



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

March 19, 2015

COUNTY: Orange

MEMORANDUM TO: Chuck Edwards, PE
District Engineer

FROM: Galen Cail, PE *WJ Cail*
Maintenance Support – Central Ops

SUBJECT: Stormwater Analysis and Review along SR 1919
(South Greensboro Street) at NC 54 in Carrboro
Division 7

Pursuant to request by City of Carrboro a stormwater narrative has been prepared and the following is offered.

There are two main drainage basins in the vicinity of South Greensboro Street north of NC 54. Both of these basins are highly developed consisting mainly of residential with some commercial development. The basin in the northeast quadrant drains southeast toward and under South Greensboro Street. The other basin is located northwest of South Greensboro Street and NC 54. This basin does not cross South Greensboro Street but flows south to NC 54 along the west side of the Rocky Brook mobile home community. Both basins drain to an existing 8' x 8' RCBC under NC 54. From the RCBC flow continues south and outlets into Morgan Creek approximately 600 ft south of NC 54.

The Department's initial stormwater review was to assess the basin in the northeast quadrant relative to the proposed development of the Triem property. This property is east of South Greensboro Street approximately 800 ft north of NC 54. This site has a history of drainage issues including overtopping of South Greensboro Street as recent as June 2013. The Triem site conveys stormwater through an undersized 24" system. This system ties to a 42" RCP under South Greensboro Street and continues south in a 48" pipe which outlets into a ditch along the NC 54 westbound ramp. The ditch continues along the toe of the ramp and flows to the inlet of the 8' x 8' RCBC under NC 54. The proposed development of the Triem property includes upgrading the site drainage system. These improvements will require upgrading of the system under South Greensboro Street.

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CENTURY CENTER COMPLEX
BUILDING B
1020 BIRCH RIDGE DRIVE
RALEIGH NC

For the basin northeast along South Greensboro Street we have the following:

Drainage area: 168 acres
Basin Type: Residential and Commercial Development
Existing Structures: 42" RCP (under) to a 48" RCP (along)
Proposed 25 yr LOS: 96" Pipe (replacement)
Alternate Proposed 25 Yr: Retain 48" & Supplement w/ 84"
NOTE: Also recommend improvement to the outlet ditch along NC 54 westbound ramp by increasing conveyance area and stabilizing with rip rap.

The other basin in the northwest quadrant flows south to NC 54. This stream flows along the west side of the Rocky Brook mobile home community. Stormwater from east of South Greensboro Street does not reach this stream until the confluence at the 8' x 8' RCBC inlet.

For the basin northwest of South Greensboro Street and NC 54 we have the following:

Drainage area: 180 acres
Basin Type: Residential and Commercial Development

Our review included assessment of downstream effects due to drainage structure/conveyance improvements at the Triem development and South Greensboro Street including effects to the Rocky Brook mobile home community and at the inlet and outlet of the 8' x 8' RCBC under NC 54. Our review analyzed discharges for the 2, 5, 10, 25 and 50 YR events and considered pre and post drainage improvement conditions for each event. Our analysis also took into account the effects of a waterline crossing approximately 140 ft upstream of the RCBC inlet along the stream west of the Rocky Brook mobile home community.

Based on our analysis the post condition effects to backwater from the RCBC will be minimal for the 2 yr through 50 yr events and are anticipated to be restricted to sections just in the vicinity of the RCBC inlet. This would include potential impact to the first mobile home just upstream with the 25 yr just accessing the floodplain. The invert of the 8' x 8' RCBC is approximately 14 ft lower than the finished floor elevation of the first mobile home just upstream and from there the stream gradient steepens quickly and the influence of the RCBC diminishes. Also, based on our analysis upstream from the influence of the RCBC, it is anticipated the stream flowing along the west side of the Rocky Brook mobile home community would access the floodplain/mobile home property in the 2 yr to 5 yr event. Per our field review following the June 2013 event we observed impacts to a number of mobile homes along this reach. It should also be noted the waterline crossing approximately 140 ft upstream of the RCBC inlet has been observed to constrict the channel and has resulted in significant scour at this location. One mobile home is situated just atop the scoured bank.

As part of our review we also analyzed the pre post effects at the outlet of the 8' x 8' RCBC. Based on our analysis and per the model the difference in outlet velocities for all frequencies would be considered negligible. However, these outlet velocities are high

nonetheless. The Department is aware of issues generated from the high outlet velocities including erosion on the west bank further downstream. Per discussions in February 2014 the Department is prepared to review any proposed remediation plans from the Town of Carrboro for this reach once these plans are made available.

It is our findings that for the 2 yr thru 50 yr events the drainage improvements along South Greensboro Street will result in minimal stormwater impacts or improvements to sites along the stream west of the Rocky Brook mobile home community but will result in overall improvements for those sites impacted by the road overtopping. Per our findings the impacts to the mobile home community along the reach would be attributed more to its location in the floodplain and to the particular basin hydraulics/hydrology than would be attributed to the proposed drainage improvements along South Greensboro Street. The improvements provide a 25 yr level of service for South Greensboro Street, will reduce the frequency of overtopping and thus improve those impacts associated with overtopping.

Please contact this office if additional information is needed.

wgc

CC: J. M. Mills, PE