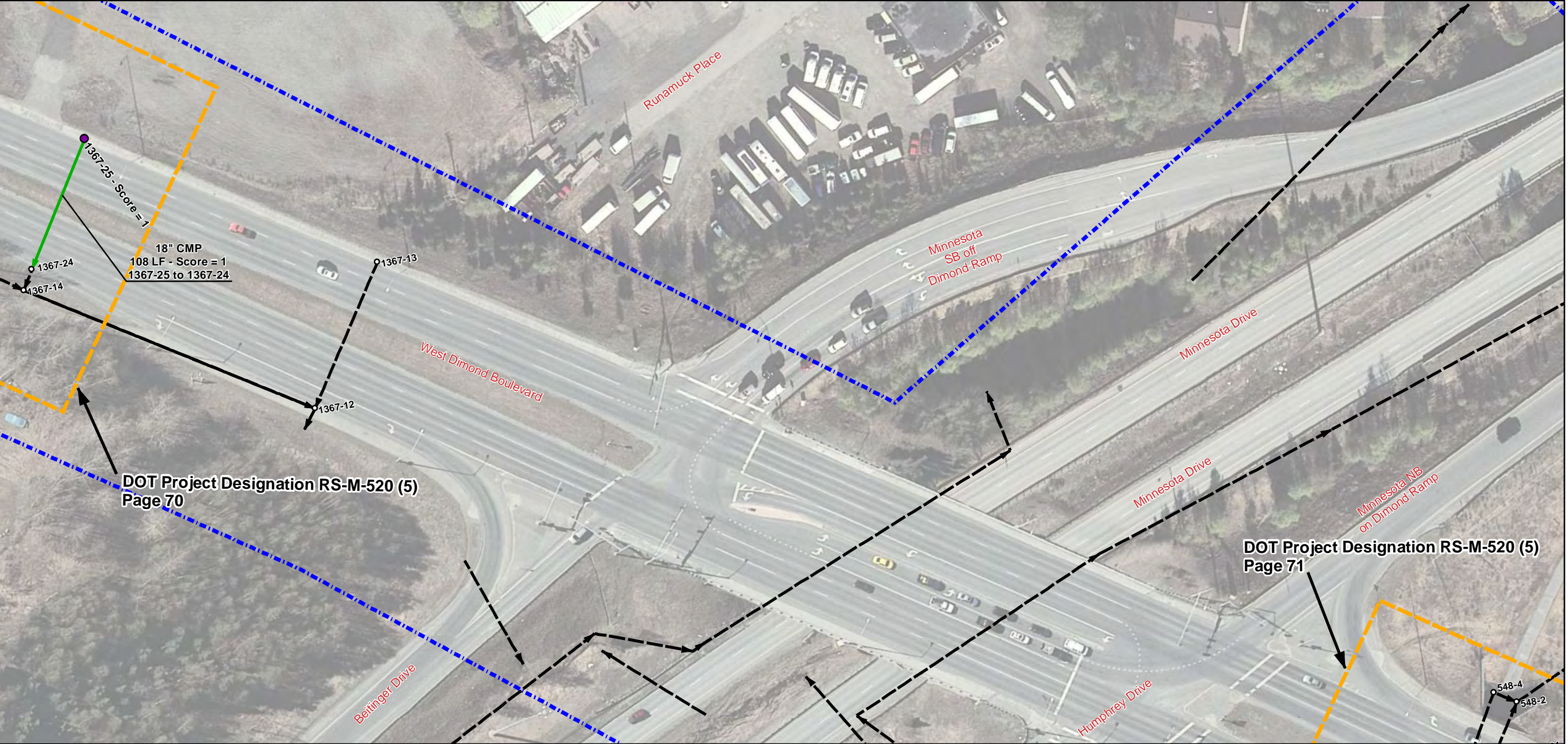
3 - Moderate Defect

4 - Significant Defect

5 - Most Significant Defect



West Dimond Boulevard: Jewel Lake Road to Old Seward Highway



0 37.5 75 Feet

Legend

⊕ Not Located

Manhole/Catchbasin

○ Not Inspected

● Inspected without Score

● Inspected with Score

Pipe Segment

---▶ Not Inspected

→ Inspected with Score

Score

0 - No Defect

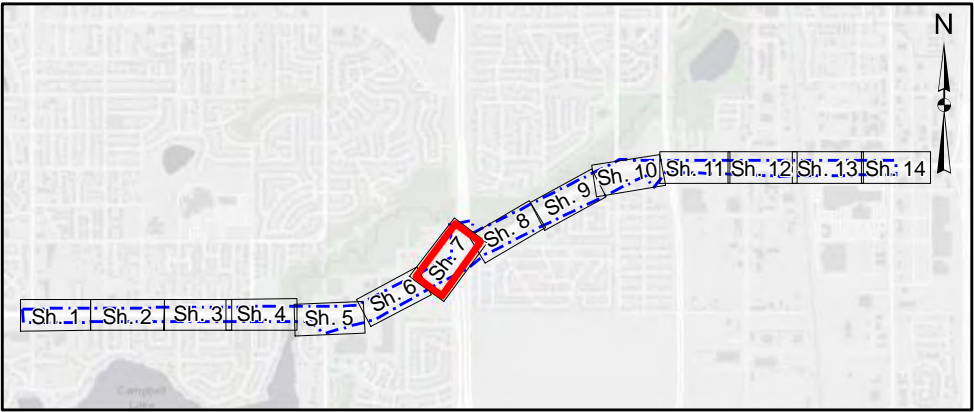
1 - Minor Defect

2 - Minor to Moderate Defect

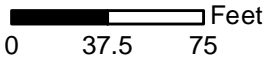
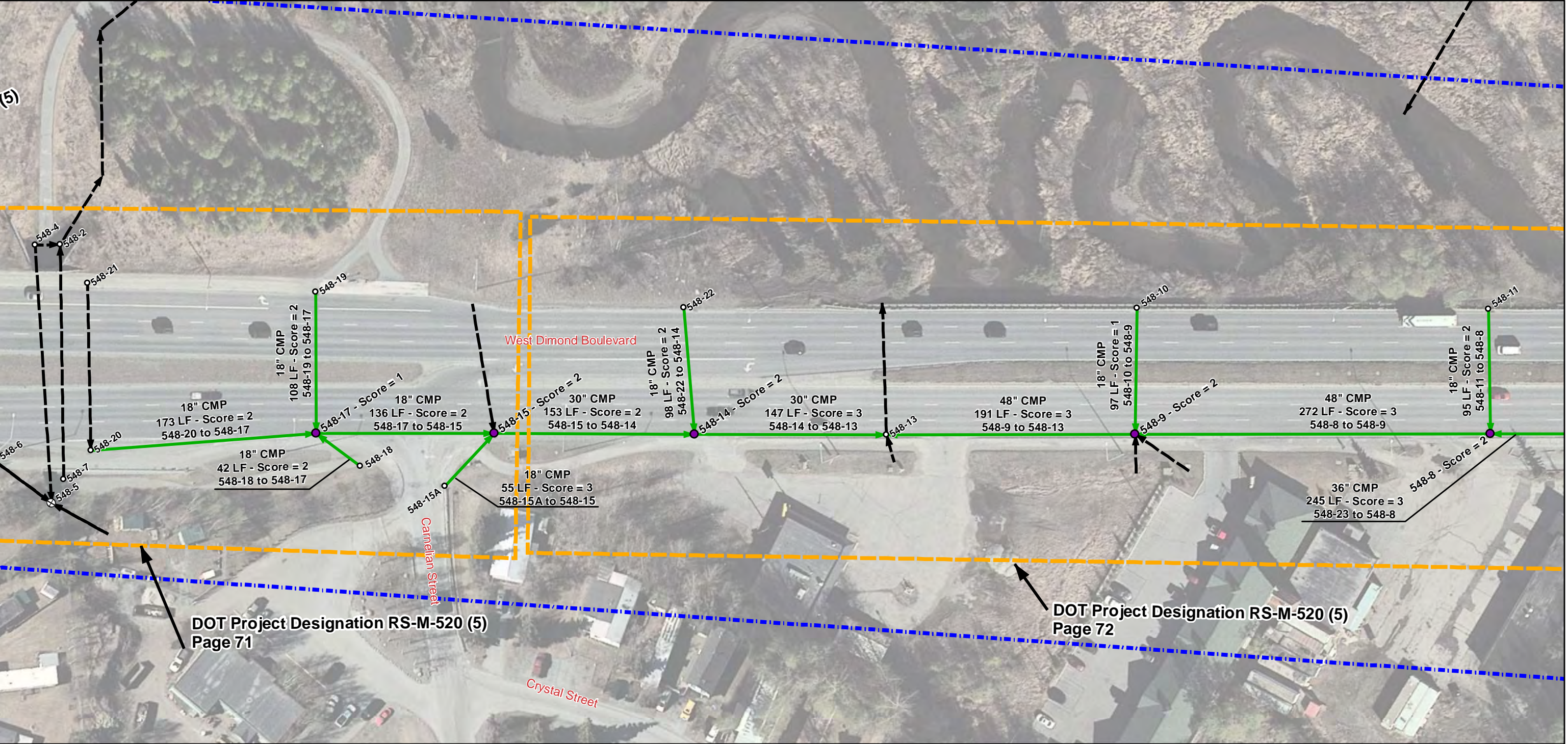
3 - Moderate Defect

4 - Significant Defect

5 - Most Significant Defect



West Dimond Boulevard: Jewel Lake Road to Old Seward Highway



Legend

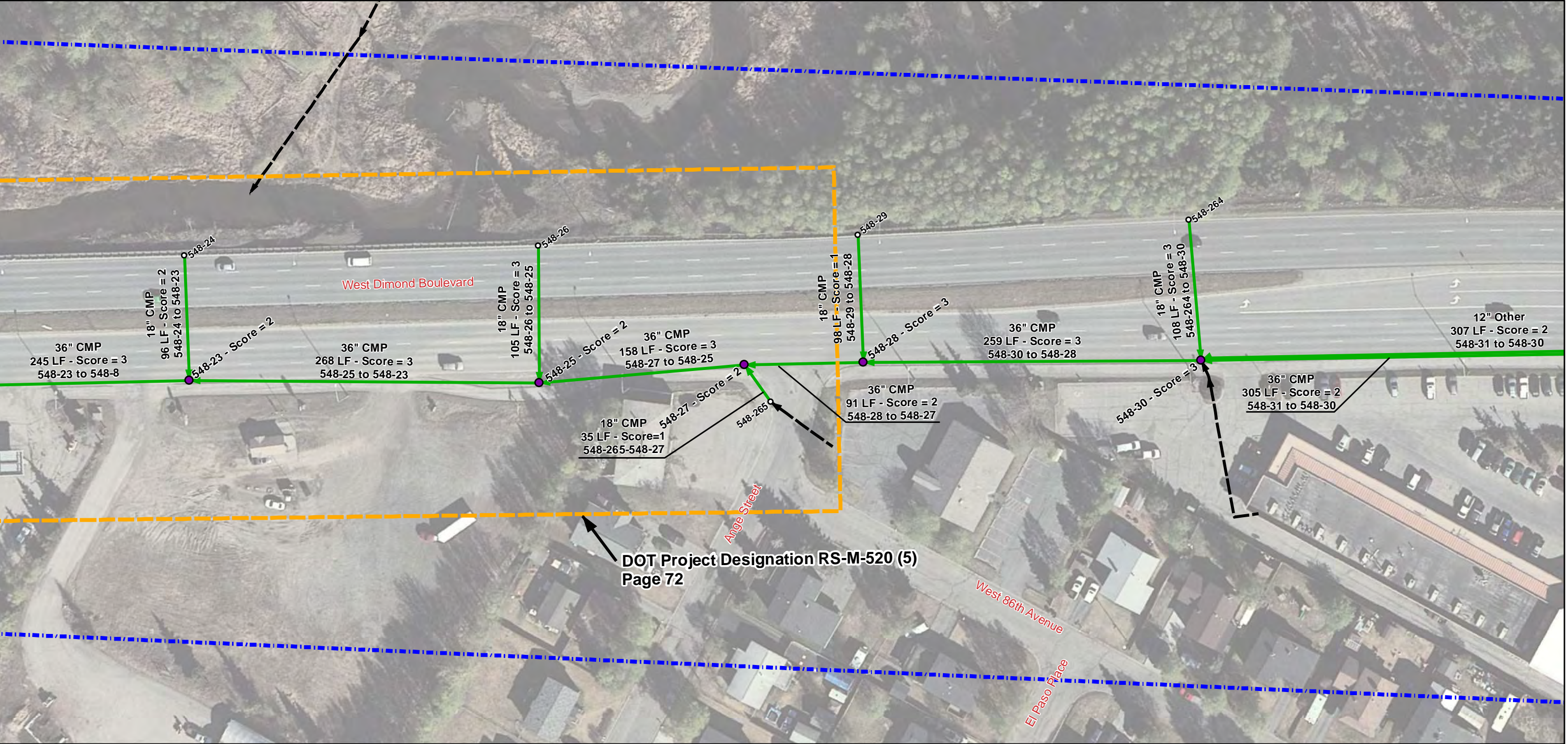
- ⊕ Not Located
- Manhole/Catchbasin**
- Not Inspected
 - Inspected without Score
 - Inspected with Score

- Pipe Segment**
- Not Inspected
 - Inspected with Score

- Score**
- 0 - No Defect
 - 1 - Minor Defect
 - 2 - Minor to Moderate Defect
 - 3 - Moderate Defect
 - 4 - Significant Defect
 - 5 - Most Significant Defect



West Dimond Boulevard: Jewel Lake Road to Old Seward Highway



0 37.5 75 Feet

Legend

⊕ Not Located

Manhole/Catchbasin

○ Not Inspected

● Inspected without Score

● Inspected with Score

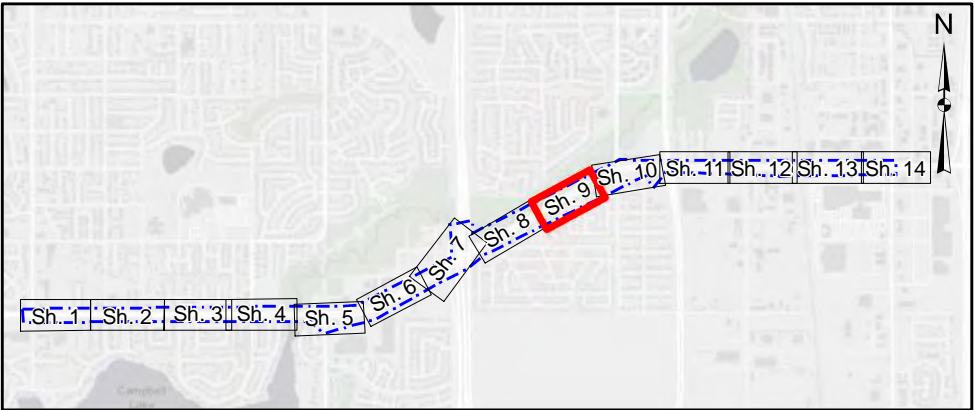
Pipe Segment

---> Not Inspected

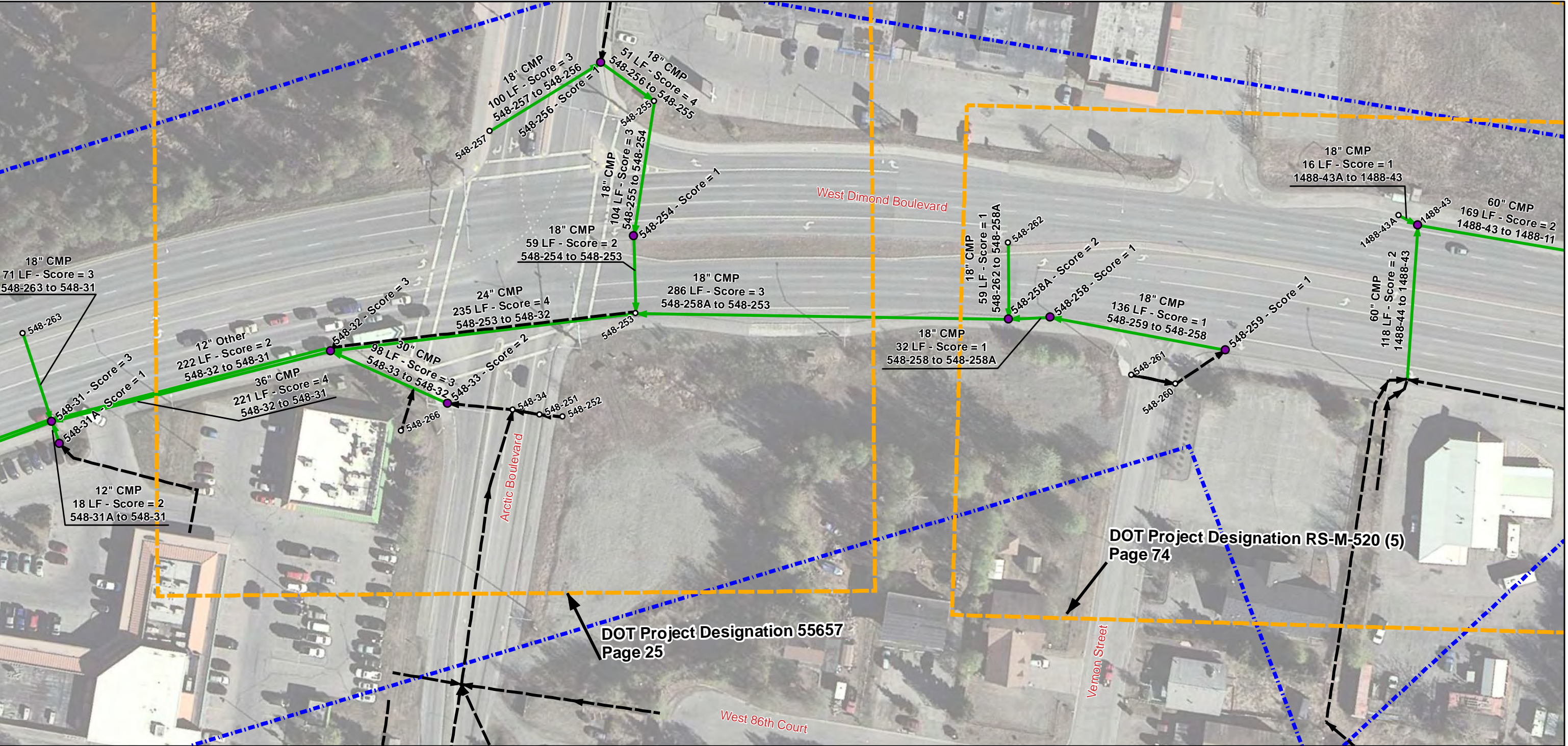
→ Inspected with Score

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect



West Dimond Boulevard: Jewel Lake Road to Old Seward Highway



0 37.5 75 Feet

Legend

⊕ Not Located

Manhole/Catchbasin

○ Not Inspected

● Inspected without Score

● Inspected with Score

Pipe Segment

---> Not Inspected

→ Inspected with Score

Score

0 - No Defect

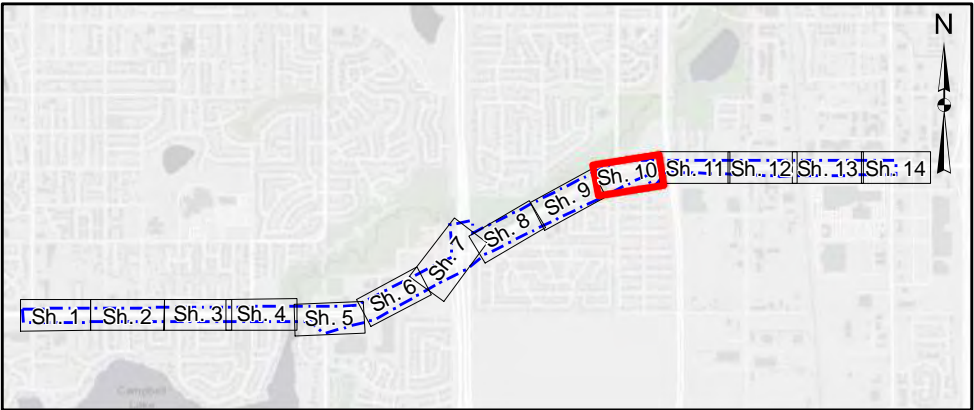
1 - Minor Defect

2 - Minor to Moderate Defect

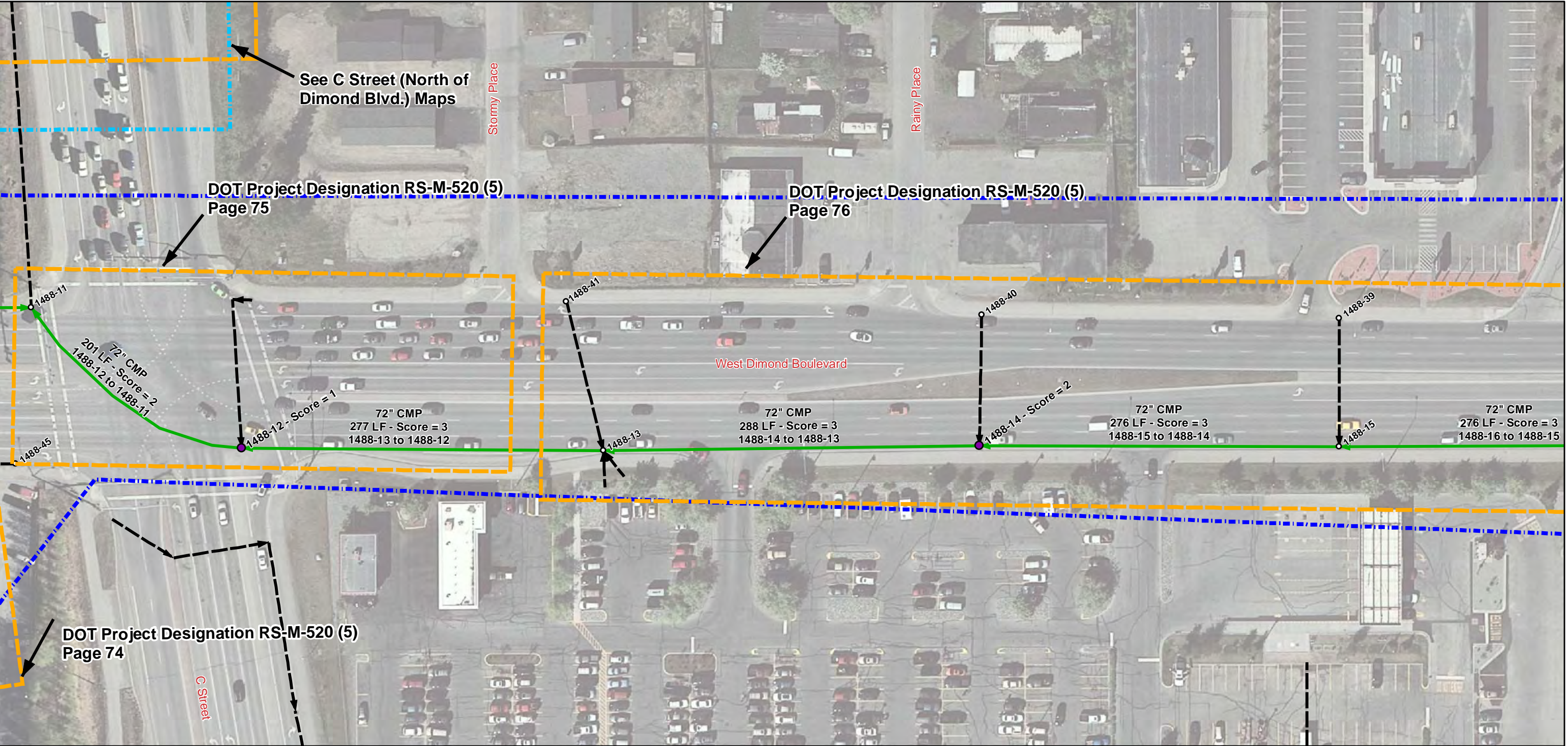
3 - Moderate Defect

4 - Significant Defect

5 - Most Significant Defect



West Dimond Boulevard: Jewel Lake Road to Old Seward Highway



0 37.5 75 Feet

Legend

⊕ Not Located

Manhole/Catchbasin

○ Not Inspected

● Inspected without Score

● Inspected with Score

Pipe Segment

---▶ Not Inspected

→ Inspected with Score

Score

0 - No Defect

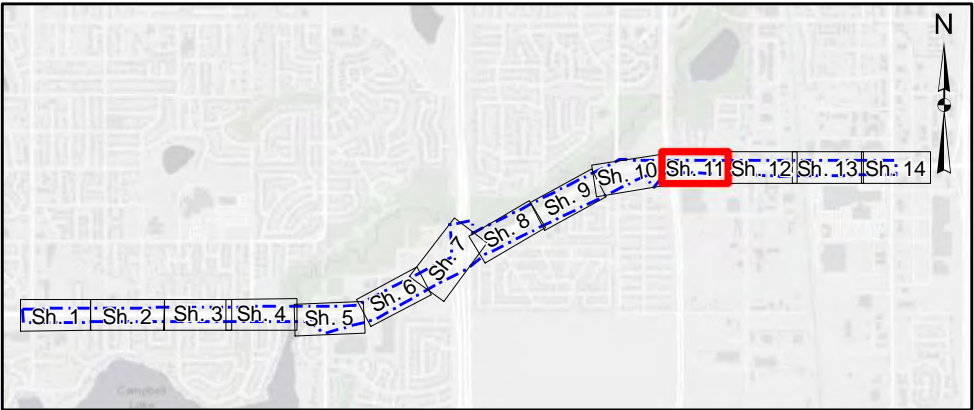
1 - Minor Defect

2 - Minor to Moderate Defect

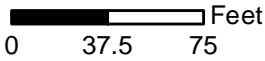
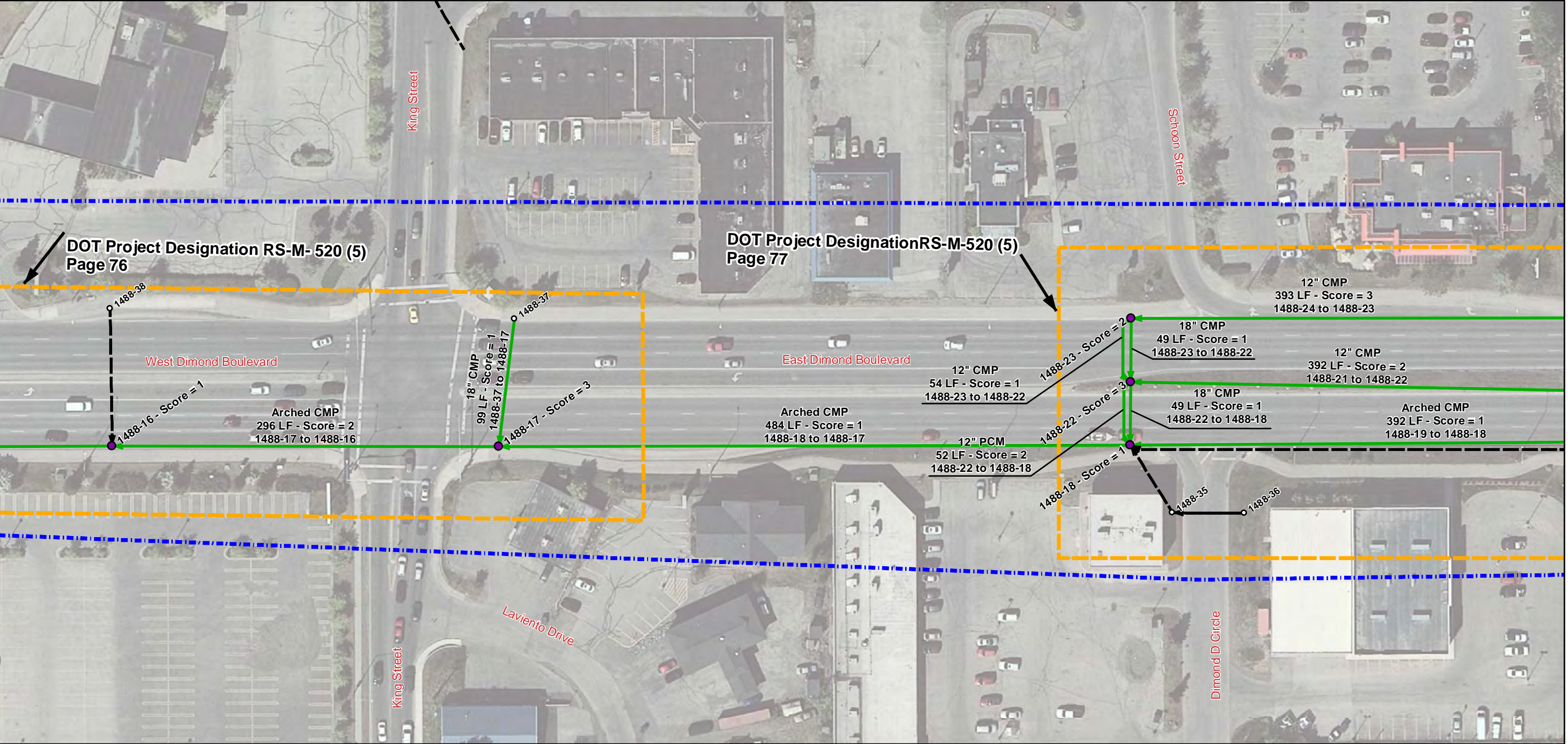
3 - Moderate Defect

4 - Significant Defect

5 - Most Significant Defect



West Dimond Boulevard: Jewel Lake Road to Old Seward Highway



Legend

⊕ Not Located

Manhole/Catchbasin

- Not Inspected
- Inspected without Score
- Inspected with Score

Pipe Segment

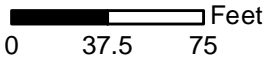
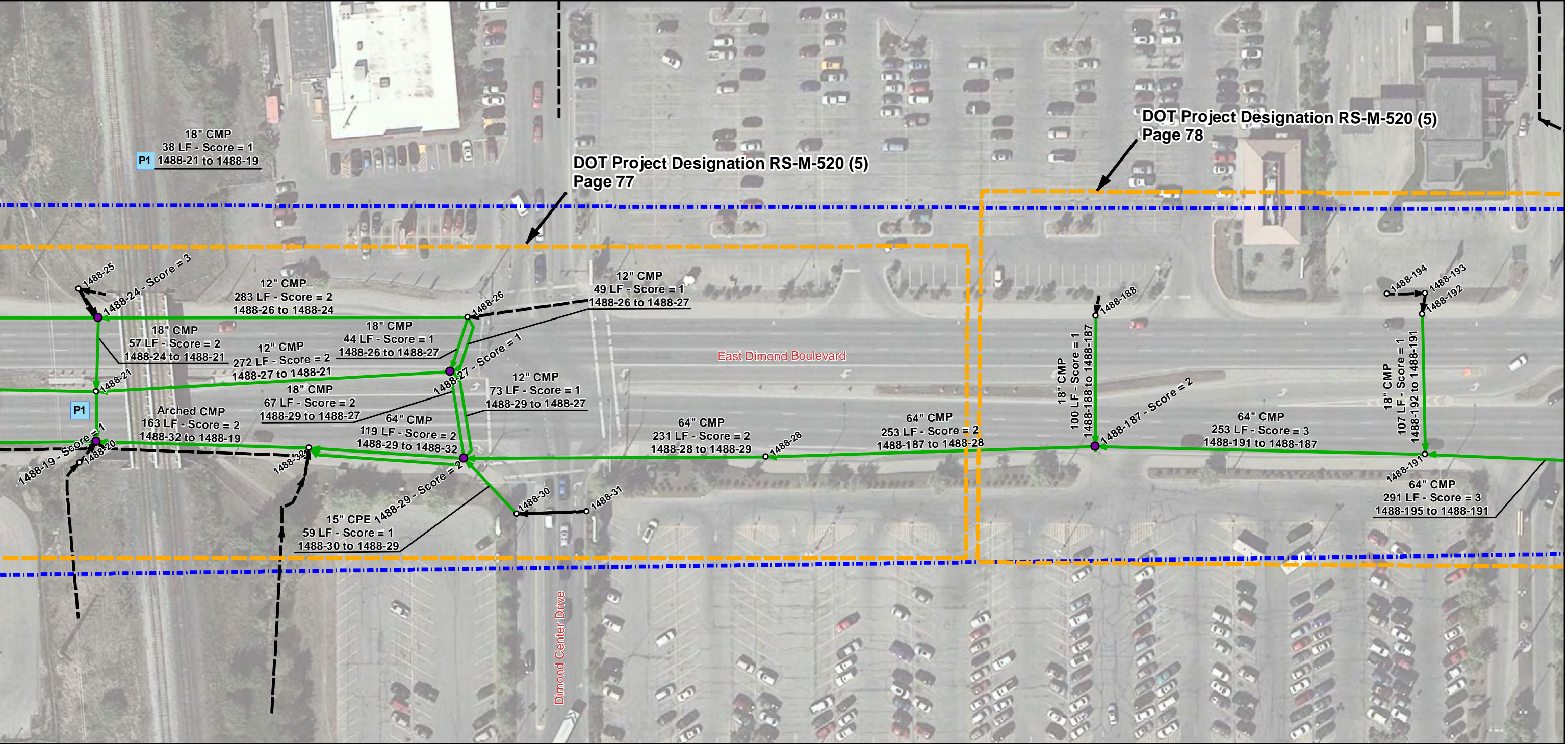
- ▶ Not Inspected
- Inspected with Score

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect



West Dimond Boulevard: Jewel Lake Road to Old Seward Highway



Legend

⊕ Not Located

Manhole/Catchbasin

- Not Inspected
- Inspected without Score
- Inspected with Score

Pipe Segment

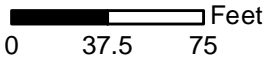
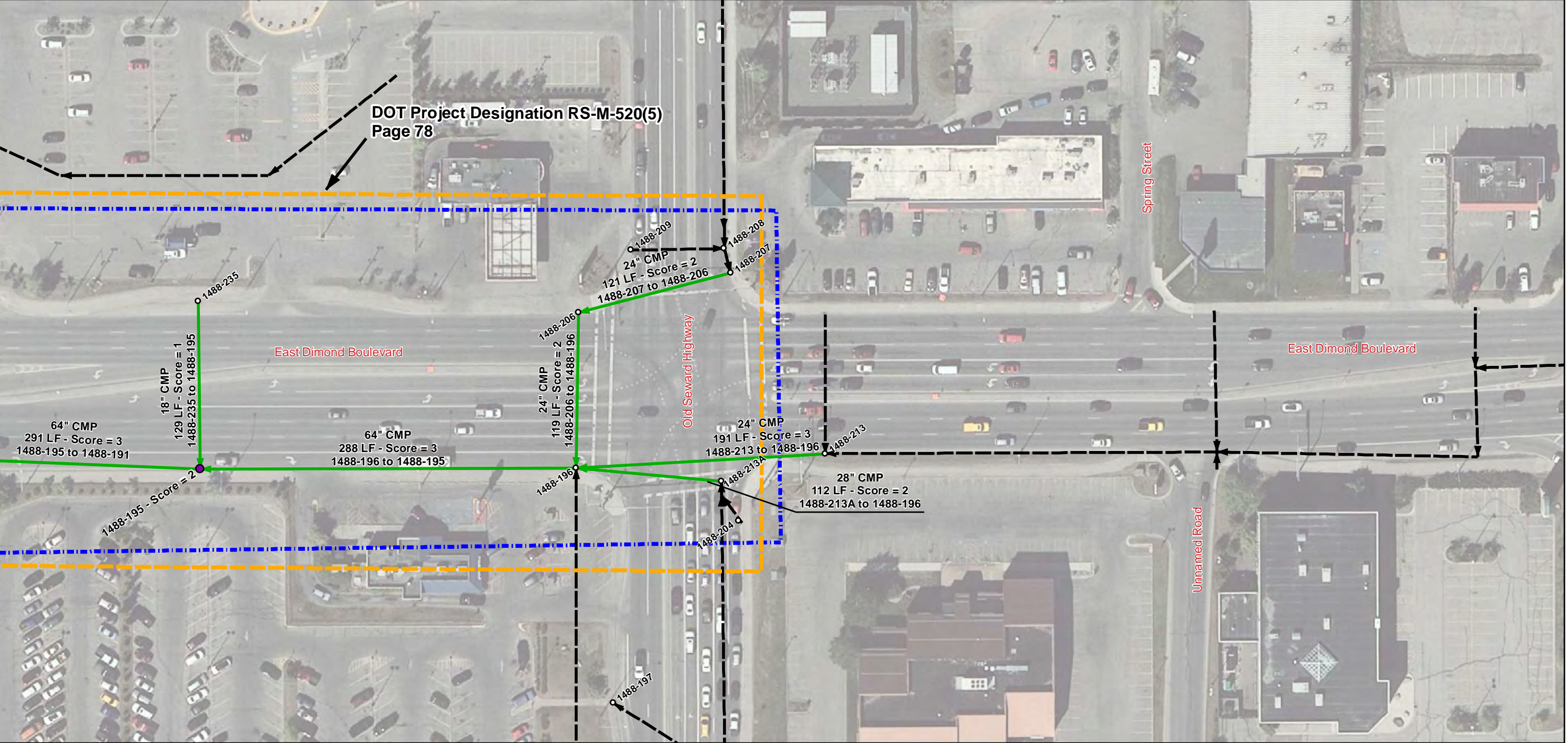
- Not Inspected
- Inspected with Score

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect



West Dimond Boulevard: Jewel Lake Road to Old Seward Highway



Legend

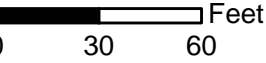
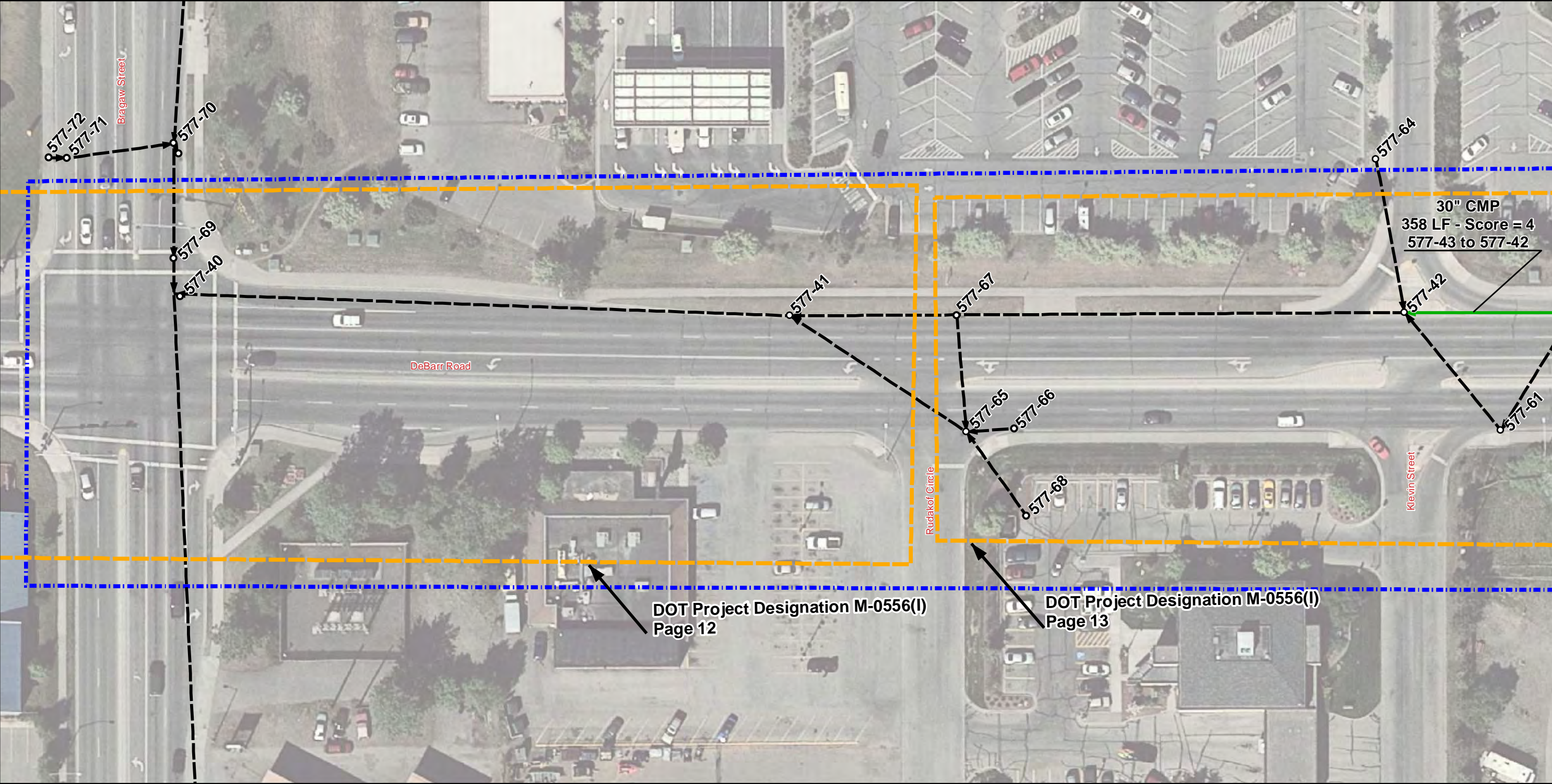
- ⊕ Not Located
- Manhole/Catchbasin**
- Not Inspected
 - Inspected without Score
 - Inspected with Score

- Pipe Segment**
- ▶ Not Inspected
 - Inspected with Score

- Score**
- 0 - No Defect
 - 1 - Minor Defect
 - 2 - Minor to Moderate Defect
 - 3 - Moderate Defect
 - 4 - Significant Defect
 - 5 - Most Significant Defect



Debarr Road: Bragaw Street to Muldoon Road



Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

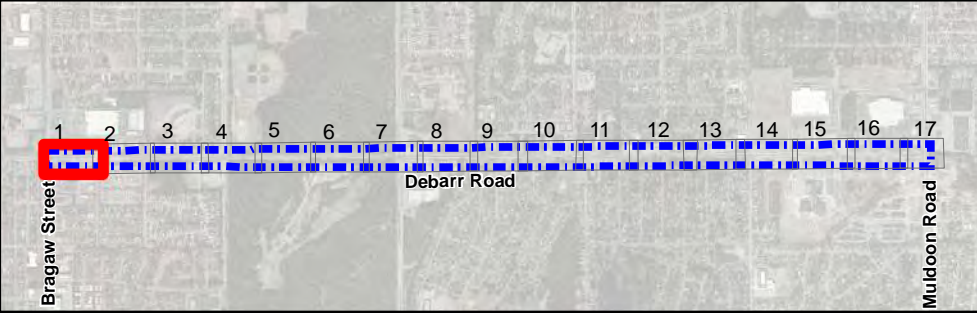
- Not Inspected
- Inspected
- Not Located

Pipe Segment

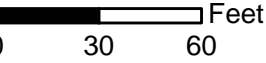
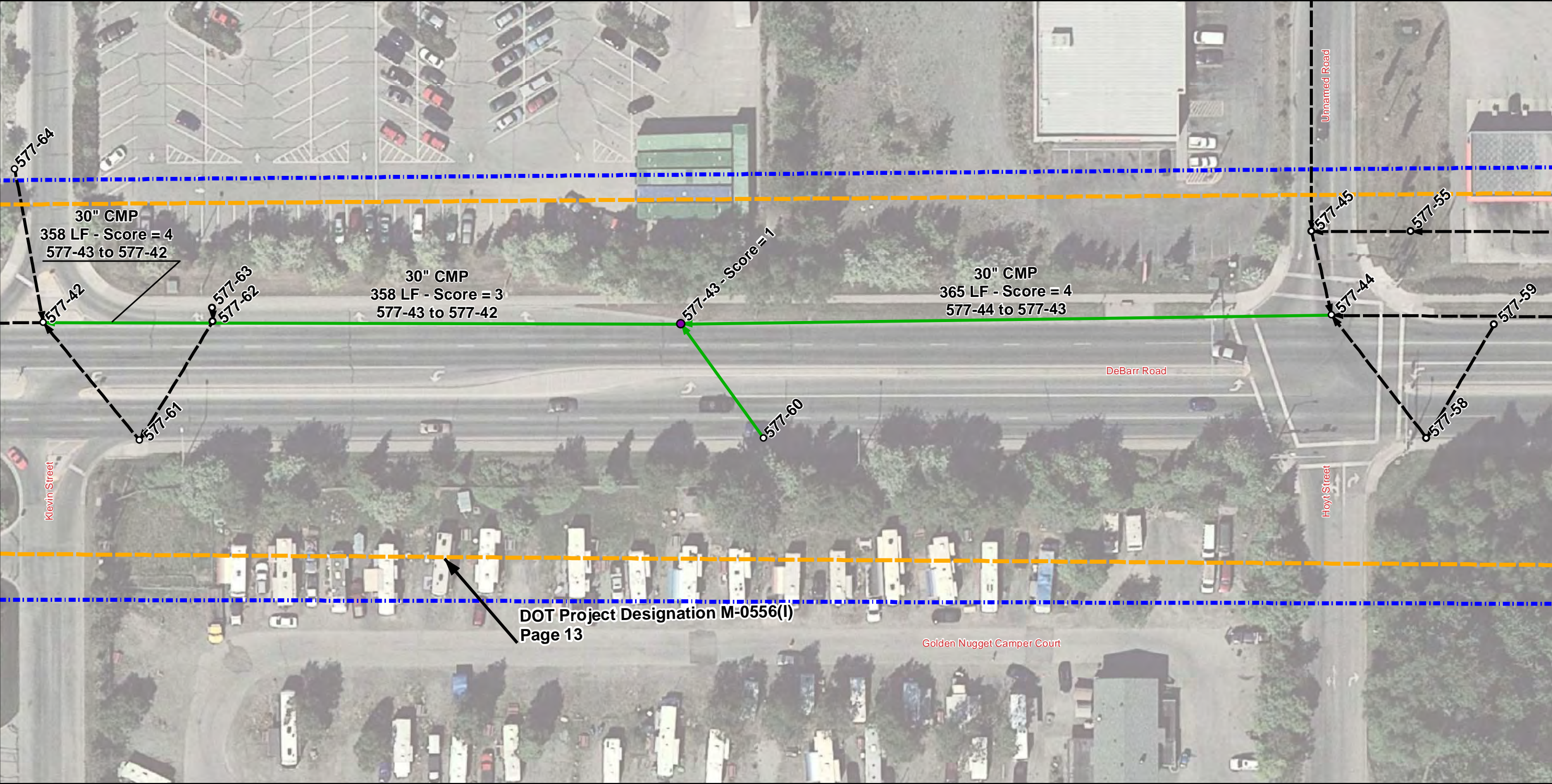
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Debarr Road: Bragaw Street to Muldoon Road



Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

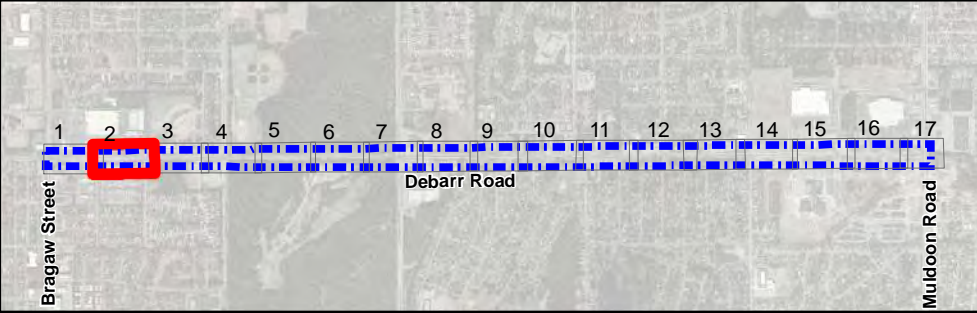
- Not Inspected
- Inspected
- Not Located

Pipe Segment

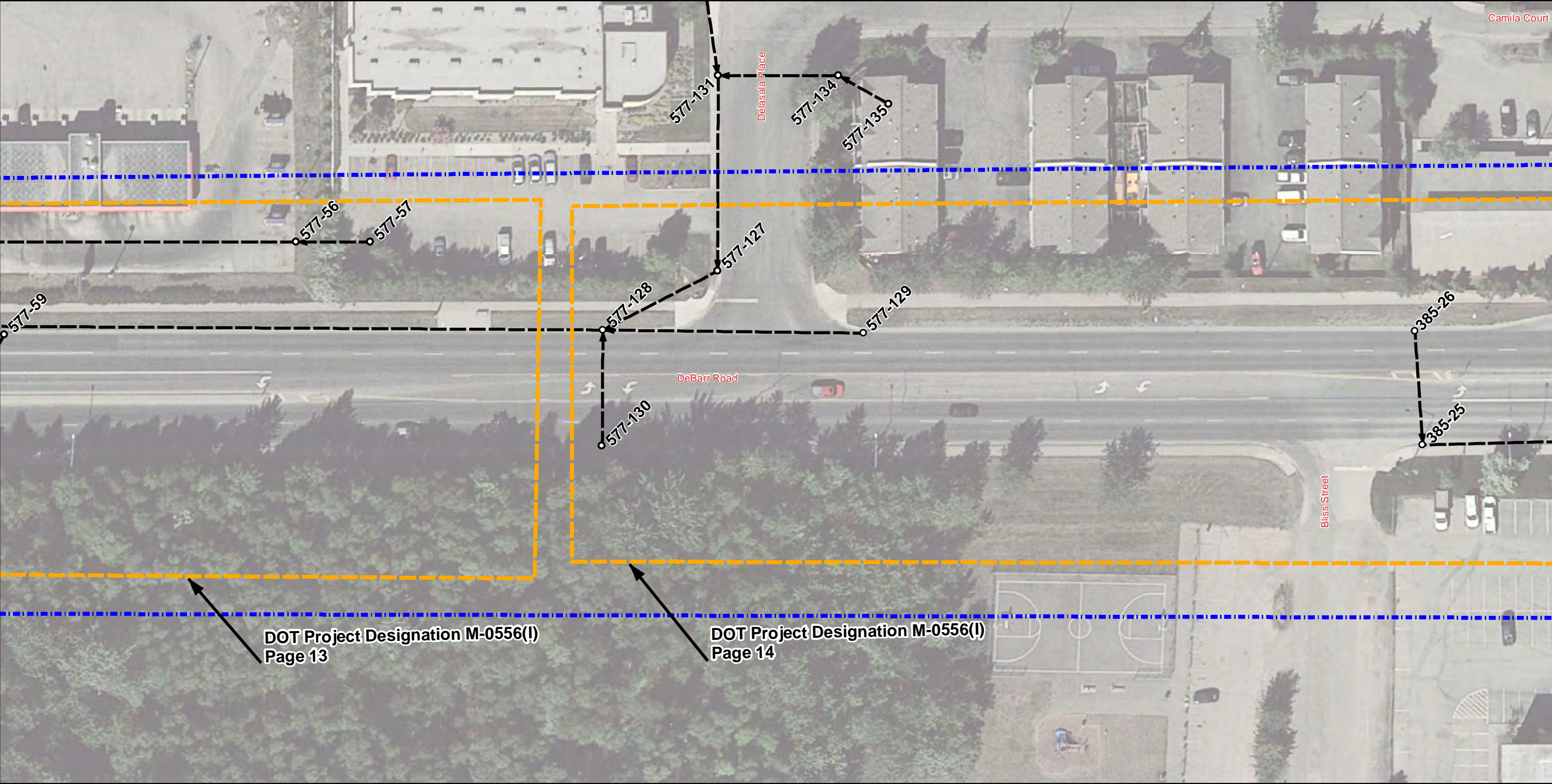
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Debarr Road: Bragaw Street to Muldoon Road



0 30 60 Feet

Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

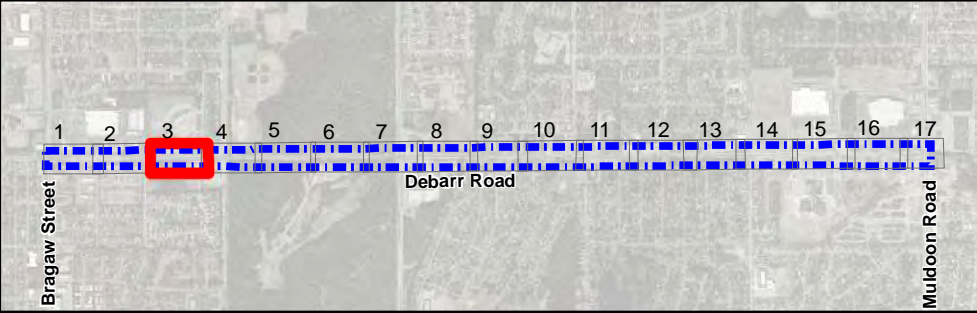
- Not Inspected
- Inspected
- Not Located

Pipe Segment

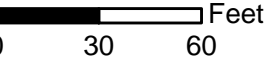
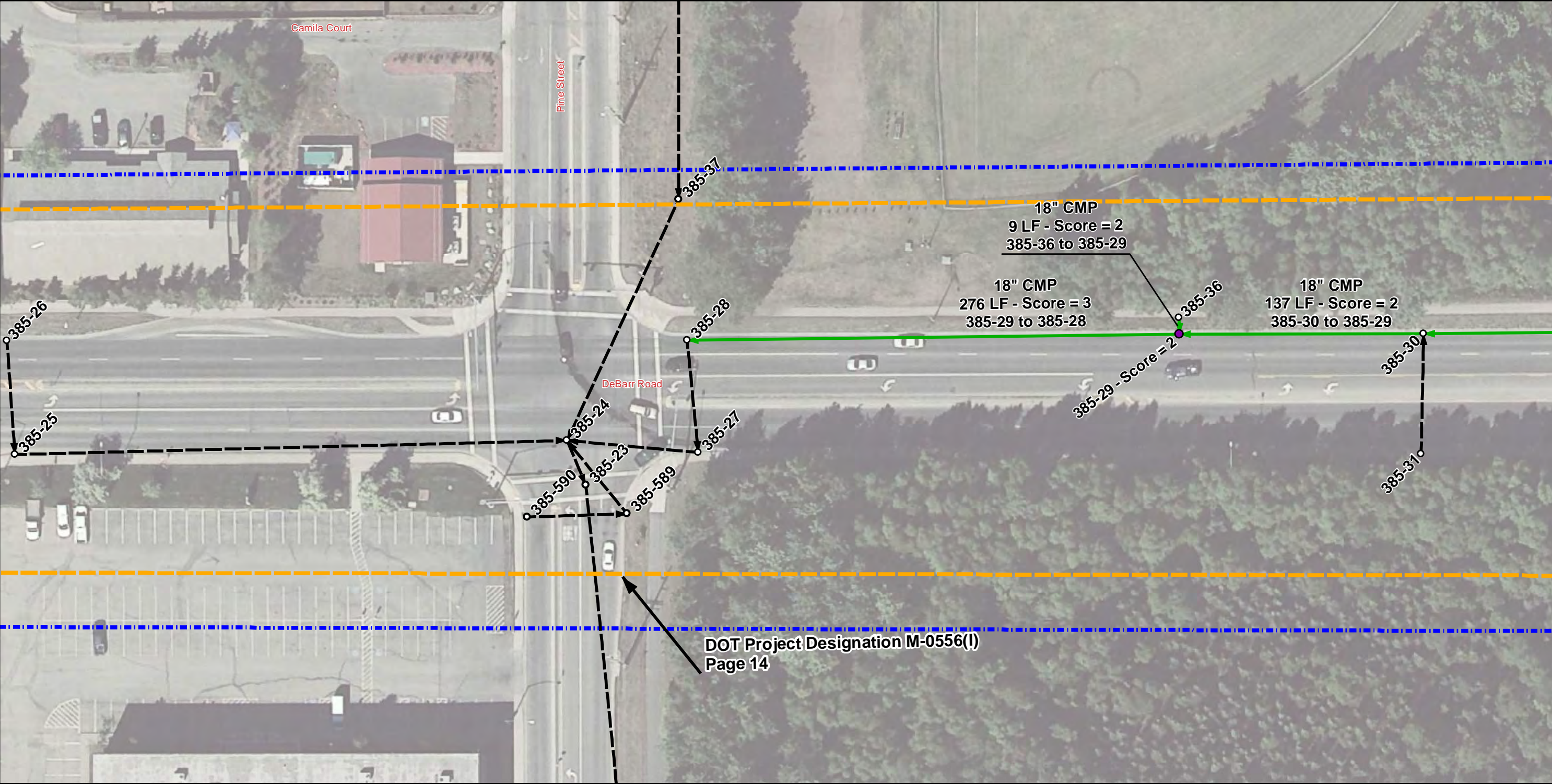
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Debarr Road: Bragaw Street to Muldoon Road



Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

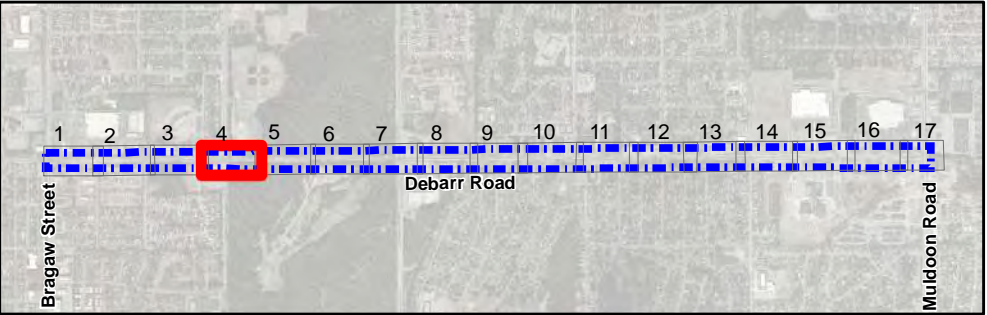
- Not Inspected
- Inspected
- Not Located

Pipe Segment

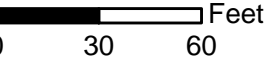
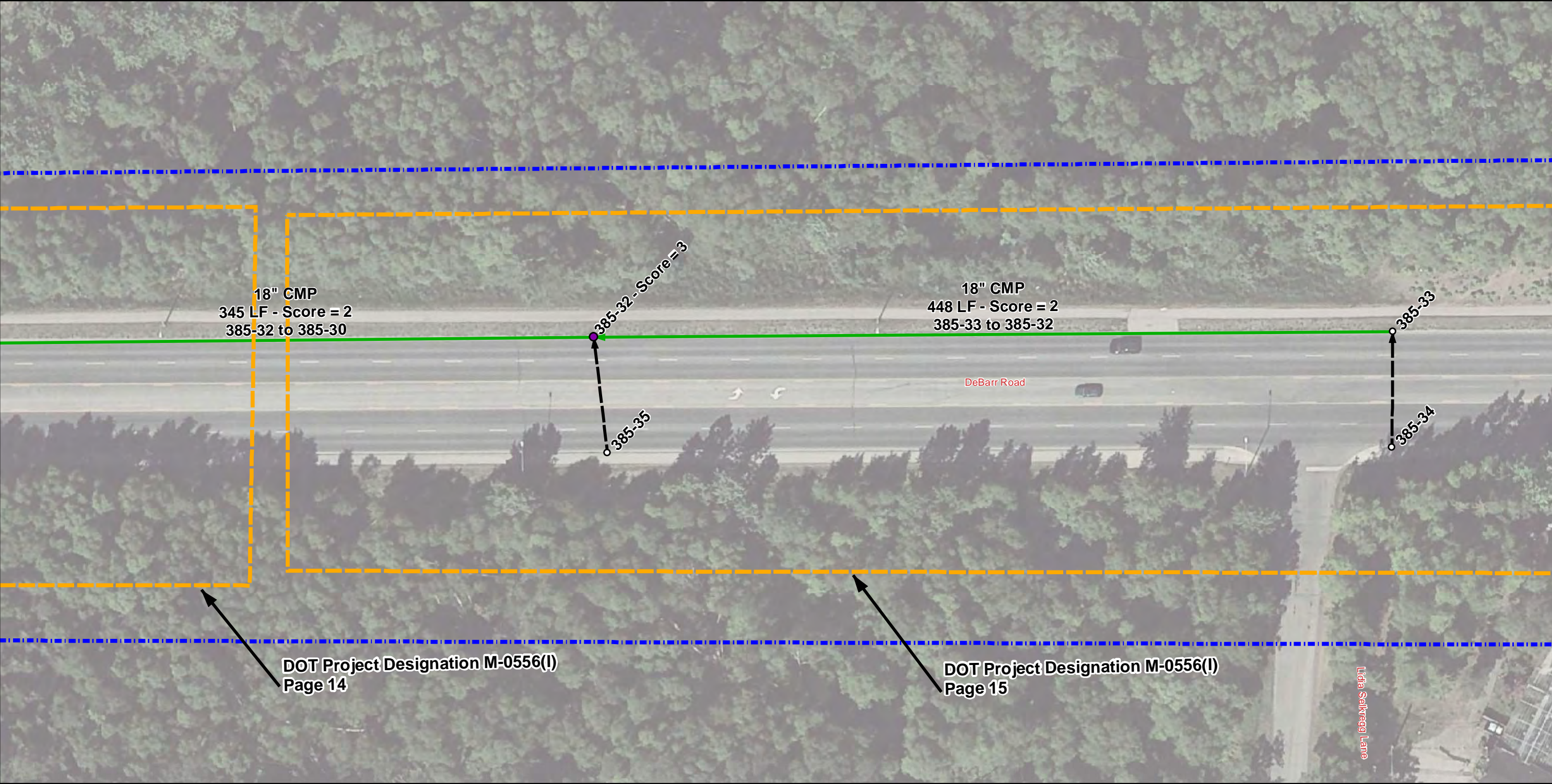
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Debarr Road: Bragaw Street to Muldoon Road



Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

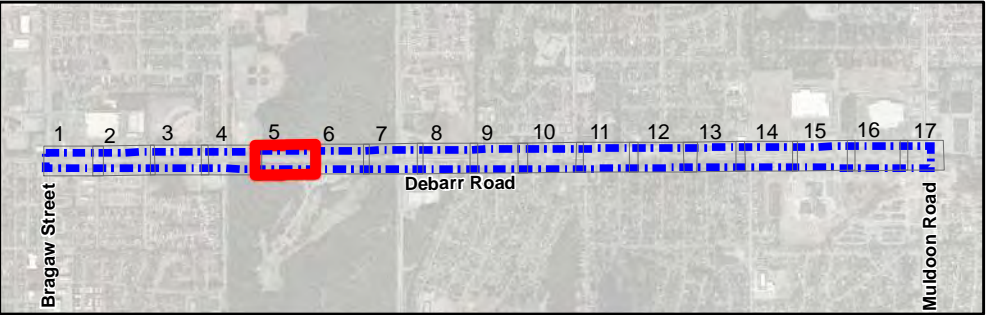
- Not Inspected
- Inspected
- Not Located

Pipe Segment

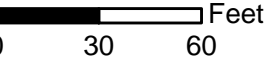
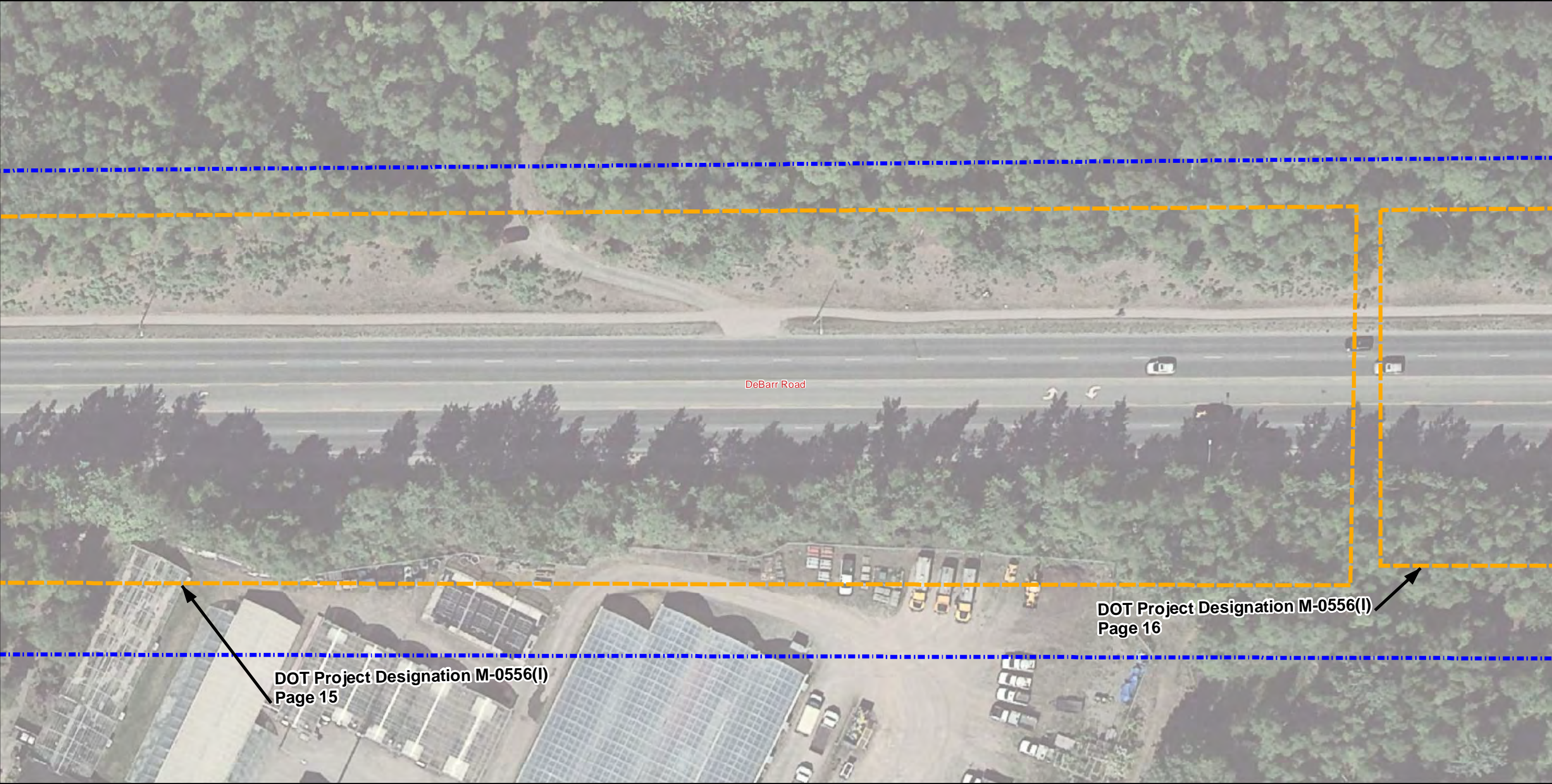
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Debarr Road: Bragaw Street to Muldoon Road



Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

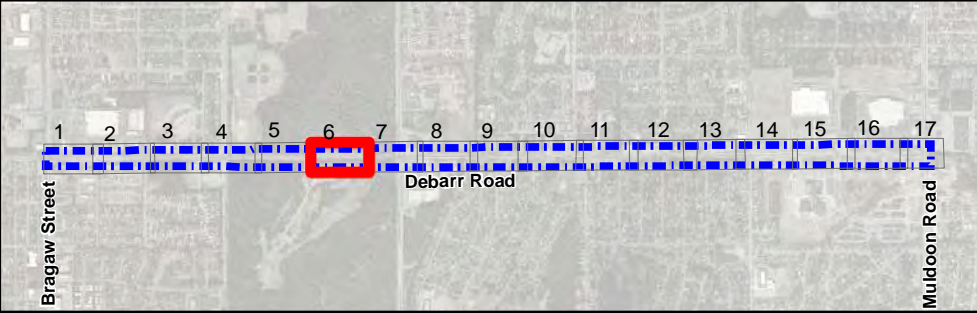
- Not Inspected
- Inspected
- Not Located

Pipe Segment

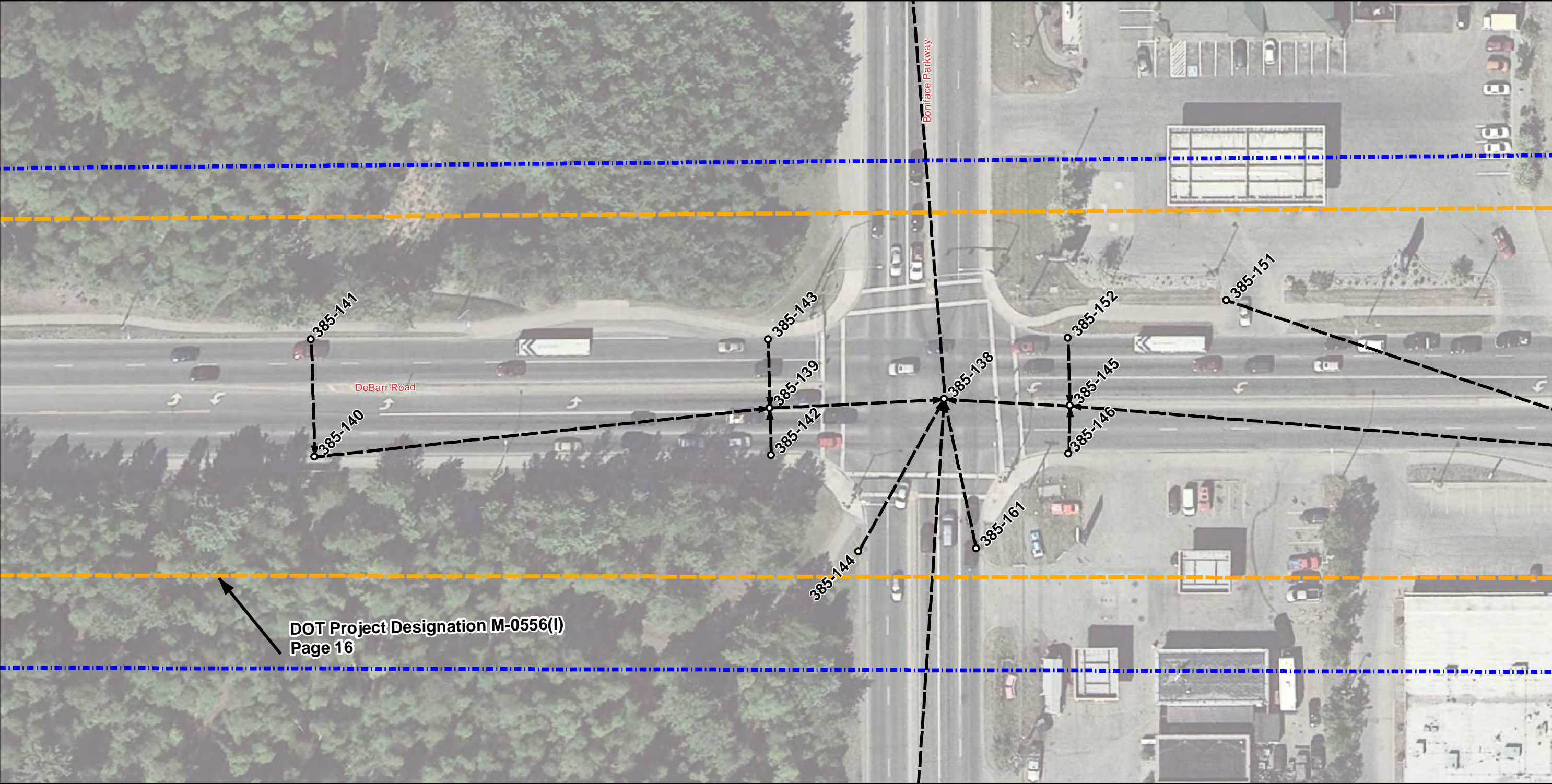
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Debarr Road: Bragaw Street to Muldoon Road



DOT Project Designation M-0556(I)
Page 16

0 30 60 Feet



Project Area
Asbuilt Designation

Legend

Manhole/Catchbasin

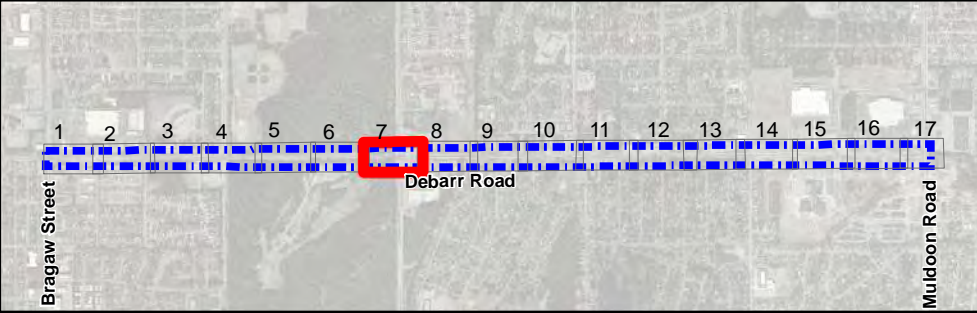
- Not Inspected
- Inspected
- ⊕ Not Located

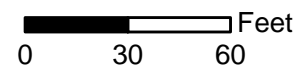
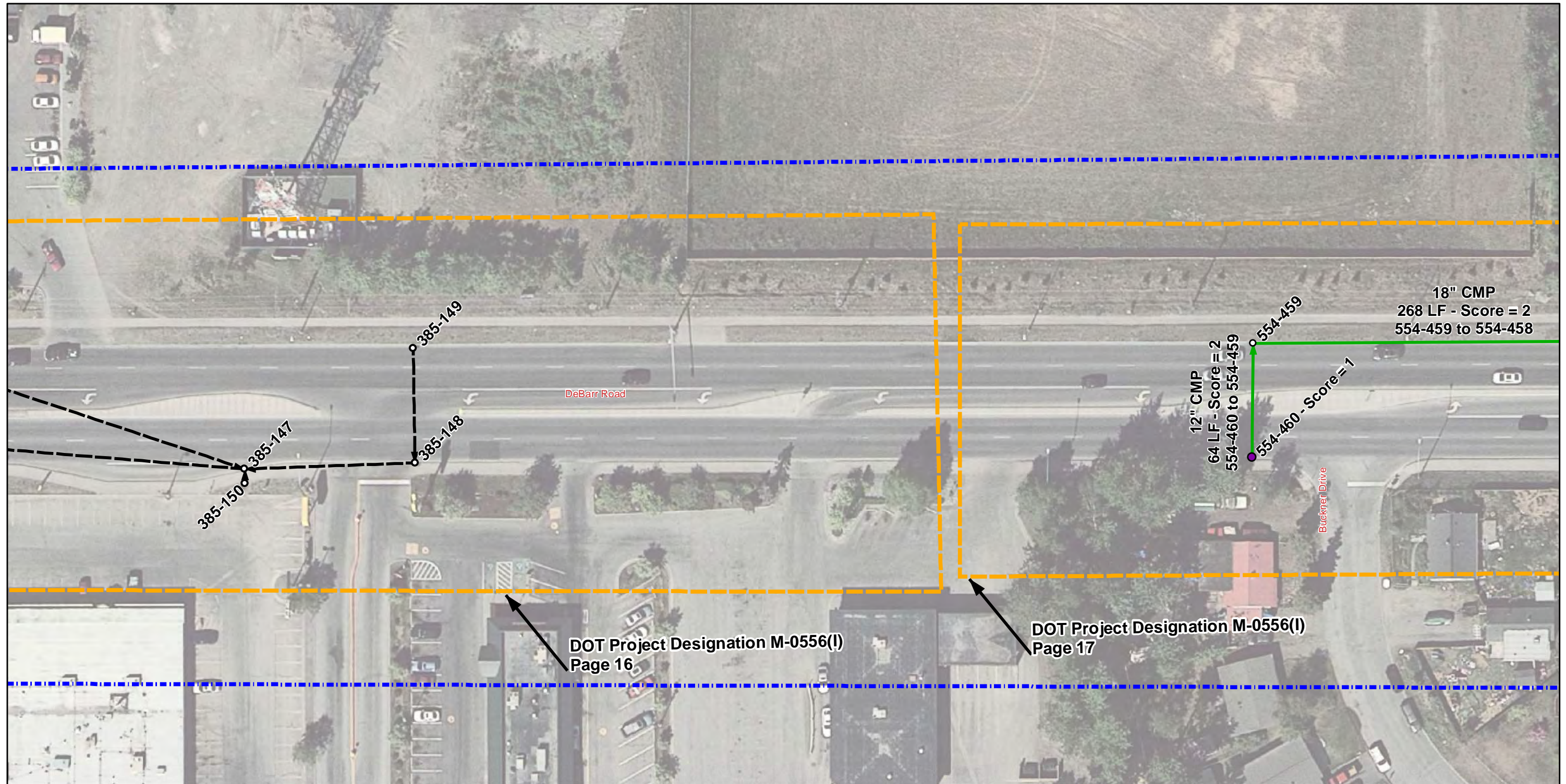
Pipe Segment

- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored







Legend

Manhole/Catchbasin

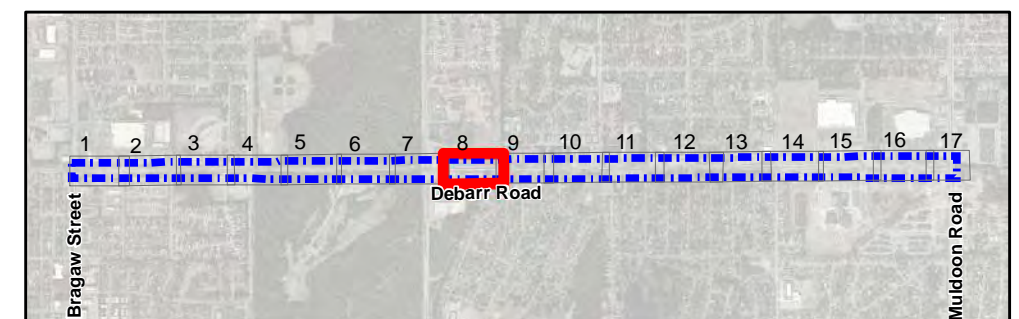
- Not Inspected
- Inspected
- ⊕ Not Located

Pipe Segment

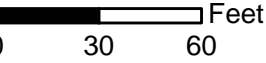
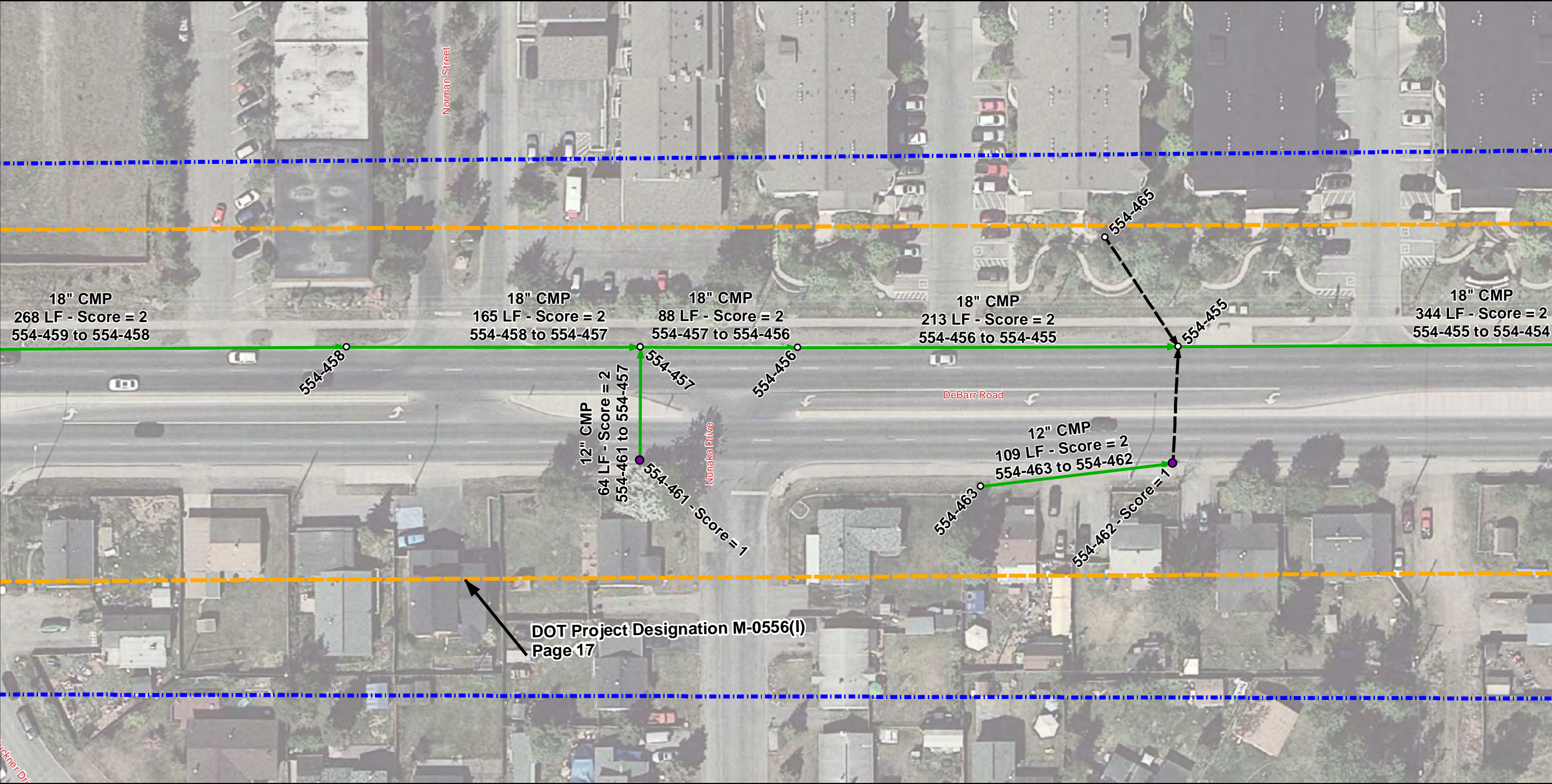
-  Inspected
 Not Inspected

Score

- 0 - No Defect
1 - Minor Defect
2 - Minor to Moderate Defect
3 - Moderate Defect
4 - Significant Defect
5 - Most Significant Defect
N - Not Scored



Debarr Road: Bragaw Street to Muldoon Road



Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

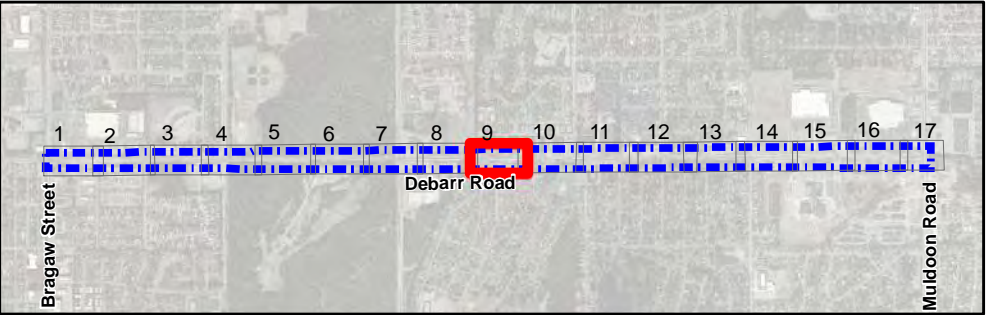
- Not Inspected
- Inspected
- Not Located

Pipe Segment

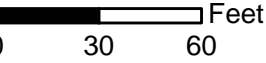
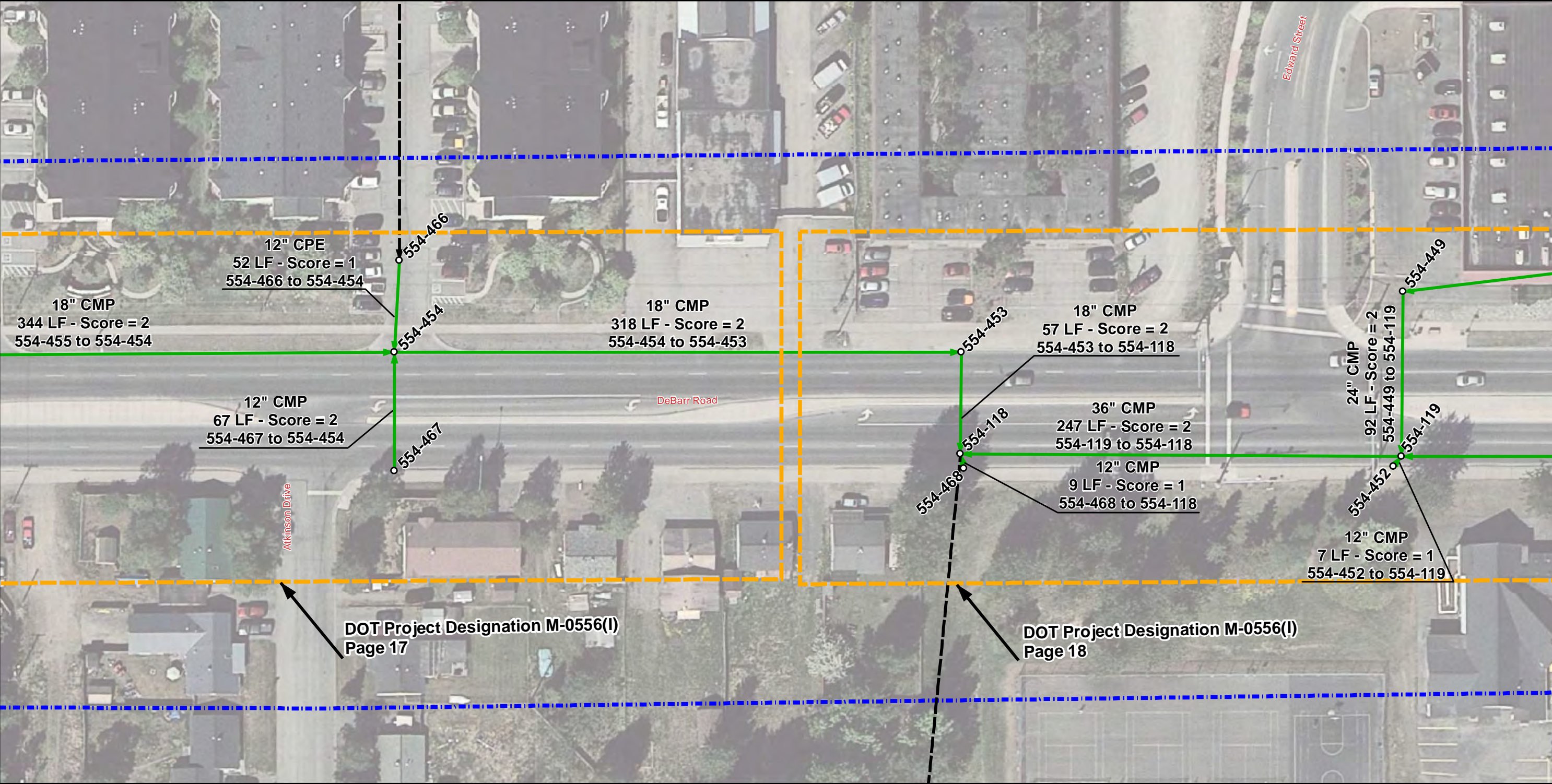
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Debarr Road: Bragaw Street to Muldoon Road



Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

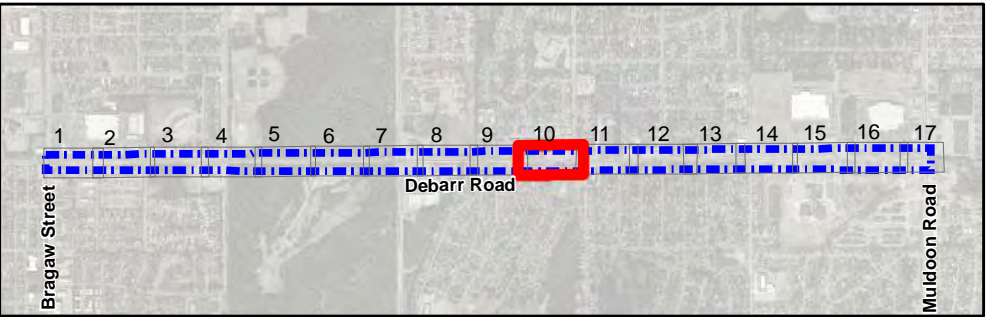
- Not Inspected
- Inspected
- Not Located

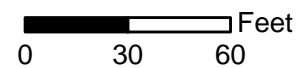
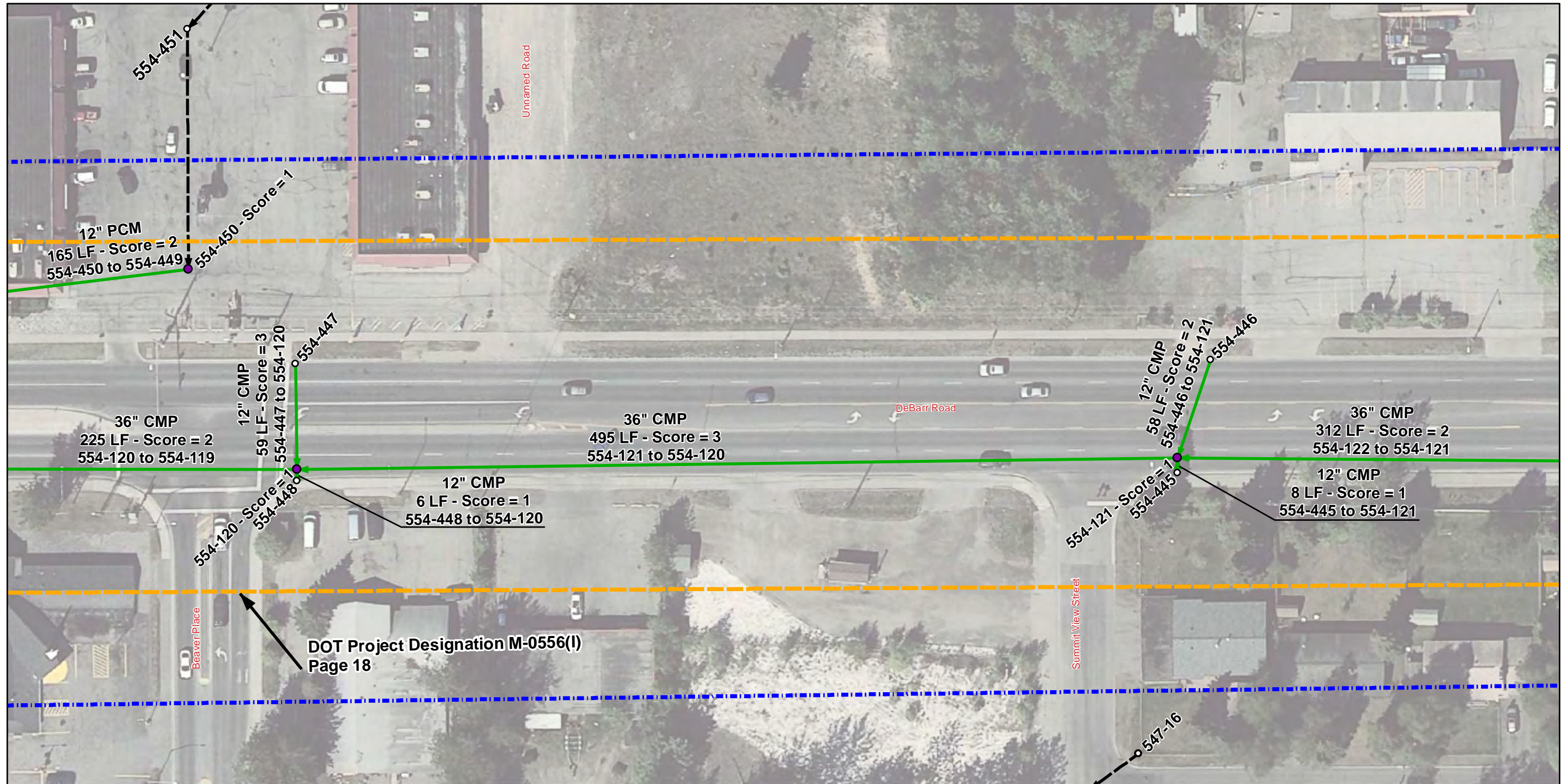
Pipe Segment

- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored






Legend

Manhole/Catchbasin

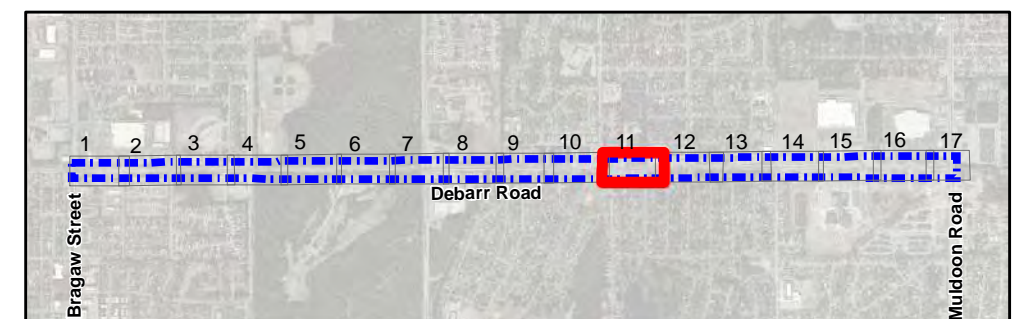
- Not Inspected
- Inspected
- ⊕ Not Located

Pipe Segment

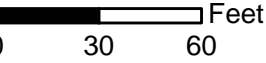
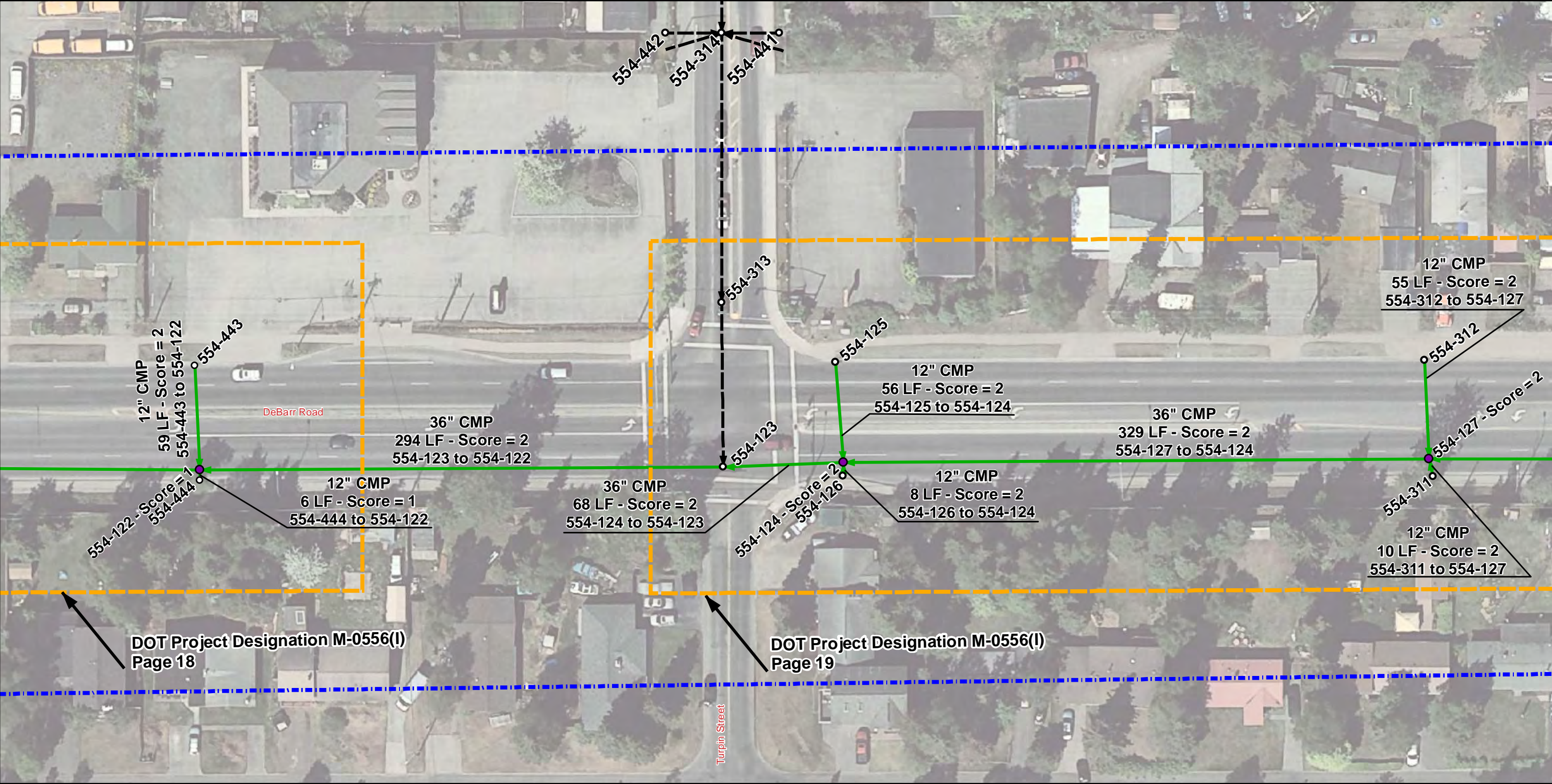
-  Inspected
 Not Inspected

Score

- 0 - No Defect
1 - Minor Defect
2 - Minor to Moderate Defect
3 - Moderate Defect
4 - Significant Defect
5 - Most Significant Defect
N - Not Scored



Debarr Road: Bragaw Street to Muldoon Road



Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

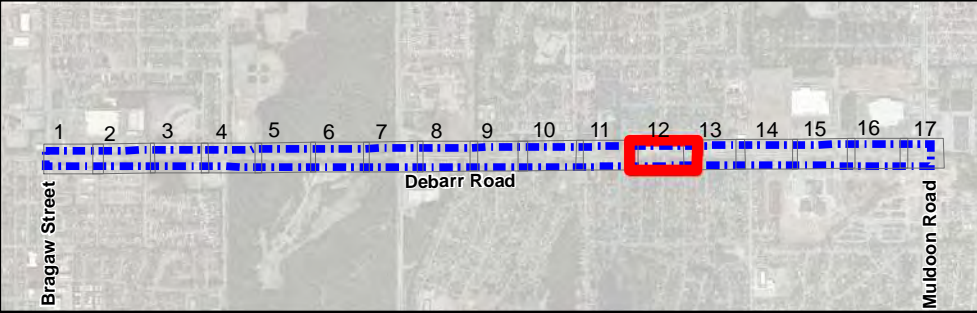
- Not Inspected
- Inspected
- Not Located

Pipe Segment

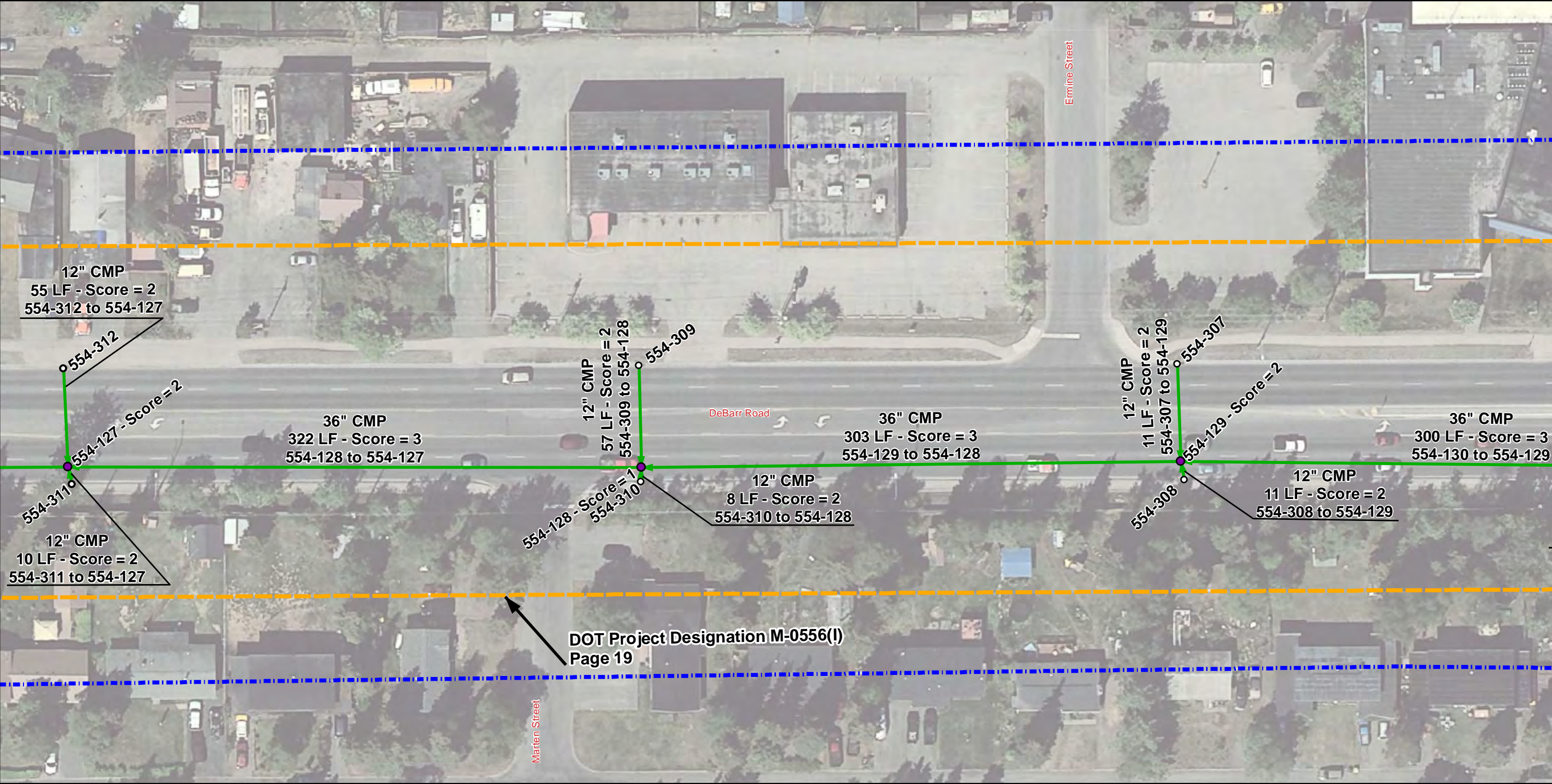
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Debarr Road: Bragaw Street to Muldoon Road



0 30 60 Feet

Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

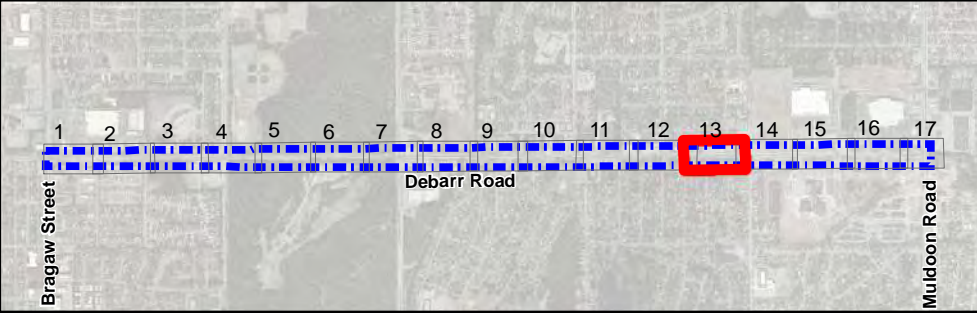
- Not Inspected
- Inspected
- Not Located

Pipe Segment

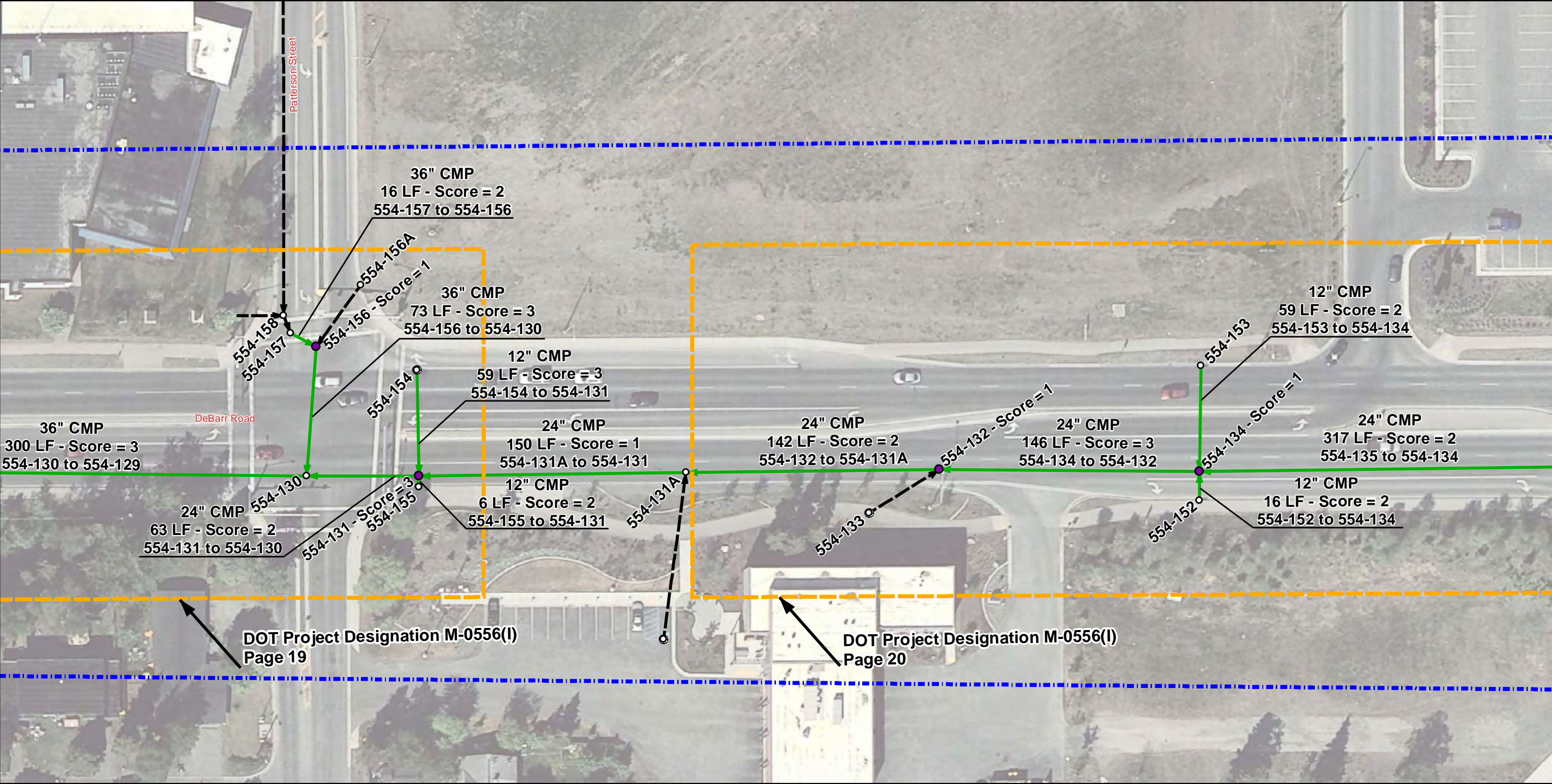
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Debarr Road: Bragaw Street to Muldoon Road



0 30 60 Feet

Legend



Project Area



Asbuilt Designation

Manhole/Catchbasin



Not Inspected



Inspected

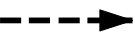


Not Located

Pipe Segment



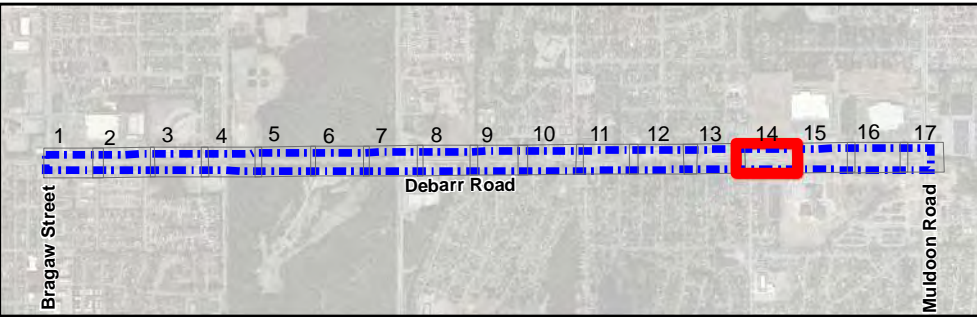
Inspected



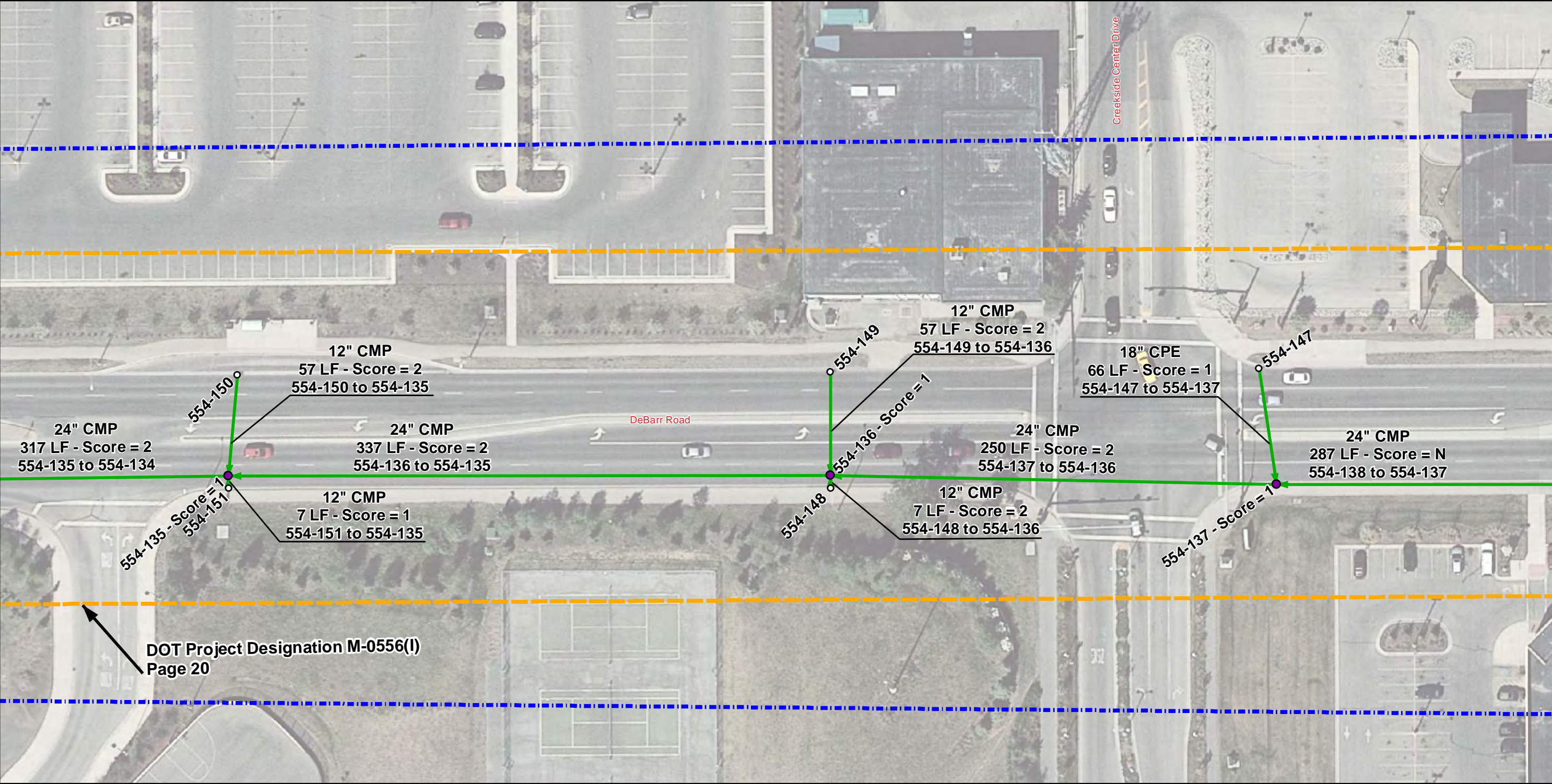
Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Debarr Road: Bragaw Street to Muldoon Road



0 30 60 Feet

Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

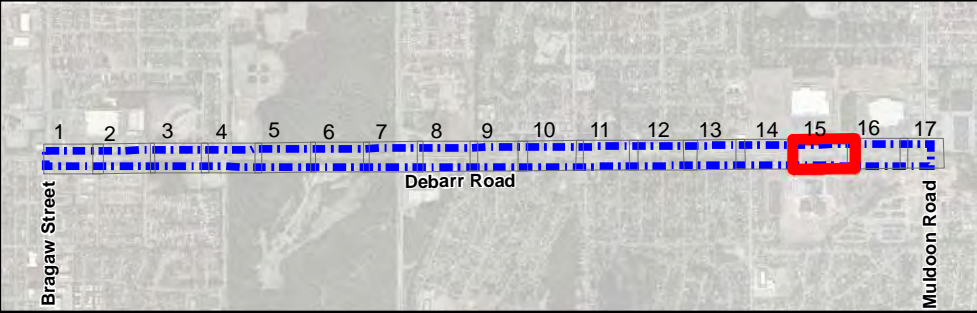
- Not Inspected
- Inspected
- Not Located

Pipe Segment

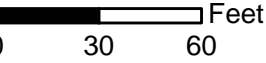
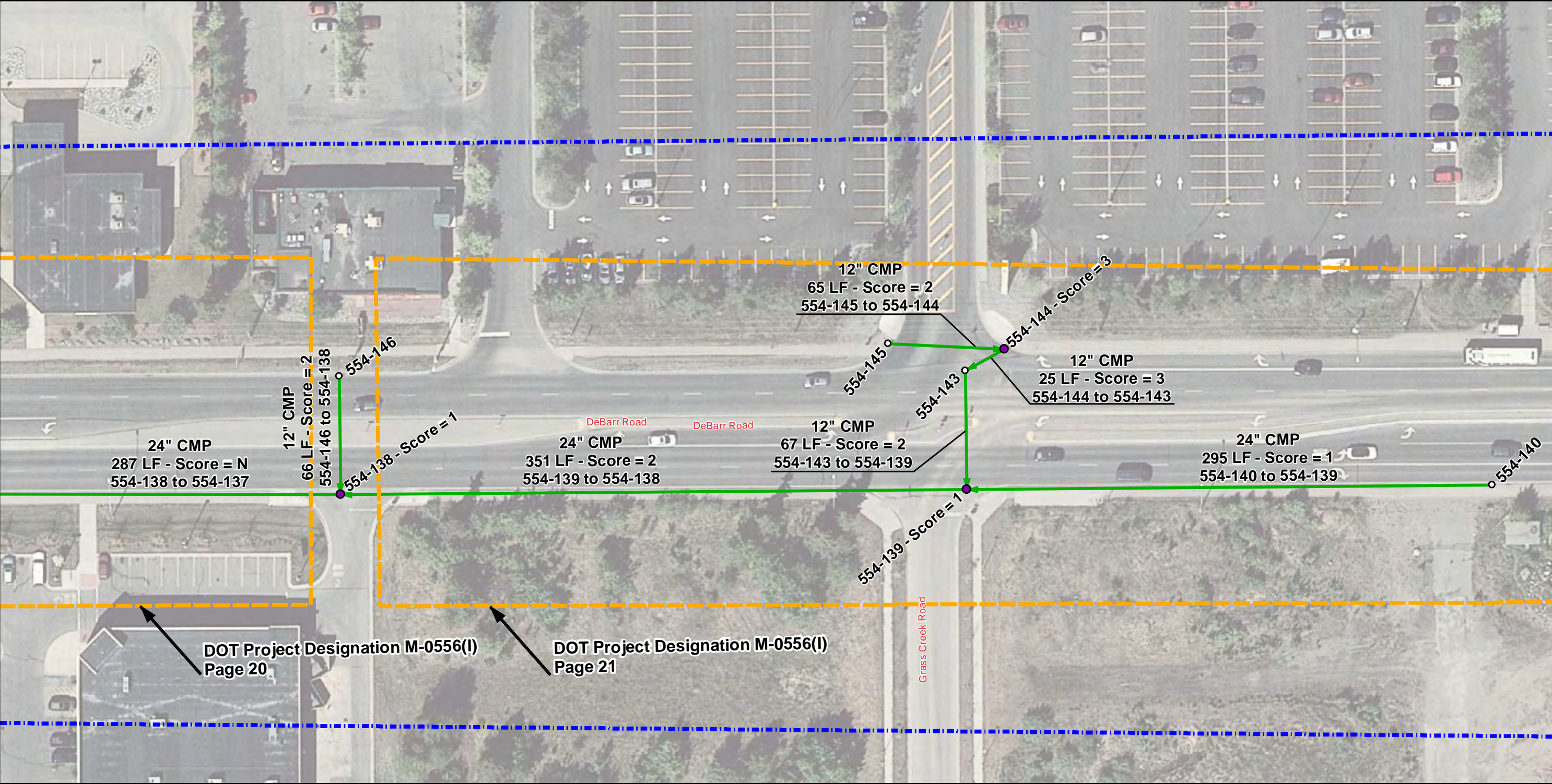
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Debarr Road: Bragaw Street to Muldoon Road



Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

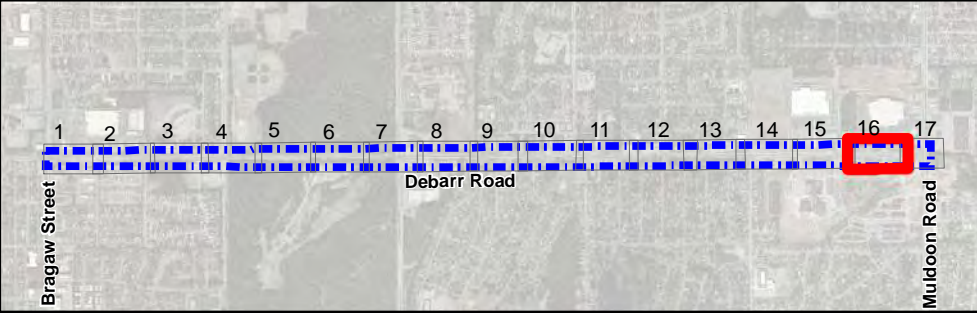
- Not Inspected
- Inspected
- Not Located

Pipe Segment

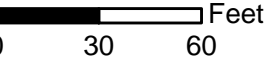
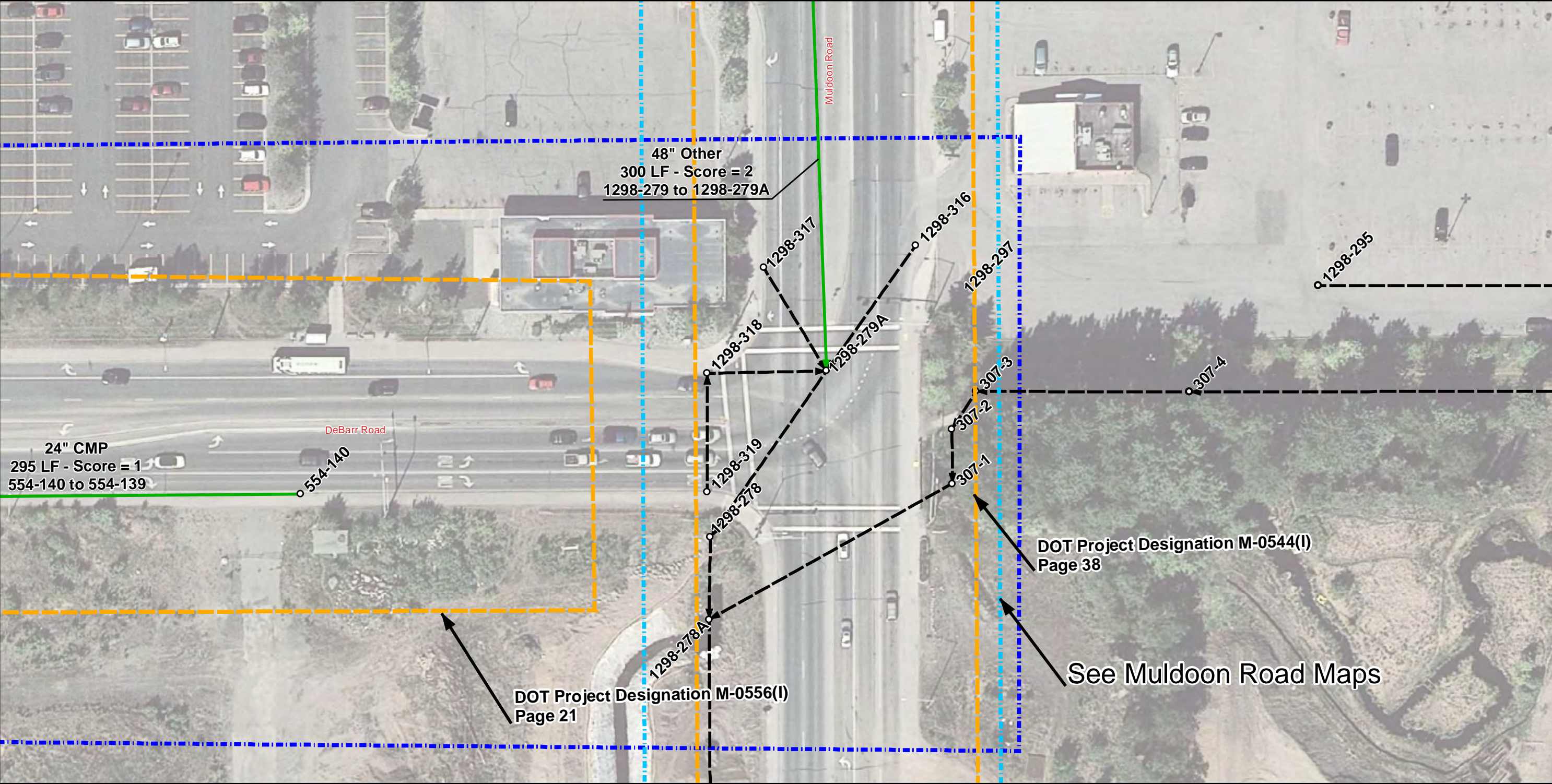
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Debarr Road: Bragaw Street to Muldoon Road



Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

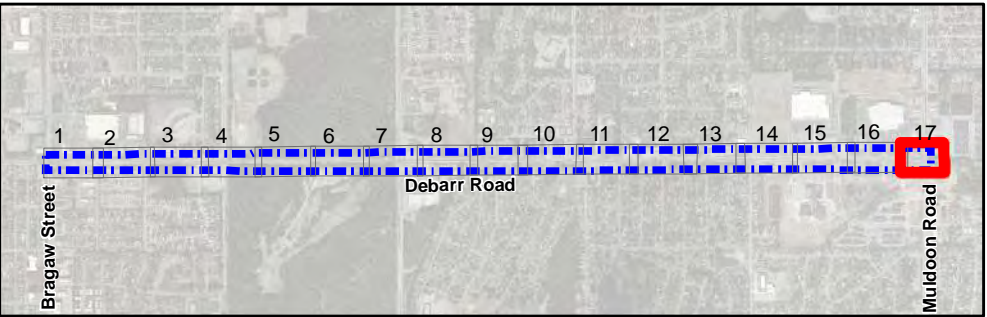
- Not Inspected
- Inspected
- Not Located

Pipe Segment

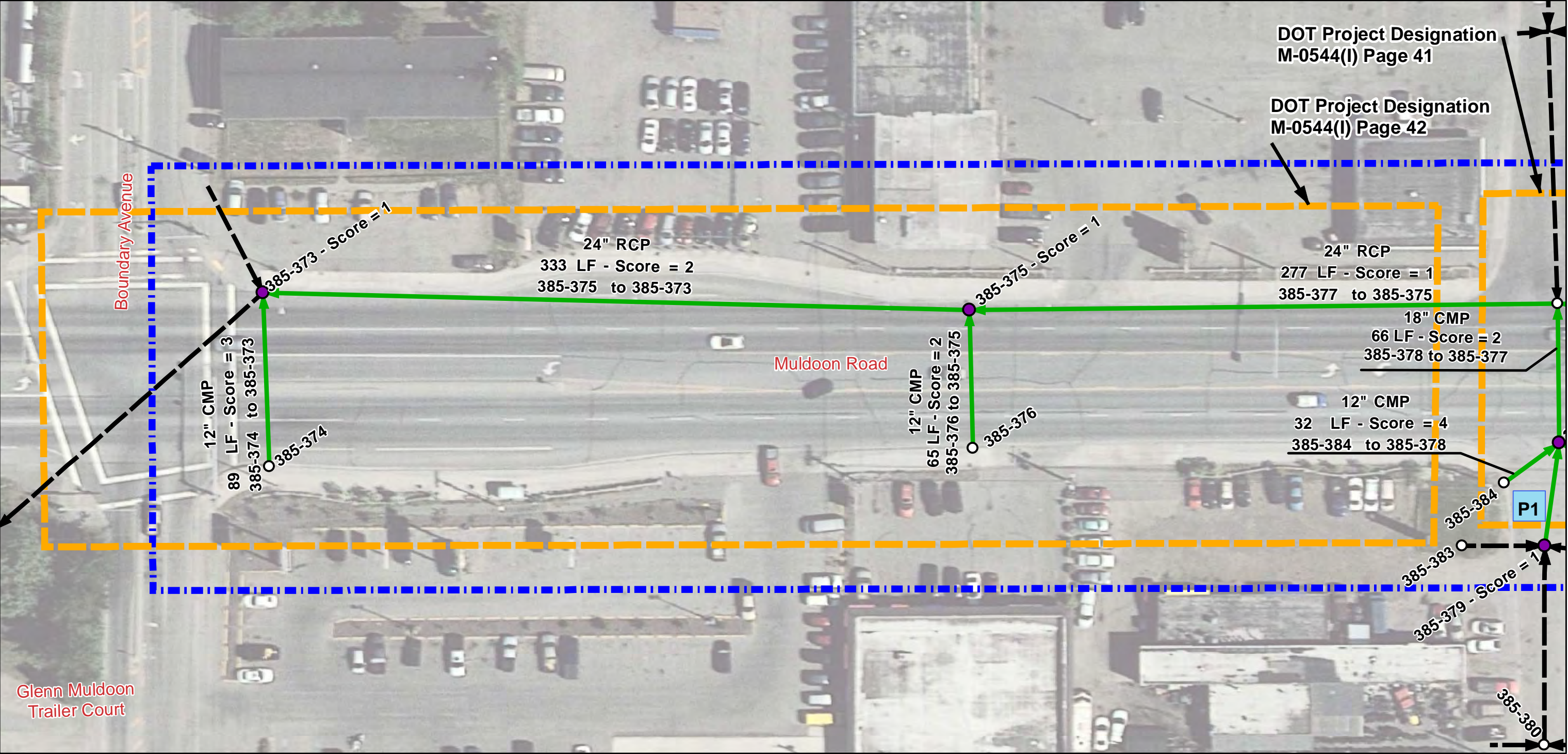
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

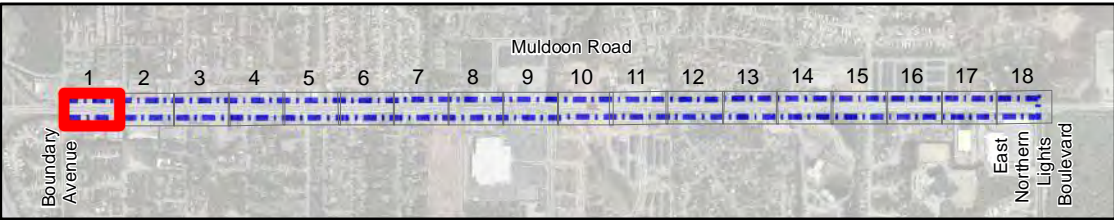
- Inspected
- Not Inspected

Pipe Segment

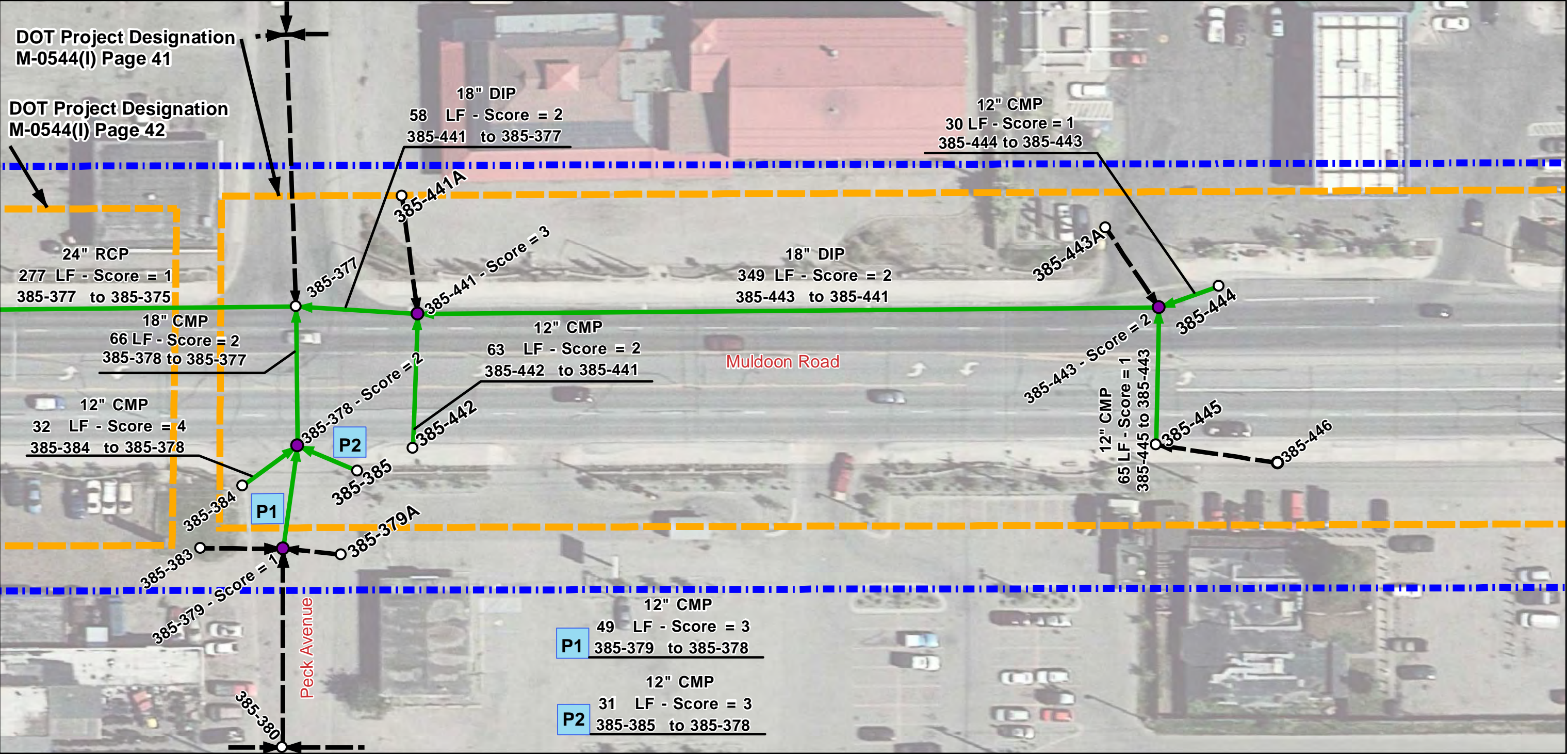
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

- Inspected
- Not Inspected

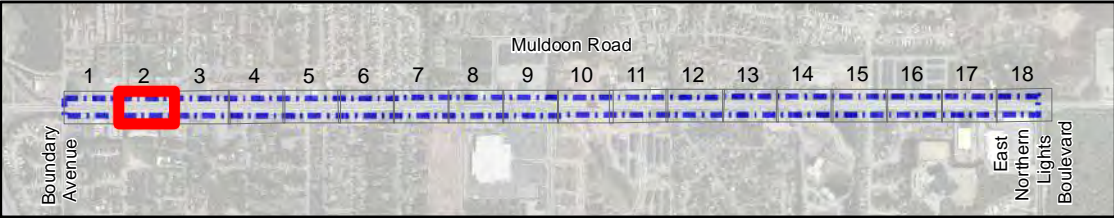
Pipe Segment

- Inspected
- Not Inspected

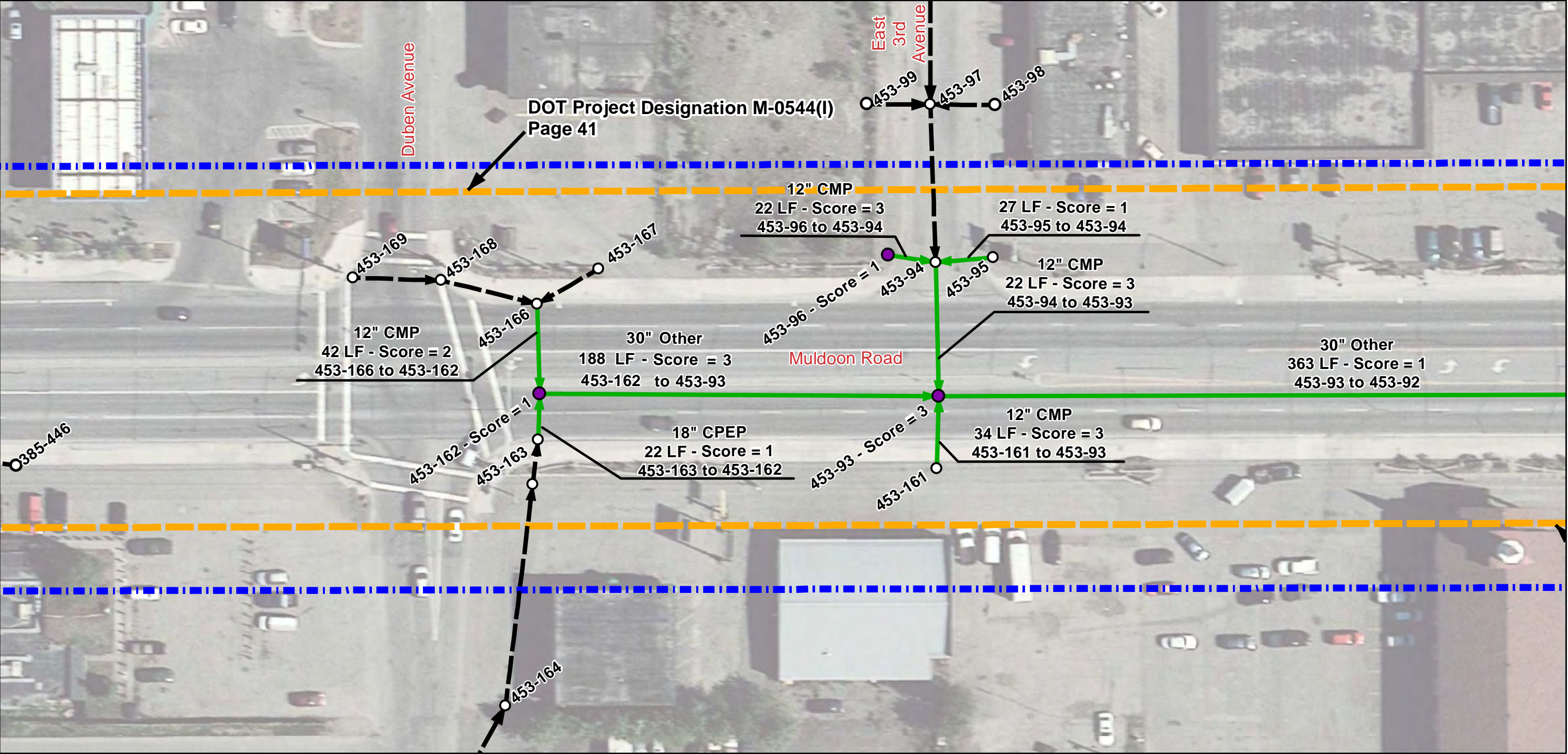
Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

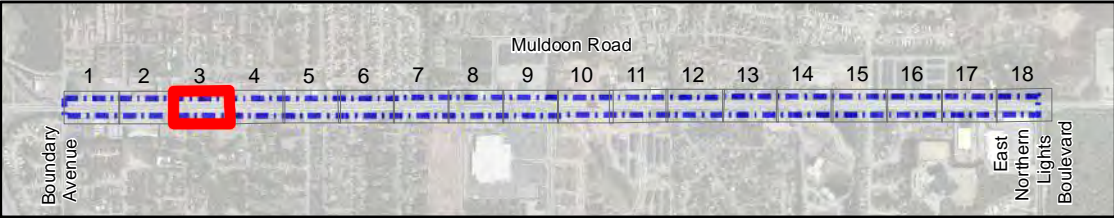
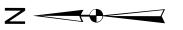
- Inspected
- Not Inspected

Pipe Segment

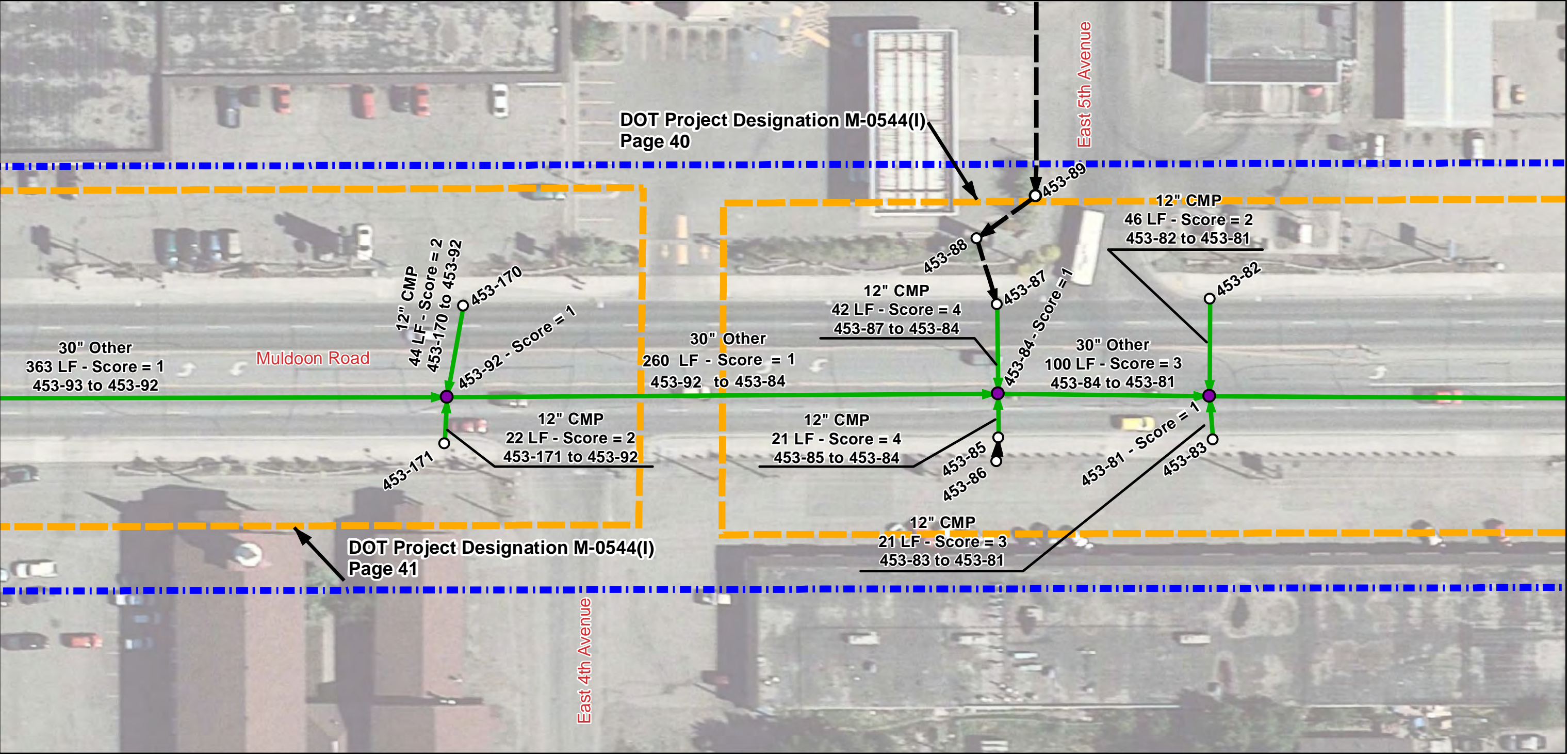
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

- Inspected
- Not Inspected

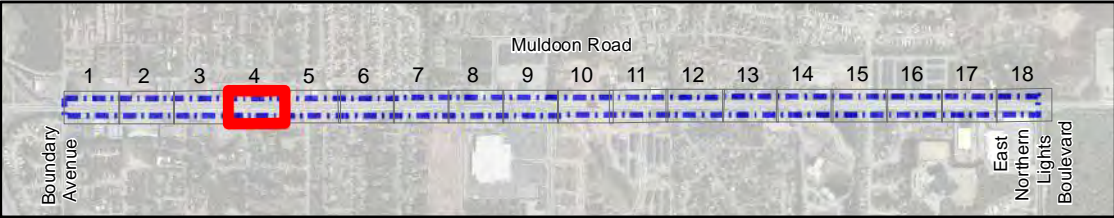
Pipe Segment

- Inspected
- Not Inspected

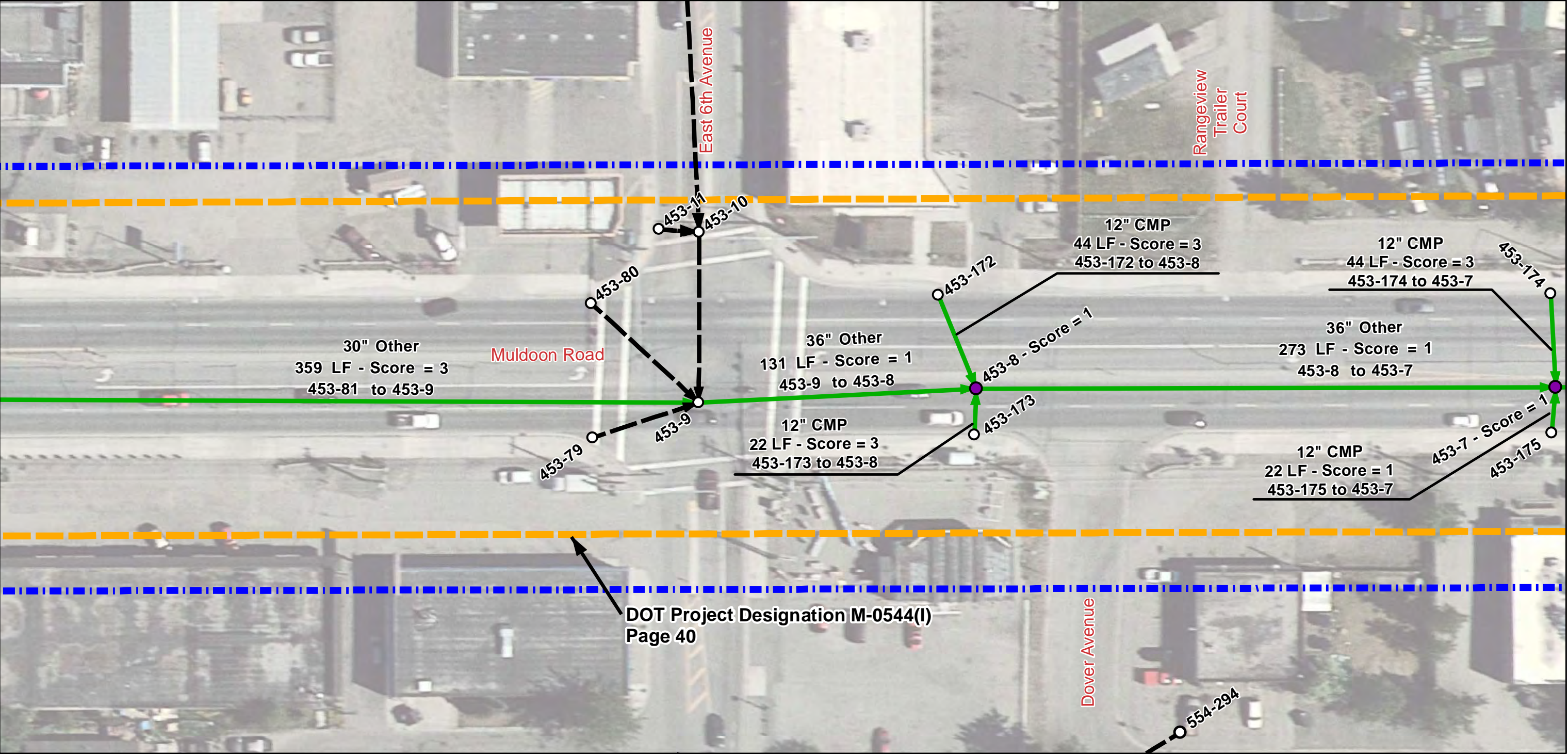
Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

- Inspected
- Not Inspected

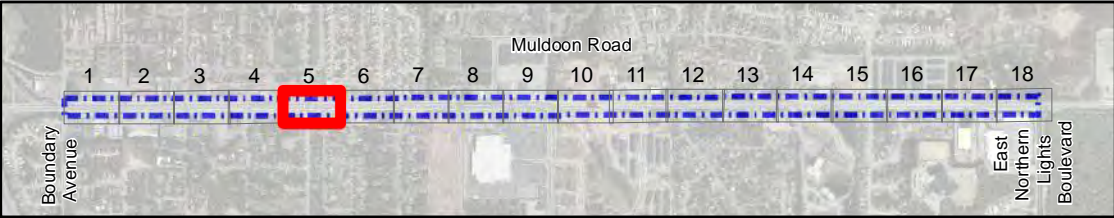
Pipe Segment

- Inspected
- Not Inspected

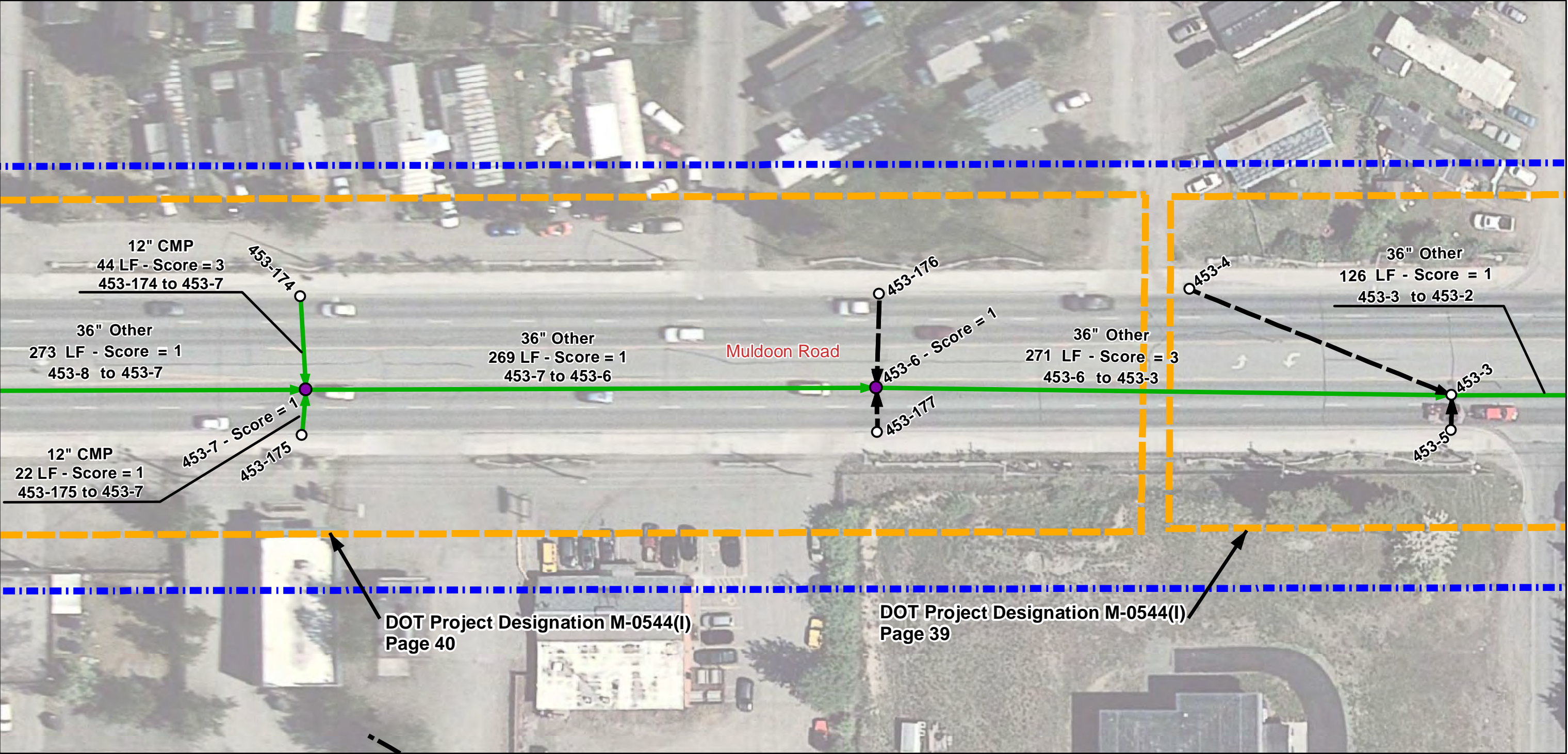
Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

- Inspected
- Not Inspected

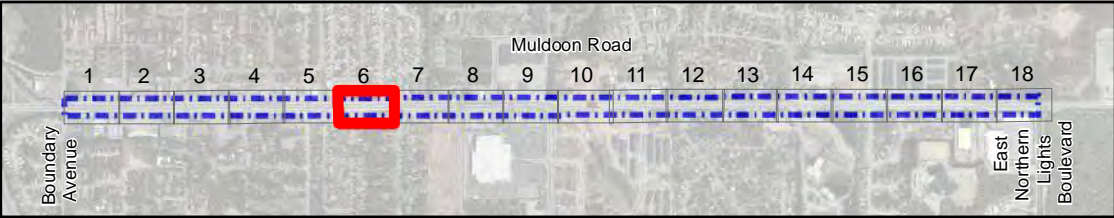
Pipe Segment

- Inspected
- Not Inspected

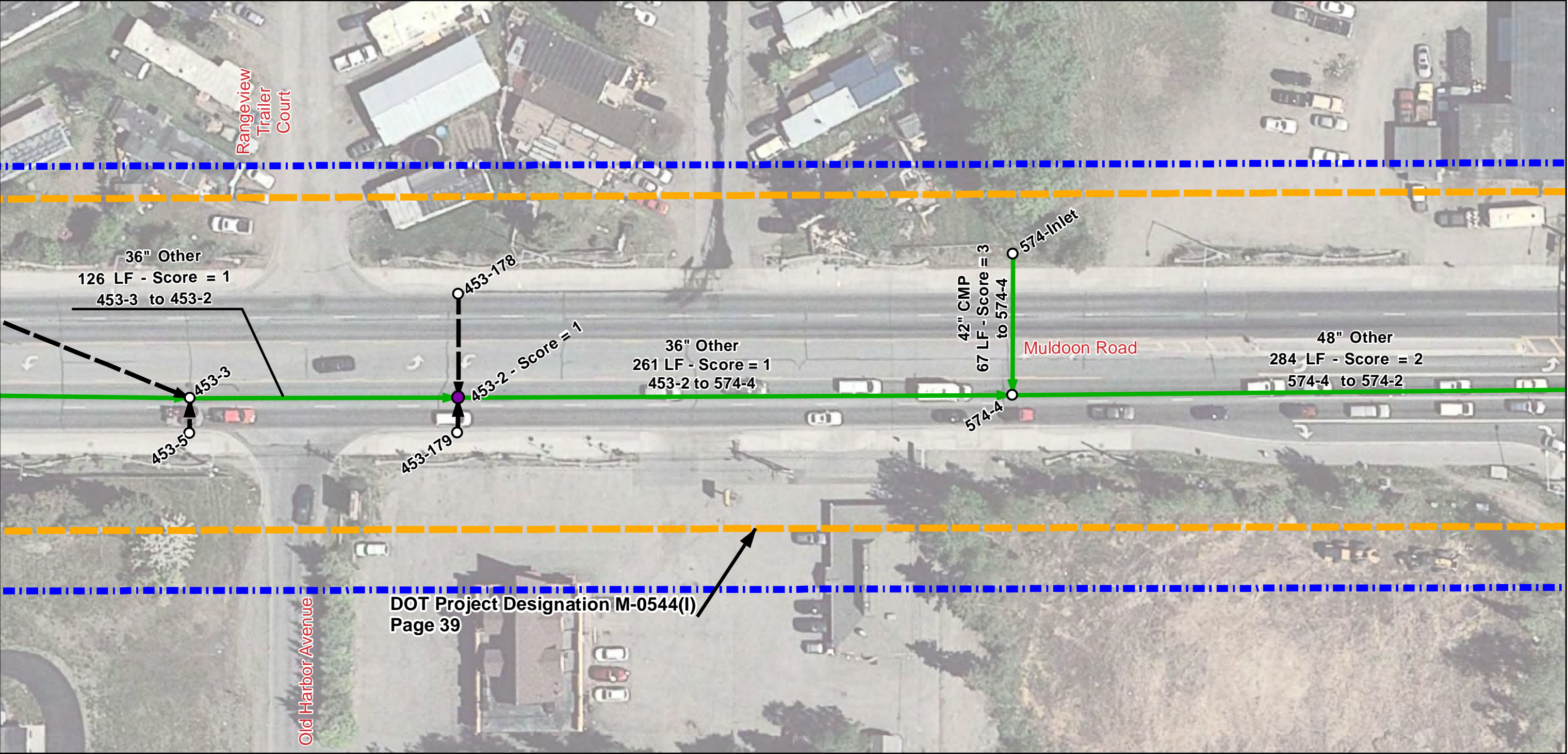
Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

- Inspected
- Not Inspected

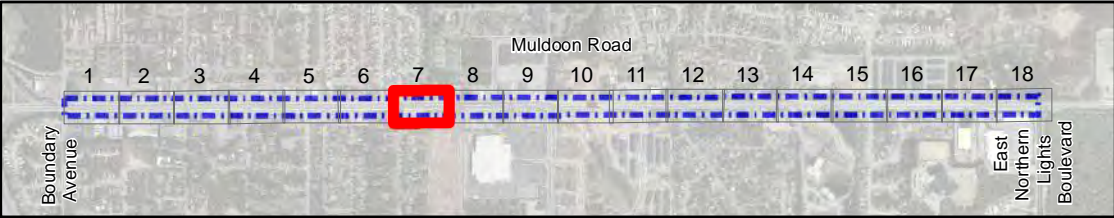
Pipe Segment

- Inspected
- Not Inspected

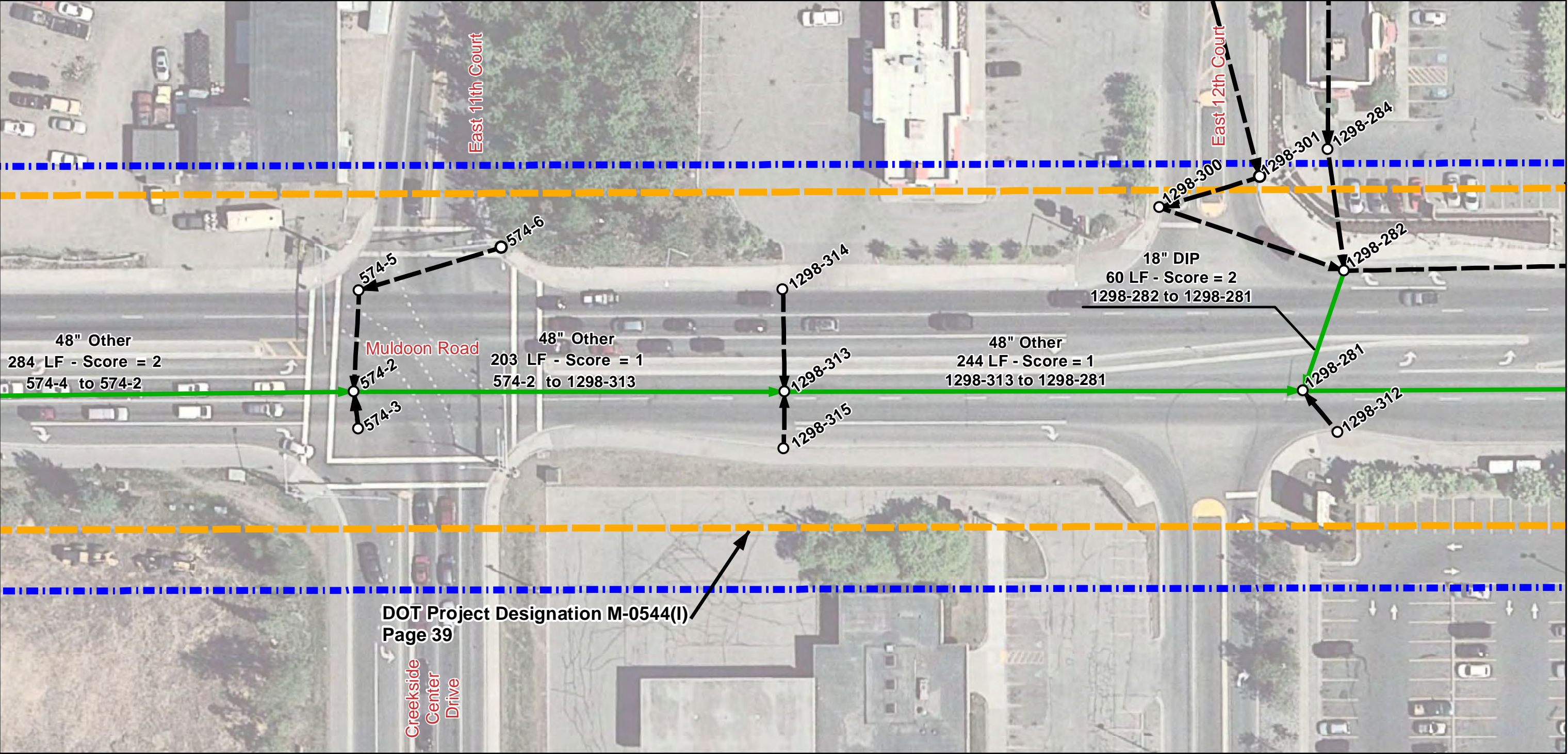
Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

- Inspected
- Not Inspected

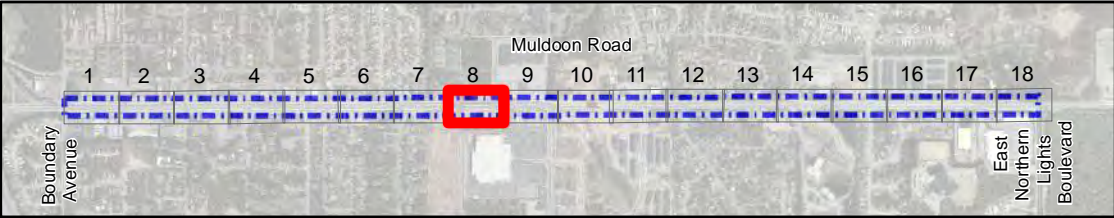
Pipe Segment

- Inspected
- Not Inspected

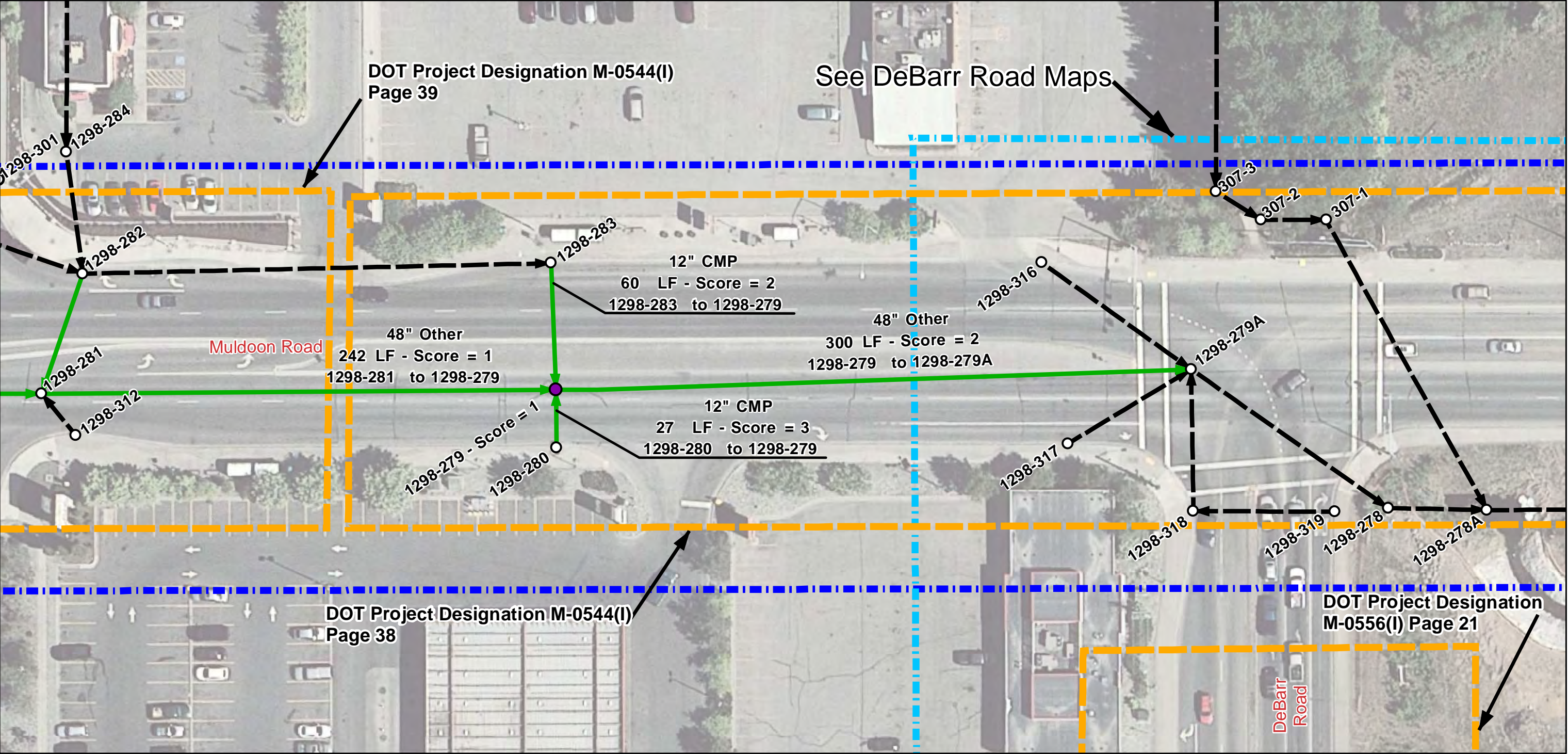
Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

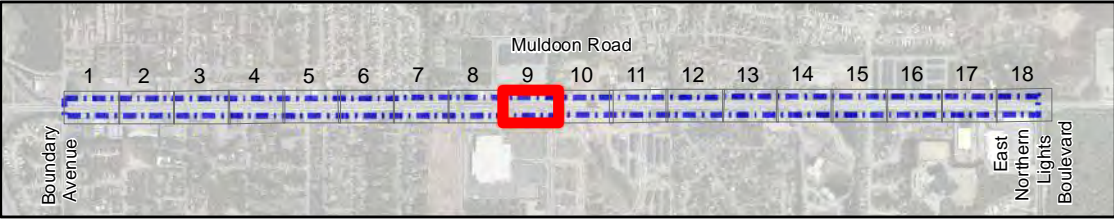
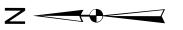
- Inspected
- Not Inspected

Pipe Segment

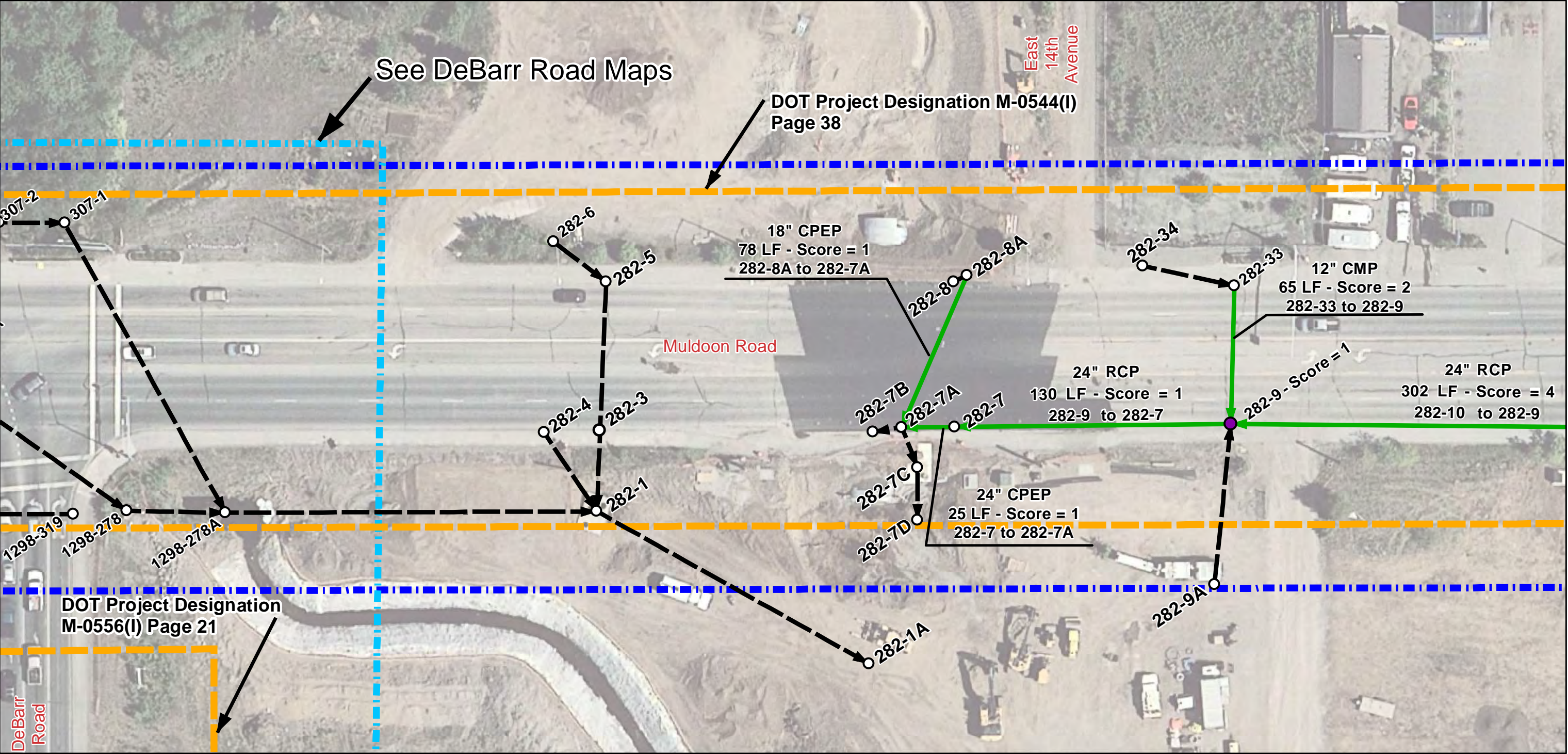
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

- Inspected
- Not Inspected

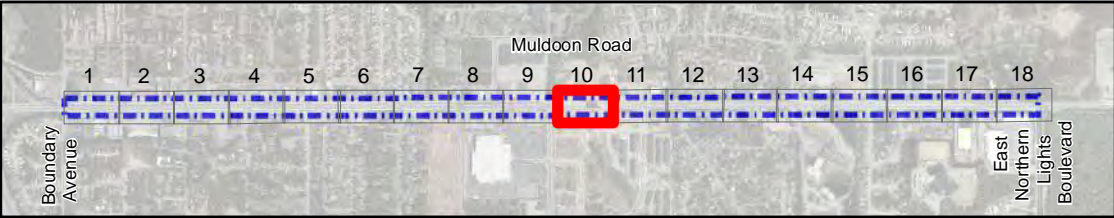
Pipe Segment

- Inspected
- - -> Not Inspected

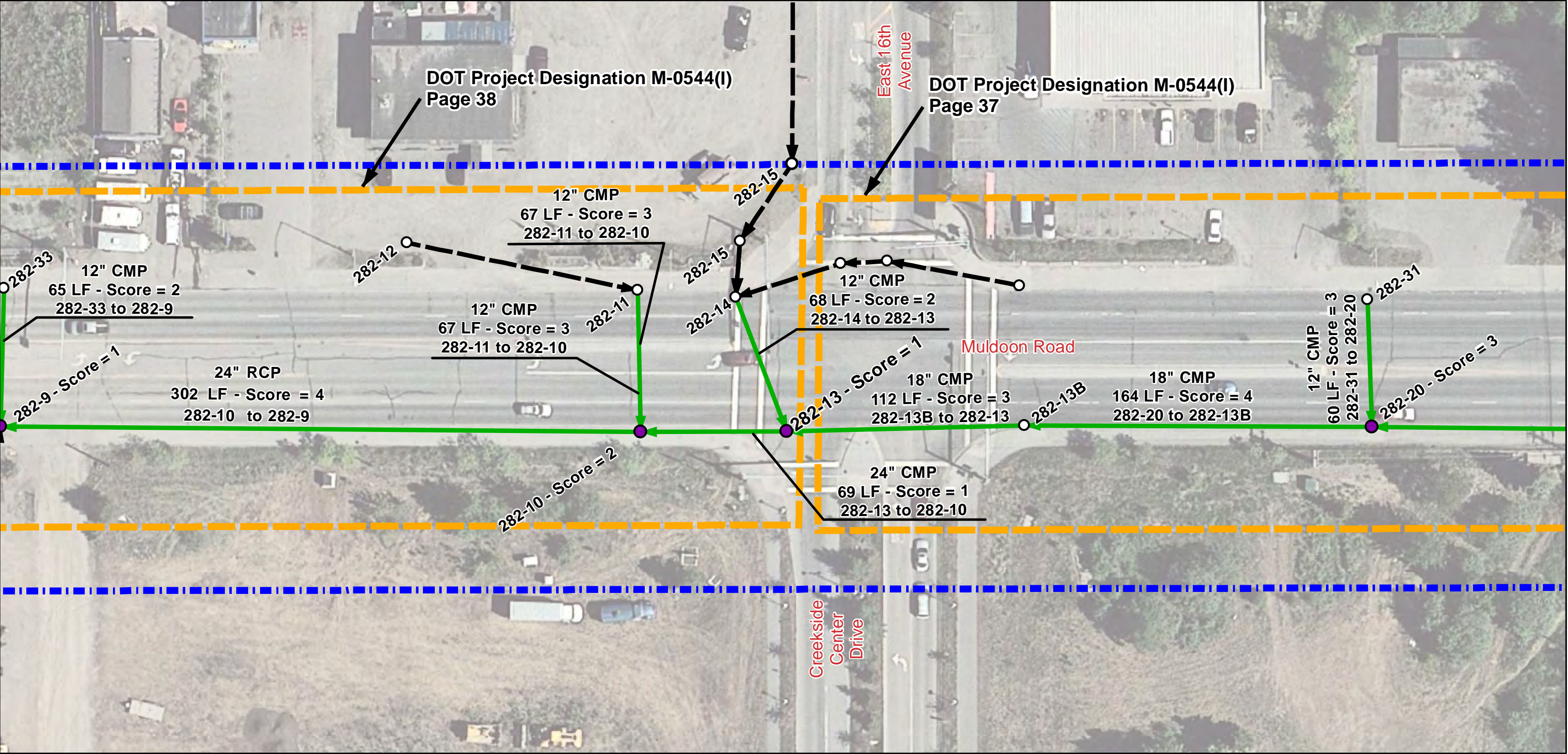
Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

- Inspected
- Not Inspected

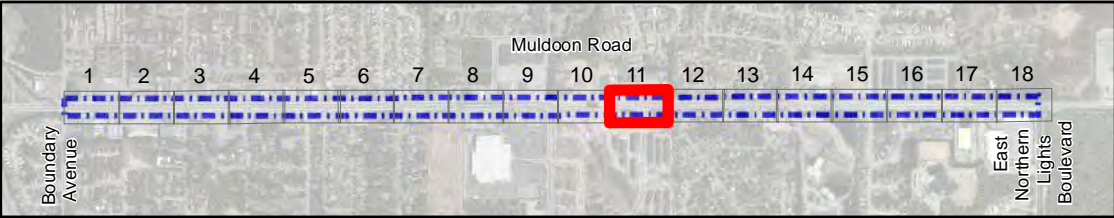
Pipe Segment

- Inspected
- Not Inspected

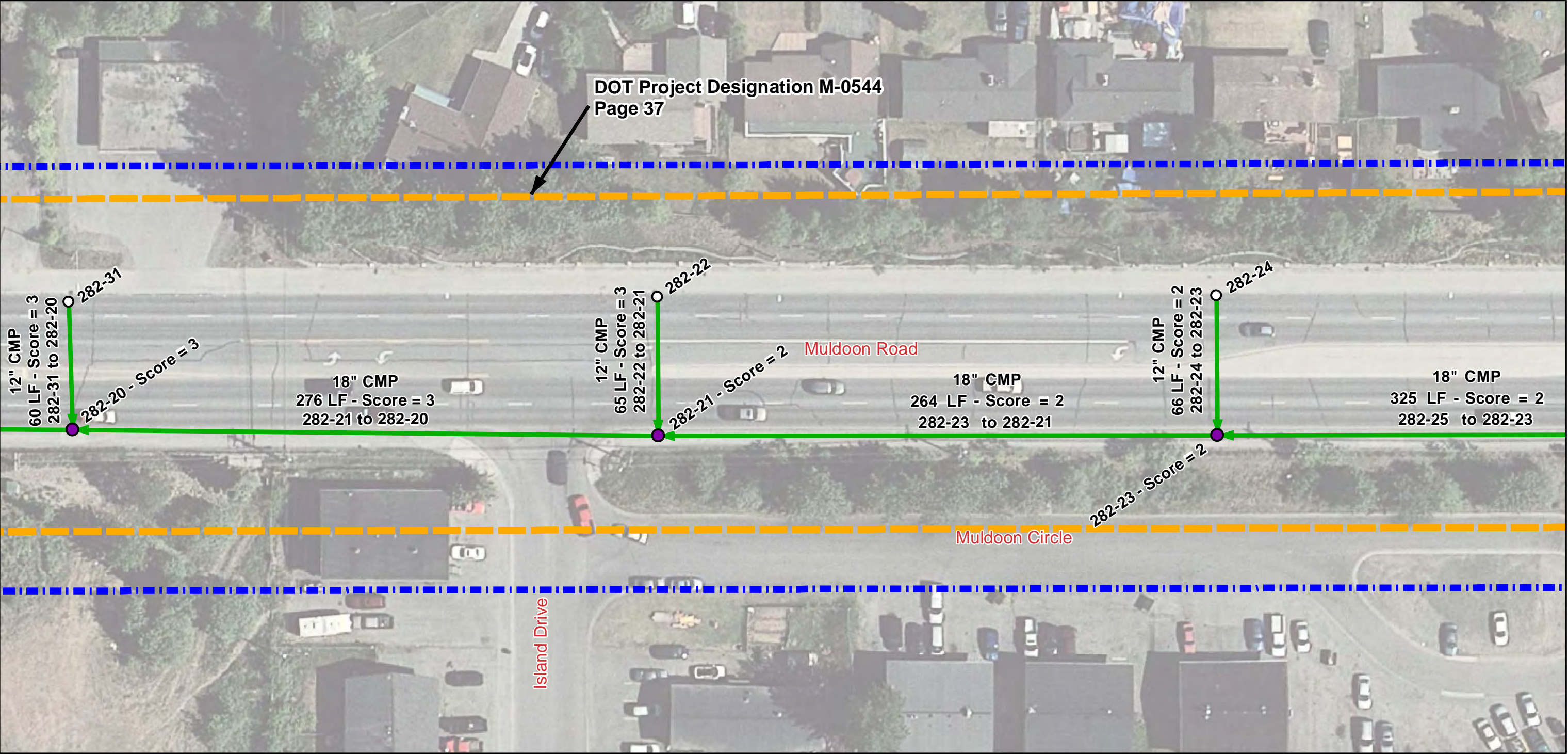
Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

- Inspected
- Not Inspected

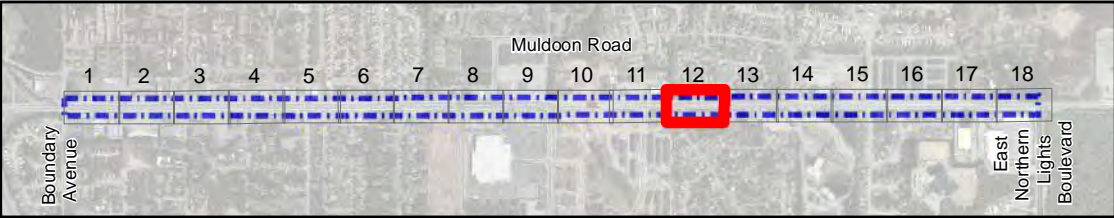
Pipe Segment

- Inspected
- Not Inspected

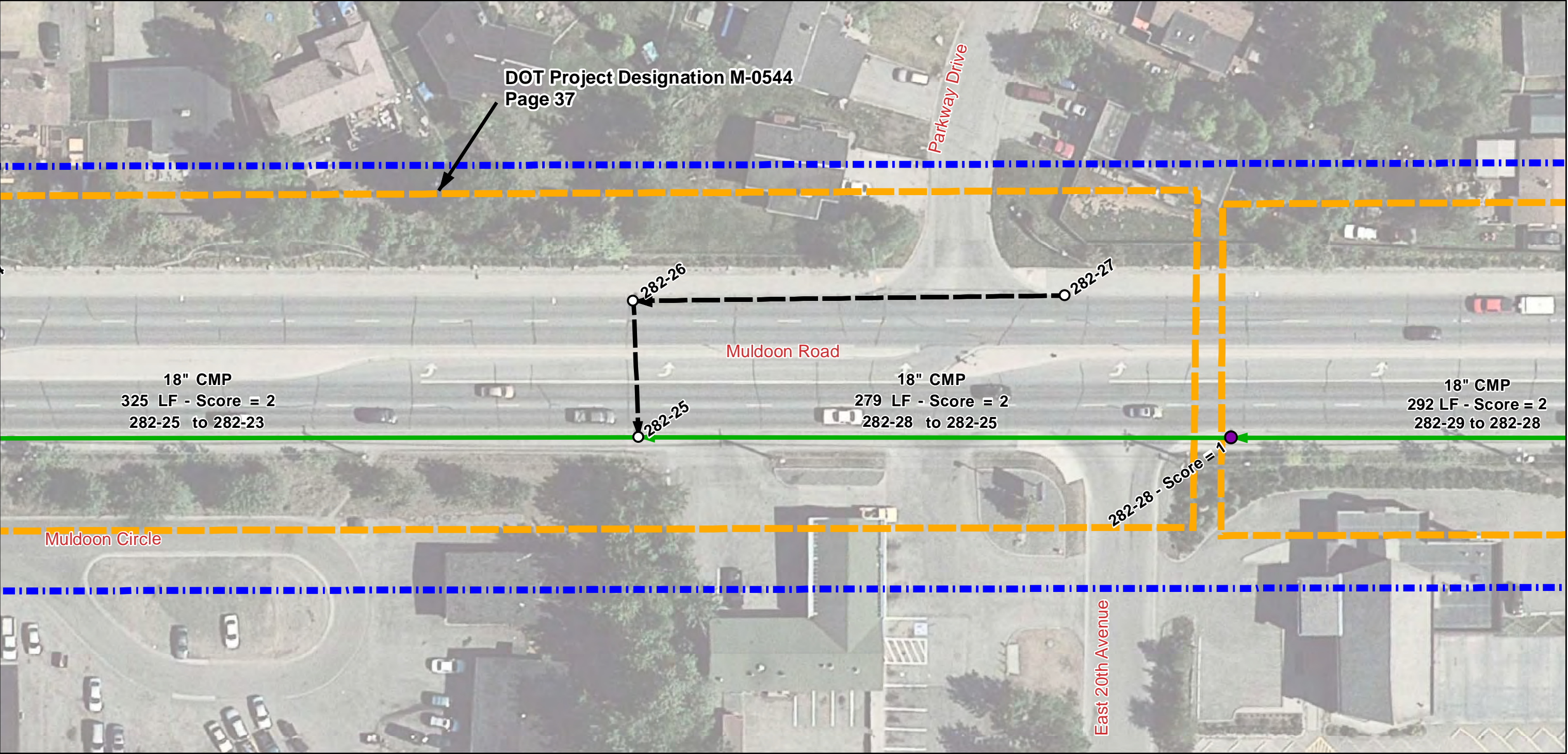
Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

- Inspected
- Not Inspected

Pipe Segment

- Inspected
- Not Inspected

Score

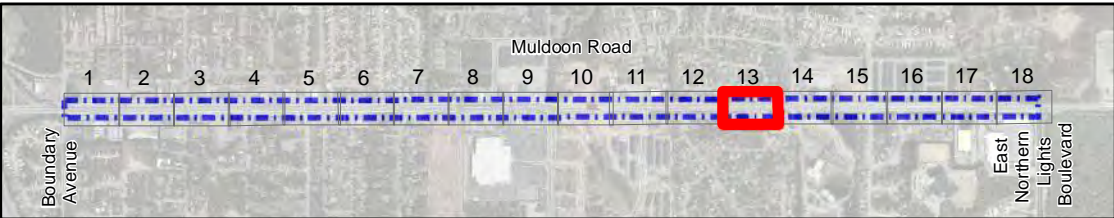
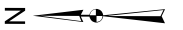
- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



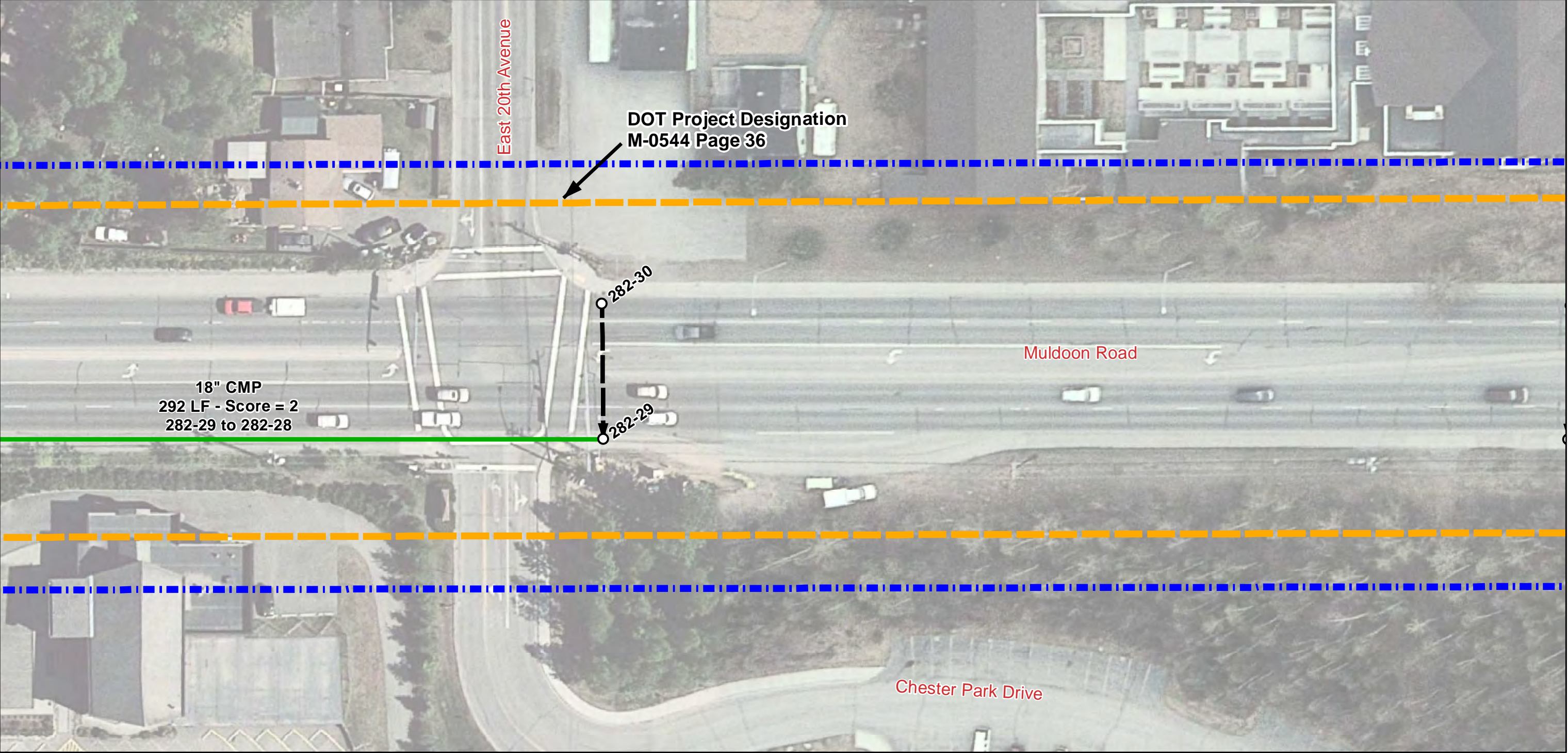
Project Area



Asbuilt Designation



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

- Inspected
- Not Inspected

Pipe Segment

- Inspected
- Not Inspected

Score

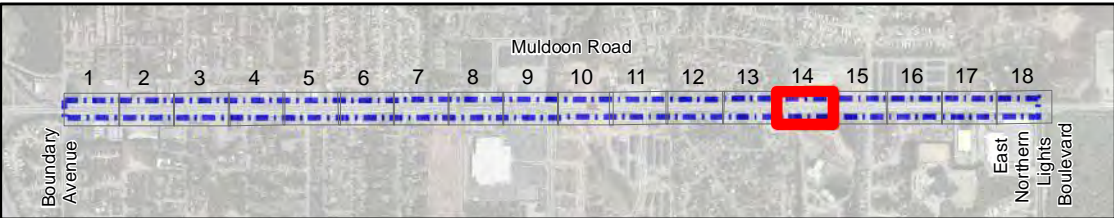
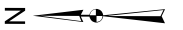
- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



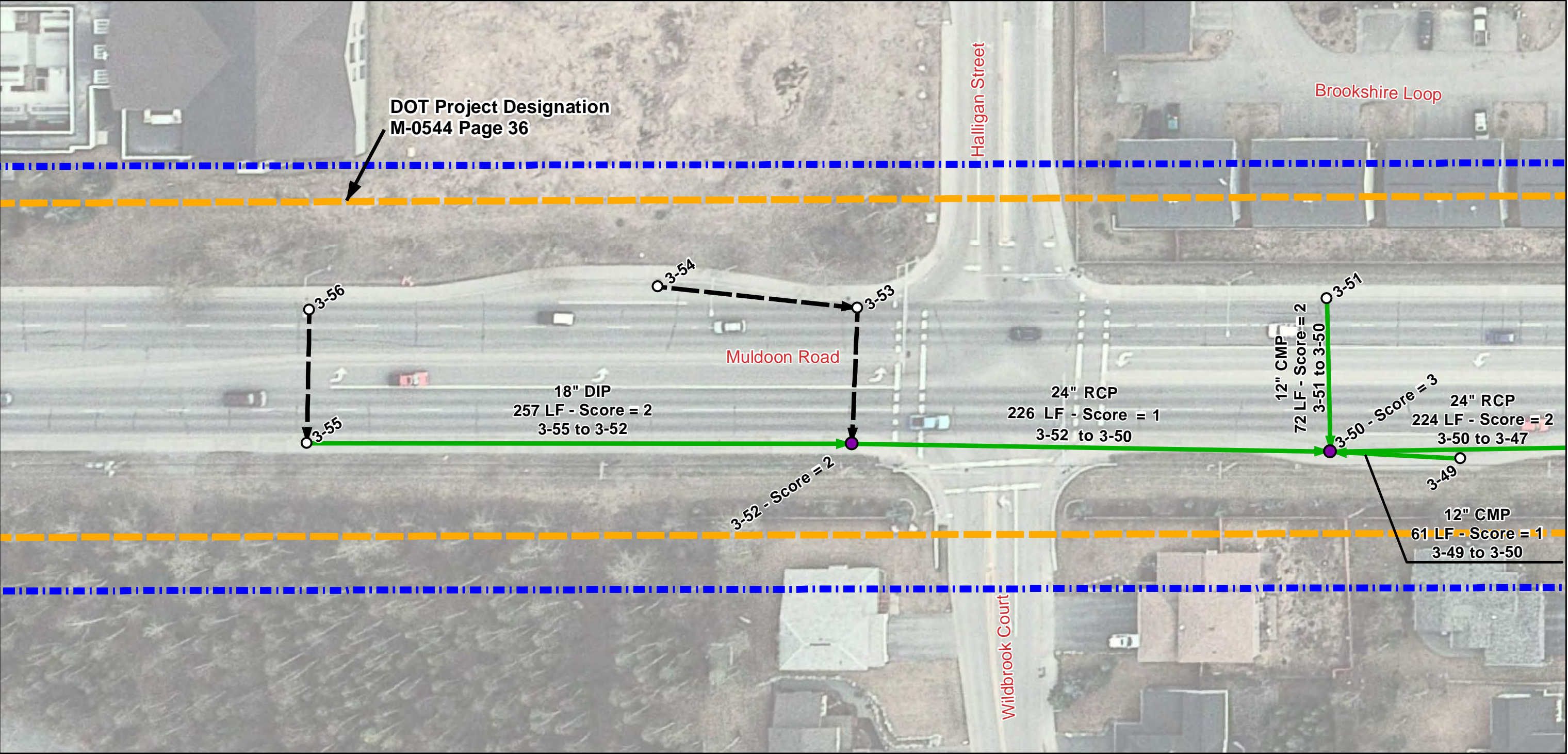
Project Area



Asbuilt Designation



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

- Inspected
- Not Inspected

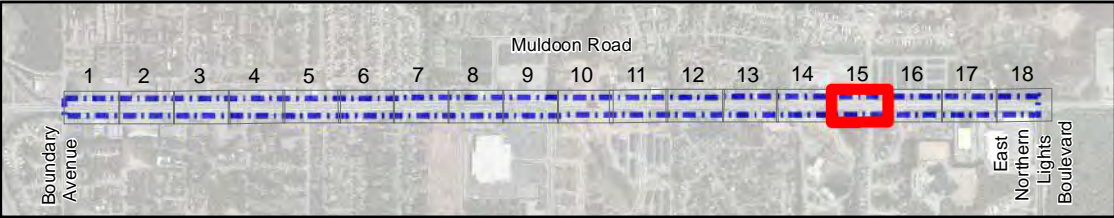
Pipe Segment

- Inspected
- - -> Not Inspected

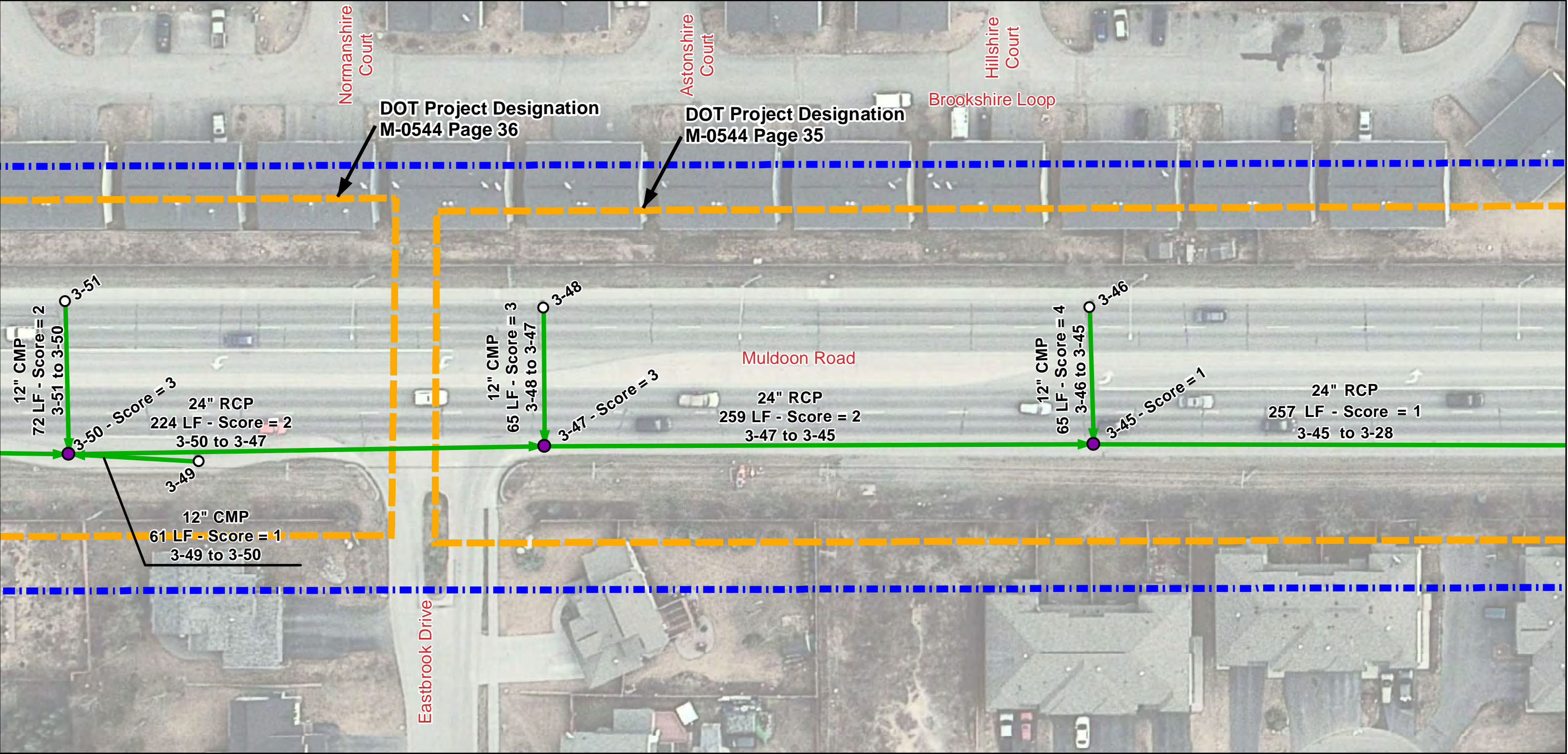
Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

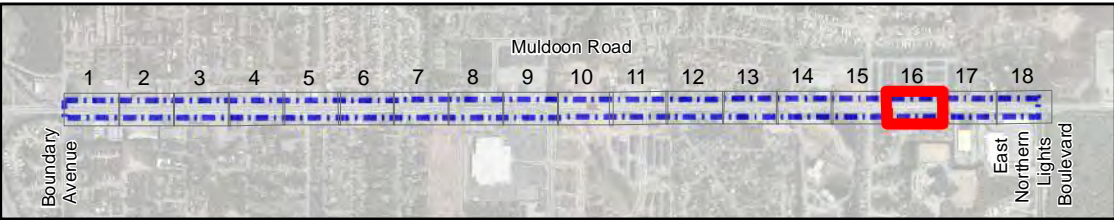
- Inspected
- Not Inspected

Pipe Segment

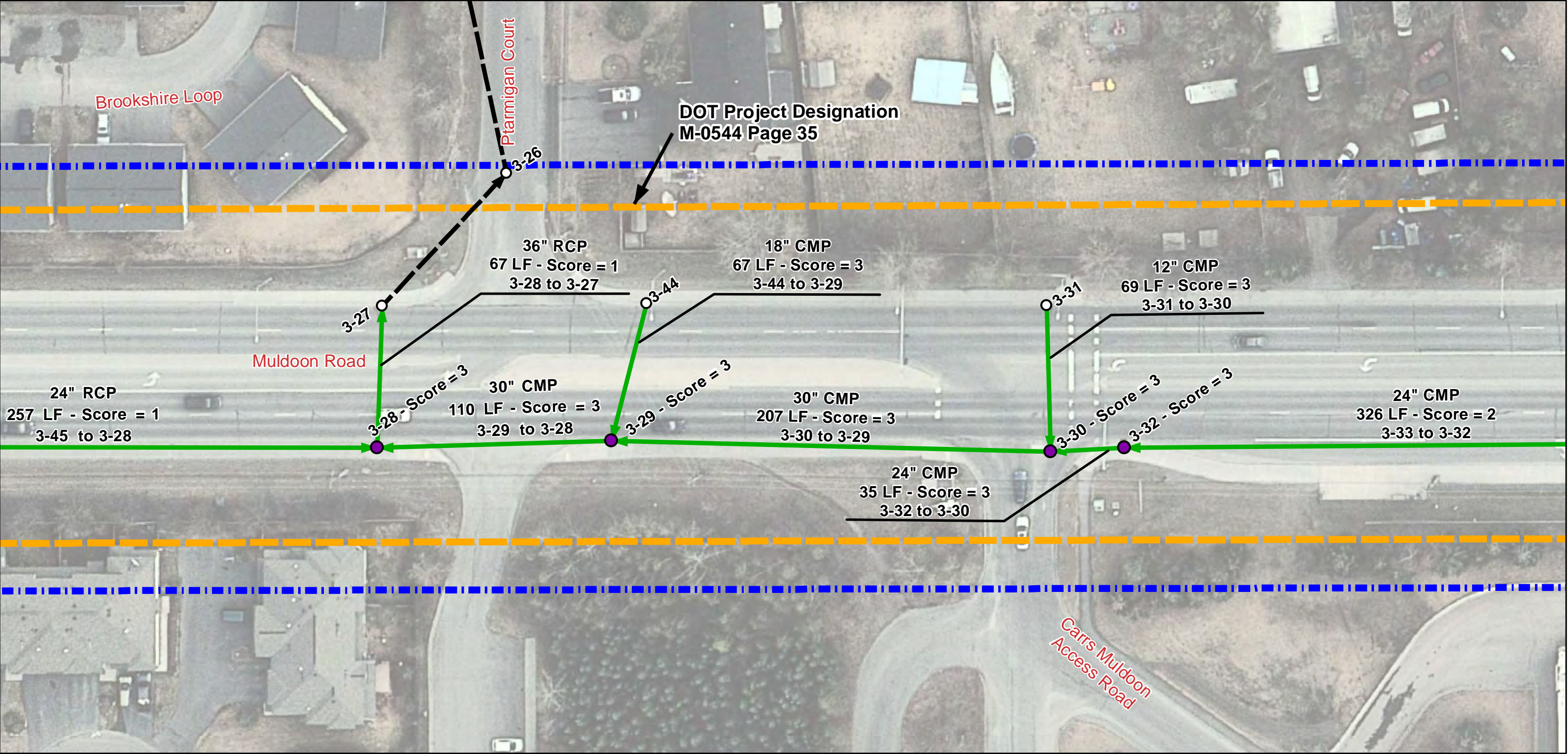
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

- Inspected
- Not Inspected

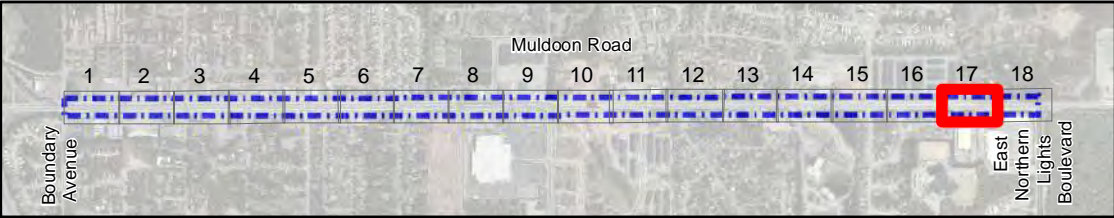
Pipe Segment

- Inspected
- Not Inspected

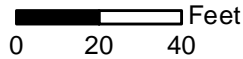
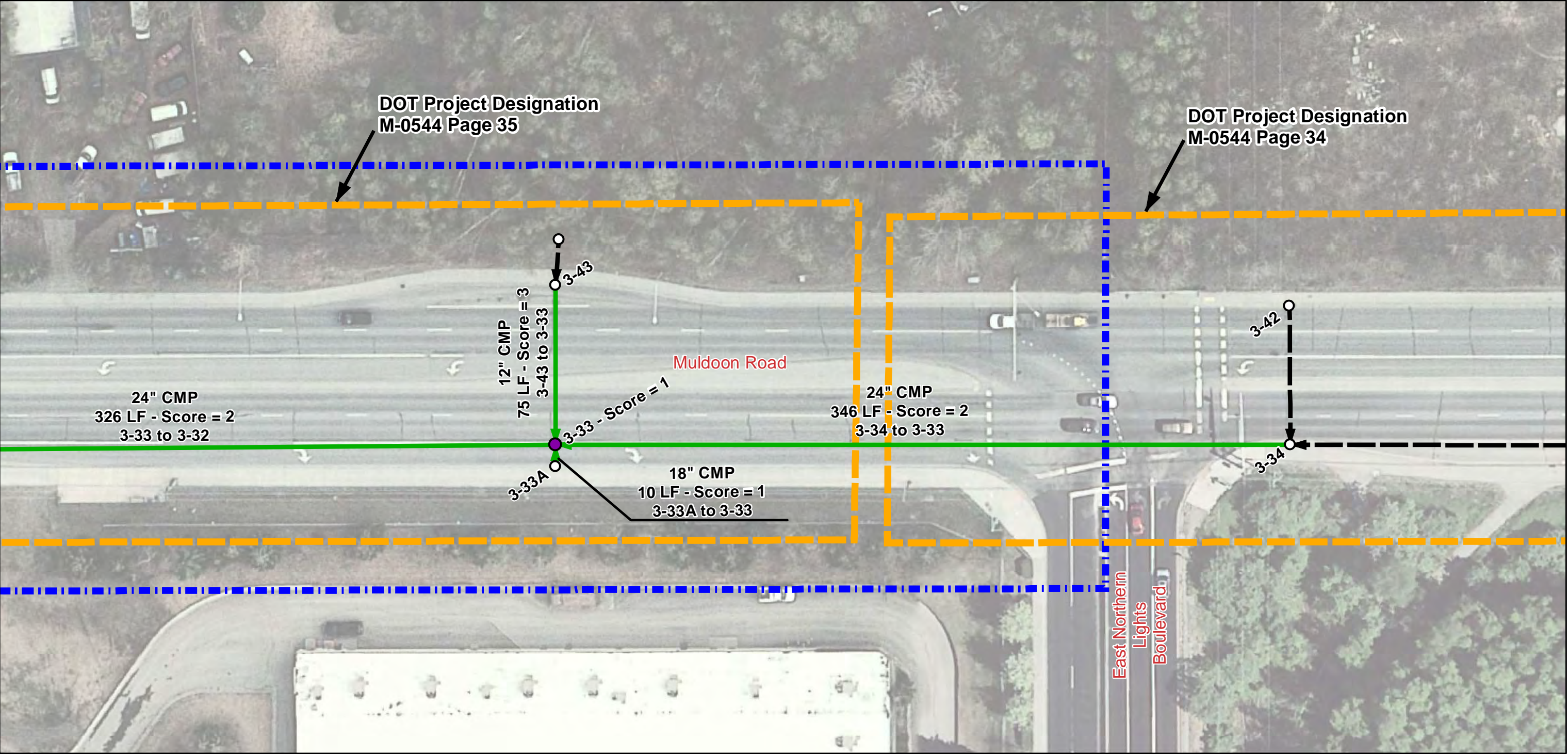
Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation



Muldoon Road: Boundary Avenue to East Northern Lights Boulevard



Legend

Manhole/Catchbasin

- Inspected
- Not Inspected

Pipe Segment

- Inspected
- Not Inspected

Score

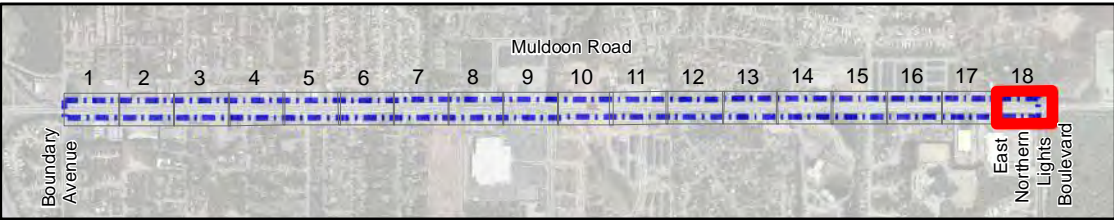
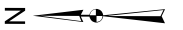
- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



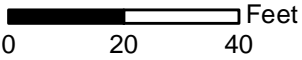
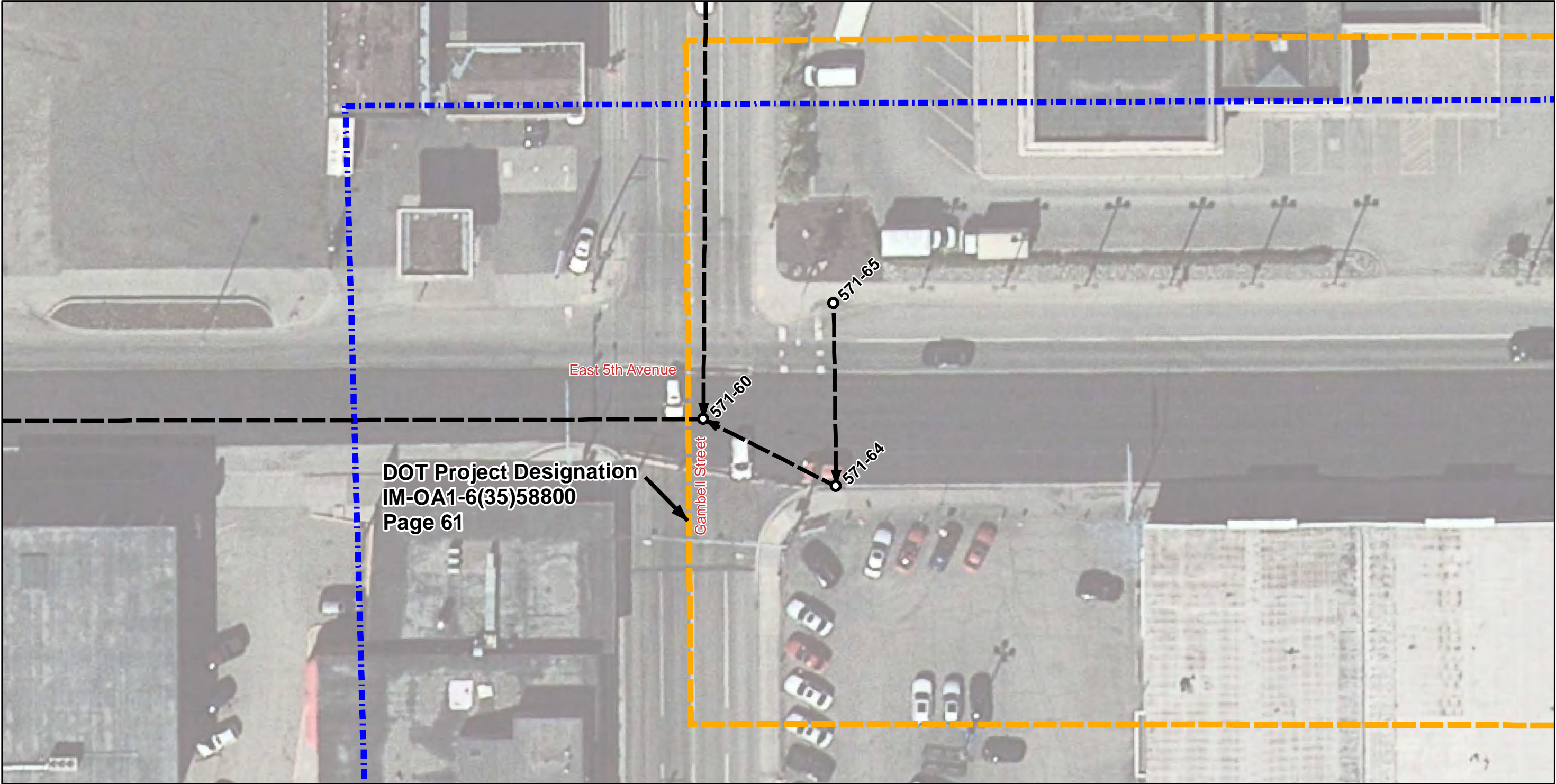
Project Area



Asbuilt Designation



East 5th Avenue: Gambell Street to Orca Street



Legend

Manhole/Catchbasin

- Not Inspected
- Inspected

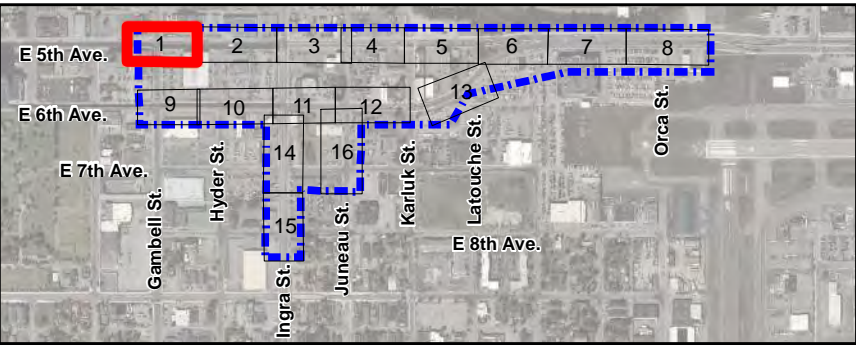
Pipe Segment

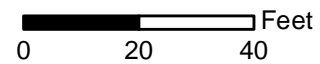
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation

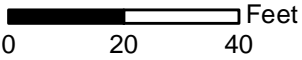
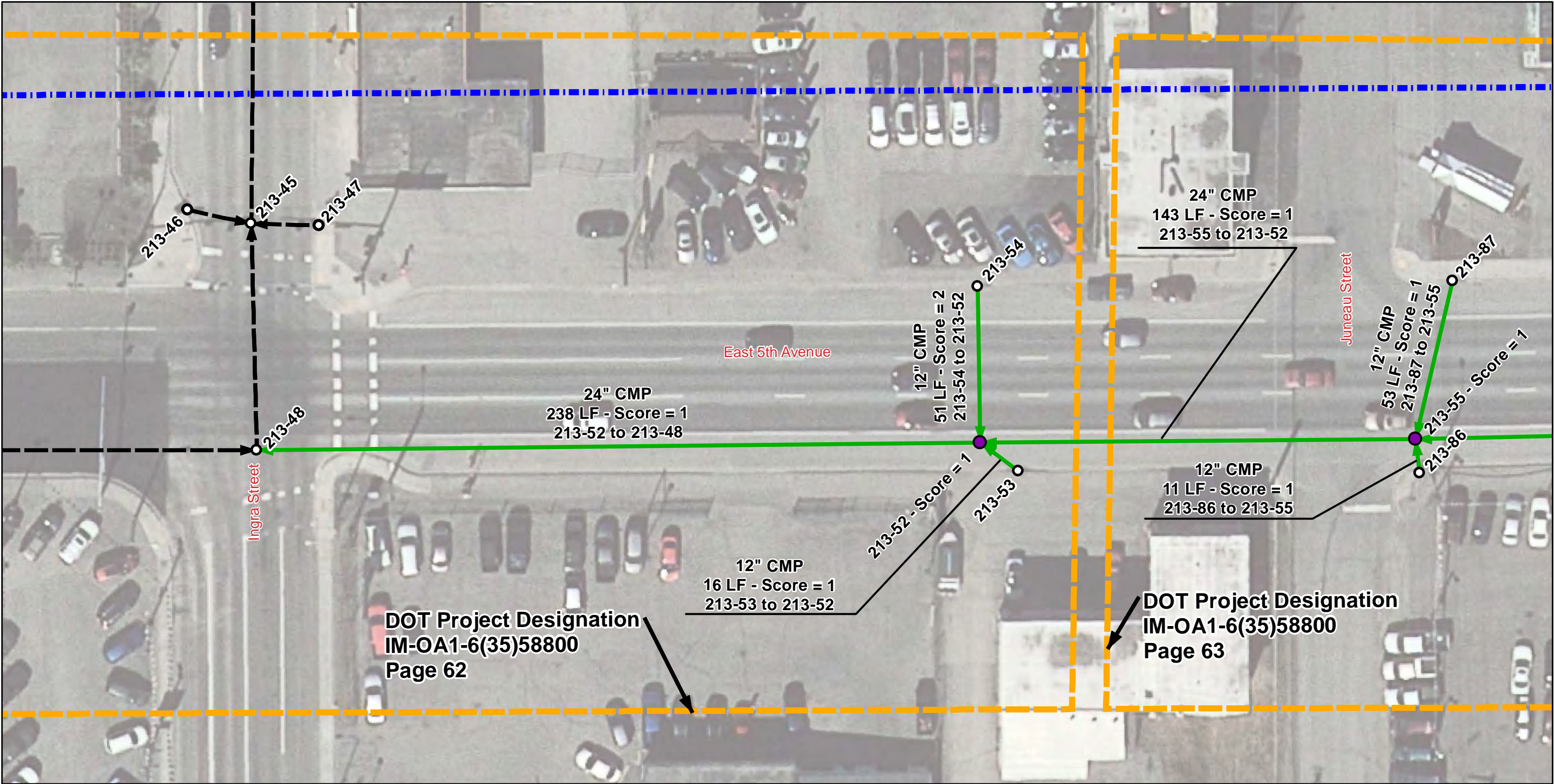





0 - No Defect
1 - Minor Defect
2 - Minor to Moderate Defect
3 - Moderate Defect
4 - Significant Defect
5 - Most Significant Defect
N - Not Scored

---▶ Not Inspected

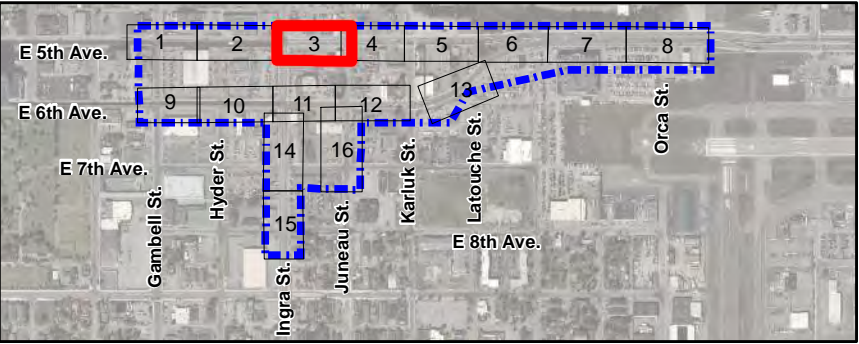
East 5th Avenue: Gambell Street to Orca Street



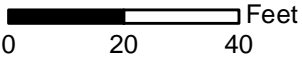
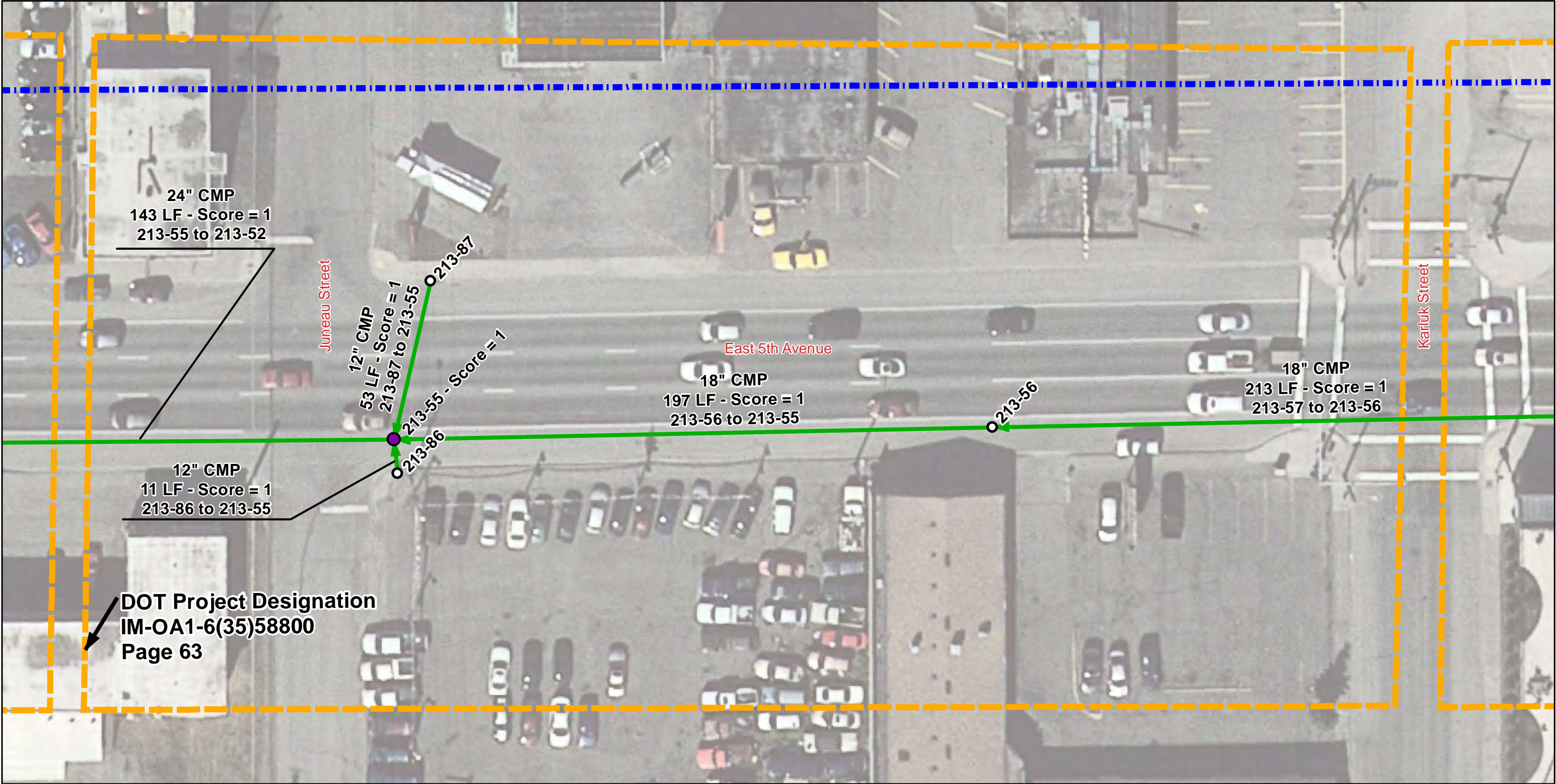
Legend

- | | | |
|--|---|---|
|  Project Area |  Not Inspected |  Inspected |
|  Asbuilt Designation |  Inspected |  Not Inspected |

- Score**
- 0 - No Defect
 - 1 - Minor Defect
 - 2 - Minor to Moderate Defect
 - 3 - Moderate Defect
 - 4 - Significant Defect
 - 5 - Most Significant Defect
 - N - Not Scored



East 5th Avenue: Gambell Street to Orca Street



Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

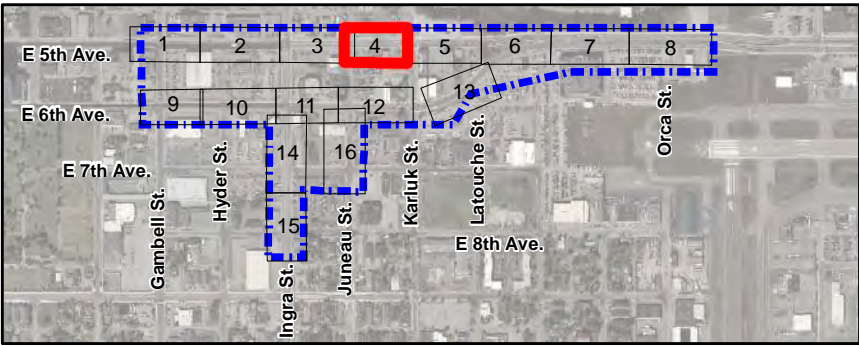
- Not Inspected
- Inspected

Pipe Segment

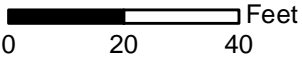
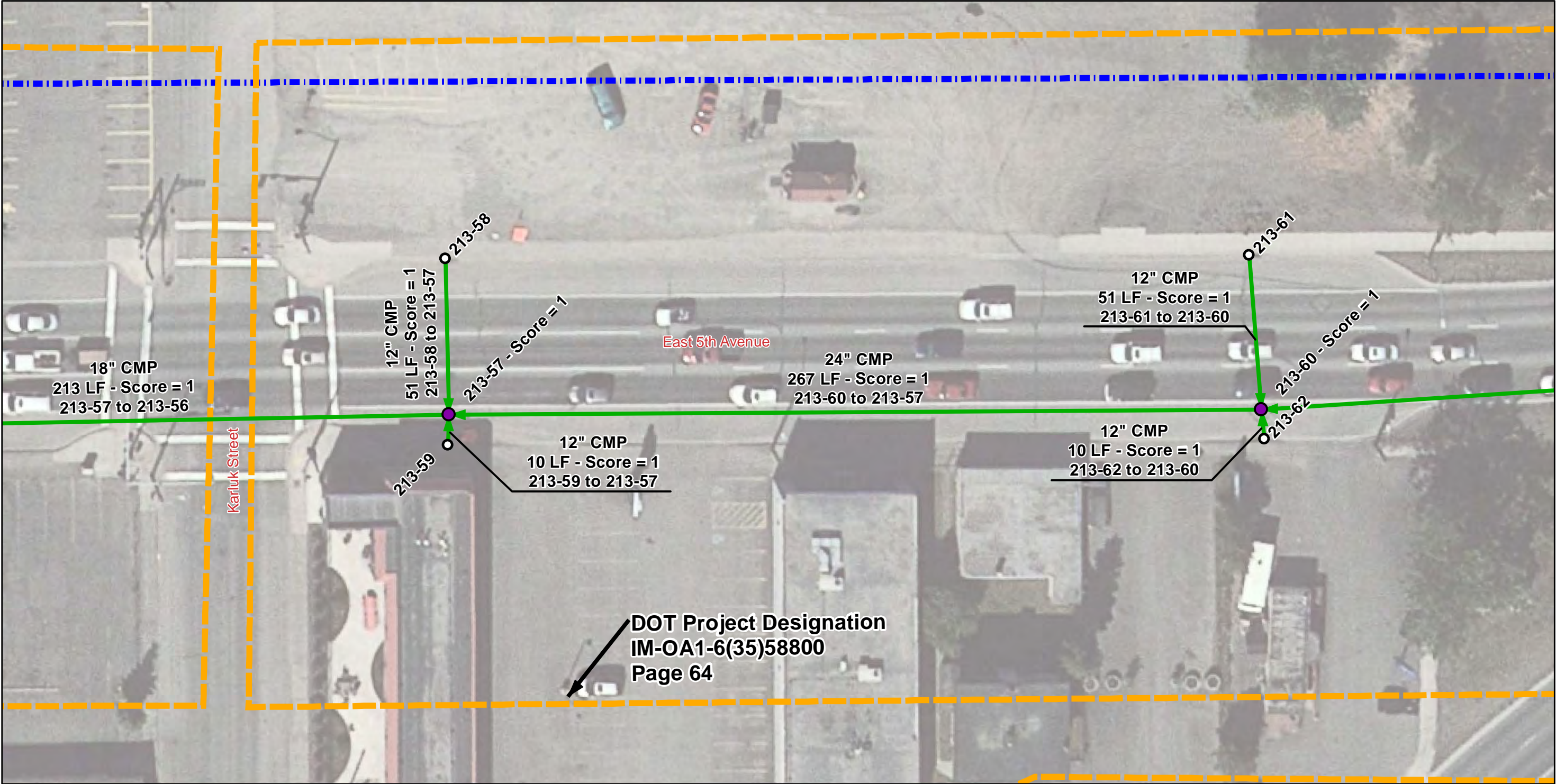
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



East 5th Avenue: Gambell Street to Orca Street



Legend

Manhole/Catchbasin

- Not Inspected
- Inspected

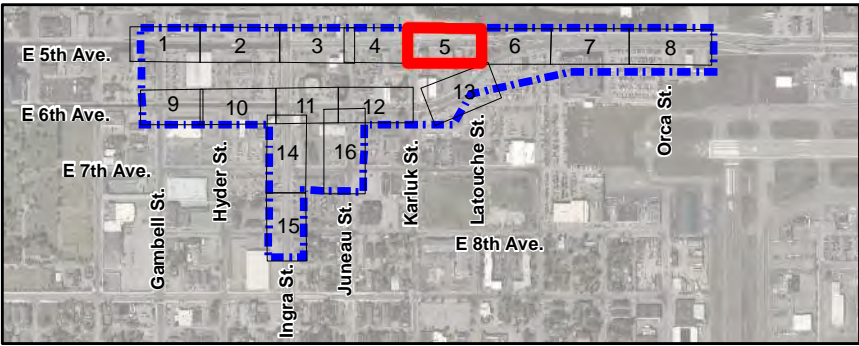
Pipe Segment

- Inspected
- Not Inspected

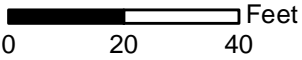
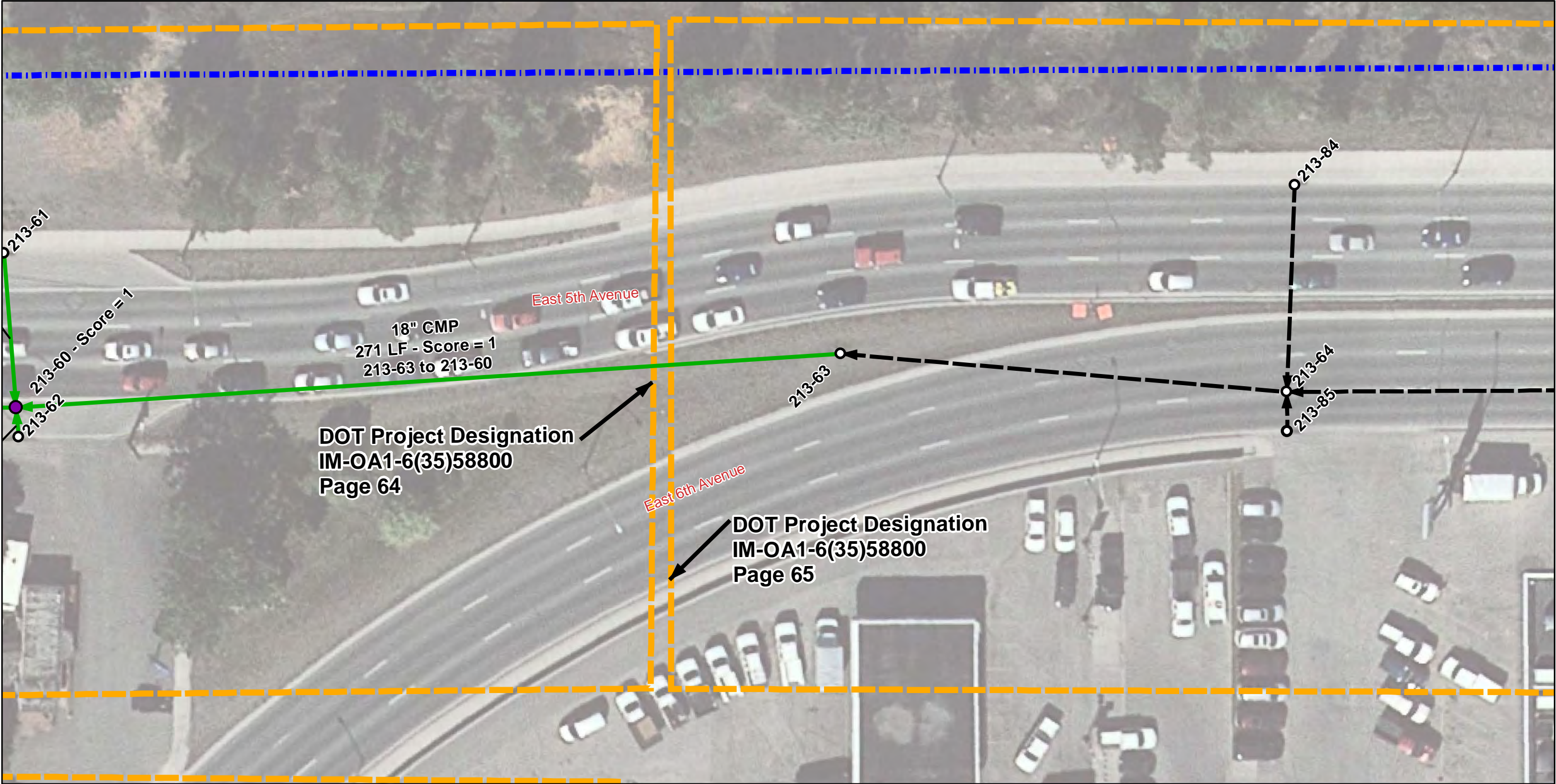
Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation



East 5th Avenue: Gambell Street to Orca Street

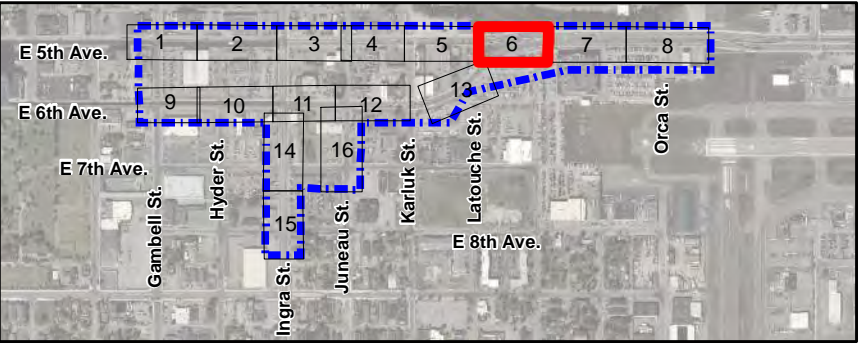


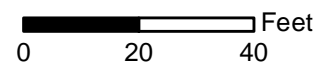
Legend

- Project Area
- Asbuilt Designation

- | Manhole/Catchbasin | Pipe Segment |
|--------------------|---------------|
| Not Inspected | Inspected |
| Inspected | Not Inspected |

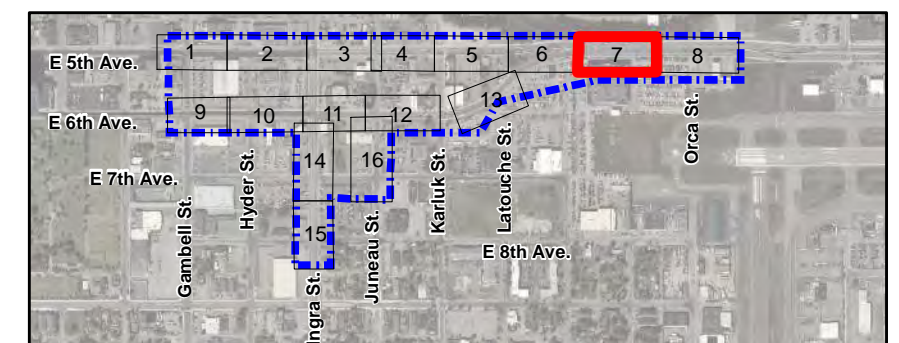
- Score**
- 0 - No Defect
 - 1 - Minor Defect
 - 2 - Minor to Moderate Defect
 - 3 - Moderate Defect
 - 4 - Significant Defect
 - 5 - Most Significant Defect
 - N - Not Scored



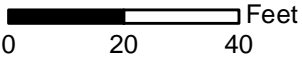
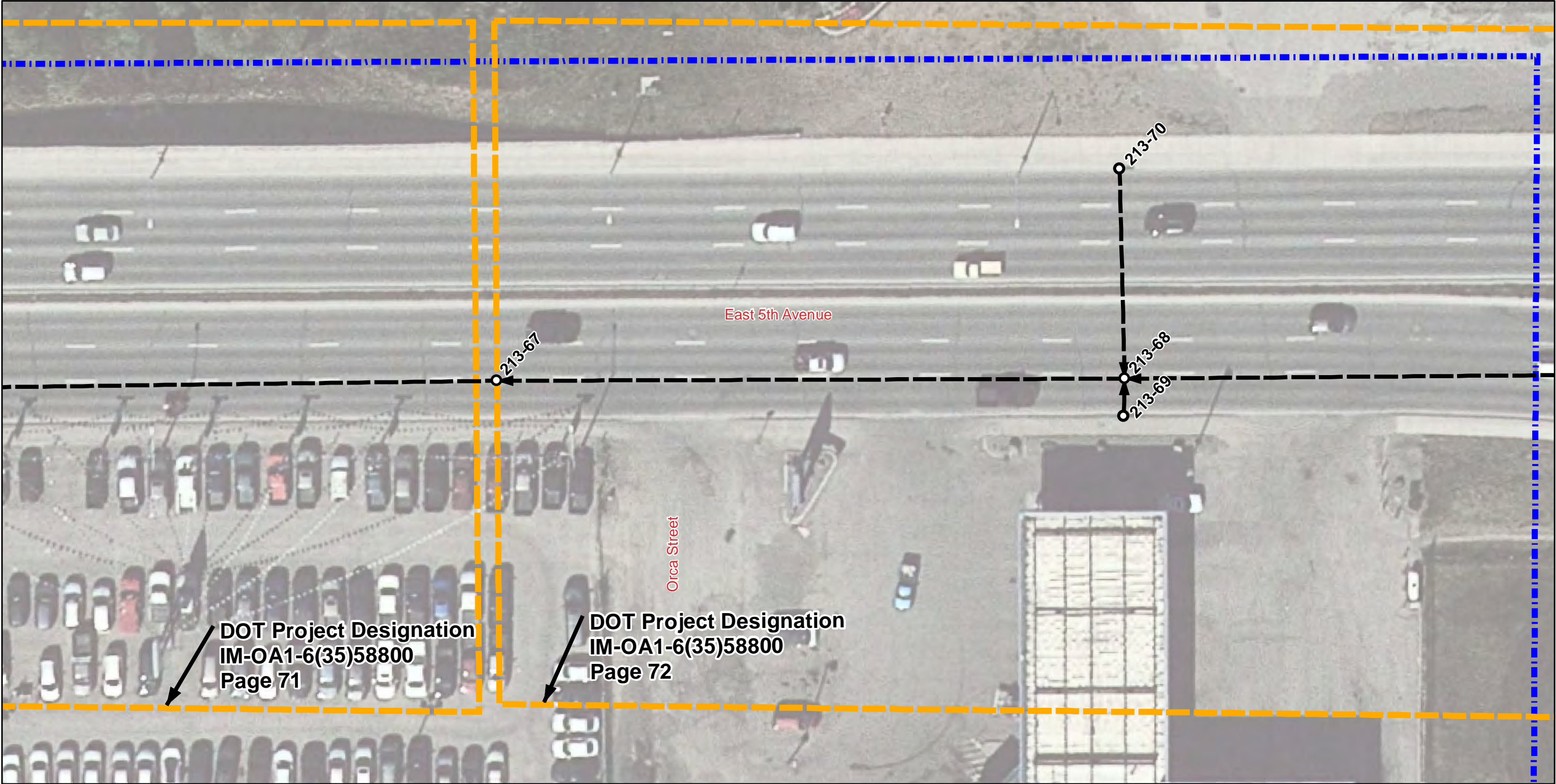


Score

- 0 - No Defect
1 - Minor Defect
2 - Minor to Moderate Defect
3 - Moderate Defect
4 - Significant Defect
5 - Most Significant Defect
N - Not Scored



East 5th Avenue: Gambell Street to Orca Street



Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

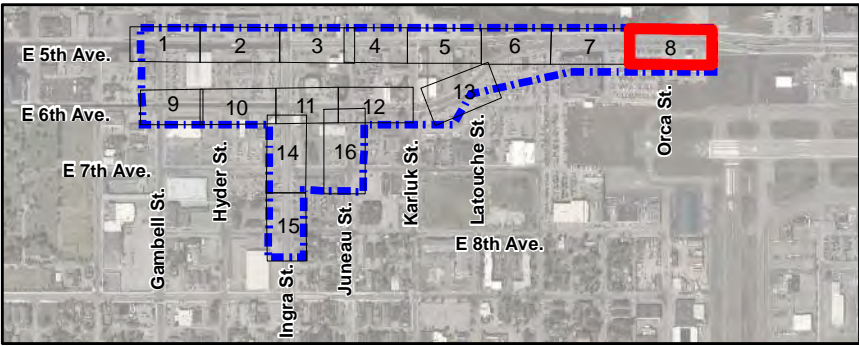
- Not Inspected
- Inspected

Pipe Segment

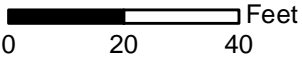
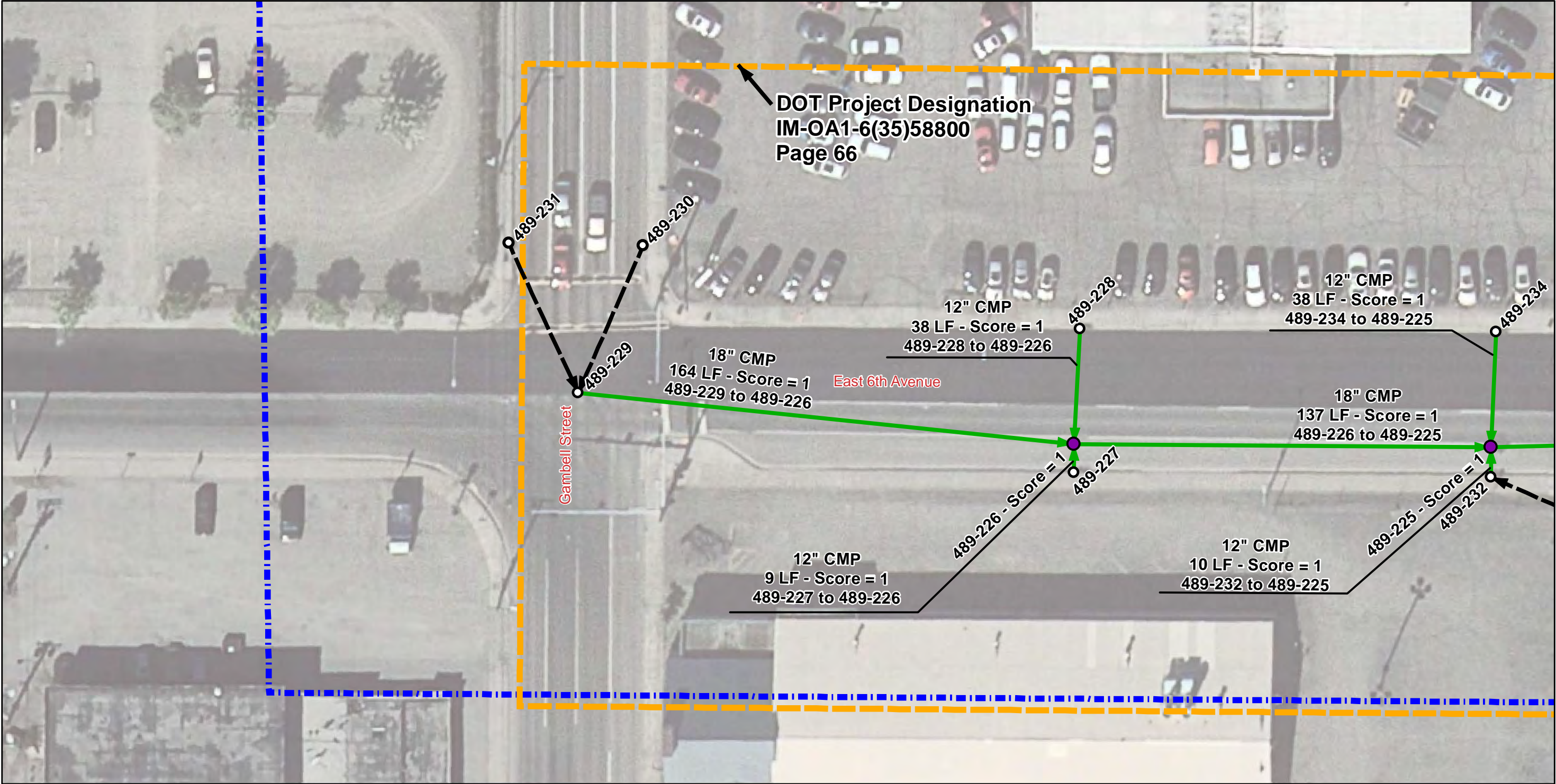
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



East 6th Avenue: Gambell Street to Latouche Street



Legend

Manhole/Catchbasin

- Not Inspected
- Inspected

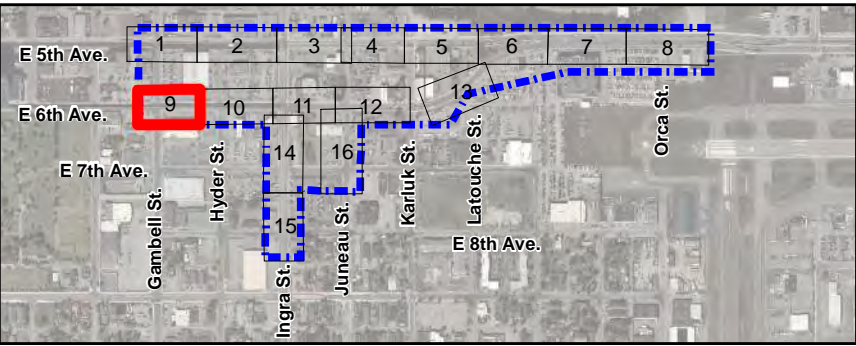
Pipe Segment

- Inspected
- Not Inspected

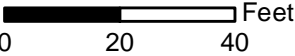
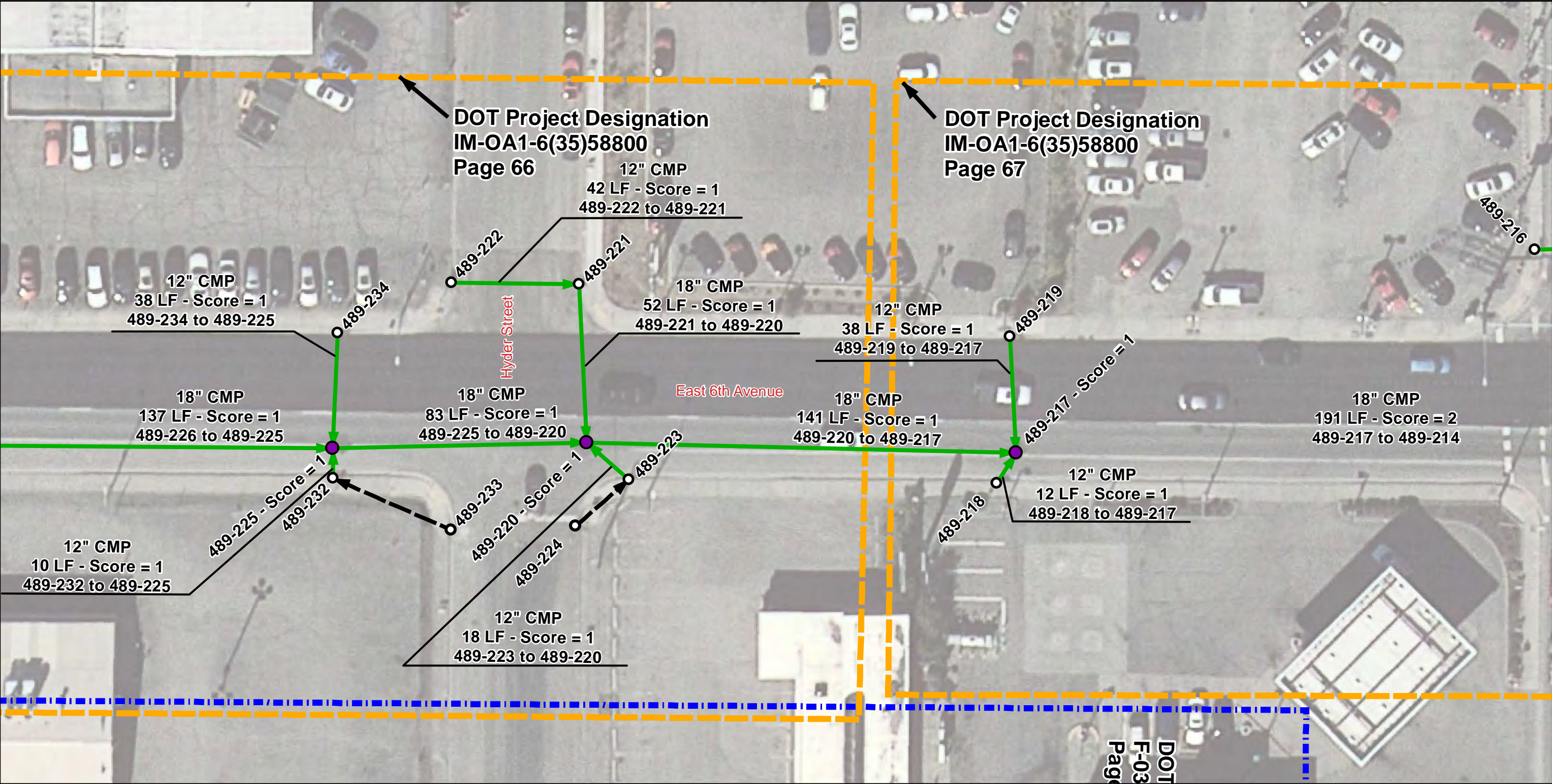
Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation



East 6th Avenue: Gambell Street to Latouche Street



Legend

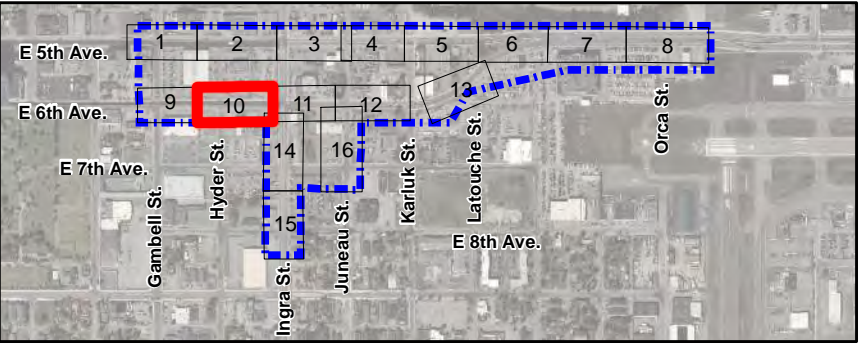
- Project Area

Asbuilt Designation
- Not Inspected

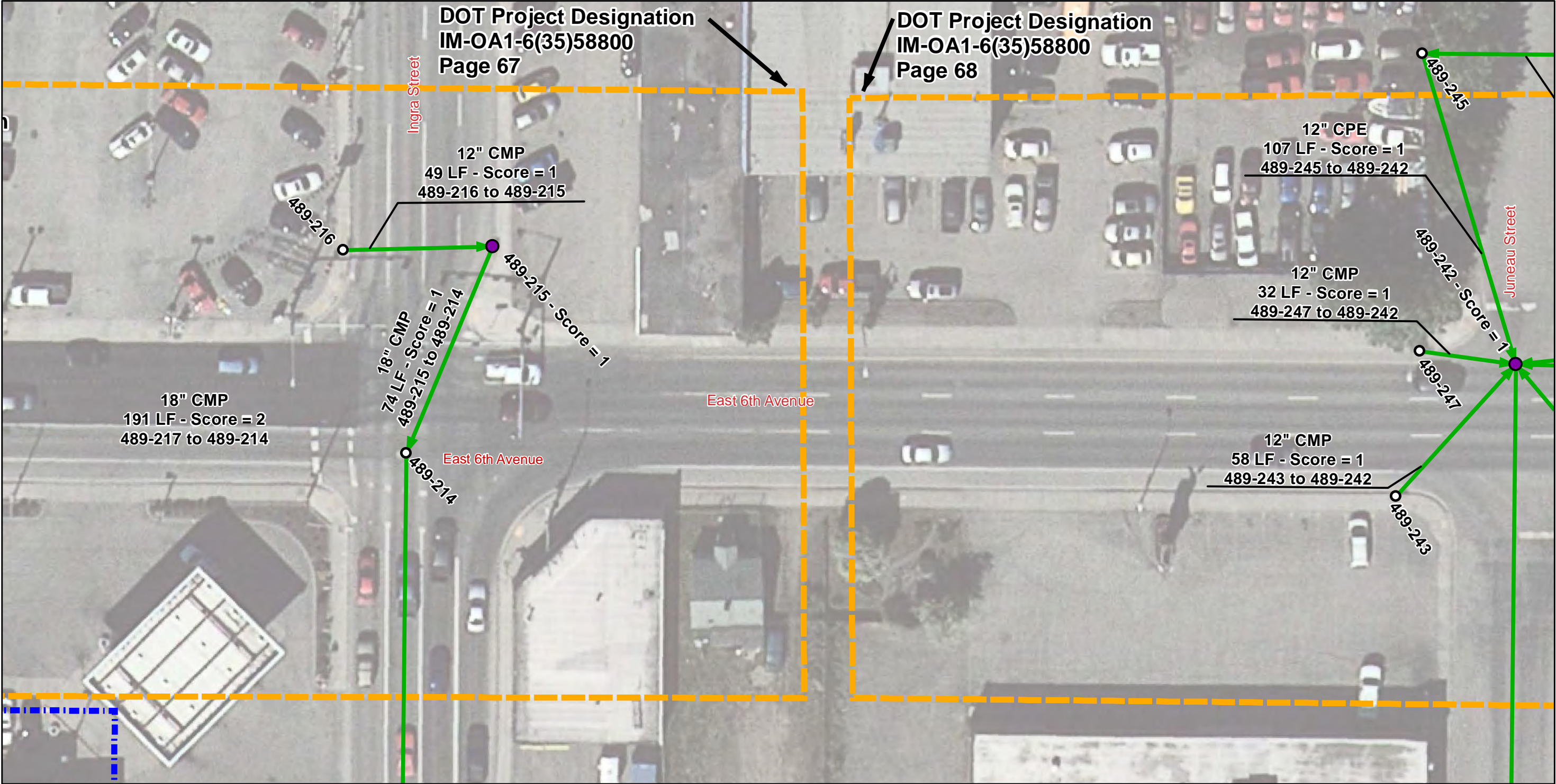
Inspected
- Inspected

Not Inspected

- Score**
- 0 - No Defect
 - 1 - Minor Defect
 - 2 - Minor to Moderate Defect
 - 3 - Moderate Defect
 - 4 - Significant Defect
 - 5 - Most Significant Defect
 - N - Not Scored



East 6th Avenue: Gambell Street to Latouche Street



0 20 40 Feet

Legend

Manhole/Catchbasin

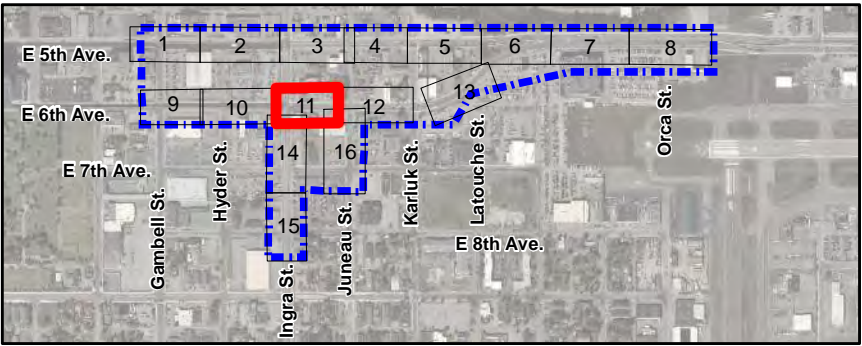
- Not Inspected
- Inspected

Pipe Segment

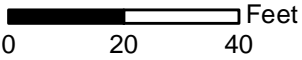
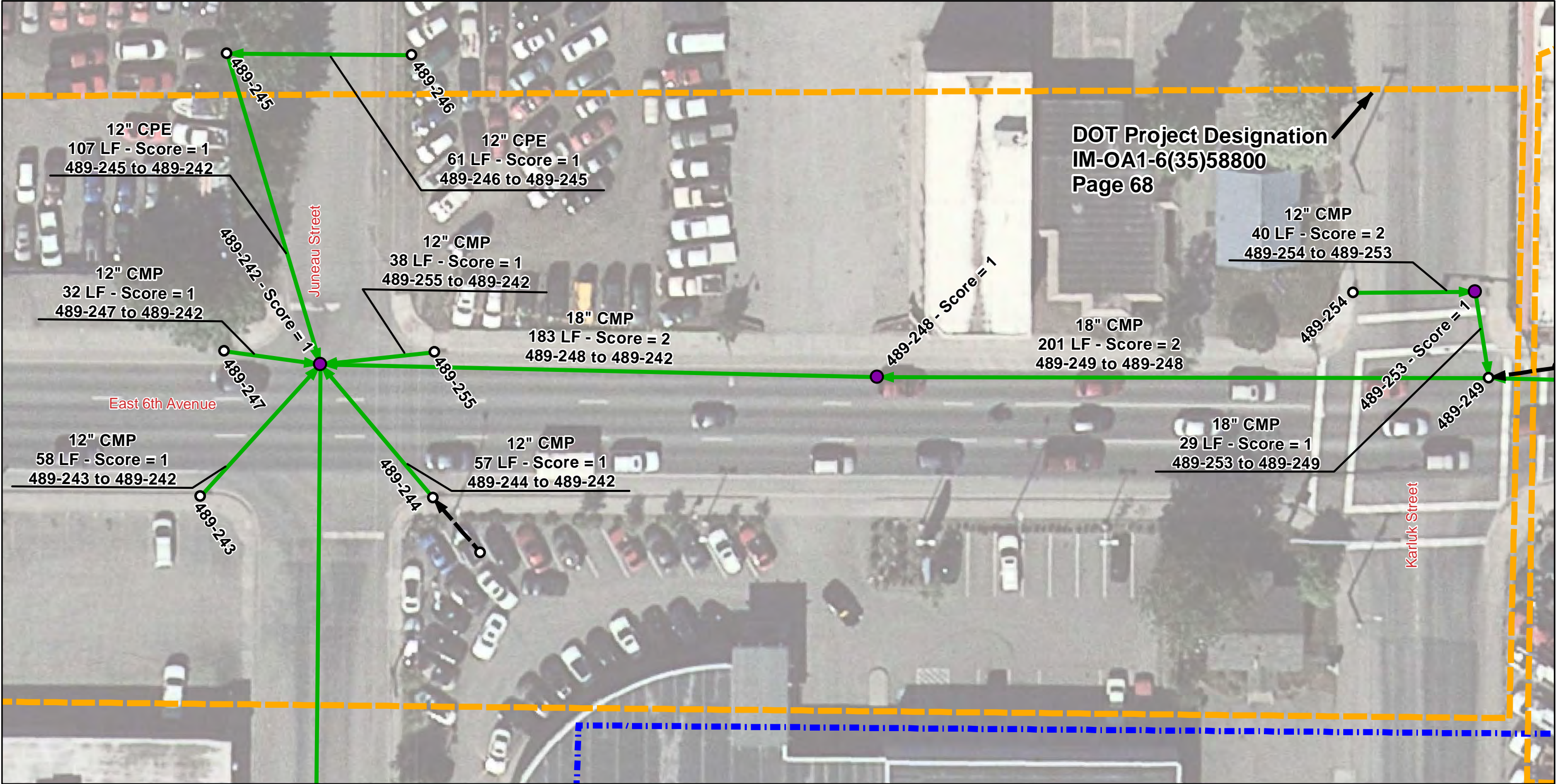
- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored



East 6th Avenue: Gambell Street to Latouche Street



Legend

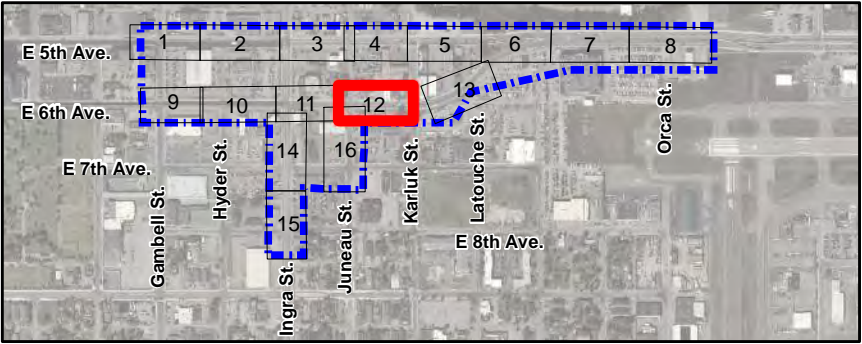
- Project Area

Asbuilt Designation
- Not Inspected

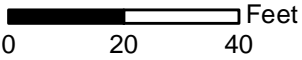
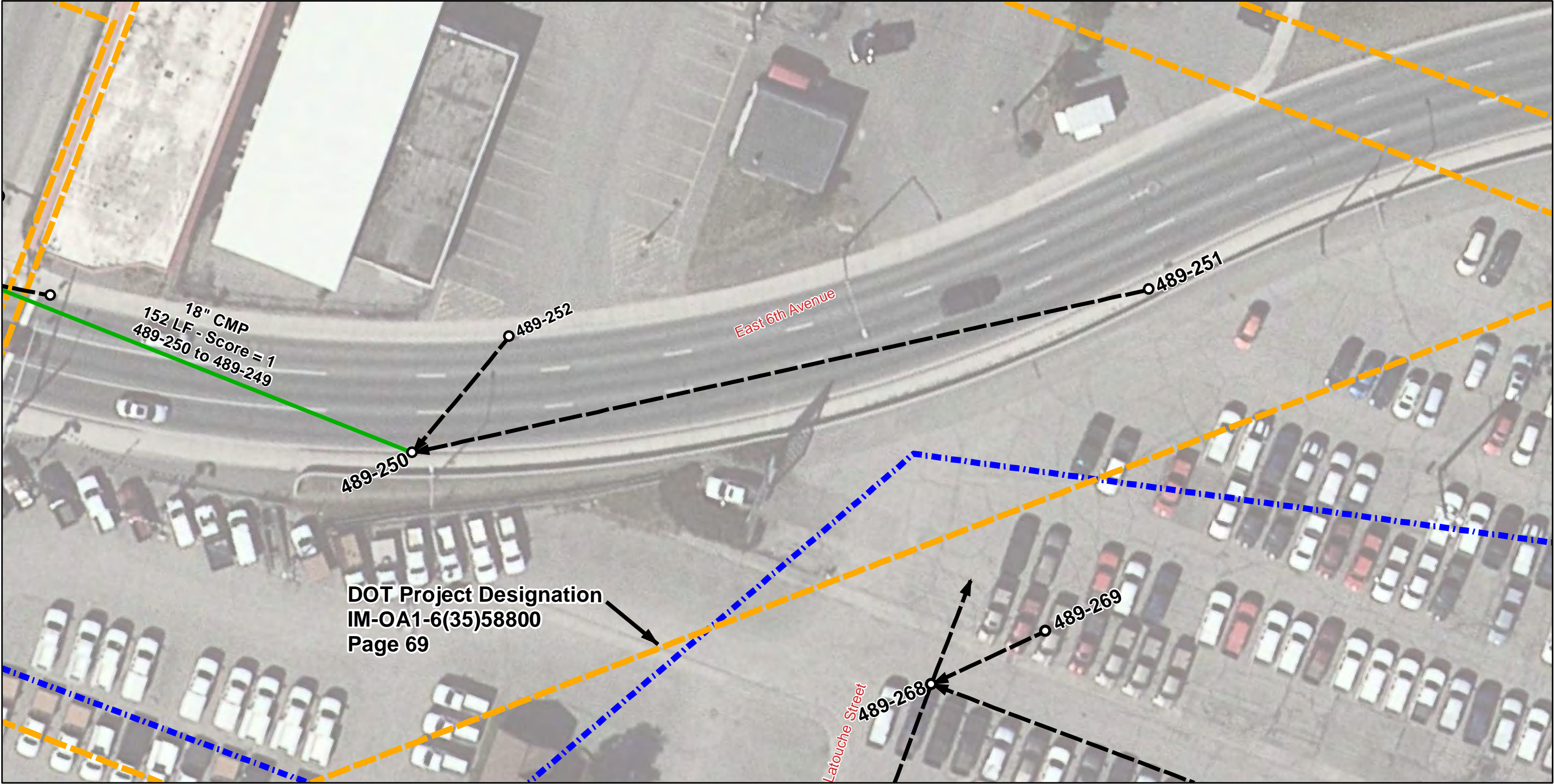
Inspected
- Inspected

Not Inspected

- Score**
- 0 - No Defect
 - 1 - Minor Defect
 - 2 - Minor to Moderate Defect
 - 3 - Moderate Defect
 - 4 - Significant Defect
 - 5 - Most Significant Defect
 - N - Not Scored



East 6th Avenue: Gambell Street to Latouche Street



Legend

Manhole/Catchbasin

- Not Inspected
- Inspected

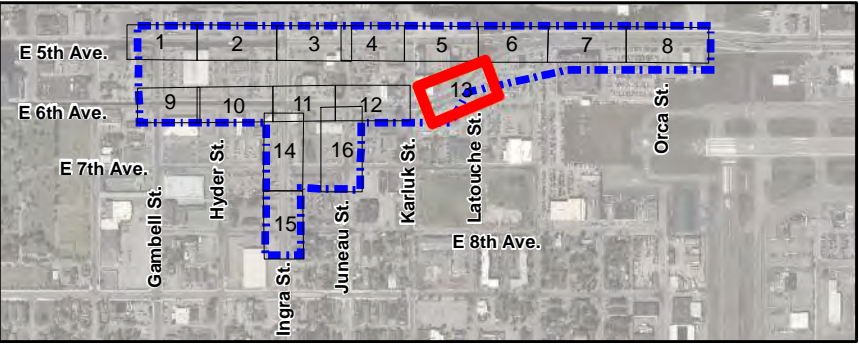
Pipe Segment

- Inspected
- Not Inspected

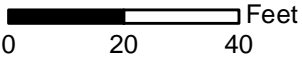
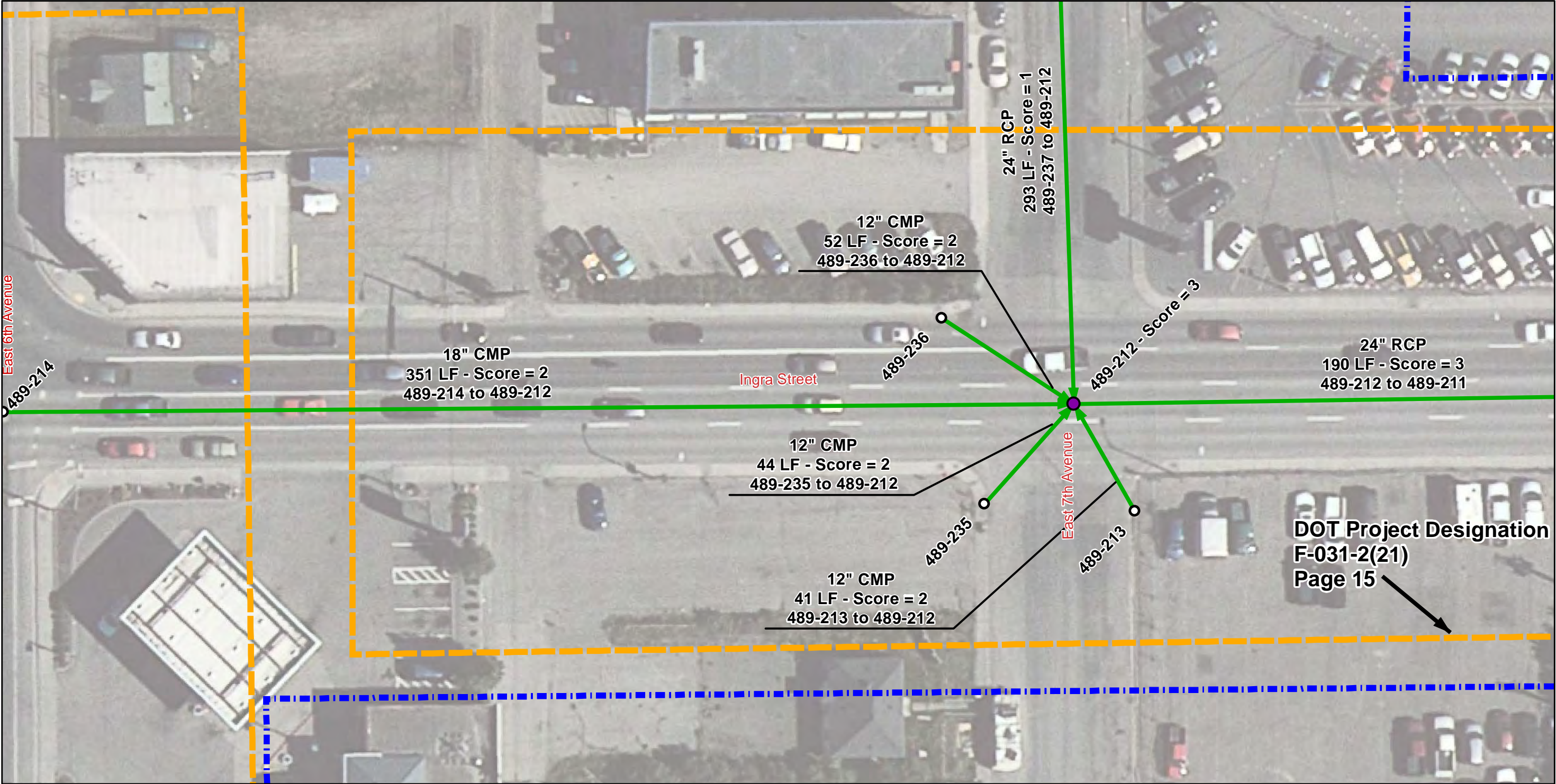
Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation



Ingra Street: East 6th Avenue to East 8th Avenue



Legend

Manhole/Catchbasin

- Not Inspected
- Inspected

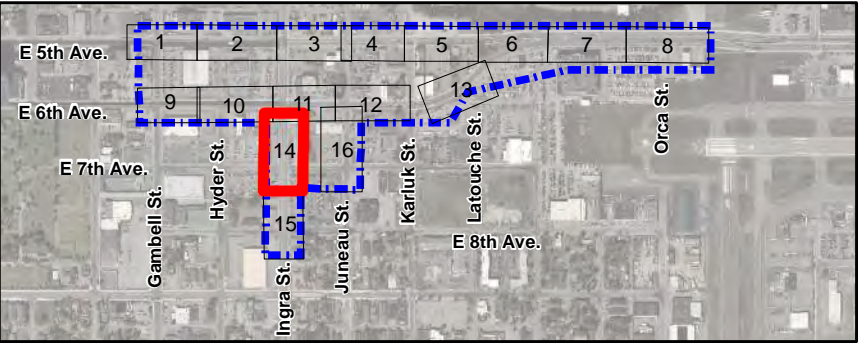
Pipe Segment

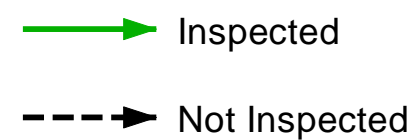
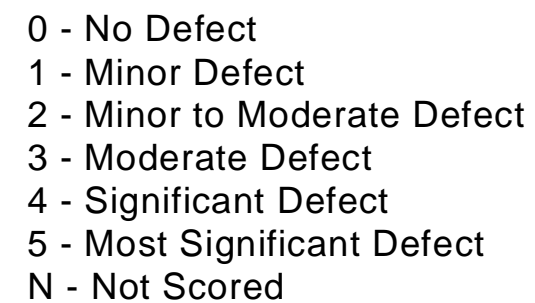
- Inspected
- Not Inspected

Score

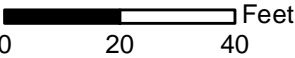
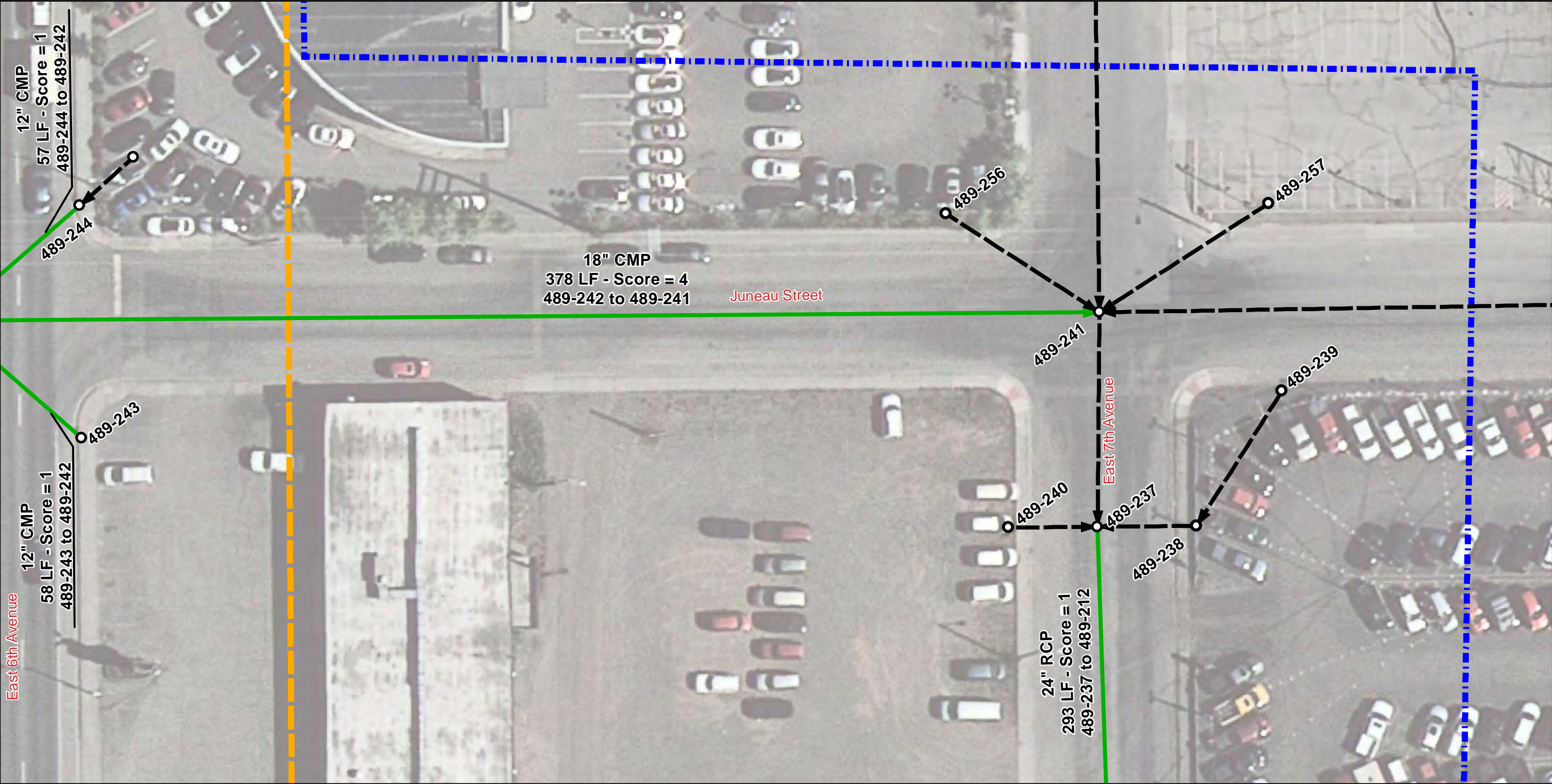
- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

- Project Area
- Asbuilt Designation





Juneau Street: East 6th Avenue to East 7th Avenue



Legend

- Project Area
- Asbuilt Designation

Manhole/Catchbasin

- Not Inspected
- Inspected

Pipe Segment

- Inspected
- Not Inspected

Score

- 0 - No Defect
- 1 - Minor Defect
- 2 - Minor to Moderate Defect
- 3 - Moderate Defect
- 4 - Significant Defect
- 5 - Most Significant Defect
- N - Not Scored

