

5. Appendix

5.1 Miscellaneous Outfall Analysis Notes

OUTFALL 1830+64 RT

The survey did not establish how the median drainage inlets (DI 15 to DI 10) from station 1828+00 to station 1834+00 drain to an outfall, and was included in this outfall's drainage area.

OUTFALL 1910+64 RT

Survey information was not provided for the upstream headwall of the culvert under the Exit 100 ramp; there is only survey information for the downstream headwall (HW11). Based on the topography, it was assumed the headwall entrance was located behind the Speedway gas station. Therefore, the outfall drainage area includes all water draining to this point, in addition to all water draining to the downstream culvert.

OUTFALL 1916+80 RT

Based on topography and As-Built drawings 11.530.1, it was assumed there is an existing upstream pipe that goes under the Exit 100 ramp.

OUTFALL 1975+08 LT

All roadway drainage systems lead to a common channel, and were combined to one drainage outfall area to determine the overall impact at the outfall point.

OUTFALL 1997+27 LT

No outlet point was picked up for this drainage system. Based on topography, it was assumed that an outlet for the median drainage exists behind the Frontage Road.

OUTFALL 2038+46 LT

Survey does not indicate where the median drainage from station 2044+00 to station 2054+00 outfalls to. As-built drawing 11.530 suggests the median drop inlet at station 2046+00 (DI 57) drains to the left side of I-85 and flows down to the drop inlet at station 2040+00 (DI 55C); ultimately reaching the common outlet point.

OUTFALL 2249+11 RT

The 30" RCP that carries the median drainage to the outlet point only had a surveyed invert elevation. An outlet point was assumed based upon the topography and as-built drawing 11.352.

5.2 Miscellaneous Cross-Line Analysis Notes

GENERAL NOTES:

- Surveyor provided a spreadsheet with revisions to surveyed pipe elevations. A math error (units) pertaining to the conversion between feet and inches for the pipe thickness was found throughout the document. Therefore, SCDOT's published pipe thicknesses were used to calculate pipe inverts.
- A constant water depth through channels was assumed for culverts placed in series. Any drainage structures downstream from the drainage structure of interest were analyzed for capacity. The downstream structures' headwater elevations were used to set the tail water conditions for the upstream culvert.
- Any drainage structures upstream from the drainage structure of interest were not considered during the analysis. In other words, it was assumed that all water from the drainage area entered the culvert of interest; ignoring all upstream pipes. This produces more conservative results because it ignores any upstream restrictions to the flow of water.

SITE 7 CULVERT

- The survey did not establish how the median drainage inlets (DI 15 to DI 10) from station 1828+00 to station 1834+00 drain to an outfall. However, field inspection pictures indicated that the system does not feed into the culvert's structure. Therefore, it was assumed this median drainage system feeds into the outfall of Site 7 and not the infall of Site 7.
- The headwater of the downstream 96" corrugated metal pipe was used to set the tail water condition for the upstream culvert.
- The 96" C.M. pipe adversely impacts the performance of the 8' x 8' R.C. box culvert. With improvement of the 96" C.M.P pipe the upstream 8' x 8' R.C. box culvert will perform adequately.

SITE 13 CULVERT

The analysis for Site 13 does not consider the restriction or ponding caused by the existing 60" corrugated metal pipe upstream of the culvert.

SITE 16 CULVERT

The analysis for Site 16 does not consider the restriction or ponding caused by the existing 36" corrugated metal pipe upstream of the culvert.

SITE 20 CULVERT

The survey did not indicate where the median drainage inlets (DI 18C to STMP 18D) drain to. For a more conservative analysis, it was assumed that the system drains to the infall of the culvert.

SITE 21 CULVERT

Survey information was not provided for the upstream headwall of the culvert under the Exit 100 ramp; there is only survey information for the downstream headwall (HW11). Therefore, all water from the drainage area was summed to the culvert under I-85 (HW 10 to HW 9).

SITE 38 CULVERT

- Site 38A (STMP 54C to STMP 54B) - Survey points label the pipe under the Frontage Road as 36" R.C. pipe. It is believed the pipe was mismeasured due to record drawing 11.347 As-Builts, which show an in place 42" R.C. pipe. Analysis assumes a 42" R.C. pipe.
- Site 38B (STMP 54A to STMP 54F) - A straight grade was assumed for pipe breaks because 11.347 As-Builts specify two T-joints.
- The headwater for Site 38B was used to set the tail water conditions for Site 38A.
- Roadway drainage on the East side of North Mountain Street was assumed to tie to CB-55.

SITE 46 CULVERT

- As-Built 11.347 states the drainage structure is a 4' x 6' R.C. box culvert; while as-built 11.530 states the drainage structure is a 4' x 4' R.C. box culvert. It is believed the 11.530 As-Built label was a copy over error, and therefore a 4' x 6' R.C. box culvert was used for the analysis.
- There is a 60" R.C. pipe connected at the entrance of the 4' x 6' box from the field investigation. As a result, the system was analyzed as both a 60" R.C. pipe and a 4' x 6' R.C. box culvert. The 4' x 6' R.C. box culvert produced more conservative results as it yielded a higher headwater elevation. Note that due to the structures' size difference, a structure height of five feet was used when calculating Hw/D because the pipe at the entrance of the box creates a restriction in the flow of water.

SITE 62 CULVERT

Survey points indicated the culvert flows from the left side of I-85 to the right side of I-85; although previous as-built plans as well as Stream Stats suggested the culvert outfalls to the left side of I-85. The surveyed points shots were used with the assumption the culvert outfalls to the left side of the highway. In other words, it was assumed the culvert is inverted.

5.3 Culvert Assessment Forms With Site Pictures

Culvert Assessment Form**Site No.** 7**Project ID****Work County****Route****Date**

Cherokee

I-85

9/12/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Sedimentation inside of culvert. Erosion along slopes of infall.

RECOMMENDATIONS

Clean culvert and stabilize infall channel.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Site No.** 8**Project ID****Work County****Route****Date**

Cherokee

I-85

9/12/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked	x	Erosion	x
Scour		Corrosion			

COMMENTS

D/S 60% filled with sediment and debris.

RECOMMENDATIONS

Clean pipe and outfall.

Site No. 8 PHOTO



D/S



D/S

Culvert Assessment Form**Site No.** 9**Project ID****Work County****Route****Date**

Cherokee

I-85

9/12/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked	x	Erosion	
Scour		Corrosion			

COMMENTS

Pipe outlet blocked 70% with sediment, debris and vegetation.

RECOMMENDATIONS

Clean Pipe, Clean Outfall.



D/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

10

Date

Cherokee

I-85

9/12/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated	x	Blocked		Erosion	
Scour	x	Corrosion			

COMMENTS

U/S heavily vegetated with erosion. D/S outlet joint separated.

RECOMMENDATIONS

Clear vegetation U/S and stabilize incoming channel U/S. Repair joint separation in pipe D/S and stabilize outfall.



U/S



U/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

11

Date

Cherokee

I-85

9/12/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Not surveyed. Could not locate.

RECOMMENDATIONS

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

12

Date

Cherokee

I-85

9/12/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated	x	Blocked		Erosion	
Scour	x	Corrosion			

COMMENTS

U/S heavy vegetation. D/S scour hole with joint separation.

RECOMMENDATIONS

Clean and stabilize U/S. Stabilize outfall and repair joint separation.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

13

Date

Cherokee

I-85

9/12/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

COMMENTS

U/S heavily obstructed by vegetation but channel was clear. Scour at culvert exit; and slight erosion along downstream channel

RECOMMENDATIONS

Repair downstream scour hole and construct energy dissipator.



U/S



U/S



D/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

14

Date

Cherokee

I-85

9/12/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

U/S has evidence of buried paved channel.

RECOMMENDATIONS



U/S



D/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

15

Date

Cherokee

I-85

9/12/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated	x	Blocked		Erosion	x
Scour		Corrosion			

COMMENTS

D/S joint separation and scour.

RECOMMENDATIONS

Stabilize outfall and repair joint separation.



U/S



D/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

16

Date

Cherokee

I-85

9/12/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Slight scour downstream, otherwise stable creek and culvert.

RECOMMENDATIONS

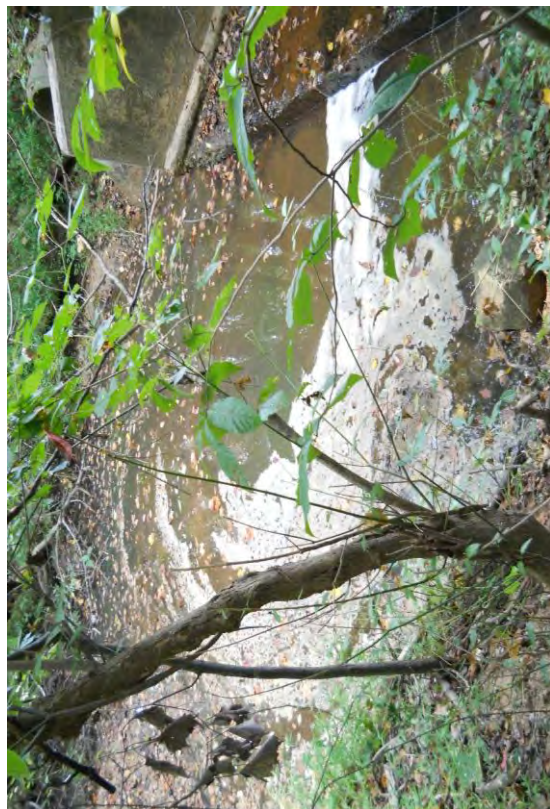
Repair downstream scour hole and construct energy dissipator



U/S



U/S



D/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

17

Date

Cherokee

I-85

9/12/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Rip Rap channel down to U/S inlet. U/S vegetated. Debris in channel D/S

RECOMMENDATIONS

Clean U/S. Clear D/S debris.



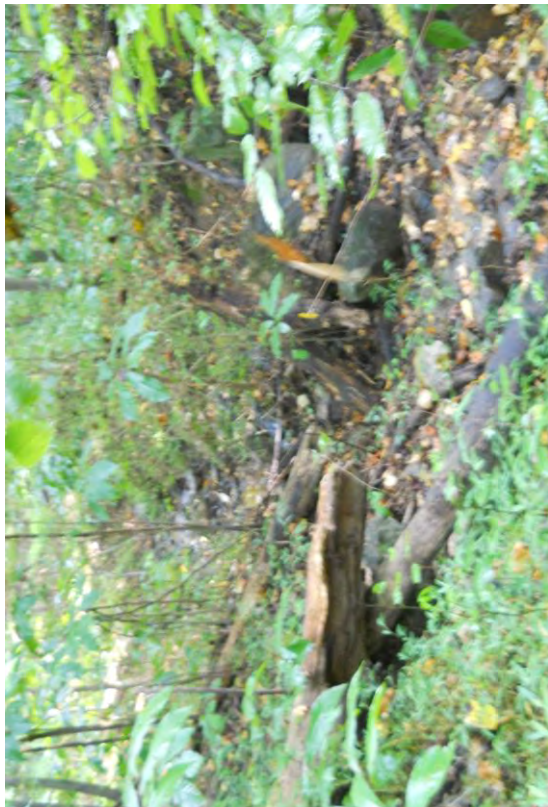
U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

18

Date

Cherokee

I-85

9/12/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Pipe goes from 72" RCP-> 4'x6' box culvert-> frontage rd. 3'x2' box culvert. D/S heavily vegetated.

RECOMMENDATIONS

Clear D/S outfall.



U/S



U/S



D/S



D/S

Culvert Assessment Form**Site No.**

19

Project ID**Work County****Route****Date**

Cherokee

I-85

9/12/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated	x	Blocked		Erosion	x
Scour	x	Corrosion			

COMMENTS

Scour hole right at inlet (median drainage)

D/S scour hole, channel erosion, and join separation.

RECOMMENDATIONS

Stabilize D/S and U/S channel. Stabilize D/S outfall. Repair separated pipe.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

20

Date

Cherokee

I-85

9/12/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	x
Scour	x	Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Upstream channel not aligned with culvert; large tree located in front of headwall. Erosion down slopes from roadway runoff draining to inlet and slight scour around inlet headwall.

RECOMMENDATIONS

Clear infall; stabilize roadway side slopes and protect with riprap.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

21

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	x
Scour	x	Corrosion			

COMMENTS

U/S receives inflow from another box culvert. Heavily vegetated U/S.

D/S large scour hole. Broken PVC pipe crossing just below outlet.

RECOMMENDATIONS

Clear vegetation U/S of culvert. Repair downstream scour hole and construct energy dissipator.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

22

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated	x	Blocked	x	Erosion	x
Scour	x	Corrosion			

COMMENTS

Difficult to find or distinguish between Site 22 and 23. U/S 22 was not found but D/S 22 was located as 80% filled 48".

RECOMMENDATIONS



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

23

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Difficult to find (and rate above). Survey had outfall (of 18" Site 23) at location of Site 22 (48" pipe). And 18" outfall was not located in the area. U/S inlet found, D/S outlet not located.

RECOMMENDATIONS



U/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

24

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

COMMENTS

Downstream channel of D/s eroded along first outer curve of creek.

RECOMMENDATIONS

Stabilize outfall channel and construct energy dissipator.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

25

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Not surveyed. Could not locate U/S or D/S.

RECOMMENDATIONS

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

26

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Not surveyed. Could not locate U/S or D/S

RECOMMENDATIONS

Culvert Assessment Form**Project ID****Work County****Route****Site No.****27****Date**

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Heavy vegetation in upstream channel but clear at inlet.

RECOMMENDATIONS



U/S



D/S



U/S



D/S

Culvert Assessment Form**Site No.**

28

Project ID**Work County****Route****Date**

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour	x	Corrosion			

COMMENTS

D/S scour hole with debris and vegetation.

RECOMMENDATIONS

Clear D/S vegetation and debris, stabilize channel.



U/S



D/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

29

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

COMMENTS

U/S heavily vegetated, Type 9 CB within apparent Clear Zone.

D/S scour hole and debris filled channel.

RECOMMENDATIONS

Clear U/S vegetation, convert Type 9 to DI type 112. Repair D/S scour hole, clear and stabilize outfall.

Site No. 29 PHOTO



U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

30

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

D/S outfall overgrown.

RECOMMENDATIONS

Clean outfall.



D/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

31

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated	x	Blocked		Erosion	x
Scour	s	Corrosion			

COMMENTS

Eroded ditch channel coming into U/S inlet.

D/S scour hole and joint separation.

RECOMMENDATIONS

Stabilize outfall and repair joint separation.



U/S



U/S



D/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

32

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

COMMENTS

U/S had erosion along incoming channel.

Outfall overgrown.

RECOMMENDATIONS

Clear overgrowth.



U/S



D/S



D/S

Culvert Assessment Form**Site No.** 33**Project ID****Work County****Route****Date**

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated	x	Blocked		Erosion	
Scour	x	Corrosion			

COMMENTS

D/S is separated at last section. Scour hole at outfall.

RECOMMENDATIONS

Stabilize outfall and repair joint separation.



U/S



D/S



D/S

Culvert Assessment Form**Site No.**

34

Project ID**Work County****Route****Date**

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked	x	Erosion	
Scour		Corrosion			

COMMENTS

D/S 20% filled with sediment. Outfall overgrown

RECOMMENDATIONS

Clear pipe and clean outfall.



U/S



D/S



D/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

35

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked	x	Erosion	
Scour		Corrosion			

COMMENTS

D/S 40% blocked and heavy vegetation

RECOMMENDATIONS

Clear Pipe and clean outfall.



D/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

36

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated	x	Blocked		Erosion	
Scour		Corrosion			

COMMENTS

D/S has a paved ditch outfall, joint separation. Erosion D/S. Adjacent driveway pipes outfall at same location.

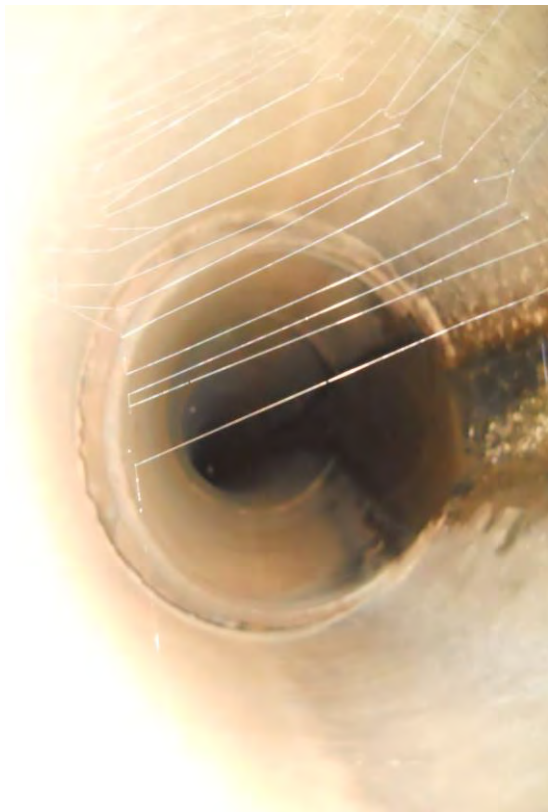
U/S is difficult to locate. Survey does not show true pipe end.

RECOMMENDATIONS

Stabilize U/S and D/S channels. Repair joint separation.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Site No.**

37

Project ID**Work County****Route****Date**

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

D/S outfall has a paved flume towards frontage road.

RECOMMENDATIONS



U/S



U/S



D/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

38A

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Wooded but stable. Downstream heavily vegetated.

RECOMMENDATIONS

Clear vegetation; stabilize channel

Site No. 38A PHOTO



U/S



U/S



D/S

Culvert Assessment Form**Site No.**

38B

Project ID**Work County****Route****Date**

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

D/S has a long paved channel outfall. Very large erosion and paved channel failure ~500 yards D/S resulting in ponded water.

U/S heavily vegetated

RECOMMENDATIONS

Clean infall and stabilize outfall channel.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Site No.**

39

Project ID**Work County****Route****Date**

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

COMMENTS

Was not located in survey and could not locate U/S or D/S

RECOMMENDATIONS

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

40

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

An upstream concrete spillway (from site 42) is damaged. Site 41 and 40 are the same system just different sized pipe that changes at a box.

RECOMMENDATIONS

Repair U/S spillway if necessary. Stabilize inlet.

Site No. 40 PHOTO



U/S



U/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

41

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated	x	Blocked		Erosion	xxx
Scour	x	Corrosion			

COMMENTS

Massive scour and erosion D/S. Some riprap has been placed and has failed. D/S pipes outfall into this eroded channel. A paved channel may have existed at some time.

RECOMMENDATIONS

D/S energy dissipation needed. Stabilize D/S channel.



D/S



D/S



D/S



D/S

Culvert Assessment Form**Site No.**

42

Project ID**Work County****Route****Date**

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation	xx	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	xx	Alignment	
Separated		Blocked	x	Erosion	x
Scour		Corrosion			

COMMENTS

U/S overgrown. D/S pipe blocked with sediment.

RECOMMENDATIONS

Clean infall. Clear D/S pipe and outfall.

Site No. 42 PHOTO



U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

43

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Not surveyed and no inlet/outfall found U/S or D/S.

RECOMMENDATIONS

Culvert Assessment Form**Site No.**

44

Project ID**Work County****Route****Date**

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked	x	Erosion	x
Scour		Corrosion			

COMMENTS

U/S has paved channel upstream. 1/2 of grade is overgrown with grass.

Median has a tree growing in it. Exit pipe is 10% blocked

D/S is 80% filled. Outfall channel is not evident beyond pipe.

RECOMMENDATIONS

Clean system and reestablish outfall.

Site No. 44 PHOTO



U/S



D/S



U/S



D/S

Culvert Assessment Form**Site No.**

45

Project ID**Work County****Route****Date**

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked	x	Vegetation	x	Alignment	
Separated		Blocked	x	Erosion	
Scour		Corrosion			

COMMENTS

D/S pipe blocked with sediment and debris. Outfall channel is not well defined.

RECOMMENDATIONS

Clean pipe and outfall.



D/S



D/S



U/S



D/S

Culvert Assessment Form**Site No.**

46

Project ID**Work County****Route****Date**

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked	x	Erosion	x
Scour		Corrosion			

COMMENTS

U/S is a 60" pipe. D/S is a 4'x6' box. D/s is 50% filled with sediment and has a large eroded ditch (from roadway ditch drainage) intersection. Sediment build up along outfall.

RECOMMENDATIONS

Clean downstream culvert and outfall. Stabilize downstream channel.

Site No. 46 PHOTO



U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

47

Date

Cherokee

I-85

9/13/2016

INLET

End Section

Cracked

Vegetation

Alignment

Separated

Blocked

Erosion

Scour

Corrosion

OUTLET

End Section

Cracked

Vegetation

Alignment

Separated

Blocked

Erosion

Scour

Corrosion

COMMENTS

U/S in median.

D/S has lots of rip rap with collection of debris. Outfall is vegetated.

RECOMMENDATIONS

Clear Outfall.



U/S



D/S



D/S

Culvert Assessment Form**Site No.**

48

Project ID**Work County****Route****Date**

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated	x	Blocked		Erosion	x
Scour	x	Corrosion			

COMMENTS

Median Inlet. D/S heavily eroded with joint separation.

RECOMMENDATIONS

Stabilize outfall and repair joint separation.



U/S



D/S



D/S



D/S

Culvert Assessment Form**Site No.**

49

Project ID**Work County****Route****Date**

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Slight scour around culvert exit; but stable outfall channel.

RECOMMENDATIONS

Repair scour hole and construct energy dissipator.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

50

Date

Cherokee

I-85

9/13/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

U/S large ponding area. Heavily vegetated. Side slope erosion.
D/S scour hole, heavily vegetated.

RECOMMENDATIONS

Remove vegetation from upstream and downstream channels. Stabilize upstream culvert entrance with riprap. Repair downstream scour hole and construct energy dissipator.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

51

Date

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Not surveyed. Could not Locate U/S or D/S

RECOMMENDATIONS

Culvert Assessment Form**Site No.**

52

Project ID**Work County****Route****Date**

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated	x	Blocked		Erosion	
Scour	x	Corrosion			

COMMENTS

Two intermediate CBs photographed.

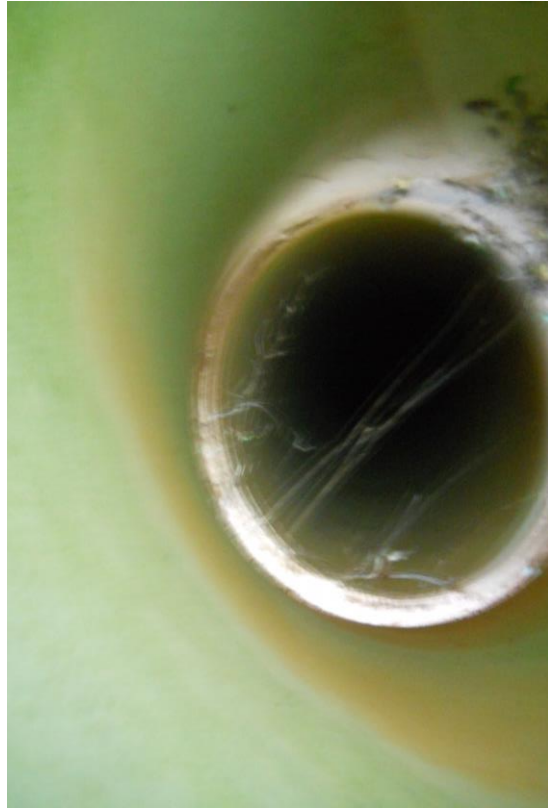
D/S ponded water with scour., could not see very far downstream to comment on downstream conditions due to heavy vegetation. D/S pipe separation.

RECOMMENDATIONS

Clean outfall. Stabilize downstream outlet and construct energy dissipator. Repair joint separation.



D/S



D/S



U/S



D/S

Culvert Assessment Form**Site No.**

53

Project ID**Work County****Route****Date**

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Clear main channel U/S and D/S, heavy vegetation along edges of channels

RECOMMENDATIONS

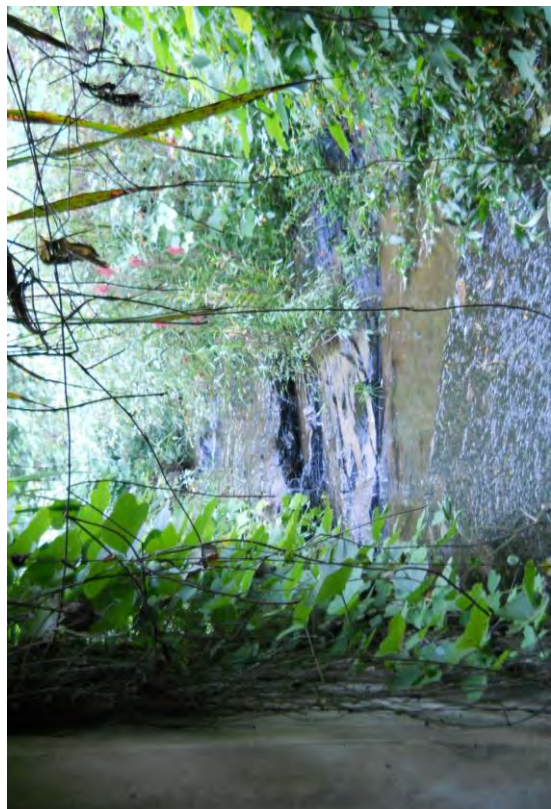
Clear main channel downstream.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Site No.**

54

Project ID**Work County****Route****Date**

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	x
Scour	x	Corrosion			

COMMENTS

Outfall heavily vegetated.

RECOMMENDATIONS

Clear outfall.



U/S



D/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

55

Date

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

3 culverts, 2 under frontage roads. Paved channels in between culverts with paved channels coming down from roadway ditches.

Infall and outfall vegetated. Utility pipe running through culvert.

RECOMMENDATIONS

Clear vegetation between culverts upstream and downstream.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

56

Date

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour	x	Corrosion			

COMMENTS

Type 9 U/S, two junction boxes

D/S scour & heavy vegetation. Some type of broken concrete at pipe end, assuming not part of drainage system

RECOMMENDATIONS

Clear outfall and stabilize channel.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

57

Date

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	x
Scour	x	Corrosion			

COMMENTS

3 pipe sections, started U/S at outfall beneath frontage road.

D/S half submerged outlet

RECOMMENDATIONS

Clear outfall for positive drainage



U/S



D/S



U/S



D/S

Culvert Assessment Form**Site No.**

58

Project ID**Work County****Route****Date**

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked	x	Erosion	
Scour		Corrosion			

COMMENTS

D/S has heavy vegetation and blocked

RECOMMENDATIONS

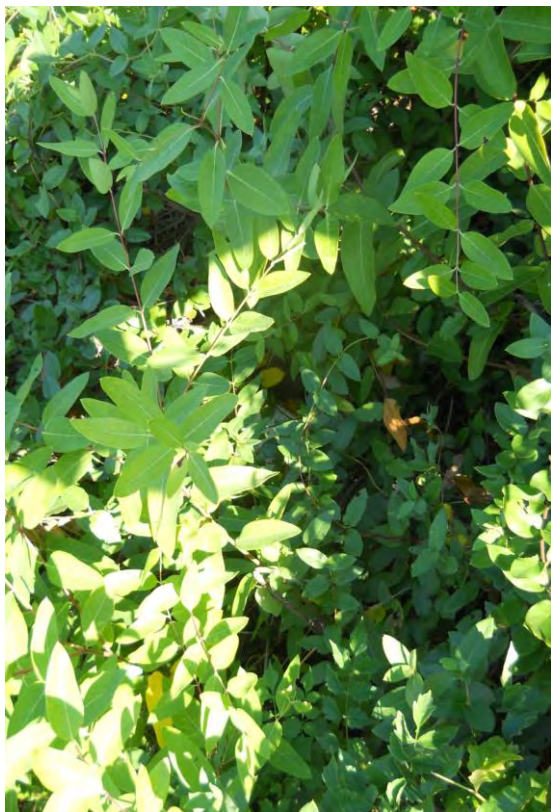
Clear D/S outlet pipe and outfall.



U/S



D/S



D/S

Culvert Assessment Form**Site No.**

59

Project ID**Work County****Route****Date**

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

COMMENTS

U/S near gas station. 3 Junction boxes. Junction box inlet needs clearing.

D/S heavily vegetated.

RECOMMENDATIONS

Clear junction box median drains. Clear D/S pipe and outfall.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

60

Date

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked	x	Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked	x	Vegetation		Alignment	
Separated		Blocked	x	Erosion	
Scour		Corrosion			

COMMENTS

Part of a system from Love's gas station. Pipes between inlets are 18"->24"->24"->30" (site 60). Site 60 begins after a short grass channel on road side. U/S edge is damaged, most likely from mower.

D/S has damaged edge

RECOMMENDATIONS

Check location of open end pipe, confirm clear zone. Clean U/S channel, above site 60 pipe. Clean D/S outfall channel.

Site No. 60 PHOTO



U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

61

Date

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

COMMENTS

D/S rip rap placed and overgrown. Sideline drainage converges at this outfall just upstream of Site 62 outfall.

RECOMMENDATIONS

Clear or replace outfall riprap. Clear outfall.



U/S



D/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

62

Date

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour	x	Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

D/S 6 inches - 1 foot of sediment deposition inside culvert. Tree growing through headwall weep hole.

RECOMMENDATIONS

Clean culvert; Clean infall and outfall.



D/S



D/S



D/S

Culvert Assessment Form**Site No.**

63

Project ID**Work County****Route****Date**

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

Downstream surrounded with heavy vegetation.

RECOMMENDATIONS

Clear outfall to R/W.



U/S



D/S



D/S



D/S

Culvert Assessment Form**Site No.**

64

Project ID**Work County****Route****Date**

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated	x	Blocked		Erosion	x
Scour		Corrosion			

COMMENTS

D/S slight erosion, and joint separation.

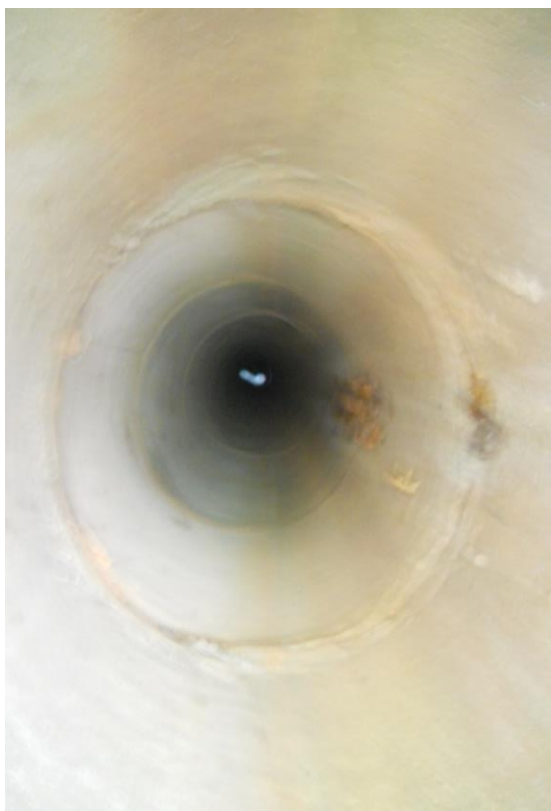
RECOMMENDATIONS

Stabilize outfall and repair joint separation.

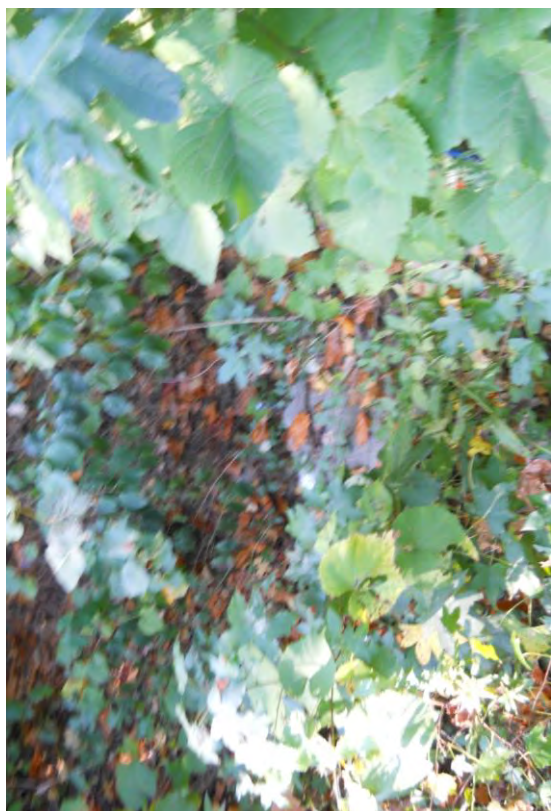
Site No. 64 PHOTO



U/S



D/S



U/S



D/S

Culvert Assessment Form**Site No.**

65

Project ID**Work County****Route****Date**

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

D/S in a pool of water w/ excessive scour and last section separated

RECOMMENDATIONS

Stabilize upstream channel. Repair scour hole and joint separation downstream. Construct energy dissipator.

Site No. 65 PHOTO



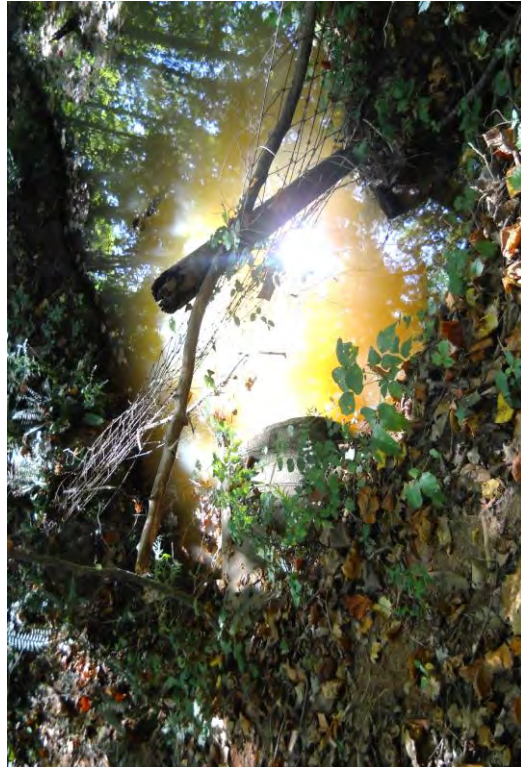
U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

66

Date

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked	x	Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	x
Scour	x	Corrosion			

COMMENTS

D/S outfalls to same scour pool as paved channel from Site 67. Large Scour pool and eroded channel

U/S has a rip rap ditch channel from interstate. Channel has a CMP ~60% buried upstream of Site 66

RECOMMENDATIONS

Clean infall and stabilize pipe entrance with riprap. Clean existing pipe; Repair scour hole, construct energy dissipator, and stabilize downstream channel.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Site No.**

67

Project ID**Work County****Route****Date**

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

COMMENTS

U/S is a median inlet with a paved channel ditch section upstream

D/S outfalls onto a paved channel (which outfalls to site 66) which has erosion around edges.

RECOMMENDATIONS

Check capacity of D/S paved channel and potentially increasing size to prevent overtopping and erosion. Stabilize outfall channel.



U/S



D/S



D/S

Culvert Assessment Form**Site No.**

68

Project ID**Work County****Route****Date**

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	
Scour	x	Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	x
Scour		Corrosion			

COMMENTS

Pipe entrance partially blocked by sediment.

D/S outfalls into eroded channel.

RECOMMENDATIONS

Clear infall to R/W. Repair downstream scour hole and construct energy dissipator.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Site No.**

69

Project ID**Work County****Route****Date**

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated	x	Blocked		Erosion	x
Scour	x	Corrosion			

COMMENTS

D/S joint separation. Discharges into already heavily eroded channel.

RECOMMENDATIONS

Stabilize outfall and repair joint separation.



U/S



D/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

70

Date

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked	x	Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked		Erosion	x
Scour	x	Corrosion			

COMMENTS

D/S has very large scour hole. Plus eroded channel coming in. Starts the eroded channel through 69, 68, 67

U/S has multiple inflows and a collection of debris.

RECOMMENDATIONS

Clear U/S channel.

Repair and stabilize outfall channel.



U/S



D/S



U/S



D/S

Culvert Assessment Form**Project ID****Work County****Route****Site No.**

71

Date

Cherokee

I-85

9/14/2016

INLET

End Section					
Cracked		Vegetation		Alignment	
Separated		Blocked	x	Erosion	
Scour		Corrosion			

OUTLET

End Section					
Cracked		Vegetation	x	Alignment	
Separated		Blocked		Erosion	
Scour		Corrosion			

COMMENTS

D/S alignment did not agree with survey or upstream junction out-pipe. Assuming a buried junction box of unknown location. Took a photo with expected alignment (photo shown with knife). Survey did show an 18" cross pipe beneath the ramp which was located and photographed to ensure outfall was not being mistaken.

RECOMMENDATIONS

Clear debris and sediment from U/S. Clear vegetation at outlet



U/S



U/S



D/S



D/S



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