



Memorandum

To: Mayor Richard Dziekan – City of Derby
Sarah Carey – Derby Zoning & Wetlands Enforcement Office
Ted Estwan, Chairman – Derby Planning and Zoning Commission
Paul Dinice, Chairman – Derby Inland Wetlands Agency
Ed Armeno – Derby Director of Public Works.

From: Ryan McEvoy, PE – SLR International Corporation

Subject: Stormwater Management Basin –Lanzieri Court
Derby, Connecticut

Date: November 15, 2021

SLR #: 11563.00023.00010

At the request of the Mayor's office and the Derby Planning and Zoning Commission, we have performed an inspection of the stormwater management basin on the east side of Lanzieri Court. The basin was observed on October 6, 2021. Weather conditions were dry, with above average rainfall in the prior month of September.

The basin was constructed in the late 1980s and collects stormwater runoff from a large portion of the hilltop areas from Lanzieri Court to the east, to General Wooster Road/Commodore Hull Drive to the west, to Frank Gates Lane to the northwest, to Lanetti Drive to the north, and portions of Derbyshire Condominiums to the northeast. The basin includes two inlet pipes. Runoff exits via an outlet control structure (OCS) on the east side of the basin and is then directed via two 30-inch pipes to a concrete splash pad to the east of the basin. Generally, the basin appears to be in acceptable condition although there are some maintenance items that have not been recently addressed. Below are some of our observations and recommendations:

- The basin berm is well maintained and mowed regularly. Vegetation in the southern portion of the basin is not significantly overgrown. The northern portion of the basin nearest to Lanzieri Court is overgrown from the large inlet off Lanzieri Court to the OCS. The inlet pipe was not accessible due to the vegetation present. All vegetation larger than 2 inches in diameter needs to be cut and overgrown areas mowed.
- Decades of runoff have resulted in a significant volume of sediment accumulation with depths of up to 2 feet, particularly in the southern portion of the basin. The removal of sediment to original grades is required for the basin to function as originally intended.

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- Debris and vegetation need to be cleared from areas immediately adjacent to the OCS and trash rack to limit the potential for clogging of the trash rack.
- Vegetation from the top of the berm to the concrete headwall at the outlet pipes is recommended to provide ease of access to the concrete outlet pad.

Attached hereto is a photograph log of observations made at the time of the site investigation.

Also, it has been our observation along with city staff members that the basin does not appear to detain water during significant storm events, including several storms that have occurred recently. Our observations during the peak of Tropical Storm Elsa did not reveal any appreciable accumulation of water detained within the basin. A storm of that magnitude (roughly 4 inches of rain) should have resulted in stormwater rising roughly 3 to 4 feet within the basin based on the calculations completed when the structure was last modified in 1995. This was not observed at the time of our inspection, nor has any appreciable detention been observed by others in more significant storms. It should be noted that the volume of water stored in this basin would not be detained for a long period (perhaps less than an hour), so any detention would have to be observed in real time, measuring the water surface elevation as it exits through the outlet structure. This detailed analysis and observation have not been completed though anecdotally the basin does not appear to detain as designed. To that end, we did confirm that the stormwater is routed to the pond per the 1994 approved plans and that the orifices and opening in the OCS are substantially similar to the approved plans, with one minor deviation. There is an 8-inch-deep by 12-inch-wide 'V'-shaped cut-out in the bottom of the OCS that was not part of the approval but was cut out by the owner of the basin to lower the water elevation to limit standing water. It is our opinion that the cut-out results in a minor improvement in the available storage in the pond and does not have a detrimental impact on the function of the basin. Additionally, we did review the calculations completed in support of the 1990s modification and found no significant errors in the design. It should be noted that the stormwater basin was designed using smaller rainfall events that were the standards at the time set forth by the Connecticut Department of Transportation (CT DOT), which are now superseded by larger rainfall totals designated by the National Oceanic and Atmospheric Administration (NOAA).

Based on the basin being constructed in substantial conformity with the 1990s modification, and the calculations at the time being completed based on sound engineering practice, it is possible that the upgradient stormwater drainage system that collects and conveys water to the basin may be inadequate. We noted several examples where there are limited stormwater inlets in the upgradient areas where roadway runoff may not be adequately collected, and a portion of the stormwater may simply bypass the drainage system and continue down the road to other watershed areas. For example, the entire length of Drenzo Heights has only one standard catch basin, and David Humphreys Road has only 10 standard catch basins from Drenzo Heights to where drainage is directed into the basin. Any runoff that bypasses the drain inlets in these roads may continue down David Humphreys Road to Sodom Lane and not be routed through the detention basin. Other roadways in the watershed may have similar limitations. This possibility would require additional observation and analysis of the drainage patterns on city streets during large storm events.

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The stormwater pond was modified in 1994 to allow for a large, 8-foot by 1-foot opening at the bottom of the OCS. This large opening (observed at our inspection to be closer to 7.50-foot by 1-foot) results in stormwater that arrives at the basin to quickly exit, in many cases as rapidly as the water enters. Typically, a stormwater basin has smaller openings in the lower portions of the structure to control the normal elevation of water in the pond and release water more slowly than it enters, particularly for smaller storm events. In order to encourage more stormwater storage within the pond, we have reviewed several different options to modify the OCS using prior watershed studies and current NOAA rainfall data. The goal of the modifications would be to allow for more stormwater detention within the basin for smaller storm events while not compromising the integrity of the basin or overtop the berm beyond what theoretically may occur today. To that end, we believe the large 7.5-foot by 1-foot opening at the bottom of the OCS should be reduced to 4 feet by 1 foot wide with the 'V' shaped cut out remaining as-is. To compensate for the decreased size of the lower opening, we recommend that the upper opening be widened back to original size by removing the blocks that were installed in the 1990s to a total size of 9.5 feet by 1.67 feet and create a new 3-foot-high by 1.25-foot-wide cut-out on the back side of the structure. Under this scenario, we should expect to see improved detention in the basin, particularly on smaller storm events while not increasing the water surface elevation in the pond for the 100-year storm. This modification to the structure can be done easily with brick and mortar along with a concrete wet saw by the owner of the pond should they be agreeable. At the time of our inspection, they seemed open to this possibility.

Attached hereto is a summary of the performance of the basin under current and proposed conditions, the supporting hydrology computations and models, along with a detail of the suggested modifications to the OCS.

Ultimately, the maintenance of the stormwater basin is the responsibility of Detention Basin LLC, and there is no provision currently for the city to perform any maintenance of the basin or modification to the OCS. The city, however does have an interest in the maintenance of the pond as large portions of City Road drainage are directed to it. We recommend that the city approach the property owner with our recommendation for maintenance and determine to what extent the property owner agrees to perform the required maintenance. Any scheduled maintenance of the basin must be reviewed by the Derby Inland Wetlands Agency to determine if any permits are required due to the proximity of wetlands areas along with the fact that the basin was constructed in and adjacent to historical wetland soils.

Additionally, we recommend that the city meet with the owner and the Connecticut Department of Energy & Environmental Protection (CTDEEP), Dam Safety Division to discuss and review the possible modifications to the OCS prior to any work on that structure. In 2006, the CTDEEP determined that the dam and embankment fall under their jurisdiction.

Should you have any questions or concerns regarding the information contained herein, please do not hesitate to contact me at (203) 271-1773.

Attachments

11563.00023.n1221.memo.docx

Client Name: City of Derby		Site Location: Stormwater Basin – Lanzieri Court, Derby, CT	Project No. 11563.00023.0010
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Photo No. 1	Direction Photo Taken: Northeast	Visit: October 6, 2021	Issued: November 15, 2021
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Manageable vegetation on south side of basin in foreground, with higher more significant vegetation that should be removed on north side of pond (in background)



Photo No. 2	Direction Photo Taken: South	Visit: October 6, 2021	Issued: November 15, 2021
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Accumulated vegetation on trash rack in front of Outlet Control Structure (OCS)



Client Name: City of Derby		Site Location: Stormwater Basin – Lanzieri Court, Derby, CT	Project No. 11563.00023.0010
Photo No. 3	Direction Photo Taken: West	Visit: October 6, 2021	Issued: November 15, 2021

Rear view of OCS. Vegetation is well maintained.



Photo No. 4	Direction Photo Taken: East	Visit: October 6, 2021	Issued: November 15, 2021
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Accumulated sediment is visible through the vegetation. Note that much of the vegetation and grasses shown have grown through the accumulated sediment.



Client Name: City of Derby		Site Location: Stormwater Basin – Lanzieri Court, Derby, CT	Project No. 11563.00023.0010
Photo No. 5	Direction Photo Taken: N. West	Visit: October 6, 2021	Issued: November 15, 2021

Overgrown vegetation to the north of the OCS within the basin



Photo No. 6	Direction Photo Taken: East	Visit: October 6, 2021	Issued: November 15, 2021
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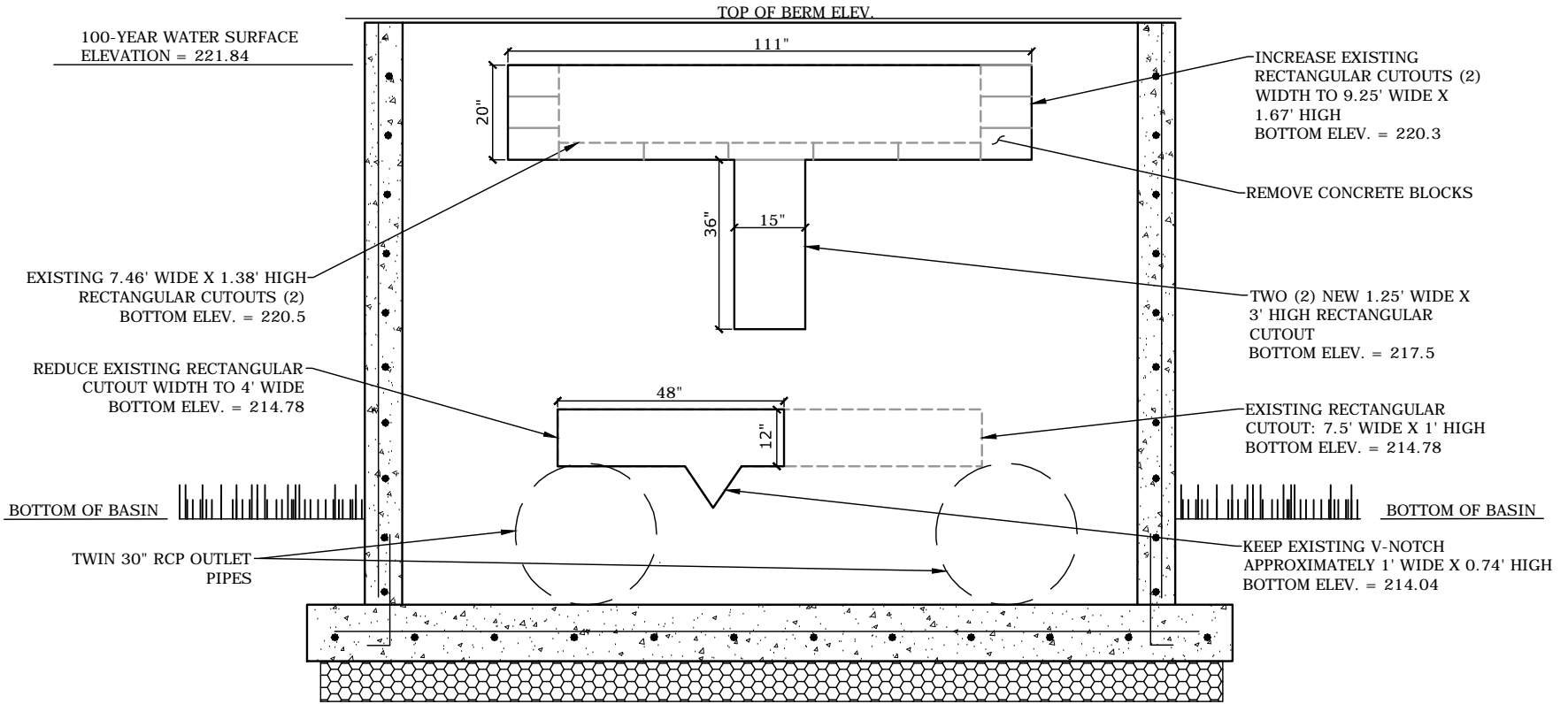
'V' shaped cut-out in the front of the OCS at the lower opening



Client Name:
City of Derby**Site Location:**
Stormwater Basin – Lanzieri Court,
Derby, CT**Project No.**
11563.00023.0010**Photo No. 7** **Direction Photo Taken: North****Visit:** October 6, 2021**Issued:** November 15, 2021

View of mowed and maintained berm





100-YEAR WATER SURFACE
ELEVATION = 221.84

EXISTING 7.46' WIDE X 1.38' HIGH
RECTANGULAR CUTOUTS (2)
BOTTOM ELEV. = 220.5

REDUCE EXISTING RECTANGULAR
CUTOUT WIDTH TO 4' WIDE
BOTTOM ELEV. = 214.78

BOTTOM OF BASIN

TWIN 30" RCP OUTLET
PIPES

TOP OF BERM ELEV.

INCREASE EXISTING
RECTANGULAR CUTOUTS (2)
WIDTH TO 9.25' WIDE X
1.67' HIGH
BOTTOM ELEV. = 220.3

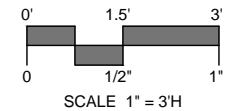
REMOVE CONCRETE BLOCKS

TWO (2) NEW 1.25' WIDE X
3' HIGH RECTANGULAR
CUTOUT
BOTTOM ELEV. = 217.5

EXISTING RECTANGULAR
CUTOUT: 7.5' WIDE X 1' HIGH
BOTTOM ELEV. = 214.78

BOTTOM OF BASIN

KEEP EXISTING V-NOTCH
APPROXIMATELY 1' WIDE X 0.74' HIGH
BOTTOM ELEV. = 214.04



99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
SLRCONSULTING.COM

DATE	NOVEMBER 10, 2021
SCALE	1"=3'
PROJ. NO.	1560-96
DESIGNED	MCB
DRAWN	MCB
CHECKED	RJM

OUTLET CONTROL STRUCTURE MODIFICATIONS

LANZIERI COURT

LANZIERI COURT
DERBY, CONNECTICUT

REVISED: ---

PROJECT PHASE:
FOR CONSTRUCTION

DRAWING NAME:

FIG. 1

Hydrographs Peak Flowrate Summary (cfs) Existing vs. Proposed

<i>Storm Event</i>	2yr		10yr		25yr		50yr		100yr	
	Exist	Prop	Exist	Prop	Exist	Prop	Exist	Prop	Exist	Prop
Basin Flow	49.4	40.4	82.5	96.5	130.6	153.7	173.6	173.1	199.3	198.5
Storage (cf)	66,093	92,644	154,818	167,326	204,081	192,454	224,068	215,565	254,310	253,933
W.S. Elev. (ft) Top Elev. of Basin = 222.7	216.96	217.96	219.99	220.36	221.38	221.07	221.90	221.68	222.63	222.62

*Reduced lower cut out to 4 wide', Created two new 1.25'x3' cutouts with invert = 217.2, knocked out blocks of upper cutouts to increase length of each to 9.25' and height of 1.67'