

**Appendix C – BridgeGuard 24 Mile Rd Delamination Report**

# Bridge Deck Delamination Report



Bridge: 1282 24 mile rd  
Talon Research, Inc.  
09/16/2013

Bridge deck delaminations can be detected within the thermal imagery captured during both daytime and nighttime hours as a result of the natural thermal transition within the structure due to normal diurnal environmental exposure. Delaminations within the concrete interrupt the flow of thermal energy to the inner deck core and, consequently, those areas will show higher/lower surface temperatures than the surrounding deck area. The BridgeGuard program exploits this situation by applying an IR camera as a thermal fault detection device. Care was taken to optimize the natural diurnal contrast between potential delaminations and the otherwise homogeneous bridge deck to include imaging at the proper time of the day and in appropriate environmental/weather conditions.

This report is presented to document the findings of a thermal infrared image analysis carried out on the bridge identified within this report along with the data specific to that bridge. The system is a vehicle mounted thermal infrared sensor suite that applies computer software tools designed to acquire appropriate information from the collected data, and maintain that data to ensure its availability for further analysis or distribution. The user is positioned in the vehicle and maintains control of the scanning process in real-time. The sensor is mounted on a monopod in the front of the vehicle which is positioned above the road to maximize the view of an entire bridge lane. A GPS device is used to monitor, in real time and ongoing, the speed at which the vehicle is traveling.

Page three (3) of this report is an overview of the bridge under investigation. Page four (4) is a summary page of the results to include a graphical representation of the bridge with the relative positions of each delamination found in the bridge. Page five (5) is a list of delaminations in descending order by the sq. ft. of each delamination. The remaining report shows the images that hold one or more delaminations with the delamination details documented.

Thank you for entrusting Talon Research with your bridge inspection needs. As with any technical reference there are items the reader must be aware of when beginning to read this document. First, use the Index as a reference tool to find specific areas of interest within the document. Secondly, highlighted hyperlinks throughout the document will bring you to areas of particular interest such as the largest delamination by size or area delaminated shown as a percentage of total area delaminated. At the bottom of each page there is a link to return the reader to the main subject heading, the Bridge Layout page. We thank you for your business. This report is illustrative of a typical bridge structure and its sole purpose is to allow the viewer to see the reporting format. It is not a representation of any individual bridge.

### **Disclaimer**

The information contained in this report is intended to supplement the client's bridge inspection protocol. The results obtained from the infrared inspection undertaken are meant to augment the bridge inspector's various inspection methods. Talon Research, Inc. does not make any claims or opinions to the safety or integrity of the structure inspected but leaves those decisions to the client, using all his/her resources and expertise to determine the appropriate action(s). Rules and regulations governing the structure's soundness and the client's actions based upon the regulations are the client's obligation and responsibility. Talon Research, Inc., while reporting the collected data within, makes no opinions or judgments to the structure's safety or soundness and is not held liable for any damages incurred whether actual or implied. The data in this report is not intended to be used solely in making those judgments but instead used as a tool along with the client's other available resources to determine the appropriate action(s) needed, if any.

Bridge:	1282 24 mile rd
Report Date:	09/16/2013
Data Collection Technician:	_____
	Chad Therrian
Data Analysis Technician:	_____
	Ben
Quality Control Technician:	_____
	Dave Torola

# Bridge Information



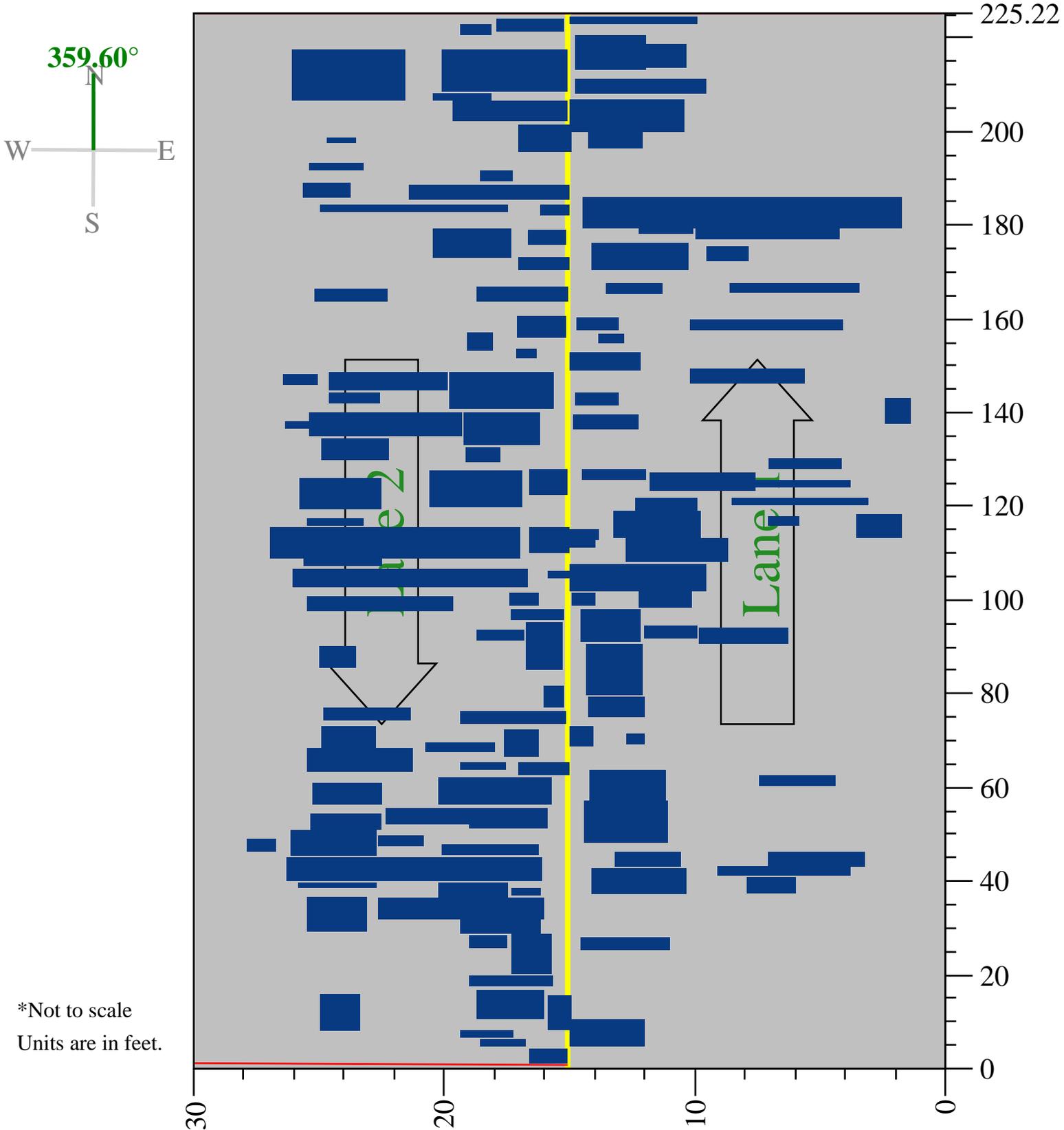
Client:	MTU Study
Bridge Name:	1282 24 mile rd
Number of Lanes:	2
Length of Bridge [ft]:	225.22
Width of Bridge [ft]:	30.00
Bridge Code:	
Year Built:	
State Name:	Michigan
State Code:	265
County Name:	Calhoun
County Code:	test
Control Section:	
Location:	
Facility Carried by Structure:	24 mile rd
Features Intersected:	I94

# Pattern Overview



Total Bridge Area (sq ft): 6756.56  
Defect Area (sq ft): 1765.61

# of Defects: 133  
% Defective: 26.13

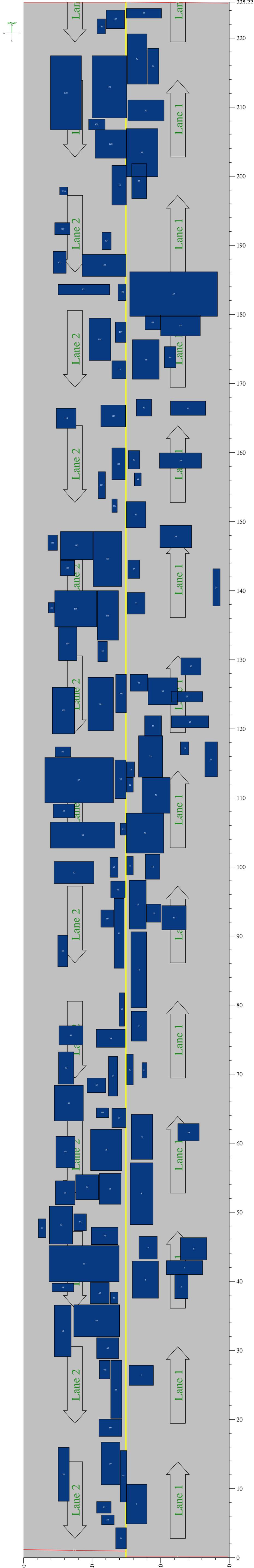


\*Not to scale  
Units are in feet.

# Overview (Scaled)



Total Bridge Area (sq ft): 6756.56      # of Defects: 133  
 Defect Area (sq ft): 1765.61      % Defective: 26.13



# Defect Summary



The following table displays the largest defects in descending order.

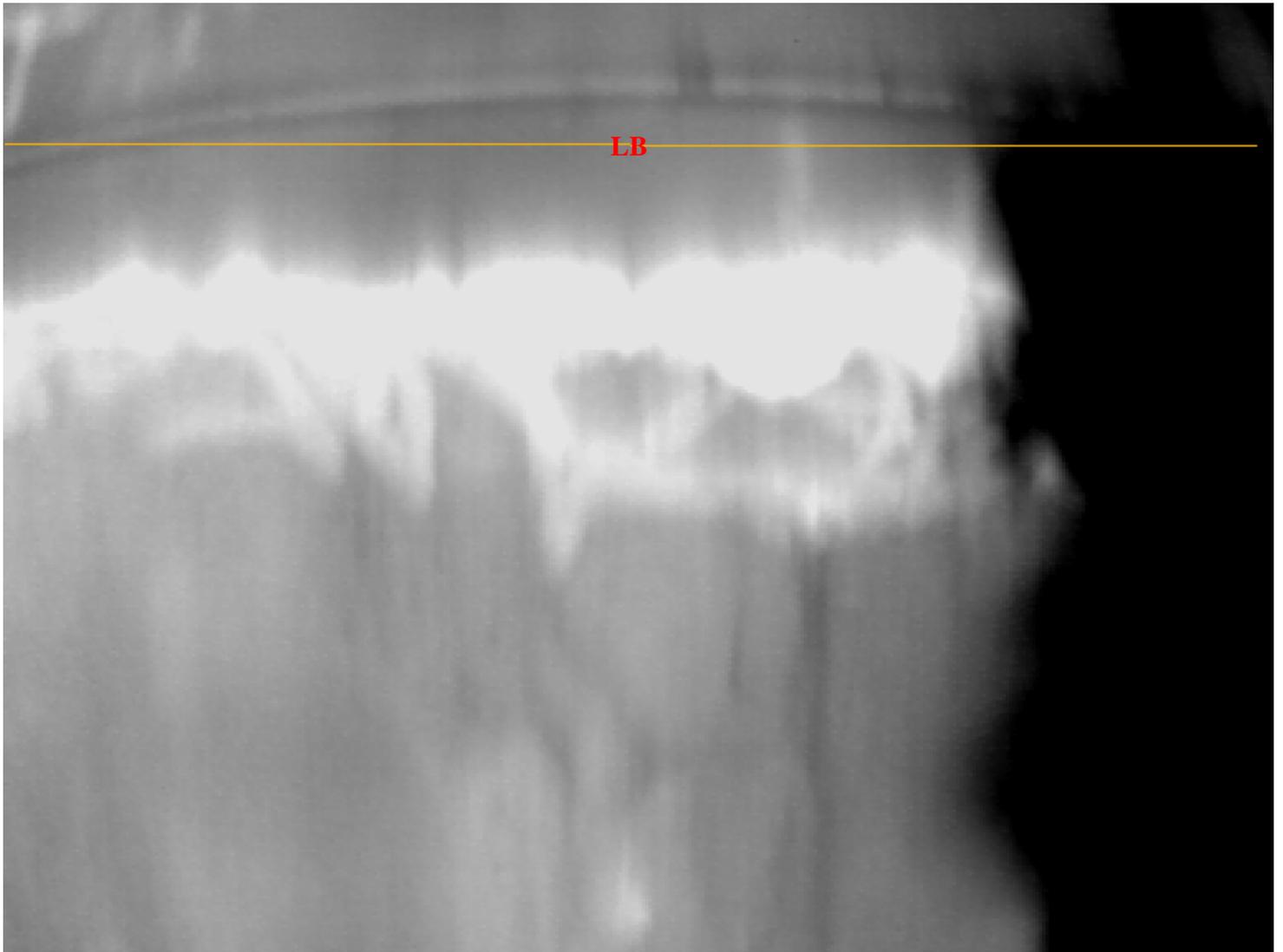
Area (sq ft)	% of Bridge	Dist fr Start (ft)	Dist fr Right (ft)	Image Name	Defect #	Page
86.15	1.28	182.96	8.12	1_8332000_45895_3598.tif	47	<a href="#">24</a>
68.62	1.02	112.56	21.90	2_5726000_44821_1799.tif	97	<a href="#">39</a>
56.12	0.83	42.54	21.17	2_7506000_44862_1798.tif	69	<a href="#">33</a>
50.54	0.75	212.07	23.83	2_3024000_44335_1801.tif	130	<a href="#">48</a>
47.55	0.70	212.93	17.52	2_3024000_44335_1801.tif	131	<a href="#">48</a>
37.32	0.55	104.59	21.34	2_6020000_44862_1798.tif	94	<a href="#">38</a>
34.48	0.51	144.60	17.79	2_4822000_44518_1800.tif	109	<a href="#">42</a>
33.41	0.49	203.43	12.71	1_8918000_45895_3598.tif	49	<a href="#">26</a>
33.40	0.49	137.37	22.37	2_5122000_44821_1799.tif	106	<a href="#">41</a>
33.07	0.49	104.88	12.28	1_6307000_46037_3597.tif	20	<a href="#">17</a>
32.10	0.48	34.34	19.33	2_7804000_44862_1798.tif	65	<a href="#">32</a>
31.13	0.46	52.72	12.77	1_4864000_46280_1.tif	8	<a href="#">12</a>
30.24	0.45	123.58	18.70	2_5423000_44821_1799.tif	101	<a href="#">40</a>
28.23	0.42	59.06	17.97	2_7206000_44862_1798.tif	78	<a href="#">34</a>
26.18	0.39	85.10	13.20	1_5725000_46158_3597.tif	14	<a href="#">15</a>
23.35	0.35	173.44	12.18	1_8047000_46280_3597.tif	43	<a href="#">23</a>
22.97	0.34	65.80	23.38	2_6906000_44862_1798.tif	81	<a href="#">35</a>
22.92	0.34	136.39	17.70	2_5122000_44821_1799.tif	105	<a href="#">41</a>
22.82	0.34	122.67	24.16	2_5423000_44821_1799.tif	100	<a href="#">40</a>
22.16	0.33	110.39	10.68	1_6307000_46037_3597.tif	21	<a href="#">17</a>
21.92	0.32	115.98	11.47	1_6596000_46037_3597.tif	25	<a href="#">18</a>
21.59	0.32	216.99	13.43	1_9208000_45895_3598.tif	52	<a href="#">27</a>
21.25	0.31	40.23	12.21	1_4579000_46280_1.tif	4	<a href="#">11</a>
21.18	0.31	187.09	18.20	2_3624000_44335_1801.tif	122	<a href="#">46</a>

# Delaminations

Bridge: 1282 24 mile rd

Lane: 1

Image Name: 1\_3426000\_46766\_0.tif



Defect #	LB
Feet from Start	0.12
Feet from Right	7.60
Defect Size	NA
Length x Width (ft)	NA
Type	Lane Bound

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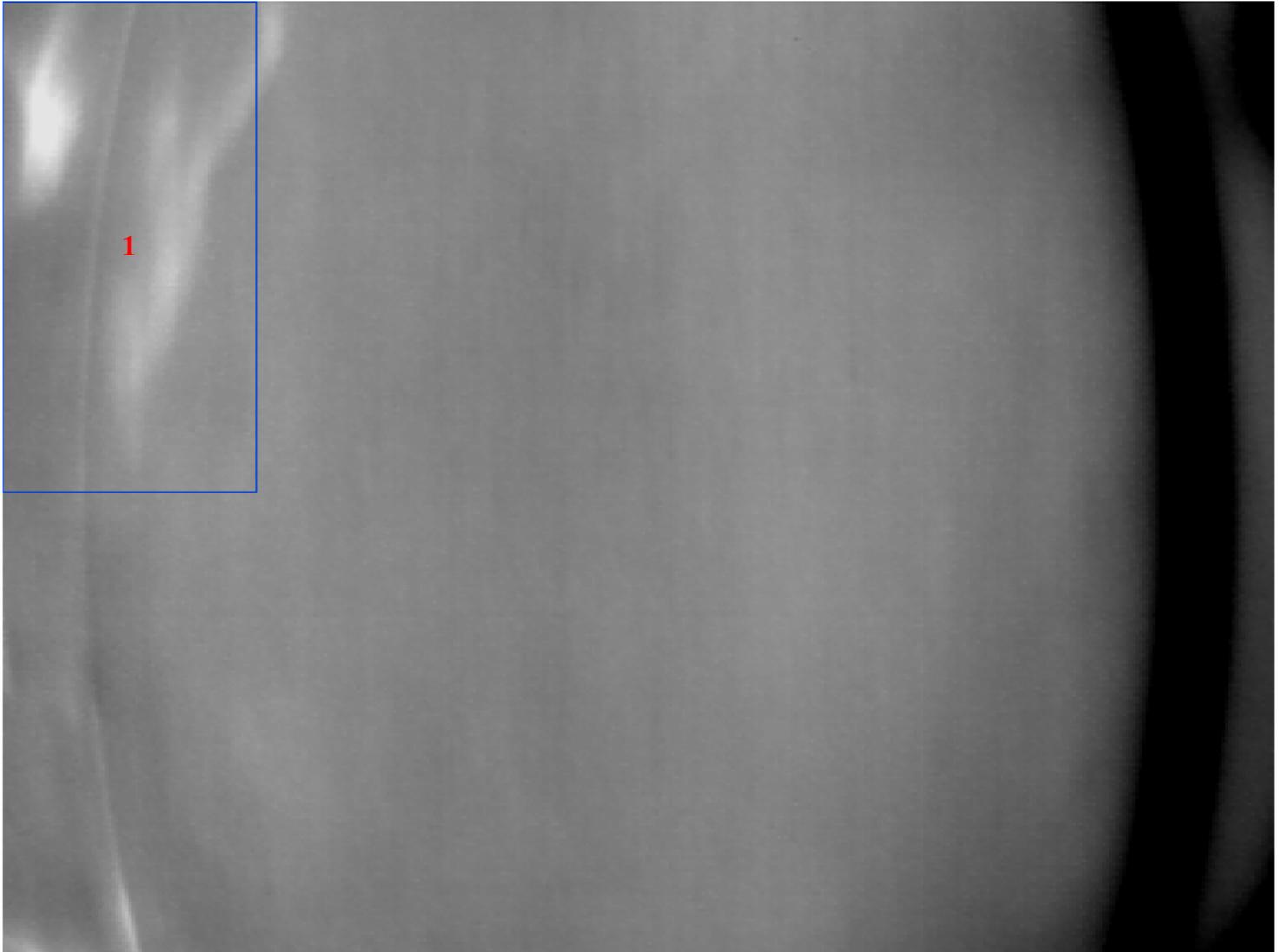
# Delaminations



Bridge: 1282 24 mile rd

Lane: 1

Image Name: 1\_3709000\_46766\_0.tif



Defect #	1
Feet from Start	7.75
Feet from Right	13.50
Defect Size	18.01 sq ft
Length x Width (ft)	5.71 x 3.01
Type	Delam

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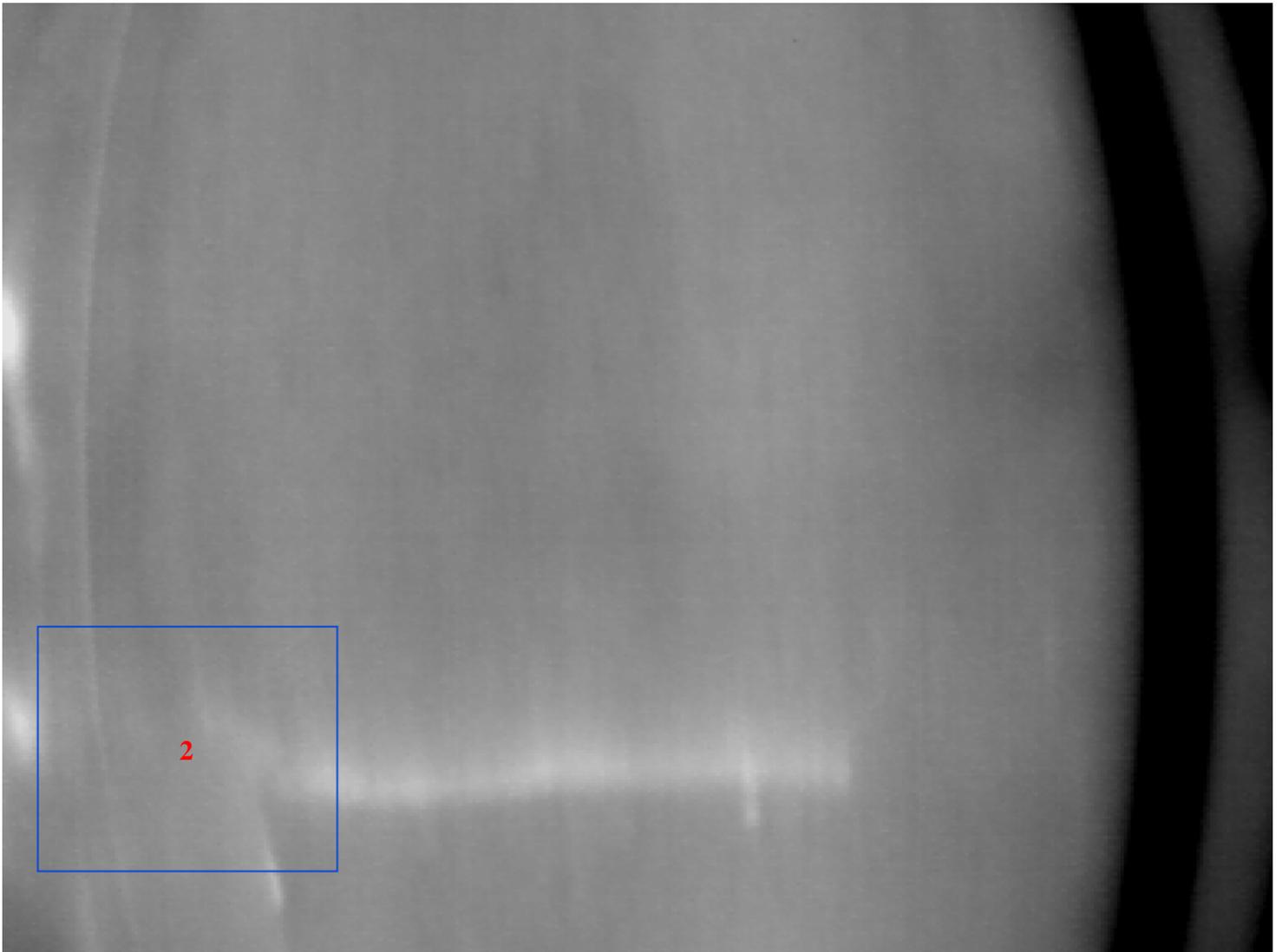
# Delaminations



Bridge: 1282 24 mile rd

Lane: 1

Image Name: 1\_4284000\_46280\_1.tif



Defect #	2
Feet from Start	26.41
Feet from Right	12.81
Defect Size	10.68 sq ft
Length x Width (ft)	2.87 x 3.55
Type	Delam

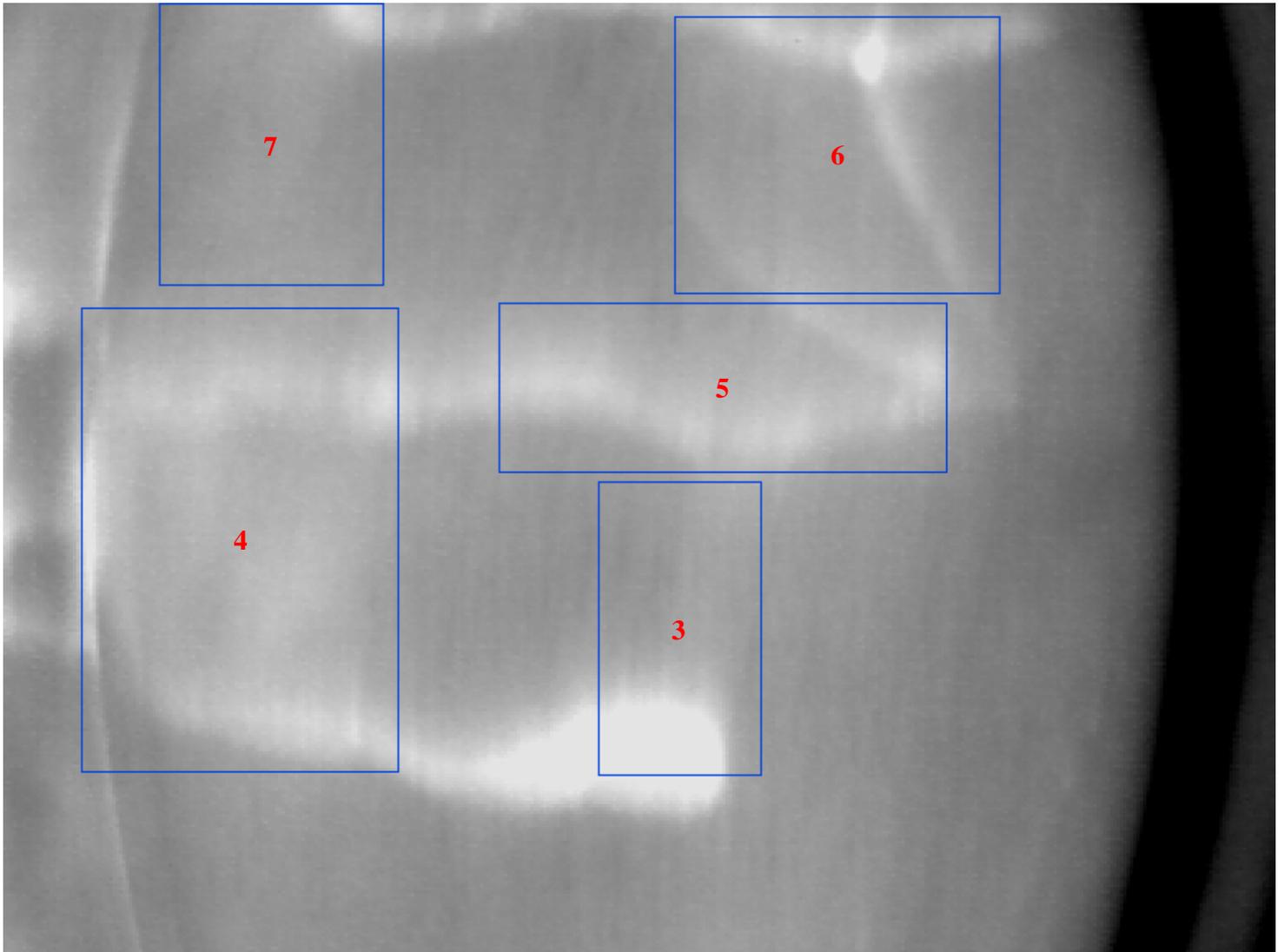
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# Delaminations

Bridge: 1282 24 mile rd

Lane: 1

Image Name: 1\_4579000\_46280\_1.tif



Defect #	3	4	5	6	7
Feet from Start	39.20	40.23	42.00	44.70	44.82
Feet from Right	7.02	12.21	6.51	5.17	11.84
Defect Size	6.94 sq ft	21.25 sq ft	10.99 sq ft	13.03 sq ft	9.16 sq ft
Length x Width (ft)	3.42 x 1.93	5.40 x 3.75	1.98 x 5.29	3.23 x 3.85	3.29 x 2.66
Type	Delam	Delam	Delam	Delam	Delam

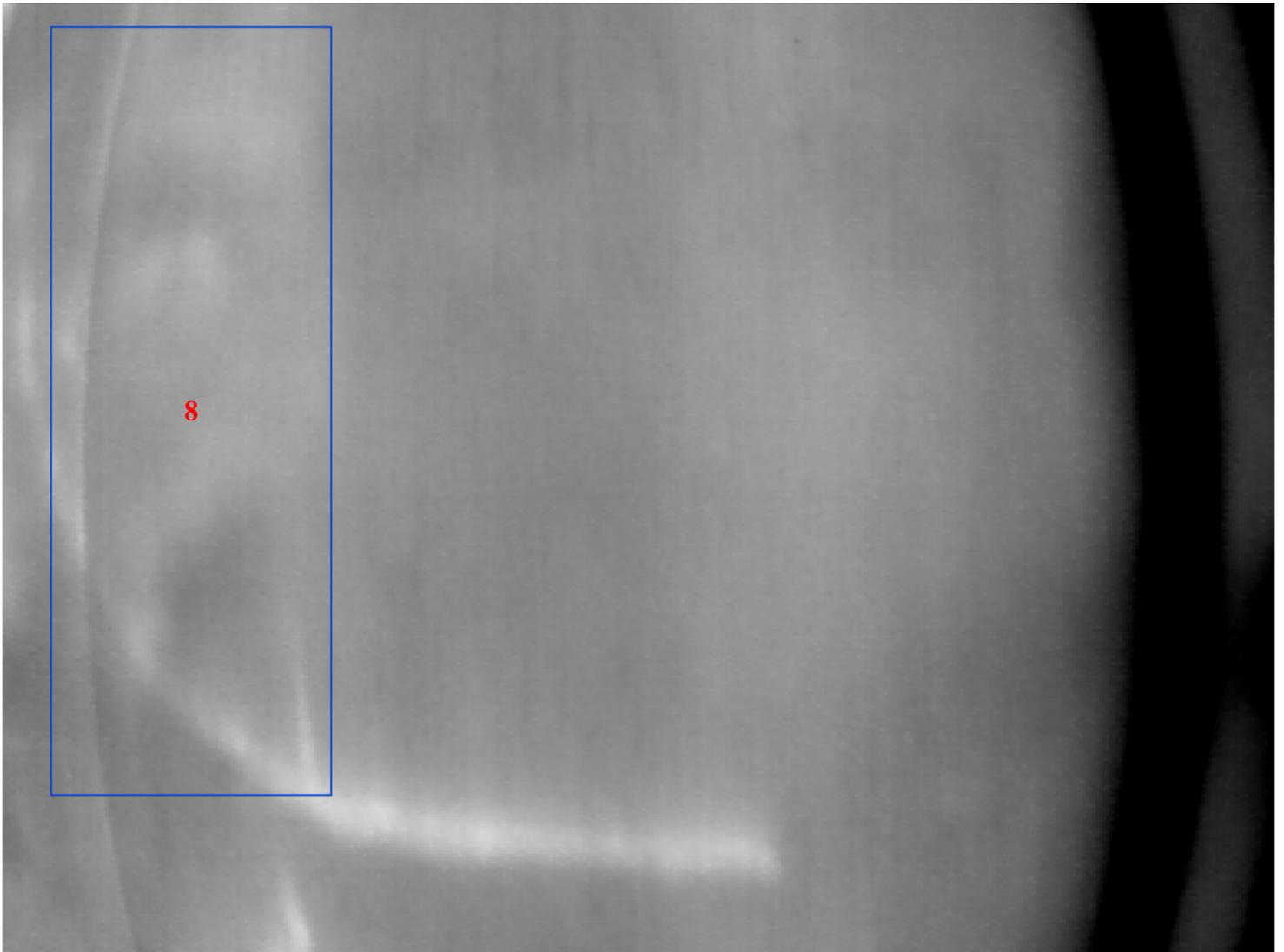
[Return to Overview](#)

# Delaminations

Bridge: 1282 24 mile rd

Lane: 1

Image Name: 1\_4864000\_46280\_1.tif



Defect #	8
Feet from Start	52.72
Feet from Right	12.77
Defect Size	31.13 sq ft
Length x Width (ft)	8.94 x 3.32
Type	Delam

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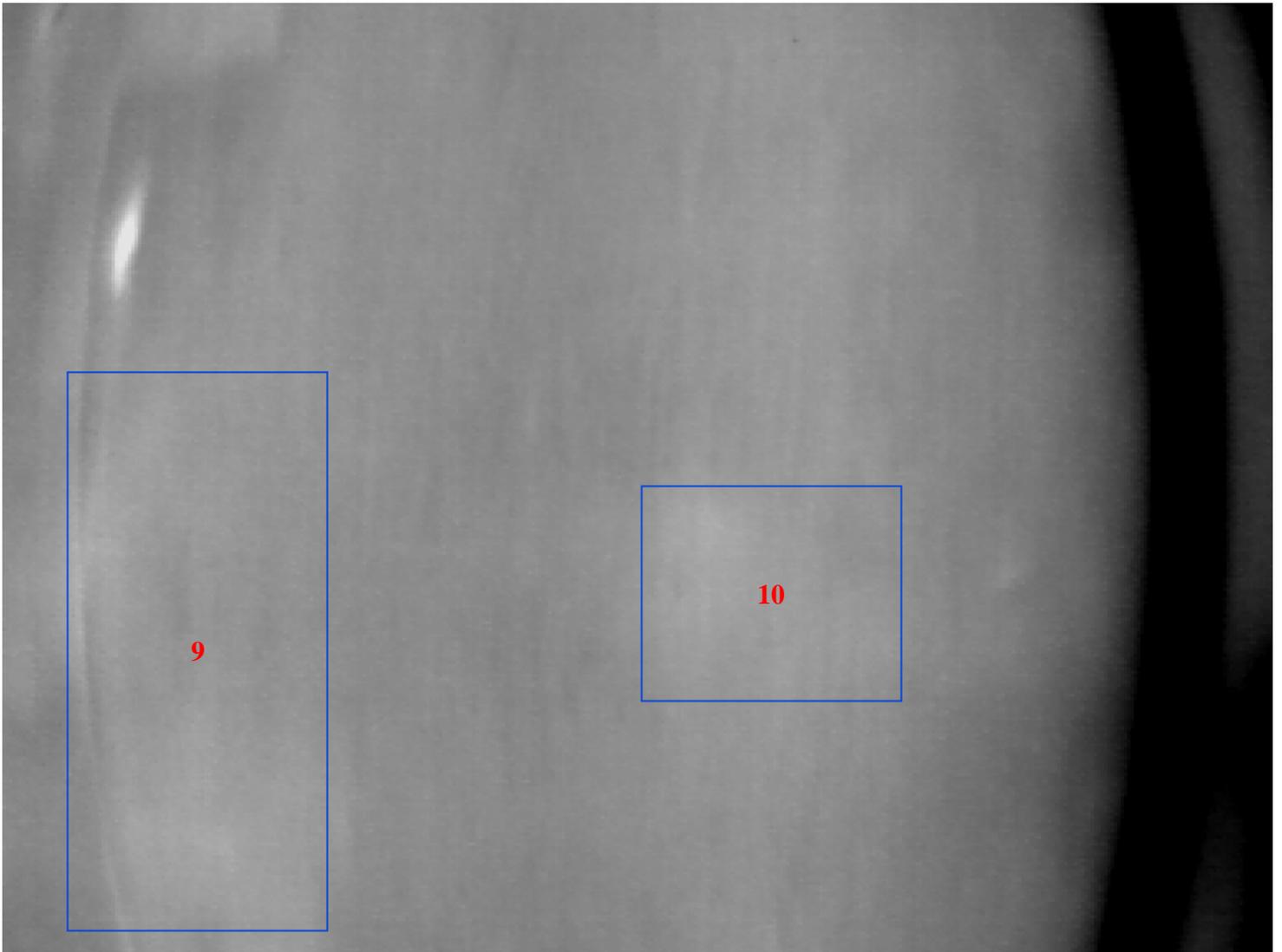
# Delaminations



Bridge: 1282 24 mile rd

Lane: 1

Image Name: 1\_5148000\_46280\_1.tif



Defect #	9	10
Feet from Start	60.86	61.54
Feet from Right	12.70	5.92
Defect Size	21.09 sq ft	8.15 sq ft
Length x Width (ft)	6.52 x 3.09	2.52 x 3.09
Type	Delam	Delam

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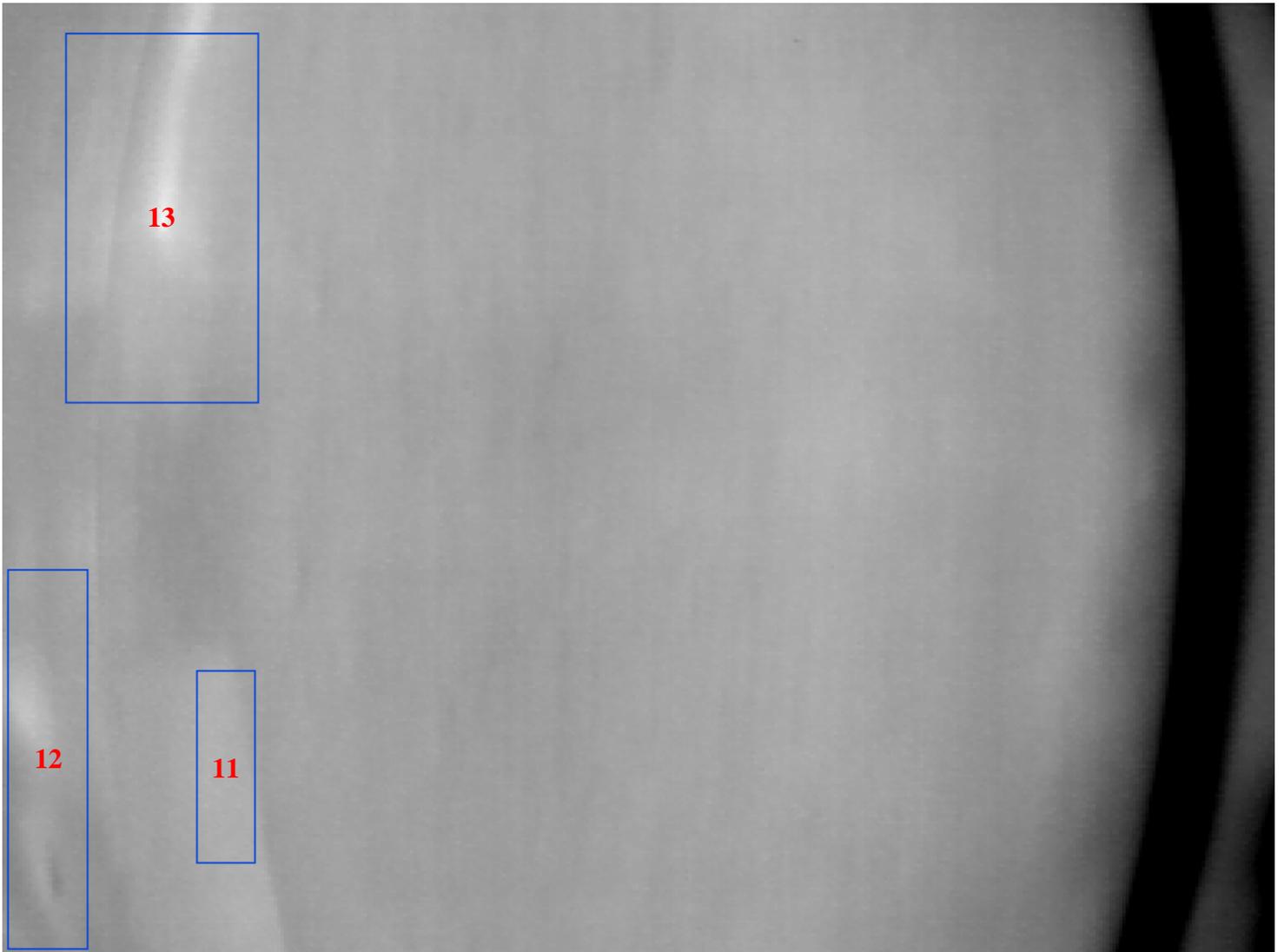
# Delaminations



Bridge: 1282 24 mile rd

Lane: 1

Image Name: 1\_5435000\_46158\_3597.tif



Defect #	11	12	13
Feet from Start	70.58	70.66	76.95
Feet from Right	12.36	14.46	13.12
Defect Size	1.66 sq ft	4.44 sq ft	10.32 sq ft
Length x Width (ft)	2.25 x 0.70	4.42 x 0.96	4.31 x 2.29
Type	Delam	Delam	Delam

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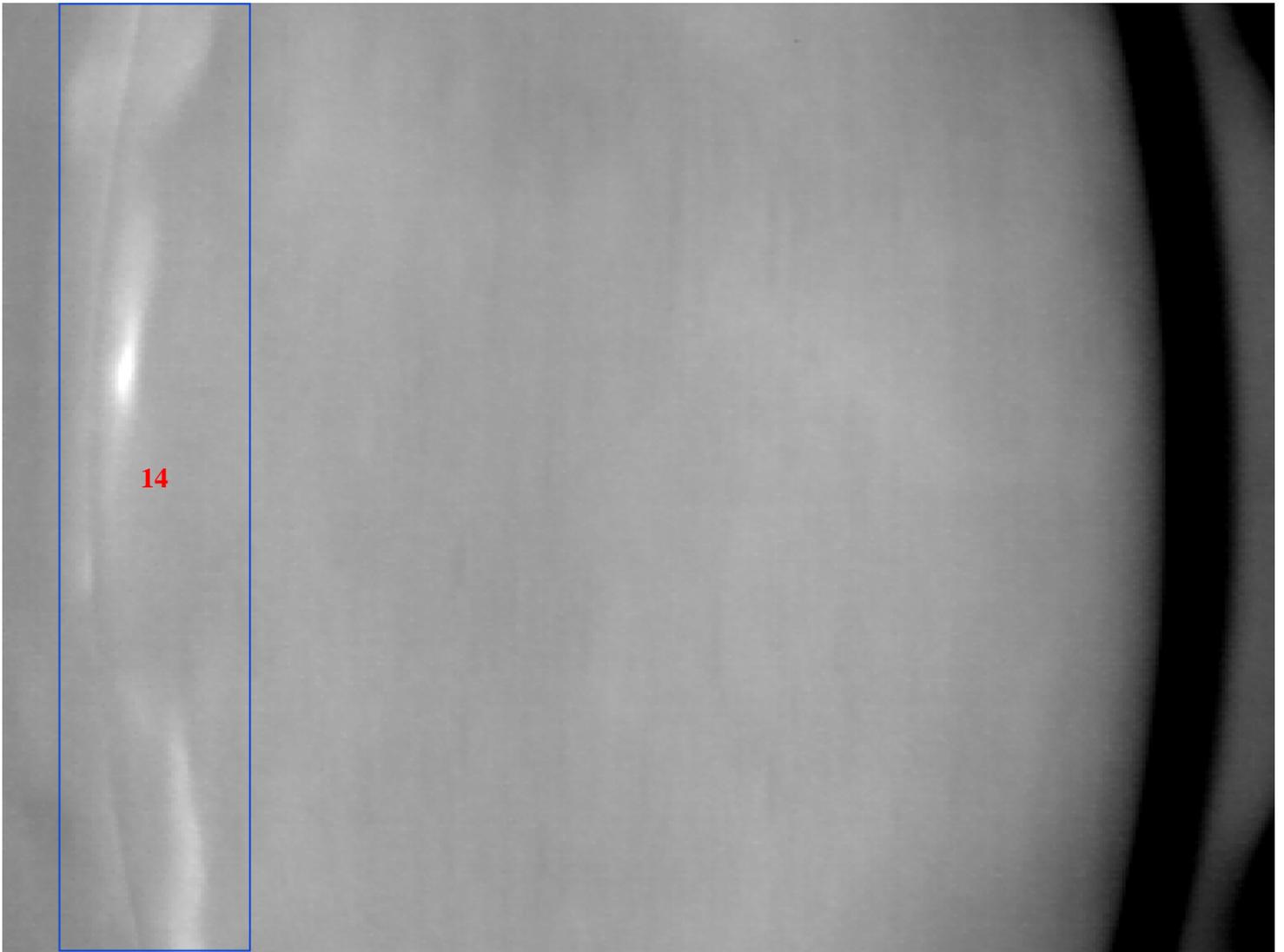
# Delaminations



Bridge: 1282 24 mile rd

Lane: 1

Image Name: 1\_5725000\_46158\_3597.tif



Defect #	14
Feet from Start	85.10
Feet from Right	13.20
Defect Size	26.18 sq ft
Length x Width (ft)	11.02 x 2.27
Type	Delam

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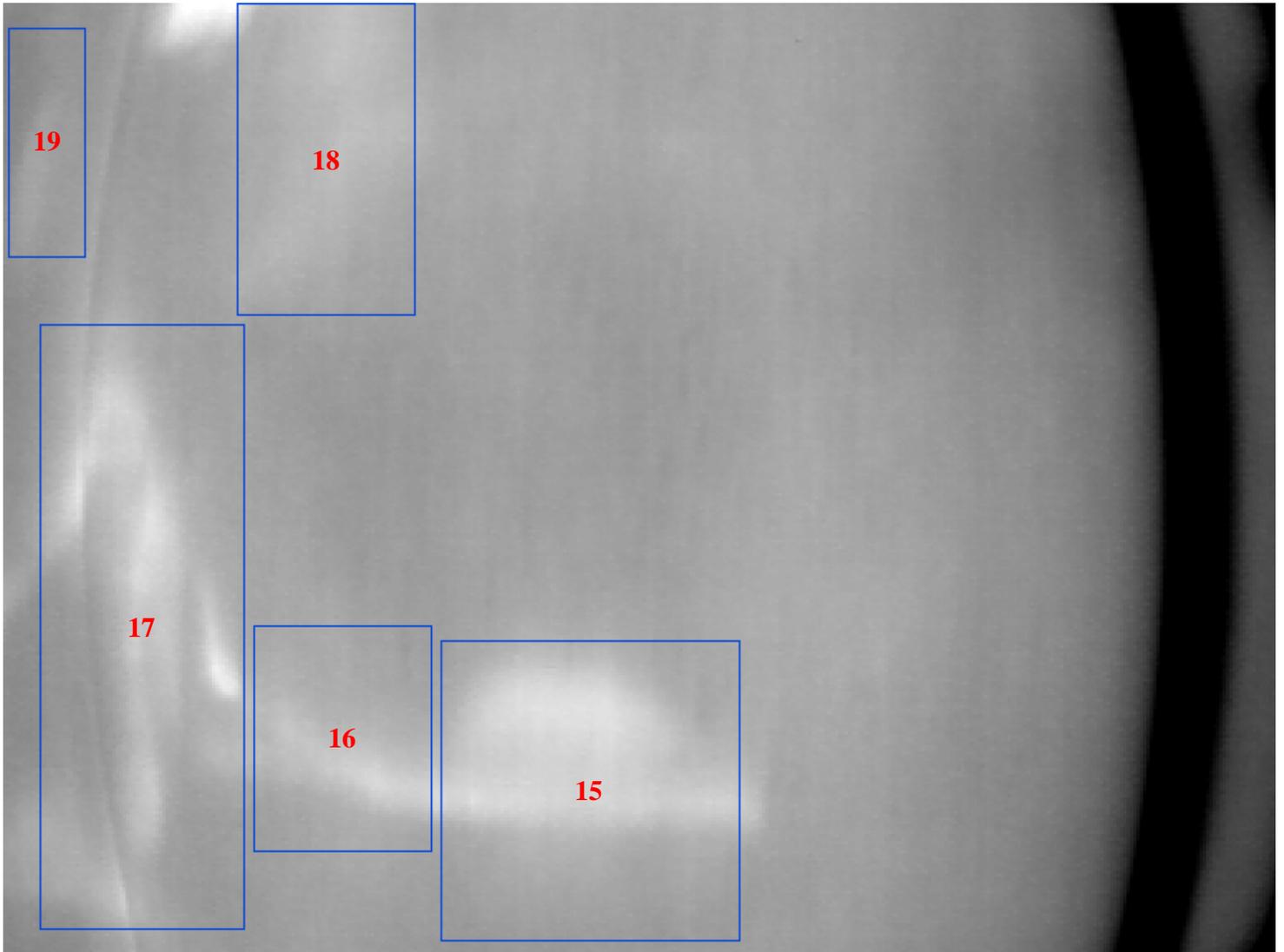
# Delaminations



Bridge: 1282 24 mile rd

Lane: 1

Image Name: 1\_6016000\_46158\_3597.tif



Defect #	15	16	17	18	19
Feet from Start	92.65	93.25	94.55	99.98	100.18
Feet from Right	8.08	11.00	13.36	11.19	14.48
Defect Size	12.97 sq ft	5.83 sq ft	17.87 sq ft	8.04 sq ft	2.57 sq ft
Length x Width (ft)	3.50 x 3.54	2.63 x 2.11	7.04 x 2.42	3.63 x 2.11	2.67 x 0.92
Type	Delam	Delam	Delam	Delam	Delam

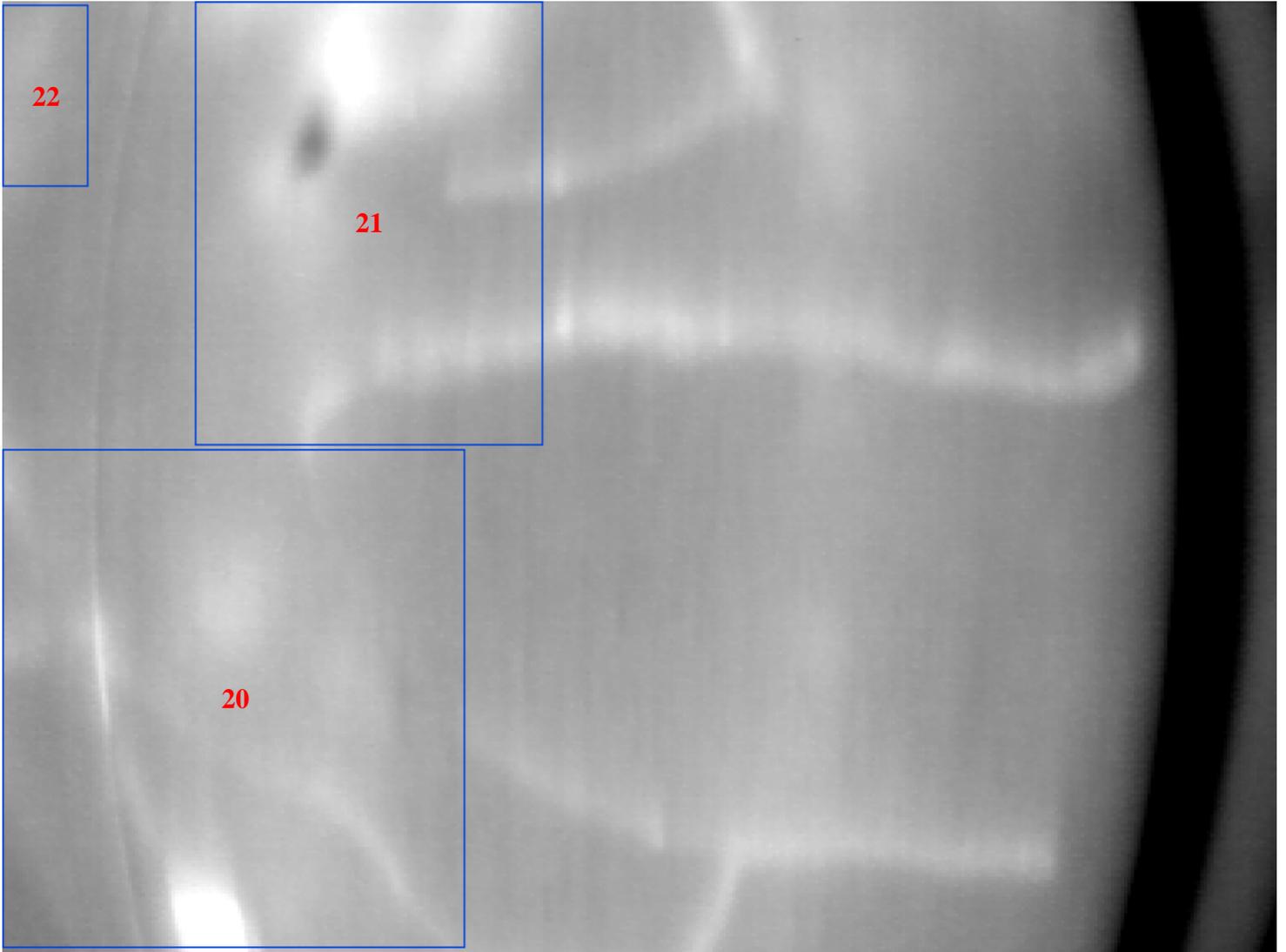
[Return to Overview](#)

# Delaminations

Bridge: 1282 24 mile rd

Lane: 1

Image Name: 1\_6307000\_46037\_3597.tif



Defect #	20	21	22
Feet from Start	104.88	110.39	111.87
Feet from Right	12.28	10.68	14.49
Defect Size	33.07 sq ft	22.16 sq ft	2.25 sq ft
Length x Width (ft)	5.79 x 5.45	5.15 x 4.10	2.12 x 1.02
Type	Delam	Delam	Delam

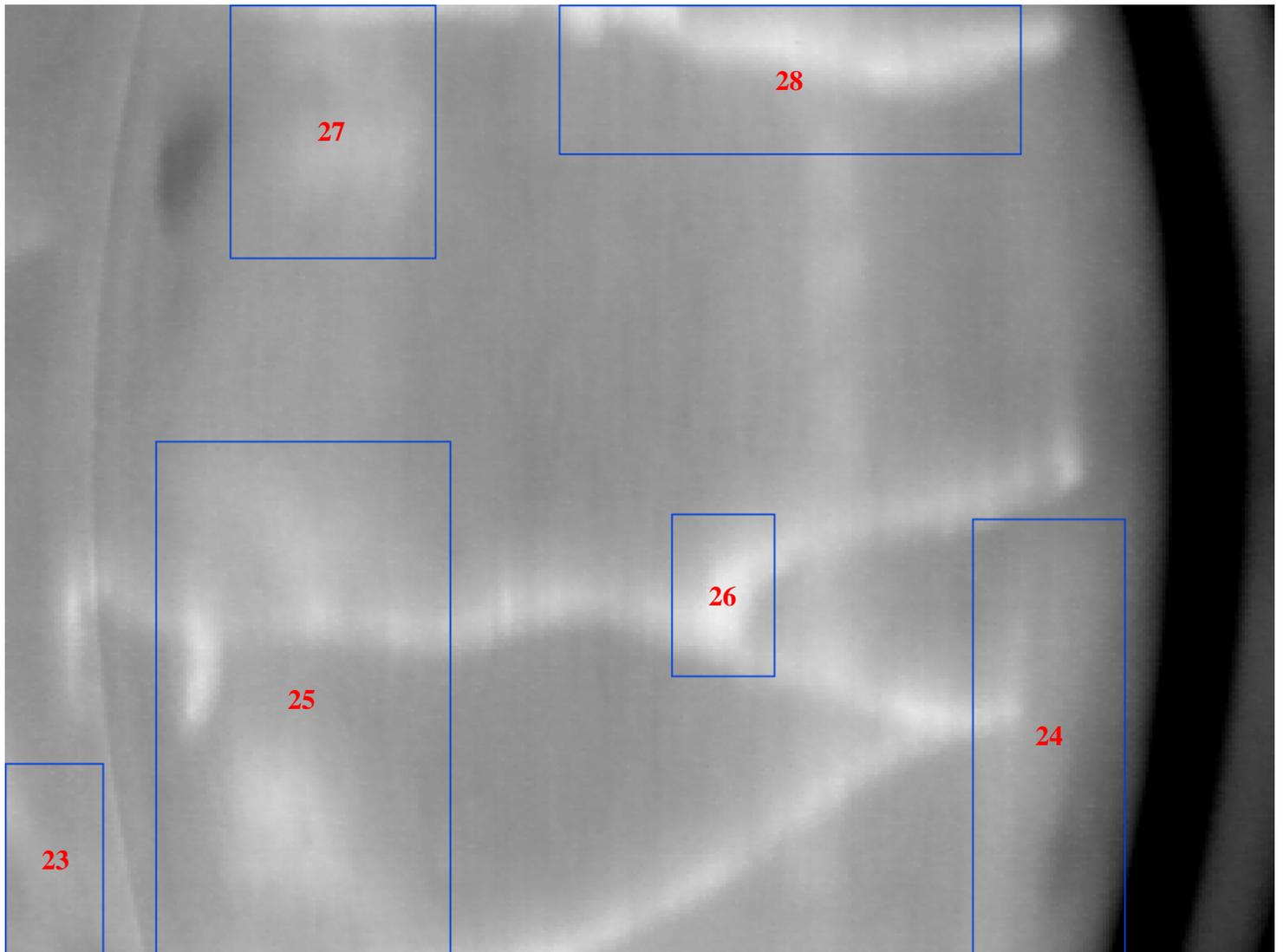
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# Delaminations

Bridge: 1282 24 mile rd

Lane: 1

Image Name: 1\_6596000\_46037\_3597.tif



Defect #	23	24	25	26	27	28
Feet from Start	114.11	115.53	115.98	117.18	120.38	120.99
Feet from Right	14.41	2.67	11.47	6.51	11.12	5.72
Defect Size	2.74 sq ft	9.67 sq ft	21.92 sq ft	2.46 sq ft	7.58 sq ft	10.03 sq ft
Length x Width (ft)	2.23 x 1.17	5.08 x 1.82	5.98 x 3.50	1.90 x 1.23	2.96 x 2.44	1.75 x 5.47
Type	Delam	Delam	Delam	Delam	Delam	Delam

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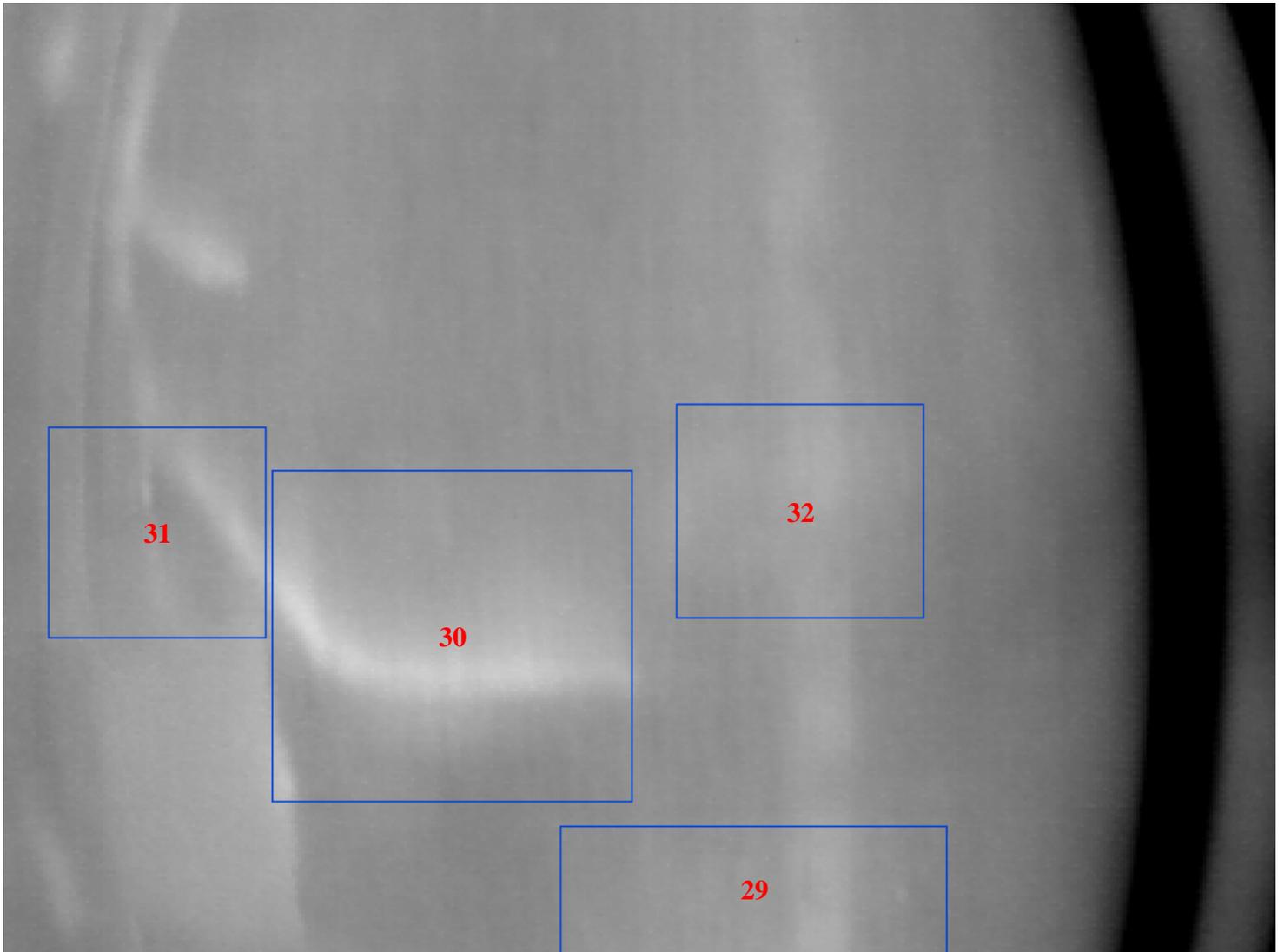
# Delaminations



Bridge: 1282 24 mile rd

Lane: 1

Image Name: 1\_6881000\_46037\_3597.tif



Defect #	29	30	31	32
Feet from Start	124.68	125.44	126.64	129.08
Feet from Right	6.15	9.71	13.18	5.61
Defect Size	7.19 sq ft	17.26 sq ft	6.65 sq ft	7.68 sq ft
Length x Width (ft)	1.50 x 4.57	3.87 x 4.26	2.46 x 2.58	2.50 x 2.93
Type	Delam	Delam	Delam	Delam

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