

City Manager's Weekly Report

Friday, October 21, 2016

Department:

Administration - City Manager

Notable Notes:

Mayor and Council,

I thank you all for your kind words and outreach following the passing of my father earlier this month. Your support and that of so many other caring coworkers and community members has been truly heartwarming and greatly appreciated.

Budget work continues following the Financial Workshop of October 3rd and in advance to the Public Hearing of November 21st. Staff and I are working on the follow-up information requested by Council or deemed necessary following the Stormwater Workshop of October 12th. I hope to have that out within a week's time.

I am happy to share that our organization has several health initiatives in the works, including biometric screening, an Anti-Hibernation Challenge and Weight Loss and Pedometer Challenge! There is a lot of excitement about these offerings.

Please find attached a letter of agreement to allow Delmarva Power to place additional poles in the right-of-way at Olan Thomas Park.

I attended a League of Local Governments Legislative Committee meeting. A copy of the minutes is attached for reference.

Attached please find the Police Department's Halloween Parade Event Notification.

I have been meeting regularly with Deputy City Manager Andrew Haines and Finance Director Dave Del Grande who continue to serve as negotiation leads regarding our union contract negotiations.

I will be assisting with the Mayor's Masquerade Fun Run/Walk this Sunday morning in the Mayor's absence while competing in a National Tennis Tournament - 9 a.m. start - Delaware Technology Park!

I participated in a presentation and discussion with the Planning Commission at a special meeting this Tuesday on the 2017-2021 Capital Improvement Program. The Commission voted 5-0 to recommend the plan to the Council. Planning and Development Director Maureen Feeney Roser will be submitting a highlight memo of Commission member comments and, where applicable, follow-up to you in the near future for awareness.

The website update is progressing nicely. Communication staff intends to present the changes at an upcoming Council meeting.

I will be participating in the Christina School District Principal for the Day program next week at West Park Elementary School!

As usual, you will find a lot of information in the rest of the departmental reports.

Activity or Project:

DE Municipal Electrical Corporation

Description:

Shared below is the agenda from this week's DEMEC meeting and the October - May Rate Comparison Chart . Additionally, you will find attached the Fitch Press Release Affirming DEMEC's A - Rating. I share here several statements related to Newark included in the release related to our margin transfer for continued awareness: Newark's utility system routinely generates strong operating margins in excess of 20%, providing positive cash flow after covering its full obligations, including purchase power costs and a sizeable 20% transfer to the city's general fund after satisfying operating expenses and debt service obligations. The system's 62 days of cash on hand is low, but is nonetheless acceptable given the utility's limited role as a distribution only system and its ability to automatically recover the vast majority of its operating expenses from a power cost adjustment that can be made on a monthly basis if needed. Newark's continued practice of making sizeable transfers to its general fund from its electric utility remains a concern. The transfer amount has remained at or close to \$10 million over the prior five fiscal years, equal to almost 20% of the utility's annual gross income. By comparison, the median transfer percentage for similarly rated utilities is 4%.

Status: Started

Expected Completion: 11/18/2016

Execution Status: Completed

Activity or Project:

Parking Meter Report

Description:

Staff and I have been working on the completion of a parking meter report that, once completed and Council is provided time to provide feedback, will be reissued on a quarterly basis.

Status: Near Completion

Expected Completion: 10/28/2016

Execution Status: Behind Schedule

Activity or Project:**Description:**

Status:

Expected Completion:

Execution Status:

Department:

Administration - Deputy City Manager

Notable Notes:

- This week the HR team worked with David Tynan and Ryan Straub from our Code Enforcement team to facilitate employee fire safety training. October is fire prevention month, and we took the opportunity to educate employees on fire, various types of extinguishers and how to properly approach a fire. A fire simulator was loaned to the City from the University for the employee training. One hundred seven employees were educated and further trained on proper techniques, and the simulator was timed creating competitive comradely among the employees. Thank you Dave Tynan and Devan Stewart for developing and facilitating this program.
- I spent time this week working with other budget team members on the FY2017 document, as well as attended the Planning Commission meeting that was on the FY2017 CIP. The Commission voted 5-0 to recommend the CIP on to Mayor and Council, however, did have suggestions and comments for future process and/or specific projects.

Activity or Project:

Open Enrollment 2017

Description:

Open Enrollment will start Monday, October 24 and run through November 11. The new ESS portal shall serve as the mechanism for enrollment this year, further expanding our digital HR presence, and Devan Stewart held five (5) ESS training sessions this week. Next week, the HR team will host three (3) Open Enrollment informational meetings for active employees and eligible retirees. Our insurance provider, DVHT, will be onsite for one of the sessions to directly assist with any medical questions for employees. The HR team extends its appreciation to the staff for positively accepting the digital change to ESS and, often, realizes the benefit and ease of the portal.

Status: Started

Expected Completion: 11/11/2016

Execution Status: On Track

Activity or Project:

Negotiations: AFSCME & FOP

Description:

Time was spent last week, and this week, on both negotiation efforts with the AFSCME and FOP leadership. An estimate for ratification are November (FOP) and December (AFSCME) based on current discussions.

Status: In-Progress

Expected Completion: 12/31/2016

Execution Status: On Track

Activity or Project:

Description:

Status:

Expected Completion:

Execution Status:

Department:

City Secretary and City Solicitor's Office

Notable Notes:

Bruce was in the office October 20. Paul was in the office October 19 and 20 for Court.

Staff finalized and posted the agenda and packet for the October 24 Council meeting on October 17. An addendum removing item 9A and the packet item for 1A were posted and distributed to Council on October 18.

Renee drafted, posted the agenda and packet items and distributed packets to Committee members for the October 25 Boards and Commissions Review Committee meeting on October 18.

Renee participated in a conference call with Councilman Chapman on October 19.

Renee participated in the Department of Justice annual training for FOIA Coordinators on October 20.

Renee finalized the subdivision agreement amendment and associated resolution for the Mill at White Clay that was scheduled for the October 24 Council meeting. It has since been removed from the agenda at the request of the developer and will be rescheduled for a future yet to be determined date.

Renee drafted a resolution and bill for the October 24 Council agenda.

FOIA requests took some time this week. The following actions were taken:

- Received relevant documents completed and closed an October 4 FOIA request from Robert Miller regarding RFP No. 16-01, Investment Management, Custodial and Benefit Administration Services.
- Received a request for additional information, which was circulated to staff, regarding an October 7 FOIA request from the Northeast Regional Council of Carpenters regarding commercial building permits issued in August and September.
- Received, circulated to staff, determined there were no records responsive to the request and closed an October 17 FOIA request from EBI Consulting regarding 500 Creek View Road.
- Received and circulated to staff an October 18 FOIA request from SmartProcure regarding purchasing records.

The October 24 Council, October 25 Boards and Commissions Review Committee and October 27 Community Development/Revenue Sharing Advisory Committee agendas were forwarded to Council.

Regarding minutes, staff time was spent on the September 27 Boards and Commissions Review Committee (Tara drafted; Renee edited - complete), October 10 Council (Alice drafted; Renee edited - complete), October 11 Conservation Advisory Commission (Tara drafting), October 12 Council executive session (Renee drafted - complete) and October 12 Council special meeting (Alice drafting) minutes. There are no other minutes currently in the queue.

Alice and Teresa have been working on approximately 30 discovery requests, each involving 30-40 pages and associated video, for upcoming Alderman's Court cases related to the recent large party citations. The office is waiting for reports from the other agencies involved before sending out the final discovery packages. Alice also processed 3 plea by mail requests.

The office received 11 new lien certificate requests this week, which were sent to Finance for processing. 8 lien certificate requests were completed and sent to the requestor this week. So far 429 lien certificate requests have been processed for 2016.

Activity or Project:

Electronic Document Management - Legislative

Description:

Renee met with staff from IT and Records Management regarding the conversion of data from Laserfiche to Tyler Content Management (TCM) on October 14, where document security, conversion of redacted documents to the new system, cleanup of data before conversion, timeline, training and other concerns were discussed. Renee also met with Records Management staff regarding document templates, setting up search fields and data cleanup on October 18. IT installed TCM and provided access to Tyler University training for Renee to begin learning the new software. Renee also spent time reviewing data for files in Laserfiche to determine indexing categories for the TCM conversion.

Status: In-Progress

Expected Completion: 12/30/2016

Execution Status: On Track

Activity or Project:

Description:

Status:

Expected Completion:

Execution Status:

Activity or Project:

Description:

Status:

Expected Completion:

Execution Status:

Department:

Community Relations

Notable Notes:

Kelly Bachman and Megan McNerney gave a presentation to the Newark Morning Rotary this week. The presentation focused on current and upcoming communications efforts, including the redesign of the City website and ongoing enhancements to the City's video production efforts (including Channel 22). The group was receptive and engaging - offering helpful insight as we move forward on these efforts and others.

The Big Jump

We are about one week away from the due date for the Big Jump application. A resolution in support of the application will be presented at the City Council meeting on October 24, as well as included in the application. Letters of support from the University of Delaware College of Health Sciences, as well as University of Delaware President Dennis Assanis will also be included in the City's application. The College of Health Sciences is also pledging \$150,000 over the next three years, to be used for bicycling projects and programs that support The Big Jump initiative.

Video Production/Channel 22

Megan produced a Halloween safety PSA with the Newark Police Department, which can be seen on the NPD and City's social media pages, as well as Channel 22 and the City's YouTube channel:

<https://www.youtube.com/watch?v=lageNwBTAN8>

DNP Events

- Halloween: The DNP will be hosting Pumpkin Palooza on Sunday, October 30, from 12 - 2 p.m. The event will include pumpkin painting and carving, face painting and food. It leads up to the Halloween Parade, which begins at 3 p.m. We are also working with the Parks and Recreation Department to encourage E. Main Street businesses to participate in Trick-or-Treat Main Street after the parade, from 4 - 5 p.m.
- Small Business Saturday: Currently, at least 10 businesses will be participating in the DNP's Small Business Saturday promotions. A Facebook event, "Shop Small in Downtown Newark" was created to draw attention to Small Business Saturday. So far, almost 100 people responded as either 'interested' or 'going'. We are also creating a trivia-style scavenger hunt to encourage shoppers to visit all of the participating stores.
- Holiday Storefront Decorating: Earlier this week, Megan delivered storefront decorating promotional flyers to 35 business on E. Main Street. A group from the DNP will judge the

storefronts on December 2, and then announce the winners that night at Winterfest.

Creative Design/Web Updates

Several projects were completed this week in conjunction with October as Fire Safety Month. In addition, ongoing updates to the website were completed.

Activity or Project:

Website Redesign

Description:

We are reviewing the updated design this week and, pending approval, CivicPlus will begin building out the site in anticipation for the new launch later this year.

Status: In-Progress

Expected Completion: 12/30/2016

Execution Status: On Track

Activity or Project:

Description:

Status:

Expected Completion:

Execution Status:

Activity or Project:

Description:

Status:

Expected Completion:

Execution Status:

Department:

Electric Department

Notable Notes:

The infrared scan of the aerial circuits have turned up a couple of hot spots in need of immediate attention. The crews are switching out the main transformers that feed the City to get to the connectors at the bushings and rework them.

The line crews have been working at the East Main Substation, inside and outside the station, reconfiguring circuits for a potential voltage upgrade.

The electricians disconnected all the communication cables and conduits to the West Main Substation transformer that failed several months ago in preparation for extracting the unit and sending it out for repair.

The electricians and engineering have been working on SCADA communication issues. Namely, several tap changers and their associated communications hardware are having spurious errors.

Engineering has continued work on two DelDOT projects, the Elkton Road expansion and the Regional Transportation Center.

Activity or Project:

Conductor Upgrades

Description:

A conductor upgrade was completed on Nottingham Road and voltage upgrades are under way in Nottingham Green.

Status: Near Completion

Expected Completion: 10/31/2016

Execution Status: On Track

Activity or Project:**Description:**

Status:

Expected Completion:

Execution Status:

Activity or Project:**Description:**

Status:

Expected Completion:

Execution Status:

Department:

Finance - Accounting Department

Notable Notes:

- Tuesday, 10/18, I attended DEMEC's monthly meeting in the morning in Dover. In the evening, the City Manager and I presented the 2017-2021 CIP to the Planning Commission, which was unanimously approved.
- Accounting staff continues to work on the 2017 budget, and we are continuing to work on our backlog of getting the financial reports out to Council. We are completing the month of August this week.
- Thursday, 10/19, I was engaged in contract negotiations with AFSCME. The Deputy City Manager, HR Manager and I discussed proposals with AFSCME and are optimistic we can come to agreement on a new contract soon.
- The 2017 subvention payment was calculated for the University of Delaware. The 2017 subvention payment will be \$523,331, or an increase of \$1,565 per the terms of the ESA agreement. Since the fee is based on CPI, the 12-month index only changed by .3%. As also included in the ESA, the electric delivery charge was reduced by the same amount. The new electric delivery charge to be distributed amongst the 23 impacted accounts will be \$287,669.
- We are currently working with our vendor, Northstar, to provide our customers with multiple utility accounts, the ability to combine their bills onto one statement. The University of Delaware has agreed to pay for 1/2 of the cost for this system upgrade.

Activity or Project:

Payments and Utility Billing (PUBS)

Description:

The group handled 682 phone calls last week, with the average call length of each call being 3:39. The average hold & queue time (average speed of answer) decreased from 11:46 to 2:58 when compared to last week. Service orders initiated by PUB in response to calls and visitors was 232 for the same period. The group processed 2,486 utility payments and CityView transactions, 399 of which were imported automatically with our electronic processes and 1,545 of which were imported via web, lockbox or preauthorized payment (PAP) over the last week.

Status:

Expected Completion:

Execution Status:

Activity or Project:

License Audit Review

Description:

MetroRev has provided the City with a format for a letter and a questionnaire. Staff is reviewing and will be providing input before it goes out to the businesses providing services within the City, but do not have a physical location in the City. Staff is reviewing the information before MetroRev begins to move forward.

Status: In-Progress

Expected Completion: 5/31/2017

Execution Status: On Track

Activity or Project:

Budget

Description:

The timeline for the budget process can be found on Budget Central via this link: <http://cityofnewarkde.us/DocumentCenter/View/6648>. Information relating to the budget is being updated as necessary to Budget Central.

Status: In-Progress

Expected Completion: 11/1/2016

Execution Status: On Track

Department:

Parks and Recreation Department

Notable Notes:

Director: Met with Parks Superintendent about the Rittenhouse Park bridge painting bid received, attended a Mayor's Masquerade Run meeting with Recreation Superintendent; meet with Parks Superintendent and Recreation Superintendent regarding Mowing Cost of Services and worked on updating information regarding contract oversight.

Recreation Superintendent: With Parks Superintendent, met with representatives from the Delaware Center for Horticulture regarding possible opportunities for sponsorship, conducted weekly informational meeting with recreation staff, worked on Mayor's Masquerade Run contacting sponsors for participation information and sending out flyers to the schools; corrected winter/spring activity information for recreation staff to prepare with updated information for their programs.

Recreation Supervisor of Athletics: Continued updating after care staff files, held orientation with three new staff, October before and after care staff meeting was held, Friday clubs began at both schools this week; held youth basketball coaches meeting for all three age groups; the Tiny Tots and Little Kickers soccer programs concluded on Saturday.

Coordinator of GWC and Volunteers: Worked with IT on connecting the George Wilson Center Attendants to the U Drive and Online Calendar to assist with more tasks that benefit the George Wilson Center; planned and scheduled staff for School's Out, Kids Day Off with a theme of "Science Fun" and one volunteer led a Tree Science Program for the kids; attended a meeting for the Christina River Watershed Clean Up and presented a proposal to the committee on combining the City of Newark Parks and Recreation Spring Community Clean Up with the Christiana River Watershed Clean Up since the City is in the Christina Watershed and much upland trash leads to the Christina River, combining initiatives will be beneficial for both organizations; prepared for and did outreach, including the News Journal, Craigslist, social media and UD Review for the Annual Fall Flea Market; finalized volunteer recruitment and assignment for the upcoming Mayor's Masquerade Run; **Volunteer Hours**: 1 volunteer devoted 2.5 hours to lead a Science Activity for the School's Out, Kids Day Off Program. Total Volunteer Hours for the week of 10/10-10/16: **2.5 Hours**.

Recreation Supervisor of Community Events: Set up meeting with fitness instructors to discuss the direction and goals of the fitness program, set dates for 2017 community events, and has been working on items for upcoming events, including the Halloween Parade, NewBark PawLooza, Turkey Trot and Winterfest.

Parks Superintendent inspected two park areas and developed work orders as needed, supervised layout/planting of old Bamboo area along the Hall Trail by Lewis Park, reviewed this year's budget to anticipate any project/expenses that will impact remaining funds.

Parks Supervisor assigned work orders and assisted with staff as needed and continued working on computer program with Recreation Superintendent.

Parks/Horticulture staff continue mowing operations and bed maintenance throughout park system, did tree removal/pruning as assigned, picked up and planted/mulched/watered in new plant material along Hall Trail behind Lewis Park, dragged/scarified all ball fields, did trash removal, potted up replacement pots for outside City Hall and Wilson Center, did interior bed maintenance at City Hall, dug out stumps along fence line at Kells Park before new fencing is installed, continued mulching traffic islands as needed, placed picnic table at Rahway Park as per resident request, and transplanted plant material from Casho Mill tunnel planting to Elkton Road Island #11 and mulched/watered in.

Contractor completed renovating Dickey Park street hockey court and continued working on Folk Park tennis court.

Activity or Project:

Folk Park Pavilion

Description:

Construction of the Folk Park pavilion and concrete pad installation has begun. The 20x20 pavilion will also include the installation of a handicap assessable walk way to the pavilion.

Status: Started

Expected Completion: 11/4/2016

Execution Status: On Track

Activity or Project:

Description:

Status:

Expected Completion:

Execution Status:

Activity or Project:

Description:

Status:

Expected Completion:

Execution Status:

Department:

Planning and Development Department

Notable Notes:

Building Maintenance

- This week Facilities Maintenance performed the following:
 - Discovered leaking toilet at George Wilson Center and began demolition of damaged floor structure;
 - Arranged placement of extra chairs for court proceedings;
 - Stripped and waxed floors at George Wilson Center;
 - Coordinated repairs of broken glass at two parking lot booths;
 - Completed monthly tank monitoring.

Code Enforcement

- The Fire Lane behind the Newark Shopping Center near the movie theater remains temporarily closed due to theater renovations. All public safety departments have been notified.
- Staff continued to work on correcting data on older building permits.
- Property Maintenance issued 13 citations this past weekend.
- Certificate of Occupancy was issued for 3000 Fountainview Circle, Unit 215.
- Framing work is ongoing at the Heights on South Chapel.
- The wall and roof installation is ongoing at the University of Delaware's South Academy Street dormitory.
- Work is ongoing at 60 North College Avenue.
- Work is continuing at the Washington House Condominiums located at 113 East Main

Street.

Parking

- Parking Division full-time office staff attended Fire Safety Training on Tuesday.
- New Parking Ambassador Jon Parker received training on handling online and in-person appeals.
- The broken loop wire/pot-hole in Lot 4 was fixed this week.
- Parking Manager Marvin Howard attended the Traffic Committee meeting on Tuesday.
- Two new Parking Attendants were hired for parking booths and received training this week.
- The Parking Division provided September meter occupancy numbers to City Hall.

Planning/Land Use

- This week considerable time was spent preparing for two Planning Commission meetings – one held Tuesday, October 18, 2016 to review the 2017-2021 Capital Improvements Plan – and the regularly scheduled November 1, 2016 meeting, during which the Commission is tentatively scheduled to review: 1) a Comprehensive Development Plan V amendment regarding the map for Planning Area 4; 2) the annexation, rezoning, major subdivision and special use permit for 1364 Marrows Road and 701 Ogletown Road (Martin Honda); and 3) Zoning Code amendments related to alcohol production, sales and related accessory uses.
- On Tuesday, Planning and Development Director Maureen Feeney Roser met with newly elected Planning Commission Chairman Jeremy Firestone to discuss Commission meetings, procedures, staff and reporting.
- Development Manager Mike Fortner spent considerable time this week preparing a report on proposed Zoning Code changes to allow craft breweries, wineries, and distilleries to operate in Newark in BC, MI, and MOR zoning districts.
- Also this week, Mike completed a Fiscal Impact Model for Martin Honda.
- On October 20, the Board of Adjustment will hear the appeal of the property owners at 250 Dallam Road to allow the location of a private garage in the front yard.
- Planner Tom Fruehstorfer met with the Community Development/Revenue Sharing Advisory Committee to review this year's CDBG/RS grant applications. The Committee members will meet again this week to review applicant responses to questions posed by the Committee and will begin formulating their recommendations.
- The following was also completed this week:
 - 12 Deed Transfer Affidavits
 - 29 Building Permit Reviews

Activity or Project:

Elkton Road Phase II Public Workshop

Description:

On Tuesday afternoon, Maureen attended the Elkton Road Phase II (from Maryland State line to Casho Mill Road) Reconstruction Coordination Meeting hosted by JMT. A public workshop will be held on Monday, October 24 at 4:00 p.m. in the Newark Charter High School to discuss project planning to date. Construction is anticipated in the 2019-2020 timeframe.

Status:

Started

Expected Completion: 10/24/2016

Execution Status: On Track

Activity or Project:

Description:

Status:

Expected Completion:

Execution Status:

Activity or Project:

Description:

Status:

Expected Completion:

Execution Status:

Department:

Police Department

Notable Notes:

On Thursday, October 13th, members of the Special Operations Unit met with the residents of Alder Creek and the Newark Housing Authority to discuss crime and safety topics within the new neighborhood.

On Friday, October 14th, members of the Newark Police Department, along with First Responders from Aetna Hose, Hook and Ladder Company met with students from John R. Downes Elementary School. The children had written cards thanking first responders for their service to the community and wanted to present the cards in person.

On Monday, October 17th, Cpl. William Smith, Officer Shannon Craig and Officer Aaron Olicker assisted the Communications Division with creating a Halloween Safety PSA video that will be released in conjunction with the upcoming Halloween holiday.

The Citizen's Police Academy held their 5th class on Tuesday, October 18th and feedback on the program continues to be positive. This week the class learned about the Newark Police Department Victim Service and Traffic Units.

On Saturday, October 22nd from 10 a.m. to 2 p.m., the Newark Police Department is once again partnering

with the Drug Enforcement Administration to host a prescription drug take-back event. The event, which helps prevent pill abuse and theft by ridding homes of potentially dangerous expired, unused, and unwanted prescription drugs, will take place at the City Municipal Building located at 220 S. Main Street. Residents are encouraged to bring any pills or patches; however, the DEA cannot accept liquids or needles. The service is free and anonymous, with no questions asked.

Activity or Project:

N/A

Description:

N/A

Status: Completed

Expected Completion: 10/20/2016

Execution Status: Completed

Activity or Project:**Description:**

Status:

Expected Completion:

Execution Status:

Activity or Project:**Description:**

Status:

Expected Completion:

Execution Status:

Department:

Public Works and Water Resources Department

Notable Notes:

Management staff has spent a significant amount of time over the past few weeks working on budget

related items and the stormwater plan. We have also begun putting together a summary of changes to the snow plan that we expect to include with next week's weekly report.

We have been developing a new ordinance related to well construction within municipal limits as a result of an issue that has been brought to our attention. We anticipate it being on the November 14th agenda for first reading, assuming it proceeds as planned.

Activity or Project:

Timberline Drive Culvert Analysis

Description:

Our engineering consultant has completed their review of the Timberline Culvert flooding issue to determine if there is a feasible method for reducing flooding of Timberline Drive when the culvert is overwhelmed by heavy rainfall. The consultant has determined that the road is overtopped during storms with a recurrence interval between 2 and 5 years. Existing site constraints result in very limited ability to make a significant impact on reducing flooding. Including engineering fees, we anticipate the cost to upgrade the culvert to pass the 10-year storm would cost between \$315,000 and \$440,000, depending on the extent of utility relocations necessary. Due to the very high cost associated with a relatively small improvement of level of service, it is our intent to begin looking for property where we can purchase an easement that could be utilized during emergencies as a secondary means of access in the event that the road is impassable for a significant amount of time. If we are able to secure the easement, language could be worded such that it could be used when or if the City chooses to upgrade the culvert in the future. The engineering report is attached for your reference.

Status: Completed

Expected Completion: 7/12/2016

Execution Status: Completed

Activity or Project:

Louviers Tank Painting

Description:

The contractor has made good progress on exterior painting and at this point anticipates being complete with the exterior by mid-week next week, assuming the weather holds out. Attached is a before and current photo of the tank showing progress.

Status: In-Progress

Expected Completion: 11/30/2016

Execution Status: On Track

Activity or Project:

Jenny's Run Culvert Removal

Description:

The contractor is very close to completing all in-stream restoration after which there is only minor

restoration work and installation of riparian plantings remaining.

Status: Near Completion

Expected Completion: 10/31/2016

Execution Status: Behind Schedule

10/16/2016 to 10/22/2016



CITY MANAGER'S OFFICE
CITY OF NEWARK

220 South Main Street · Newark, Delaware 19711
302.366.7000 · Fax 302.366.7035 · www.cityofnewarkde.us

October 21, 2016

Ms. Marianne Abdul
Delmarva Power
92DC73
Box 6066
Newark, DE 19714

RE: Olan Thomas Park

Dear Ms. Abdul:

The City of Newark has no objections to Delmarva Power's proposed installation of two new street poles in the right-of-way at Olan Thomas Park. I have been advised by Electric Director Rick Vitelli that the conductor upgrade and circuit realignment will increase our reliability.

Please note that Delmarva Power must agree to and meet the following conditions:

1. Work must not interfere with the mulch and flower beds.
2. No closures of the park access road and trail.
3. Access path must be double locked.
4. Any damage to trail, access road or mulch beds must be restored to original conditions.
5. Trees may be trimmed but no climbing is allowed.
6. Delmarva Power and Light and Newark representatives must meet onsite when final plans are complete before new poles are installed.

As always, we sincerely appreciate your assistance. Rick Vitelli will serve as your point of contact for this project.

Sincerely,

Carol S. Houck
City Manager

CSH/mp

c: Rick H. Vitelli, Director of Electric
Joseph Spadafino, Director of Parks and Recreation

DLLG Legislative Advocacy Committee
Meeting Minutes – October 18, 2016
DLLG Office, Camden

Attendees:

Marge Hadden, Council Member, Newark
Michael Spencer, Mayor, Newport
Teresa Tieman, City Manager, Harrington
Carol Houck, City Manager, Newark
Jesse Savage, Town Manager, Bridgeville
Scott Koenig, City Manager, Dover
David Hugg, Town Manager, Smyrna

Carl Luft, Executive Director, DLLG

Watch Issues/Bills for Upcoming General Assembly

- State/County Finance and Revenue Committee established by SB 285. DLLG rep is Michael Vincent, Sussex County Council President. High priority issue to watch is State take back of realty transfer tax portion.
- Clean Water Act.
- Minimum Wage Bill.
- Administrative warrants for municipalities.
- MS4 storm water management. EPA leaning on DNREC. Suggestion is for individual towns to communicate/meet with DNREC staff per last January's Consortium Resources session at the Duncan Center.
- Housing for homeless sex offenders. Still in committee. Homeless Bill of Rights, issue in Dover.
- Accessible parking regulations. Did not reach final vote in GA last session.

New Issues and Priorities

1. Local Government funding programs in the State Budget, protection of MSA and CTF funds, and retaining the current level of realty transfer tax are high priority items.
2. DNREC Title 7 Water Well Permitting. Executive Director summarized the problem referencing Frankford's communications and the latest DNREC letter to various towns. Some municipality's are approaching or have approached with their own ordinances (Smyrna, Bridgeville, Newark). Frankford's issue is not as clear as first represented.

Conclusion of LAC: Last paragraph of DNREC letter to Mayors dated October 12, 2016 is a positive step, and appears to be an action individual towns can take. See attached letter. Recommendation is to step back and review the option of amending

- 7 Del. C. 6075 to its original 1991 language. Middletown and Georgetown attorneys are currently evaluating this option. It is also recommended to keep a close watch on this issue.
3. Proposed recreational use of marijuana. Subject to drafting and submission to Legislature. Monitor after it is proposed.
 4. Maintenance of DelDOT signs on State roads in municipal boundaries. Incorporated cities/towns are required to maintain/replace DelDOT signs, while unincorporated areas are not (State maintains these). Not fair to incorporated munis. A bigger issue is maintenance of infrastructure under state roadways. Conclusion of LAC: Discussion item, continue to monitor.

Next Meeting: December 14, 2016, 2 pm, DLLG Office

Meeting adjourned at 3:20 pm.



POLICE DEPARTMENT
CITY OF NEWARK

220 South Main Street · Newark, Delaware 19711
302.366.7100 · Fax 302.366.7115 · www.cityofnewarkde.us

EVENT NAME: 2016 Halloween Parade

EVENT TYPE: Community Holiday Parade

LOCATION: City of Newark

DATE: Sunday, October 30, 2016

TIME: Parade Start- 3:00pm, Trick or Treating- 4:00pm
Road Closures- See Below

ROADS AFFECTED:

Academy St will be closed (open to local traffic) from E. Delaware Ave to E. Main St from 1:00pm to 5:00pm.

N. Chapel Street will be closed (open to local traffic) from New Street to E. Main St from 2:40pm to 5:00pm.

N. College Avenue (northbound only) will be closed from E. Main St to E. Cleveland Ave from 2:40pm to 5:00pm.

E. Delaware Avenue will be closed from S. Chapel Street to Library Avenue for eastbound traffic from 2:40pm to 4:00pm.

E. Main Street will be closed (open to local traffic) from Library Avenue to Tyre Avenue for westbound traffic from 2:40pm to 5:00pm.

E. Main Street will be closed from Tyre Avenue to S. College Avenue for westbound traffic from 2:40pm to 5:00pm.

Tyre Avenue will be closed at E. Delaware Avenue from 2:40pm to 4:00pm.

Additionally, there will be no parking on Main Street between Tyre Avenue and New London Road from approximately 11:00am to 5:00pm.

NUMBER OF PEOPLE: Approximately 10,000

CITY RESOURCES REQUIRED: Newark Police/ Public Works/ Parks and Recreation

AGENDA
DELAWARE MUNICIPAL ELECTRIC CORPORATION
REGULAR MEETING
Tuesday, October 18, 2016
Dover Downs Conference Center
Silver Lake Room
1131 North DuPont Highway, Dover, DE 19901
9:00 am

1. CALL TO ORDER
2. ROLL CALL
3. APPROVAL OF MINUTES
 - a. Minutes of the Meeting of July 19, 2016
 - b. Minutes of the Executive Session of July 19, 2016
 - c. Minutes of the Special Meeting of August 30, 2016
 - d. Minutes of the Executive Session of August 30, 2016
 - e. Minutes of the Annual Meeting of September 21, 2016
 - f. Minutes of the Annual Meeting Executive Session of September 21, 2016
4. TREASURER'S REPORT
 - a. Monthly Financial Reports – August 2016
5. APPOINTMENTS/ELECTIONS
 - a. None
6. PRESENTATIONS
 - a. None
7. RESOLUTIONS
 - a. 2016-11 Resolution Authorizing Purchase of New Castle MSC SRECs
8. COMMITTEE REPORTS
 - a. Executive Committee
 - b. Audit Committee
 - i. Baker Tilly Recommendation Memo dated August 22, 2016
9. PRESIDENT'S REPORTS TO BOARD
 - a. Generation Projects Status Report
 - b. Construction Projects Status Report
 - i. Middletown Transmission & Substation
 - ii. Seaford System Improvements
 - c. Economic Development Projects
 - i. Middletown Technology Center

- ii. Milford Bayhealth Hospital
- d. Legislative Report
- e. Credit Rating Agency Report
- f. APPA Mutual Aid Working Group
- g. Training/Education
 - i. Board Continuing Education Webinars as Requested
 - ii. DPPA Meeting – November 9, 2016
 - iii. DPL-DEMEC Administrative Meeting – November 9, 2016
- h. DEMEC Green Energy Programs Status Report
 - i. Renewable Energy Tracking
 - ii. Smyrna Solar Project Update
 - iii. Customer Sited Generation Policies
 - iv. Energy Efficiency Advisory Council Update
 - v. Energy Efficiency Program Proposal
 - vi. Demand Response Update
- i. Discuss Rescheduling of November Board Meeting

10. BUSINESS FROM THE FLOOR

11. EXECUTIVE SESSION

- a. To discuss strategic business and commercial generation operations, dispatch, negotiations and planning

12. SET NEXT MEETING DATES

(Third Tuesday of each Month; Subject to Change)

- a. Tuesday, November 15, 2016
- b. Tuesday, December 6, 2016 (Holiday Luncheon)
- c. Tuesday, January 17, 2017

13. ADJOURNMENT

Selected Area Utilities

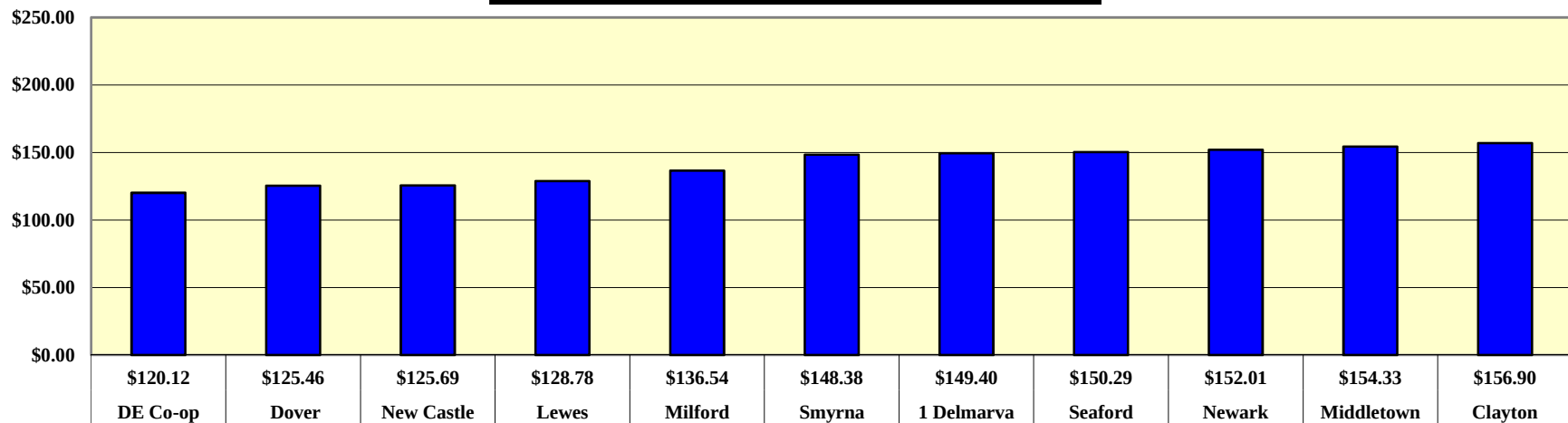
Winter (Oct. - May)

RESIDENTIAL RATE COMPARISON @ 1,000 kWh

		DE COOP	DPL
		<u>% Difference</u>	<u>% Difference</u>
<u>DE Co-op</u>	\$120.12	0.0%	-19.6%
<u>Dover</u>	\$125.46	4.4%	-16.0%
<u>New Castle</u>	\$125.69	4.6%	-15.9%
<u>Lewes</u>	\$128.78	7.2%	-13.8%
<u>Milford</u>	\$136.54	13.7%	-8.6%
<u>Smyrna</u>	\$148.38	23.5%	-0.7%
¹ <u>Delmarva</u>	\$149.40	24.4%	0.0%
<u>Seaford</u>	\$150.29	25.1%	0.6%
<u>Newark</u>	\$152.01	26.5%	1.7%
<u>Middletown</u>	\$154.33	28.5%	3.3%
<u>Clayton</u>	\$156.90	30.6%	5.0%

¹ Approximate. DP&L's transmission capacity charge is based on each individual's Peak Load Contribution (PLC) to the overall transmission load. Each customer has a unique PLC that changes every January.

Residential Cost @ 1,000 kWh's As of October 1, 2016





Fitch Affirms Delaware Muni Electric Corp's Electric Revs at 'A'; Outlook Stable

Fitch Ratings-New York-14 September 2016: Fitch Ratings affirms the 'A' rating on the following Delaware Municipal Electric Corporation's (DEMEC) bonds:

--\$52 million electric utility revenue bonds, series 2011.

The Rating Outlook is Stable.

SECURITY

The bonds are secured by a first lien on net revenues, which are principally derived from power sales contracts (PSC) between DEMEC and the electric enterprise funds of seven project participants related to the Beasley Power Station. Other net revenues include administrative charges derived from full requirements contracts with the same seven participants, but annual amounts are nominal.

KEY RATING DRIVERS

SMALL JOINT ACTION AGENCY: DEMEC is a project-based joint-action agency providing power to seven electric distribution systems located in Delaware. The agency's lone generating asset is the Beasley Power Station, consisting of two natural gas-fired simple-cycle combustion turbine generation units (Units 1 and 2), each with 45 MW of capacity.

TAKE-OR-PAY OBLIGATION: Bondholders are secured by PSCs requiring the seven project participants to satisfy project payment obligations as an operating expense of their city electric systems. The PSCs remain in effect as long as the bonds are outstanding.

STABLE CREDIT FUNDAMENTALS OF PARTICIPANTS: The credit quality of the seven participants underpins the project rating. Fitch expects participants' generally sound financial and debt metrics and service territory characteristics to continue.

DIRECT BONDHOLDER EXPOSURE: A 25% step-up provision included in the PSCs provides additional bondholder protection from a default of one or more participants with the exception of Newark, DE, whose 42.1% entitlement share in the project would not be sufficiently covered by the other participants. However, Fitch believes the solid credit characteristics exhibited by Newark's electric utility adequately mitigate the direct exposure.

LARGE GENERAL FUND TRANSFERS: The participants are required under the PSCs to pay project debt service as an operating expense paid prior to making general fund transfers to their respective host cities and satisfying any direct debt obligations. The first claim on participant revenues somewhat offsets concerns over the sizeable transfers made by each of the utilities, which prevent the accumulation of stronger levels of liquidity and net assets at the participant level.

RATING SENSITIVITIES

CHANGE IN PARTICIPANT CREDIT QUALITY: Meaningful changes in the credit fundamentals of the

Delaware Municipal Electric Corporation Beasley Project participants would likely trigger a rating review to consider a corresponding rating action.

CREDIT PROFILE

DEMEC is a joint action agency serving nine municipal electric utilities located in the state of Delaware. Members include Newark (GO bonds rated 'AA+'/'Stable Outlook'), New Castle, Middletown, Dover (electric revenue bonds rated 'AA-', Stable Outlook), Smyrna, Seaford, Lewes, Clayton and Milford. The member utilities provide electric distribution service to nine of the 10 largest cities in the state and on a combined basis serve nearly 67,000 customer accounts and a total population of about 126,000.

The seven participants in the Beasley Project are required to pay their proportional share of the project costs from electric system revenues pursuant to power sales contracts. The contractual obligation of each participant is take-or-pay, requiring the payment of all costs (including debt service) whether or not the project is operating or operable. The power sales contract also contains a step-up provision requiring each participant to purchase up to 125% of its original purchase obligation if another participant were to default on its obligation.

SOLID PROJECT MEMBERS

The credit quality of the Beasley Project's participants continues to sufficiently support the project rating. Each participant generally exhibits healthy cash flow, minimal to no debt and in some instances, cash reserves consistent with the project rating. Weaker liquidity with remaining participants is a result of sizeable general fund transfers typically used in Delaware to keep property tax rates low.

Newark's utility system routinely generates strong operating margins in excess of 20%, providing positive cash flow after covering its full obligations, including purchase power costs and a sizeable 20% transfer to the city's general fund after satisfying operating expenses and debt service obligations. The system's 62 days of cash on hand is low, but is nonetheless acceptable given the utility's limited role as a distribution only system and its ability to automatically recover the vast majority of its operating expenses from a power cost adjustment that can be made on a monthly basis if needed.

Newark's continued practice of making sizeable transfers to its general fund from its electric utility remains a concern. The transfer amount has remained at or close to \$10 million over the prior five fiscal years, equal to almost 20% of the utility's annual gross income. By comparison, the median transfer percentage for similarly rated utilities is 4%.

Financial metrics of the remaining participants are also sound. Milford, the second largest member, ended fiscal 2015 with strong debt service of 5.24x and nearly 160 days of unrestricted cash on hand. Middletown's practice of transferring all of its excess operating cash flow to the city's general fund is of some concern, but operating margins have averaged a strong 24% over the prior three years and the system has no long-term debt obligations. Fitch notes that only four of the seven participants have long-term debt obligations, with total obligations being nominal.

LIMITED BUT STABLE SERVICE TERRITORY

Economic and demographic indicators vary somewhat for each member city, but metrics in general appear stable. Newark's economy is anchored by a significantly sized healthcare and education sector. Christiana Care Health System, one of the largest private employers in Delaware, and the University of Delaware (UD), enrolling approximately 21,000 students at the Newark campus, are key employers.

Newark's June 2016 unemployment rate of 5.3% remains nominally higher than state and national rates, but has trended downward in recent years. The city's employment prospects should benefit going

forward by the UD's recent purchase and continued development of a former Chrysler assembly plant that was shuttered in 2008 amid the economic recession. UD is in the midst of developing the 272-acre site into a science, technology and advanced research campus in connection with several notable firms, including Thomas Jefferson University, Dow Chemical and E.I. Dupont de Nemours and Company.

Wealth measures for Newark rank somewhat lower than state and national indicators, likely reflecting the city's large student population. Nevertheless, Newark's electric utility continues to record low customer receivables and minimal write-offs. Both Milford and Middletown exhibit stronger wealth and employment indicators. Both cities have grown considerably since 2000; Milford, which lies immediately outside of Dover, the state capital, increased in population by 42% while Middletown nearly tripled in size. The proximity to Wilmington and to a lesser extent, Philadelphia, provides Middletown with good access to sizeable employment centers.

STRONG PROJECT FINANCIAL PERFORMANCE

Beasley Project debt service coverage is required to equal no less than 1.1x, per the bond indenture. However, increased energy sales and significantly higher capacity market revenues have provided for considerably stronger debt service coverage ratios averaging about 3.45x over the prior five years. With level debt service going forward, Fitch expects coverage of project debt service will remain at a healthy level.

SATISFACTORY FINANCIAL PROFILE AT THE AGENCY LEVEL

The agency's financial profile on a consolidated basis remains sound, despite a recent trend of incurring operating losses that led to debt service coverage of well below 1.0x as a consequence of implementing a rate stabilization plan (RSP). DEMEC, beginning in January 2012, elected to forego wholesale rate increases as part of the RSP and instead offset a short-term increase in capacity costs scheduled to last through May 2014 with a \$33 million fixed rate, low interest borrowing from AMP's line of credit.

The over collection of revenue from members since then, beginning in July 2014 when capacity costs declined considerably and wholesale rates were held relatively constant, yielded positive operating results beginning in fiscal 2014 and provided for surplus revenue needed to repay the loan from AMP by 2017. Fitch views the RSP as credit neutral given the relatively short tenor of the loan.

DEMEC continues to target a modest 30 days of unrestricted cash on hand and instead provide project participants with annual rebates from surplus revenues. The dividend paid to members in fiscal 2015 totaled \$7.7 million. A \$10 million working capital line of credit, a \$20 million liquidity facility for collateral posting requirements and DEMEC's ability to access members' liquidity on three days notice through interim billing all provide sufficient cushion. The series 2011 bonds have a cash funded debt service reserve fund equal to maximum annual debt service.

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Applicable Criteria

Revenue-Supported Rating Criteria (pub. 16 Jun 2014) (<https://www.fitchratings.com/site/re/750012>)
U.S. Public Power Rating Criteria (pub. 18 May 2015) (<https://www.fitchratings.com/site/re/864007>)

Additional Disclosures

Dodd-Frank Rating Information Disclosure Form
(https://www.fitchratings.com/creditdesk/press_releases/content/ridf_frame.cfm?pr_id=1011704)
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NEWARK POLICE DEPARTMENT

WEEK 10/09/16-10/15/16

INVESTIGATIONS

CRIMINAL CHARGES

	2015 TO <u>DATE</u>	2016 TO <u>DATE</u>	THIS WEEK <u>2016</u>	2015 TO <u>DATE</u>	2016 TO <u>DATE</u>	THIS WEEK <u>2016</u>
<u>PART I OFFENSES</u>						
a)Murder/Manslaughter	0	0	0	0	0	0
b)Attempt	0	0	0	0	0	0
Kidnap	5	6	0	1	4	0
Rape	4	3	0	1	3	0
Unlaw. Sexual Contact	7	6	0	2	2	0
Robbery	26	37	0	28	13	0
- Commercial Robberies	11	11	0	10	0	0
- Robberies with Known Suspects	2	2	0	1	0	0
- Attempted Robberies	2	5	0	7	2	0
- Other Robberies	11	19	0	10	11	0
Assault/Aggravated	5	22	2	25	24	0
Burglary	46	65	0	19	33	0
- Commercial Burglaries	5	14	0	3	4	0
- Residential Burglaries	38	43	0	15	22	0
- Other Burglaries	3	8	0	1	7	0
Theft	413	531	11	138	144	4
Theft/Auto	27	42	1	7	12	0
Arson	2	2	0	1	0	0
All Other	61	103	3	44	83	0
TOTAL PART I	596	817	17	266	318	4
<u>PART II OFFENSES</u>						
Other Assaults	238	258	6	139	91	2
Rec. Stolen Property	3	0	0	17	24	0
Criminal Mischief	163	159	2	102	51	0
Weapons	8	8	0	56	33	1
Other Sex Offenses	1	0	0	2	0	0
Alcohol	228	200	2	384	966	2
Drugs	84	106	2	192	160	2
Noise/Disorderly Premise	362	490	19	160	215	10
Disorderly Conduct	145	127	3	74	79	0
Trespass	130	161	4	57	55	1
All Other	369	370	7	244	256	4
TOTAL PART II	1731	1879	45	1427	1930	22
<u>MISCELLANEOUS:</u>						
Alarm	737	547	10	0	0	0
Animal Control	430	456	8	3	4	0
Recovered Property	209	234	1	0	0	0
Service	24999	26377	551	0	0	0
Suspicious Per/Veh	412	443	12	0	0	0
TOTAL MISC.	26787	28057	582	3	4	0

	THIS WEEK <u>2015</u>	2015 TO <u>DATE</u>	THIS WEEK <u>2016</u>	2016 TO <u>DATE</u>
TOTAL CALLS	861	34,661	756	35,839



Newark Police Department
Weekly Traffic Report
10/09/16-10/15/16



TRAFFIC SUMMONSES	2015 YTD	2016 YTD	THIS WEEK 2015	THIS WEEK 2016
Moving/Non-Moving	7,187	8,501	236	199
DUI	164	145	1	3
TOTAL	7,351	8,646	237	202

TRAFFIC ACCIDENTS				
Fatal	2	0	0	0
Personal Injury	170	186	11	3
Property Damage (Reportable)	461	612	29	2
Property Damage (Non-Reportable)	251	156	0	20
Hit and Run	219	225	6	5
TOTAL	1,103	1,179	46	30

CULVERT ANALYSIS REPORT

TIMBERLINE DRIVE CULVERT

Newark, Delaware

PENNONI PROJECT NO. CNEW1604

CITY OF NEWARK

PURCHASE ORDER NO. 20160086



Prepared For:

City of Newark

Mr. Thomas A. Coleman II, PE
Director of Public Works and Water Resources
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July 12, 2016
CNEW1604



PARTNERS FOR WHAT'S POSSIBLE

pennoni.com

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Attachments

Attachment A	Existing Features Plan Sheet (sheet 1 of 2)
Attachment B	Drainage Area Plan (Sheet 2 of 2)
Attachment C	General Site Location Figures
	Figure 1 – USGS Location Map
	Figure 2 – Aerial Location Map
	Figure 3 – FEMA Flood Hazard Map
	Figure 4 – NRCS Soils Map
Attachment D	StreamStats Drainage Area and Flow Statistics
Attachment E	FlowMaster Culvert Analysis
Attachment F	HY-8 Existing Conditions Analysis
Attachment G	Site Photographs

Background

Pennoni performed survey, research and data analysis, and preliminary engineering services to examine roadway overtopping and flow capacity of the Timberline Drive Culvert. Roadway overtopping from storms impedes access to local residences south of Panorama Drive. The culvert under Timberline Drive conveys flow of an unnamed tributary of the Christina River. Pennoni analyzed the culvert drainage area, flow capacity and water surface elevations for design storm events. Culvert modeling calculations were performed to determine the culvert size required to pass a 100-year storm event or the most reasonably practicable storm according to site landscape and landform constraints. The following summarizes our analysis of the Timberline Drive Culvert and alternatives to reduce the frequency of roadway overtopping.

Existing Conditions

The culvert is located west-southwest of 116 Timberline Drive between Panorama Drive and North Wynwyd Drive. It is an existing concrete slab and concrete masonry unit rectangular culvert crossing under Timberline Drive. The 9-foot wide by 3-foot high by 80-foot long culvert conveys an unnamed tributary with an approximate 0.76 square mile drainage area to the Christina River and generally flows west to east. The stream banks on the downstream (eastern) side of the culvert are lined for approximately 130 feet with gabion walls to protect the banks from erosion during storm events. The upstream (western) banks are shallow vegetated slopes.

The drainage area land uses vary from developed residential to agricultural and woodland primarily consisting of C type, poorly drained, soils. The immediate surrounding land use is residential single-family homes associated with the Timber Creek subdivision. The more distant reaches of the drainage area are mostly made up of agricultural with some natural woodland.

The size of the properties and close proximity of homes and utilities to the stream and culvert present constraints when considering options to address the culvert's flow capacity. The homes on the west side of Timberline Drive are approximately 40-50 feet from the stream centerline. The homes on the east side of Timberline Drive are approximately 30-60 feet from the streambank gabion walls. A sewer main runs underneath the culvert near the centerline of the road. The downstream sewer main continues east of Timberline Drive running parallel and adjacent to the stream. The sewer main parallel to the stream is within 10 feet of the culvert edge and approximately 3 feet from the top of bank. There are also overhead utility wires and a utility pole in close proximity to the culvert.

Attachment A presents the culvert and site existing features plan (sheet 1 of 2), and Attachment B presents the culvert's existing drainage area plan (sheet 2 of 2). Additional location figures are provided in Attachment C and include United States Geological Survey (USGS), Site Aerial, Federal Emergency Management Agency (FEMA) Flood, and Natural Resources Conservation Service (NRCS) soil survey general project location exhibits.

Maintenance Observation

There is a root system of a large cedar tree growing into the upstream portion of the culvert opening. Immediate removal of the encroaching root system and slope regrading and stabilization along the bank of the stream at the culvert should provide a minor improvement to the flow capacity. The City's continued regular maintenance to keep the culvert clear and functioning will help with capacity in the interim until a more significant, permanent solution is implemented.

Culvert Analysis

Pennoni developed the stream flow data using two methods. Method 1 was based on the drainage area and supporting data provided from the USGS Delaware StreamStats Program. Method 2 considered the drainage area with available online mapping programs analyzed through HydroCAD. Additional programs – Flow Master, and HY-8 hydrology and hydraulics software – were used to analyze the culvert flow capacity.

Attachment D presents the StreamStats point delineation drainage area and flow statistics calculations utilized for this analysis. FEMA map information was used to estimate tailwater elevations from the Christina River during the 100-year storm (approximate elevation 123) for the HY-8 analysis. StreamStats point drainage area delineation results were compared with available LiDAR and associated Geographical Information Systems (GIS) information to confirm the contributing drainage area. StreamStats flow statistics were compared with calculated results from HydroCAD and Rational Methods to evaluate contributing storm flows. The HydroCAD and Rational methods yielded higher flows for each storm event that would result in more frequent and higher flooding elevations than actually occurs per our understanding of the existing conditions from City staff. The HydroCAD and Rational Method computations are not included in this report. Therefore, StreamStats flow statistics were utilized in the HY-8 model since they are considered to be the most realistic flows when analyzed in the HY-8 model and compared with historic flooding reported to the City by nearby residents.

Pennoni utilized Section B-B and Section C-C from Attachment A to build the HY-8 roadway and channel conditions in the model. StreamStats flows were used for the various storms and the structure was located in section view and built in the model based off of survey data (inverts, lengths, widths, etc.).

The analysis and results in this report are based upon free discharge (no tailwater) for all storm events. It is our opinion that the free discharge analysis results are more representative of reported flooding conditions even though there actually is tailwater that occurs, particularly during larger storm events such as the 100-year storm. Further, the modeling indicates an inlet (headwater) control condition even with a free discharge, causing the inlet side to become submerged even during the 2-year storm event. The amount of water the culvert can convey is therefore limited by the culvert entrance (“inlet control”), which poses the primary flood control issue. Additionally, tailwater elevations for the 2-year to 50-year storm events are not readily available and would require extensive watershed-wide modeling to estimate, which was beyond the scope of this study.

Since 100-year flood information is readily available, we performed a limited tailwater analysis of this worst-case scenario for a 100-year storm only; however, as noted above, the analysis and results in the remainder of this report are not based upon a tailwater scenario. The Christina River is approximately 400 feet downstream of the project site. When the Christina River is flooded, flood waters come up to the outlet of the Timberline Drive Culvert to an approximate elevation of 123 (shown on the FEMA Map as the 100-year flood). This is a tailwater depth which completely submerges the culvert outlet but is below the road surface. The HY-8 model was thereby run for a 100-year storm with a fixed tailwater at elevation 123. This resulted in substantial roadway overtopping beyond that of the free discharge condition. An inlet control condition also occurred so the culvert is not only influenced by downstream flooding but is also undersized in this 100-year fixed tailwater scenario. The overtopping depths in this scenario are not presented in this report because this was a very limited analysis, and upstream storage volumes and downstream flooding extents and depths are critical and would need to be known with much more detail to provide accurate results.

The existing culvert full flow capacity with a contained head condition is approximately 409 cfs as calculated in Attachment E using Bentley FlowMaster. However, the performance curve developed using the HY-8 analysis shows that the culvert flow is inlet controlled and flow relief across the road is available before the hydraulic head needed for full flow is reached. Results of the existing conditions HY-8 analysis with free discharge are summarized in Table 1 and indicate water surface elevations during the various storms as compared to:

- Top of Road Section B-B “Low Point” Elevation = 124.6
- Culvert Upstream Invert = 120.5
- Culvert Flowing Full Upstream Elevation = 123.5

Table 1 - Timberline Drive Culvert Existing Conditions

Storm	Storm Flow (cfs)	Estimated W.S. (Headwater Elev. Ft.)	Depth of Water on Road (ft.)	Roadway Overtopping
2-year	172	124.44	0.00	NO
5-year	371	125.50	0.90	YES
10-year	427	125.65	1.05	YES
25-year	554	125.94	1.34	YES
50-year	647	126.12	1.52	YES
100-year	745	126.30	1.70	YES

Detailed calculations and results of the existing conditions HY-8 analysis are provided in Attachment F.

Based on these results and for purposes of reducing roadway overtopping during the largest practicable storm event, the following section summarizes possible alternatives.

Alternatives

The analysis of the existing culvert condition indicates the upstream side of the culvert becomes submerged during a 2-year storm event, but the roadway does not flood since the water surface elevation does not crest above the upstream top of bank and sidewalk. However, storm events greater than the 2-year design storm are calculated to cause roadway flooding. Various alternatives were considered to address the roadway flooding. Most of the alternatives were not analyzed in HY-8 due to feasibility of installation, practicability, and/or significant cost required to design and construct the alternative.

Alternatives

The following alternatives were considered. Alternative 1 is recommended since site constraints, costs, property acquisition/condemnation, and other limitations make the remaining alternatives less desirable and/or impractical.

1. *Culvert replacement* – Recommended and described in the next section.
2. *Increasing the height of the culvert opening* –

The maximum opening height of the culvert is dictated by the lowest elevation of the roadway above the culvert. The lowest controlling elevation is the western curb, which is estimated to be ±0.8 feet above the culvert’s top slab. The DelDOT standard Type 2 curb and gutter is approximately 0.7 feet (8.1 inches) thick at its lowest point. The top of the existing 8-inch thick culvert top slab is therefore no more than 0.1 feet below the bottom of the curb, leaving

essentially no room to increase the culvert height while maintaining existing curb and road elevations.

If the culvert is widened, the top slab thickness would need to increase. The top slab would typically need to be 12 inches thick for a 12-foot wide culvert and 15 inches thick or more for a ≥ 20 -foot wide culvert. A 12-inch thick top slab will extend into the existing curb and road pavement sections and will necessitate reduced curb and pavement thicknesses in order to maintain existing top of curb and road elevations.

The curb and roadway elevations would therefore need to be raised to allow for a significant enough increased culvert opening height to provide meaningful flow capacity improvements and reduction of roadway overtopping. Raising the road is not considered viable because the existing road has limited longitudinal slope near the culvert (approximately 2%) so it would require lengthy regrading of the road on both sides of the culvert, significant regrading of yards, driveways and sidewalks on abutting residential properties, and may impact drainage to the low-point stormwater inlets adjacent to the culvert. Further, the solution would potentially need to handle a 100-year storm event; otherwise, the flooding relief over the roadway would occur at higher elevations thereby causing high water levels to move closer to homes on the west side of Timberline Drive.

3. *Installing a bridge/culvert with open bottom stream channel* – This would not provide any more capacity than the recommended alternative since the height of the opening would not change, and it would be difficult to construct in the close proximity of the homes and sanitary sewer main.
4. *Creating extended detention in the upstream channel by installation of gabion walls* – Flood management at or immediately upstream of the culvert is not expected to be adequate to feasibly address the problem as a stand-alone solution. Property acquisition/easements would also be required. Additionally, this would necessitate extensive survey and analysis of the stream flow and may be a permitting challenge since stream obstructions would be created.
5. *Creating, enlarging, and/or redesigning upstream stormwater management detention/retention facilities in the watershed* – Upstream detention/retention of stormwater could significantly decrease the peak flow rates at the culvert, allowing the existing culvert to convey larger storm events without overtopping. However, this would likely require extensive research into upstream stormwater management designs for facilities including those outside of the City and the State, detailed upstream watershed modeling and design of new stormwater management facilities, extensive permitting, and property acquisition, making this a very lengthy and costly endeavor.
6. *Installing an emergency access road to the neighborhood west of the stream and culvert* – There appears to be no viable path of access without condemning residentially developed property. Even a very small access path would require property acquisition for easements/right-of-way from homeowners and could involve another stream crossing if the selected path would be required to cross the Christina River or a nearby tributary.
7. *Diverting flow from the upstream channel through an emergency bypass channel for large storms* – This would reduce flows to the culvert by routing a portion of water through an alternative channel to avoid the culvert, but there do not appear to be any existing adjacent swales, channels, or streams by which to do so. This would be a difficult and time consuming process for permitting and may not be permissible at all. A new channel would impact a large number of private property owners and would require easements and potential property condemnation.

Culvert Replacement Alternative

Culvert replacement presents a viable solution to improve the conditions, but it cannot be sized to prevent all flood conditions due to existing site constraints. Upon iterative analysis of the existing culvert HY-8 model, the culvert could practicably be sized to reduce roadway overtopping for the 10-year storm without changing the height of the roadway. Table 2 presents culvert widths required to reduce roadway overtopping during all of the analyzed storm events.

Table 2 - Minimum Size Culvert Opening Required to Reduce Roadway Overtopping

Storm	Storm Flow (cfs)	Minimum Size Opening (ft.) *	Estimated W.S. (Headwater Elev. ft.)	Depth of Water on Road (ft.)	Roadway Overtopping
5-year	371	19	124.51	0.0	NO
10-year	427	22	124.49	0.0	NO
25-year	554	28	124.56	0.0	NO
50-year	647	33	124.53	0.0	NO
100-year	745	38	124.53	0.0	NO

**NOTE: Based upon a rectangular culvert with the same clear height as the existing culvert.*

If the culvert is sized to maintain existing inverts, height, and length dimensions, a 22-foot wide opening could effectively keep the 10-year storm from overtopping the roadway. Results of this analysis with a 22-foot wide culvert are presented in Table 3.

Table 3 - Proposed 22-Foot Wide Culvert Conditions

Storm	Storm Flow (cfs)	Estimated W.S. (Headwater Elev. ft.)	Depth of Water on Road (ft.)	Roadway Overtopping
2-year	172	122.58	0.00	NO
5-year	371	124.05	0.00	NO
10-year	427	124.49	0.00	NO
25-year	554	125.13	0.53	YES
50-year	647	125.40	0.80	YES
100-year	745	125.63	1.03	YES

A 22-foot wide replacement culvert could be constructed by maintaining the existing gabion wall on the north bank of the downstream side in its existing location and installing the wider culvert to the south side in an alignment parallel to the northern gabion wall. With this slightly realigned culvert, the majority of the gabion wall along the downstream south bank would need to be relocated approximately 7-10 feet further south to widen the downstream channel to 22 feet wide. The channel and banks further downstream would be graded to transition from the new wider channel to the existing channel. The gabion wall relocation, stream widening, and bank regrading are anticipated to be completed entirely on City-owned property. However, there would be disturbance to the property of 116 Timberline Drive during construction including limited regrading and gabion wall adjustments at the culvert outlet.

The upstream channel and banks would need to be significantly widened, entirely on private properties, and may require gabion walls. The regrading could extend over 10 feet from the existing top of bank onto the properties of 115 and 119 Timberline Drive.

The widened culvert would be in conflict with the existing sanitary manhole in Timberline Drive and the downstream gravity sewer that runs parallel to the creek east of Timberline Drive. The manhole and sewer main would therefore need to be relocated, approximately 5-10 feet south of their existing locations. The work would also require removal and reconnection of a storm sewer pipe that discharges directly into the existing culvert, removal of the existing mature tree on 119 Timberline Drive near the upstream culvert opening, and relocation of an existing utility pole.

To avoid sanitary sewer manhole and sewer pipe relocation, we estimate the replacement culvert can be no wider than 13-15 feet, which would only provide capacity to convey slightly greater than the 2-year design storm. A 13-foot wide culvert would likely allow for the existing utility pole to remain in its existing location post-construction, but it would need to be temporarily braced, relocated, or removed during construction. We anticipate the utility pole would need to be permanently relocated to accommodate a 15-foot wide culvert.

Upstream gabion walls, wingwalls, and a parapet wall that extend slightly above the existing road surface elevation to provide limited upstream storage volume could be coupled with a widened culvert to reduce roadway overtopping beyond that of a widened culvert alone. However, additional calculations and analysis would be required to determine the extent and benefit of such improvements and to ascertain the impact to the adjacent residential properties.

With upstream and downstream wingwalls and parapet walls, a replacement culvert could be shorter with the inlet and outlet ends closer to the existing sidewalks to decrease cost and slightly reduce impacts to private property.

Lastly, selection of a larger opening will require further analysis, including scour analysis and/or HEC-RAS modeling, to confirm that conveyance of larger storms through the culvert will not cause downstream erosion. This can be analyzed in more detail as part of the selected project design.

Opinion of Probable Construction Costs

Using past culvert and bridge projects to determine a rough construction budget estimate, the costs are anticipated to be at least \$250,000 for either a concrete box structure or a ConSpan style culvert with the potential to exceed \$350,000 when considering the additional channel improvements and sanitary sewer relocation. The costs of construction will depend greatly on the targeted storm event and selected structure size and type. Increasing the width of the structure will impact the structure cost as well as the ancillary construction efforts to accommodate the structure. Since most storm events have the potential to cause roadway overtopping in the existing condition, we recommend the target design storm be discussed further and determined before more detailed estimates are prepared.

Engineering services for site design, structural design, and permitting could vary between \$65,000 and \$90,000 depending upon the type of structure and whether a design-bid-build versus design-build methodology is used.

Conclusion

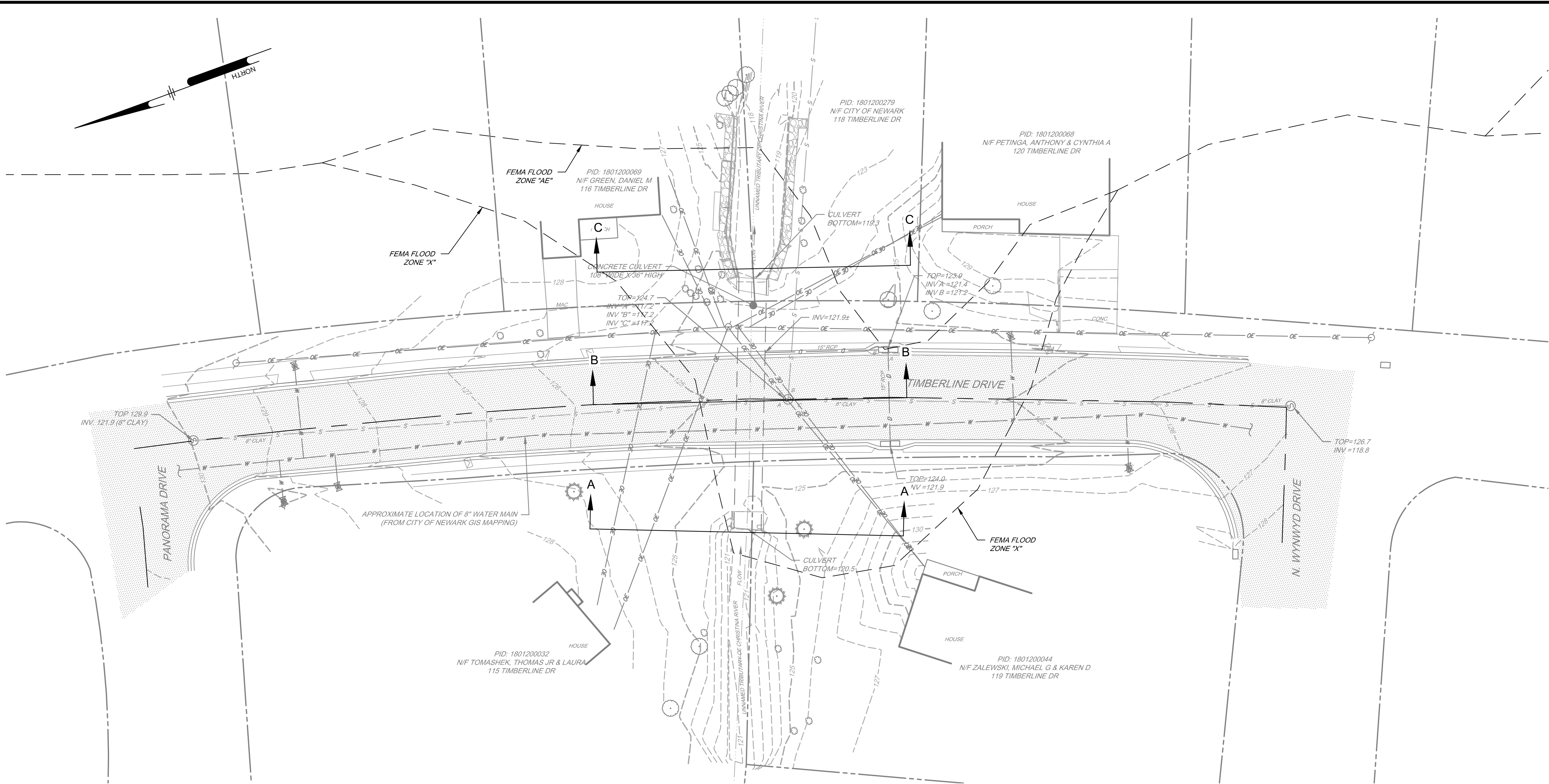
The most timely, cost-effective, and practical method to reduce flooding of Timberline Drive at the location of the culvert is to widen the culvert. Significant upstream detention/retention of stormwater would also reduce flooding; however, this would be a much longer-term solution to implement that would require significant planning and property acquisition.

Based on the calculations for the required size, a wider culvert to convey the 25- to 100-year design storm events without roadway overtopping is not considered viable due to the proximity of existing homes. A 22-foot wide by 3-foot high replacement culvert sized to convey no greater than a 10-year design storm event is considered the largest viable solution to reduce road flooding within existing site constraints. This will require relocation of an existing sanitary sewer main and manhole, relocation of a streambank gabion wall, relocation of an existing utility pole, and upstream and downstream channel and bank grading modifications. Construction and grading will require access to street right-of-way, City property, and private residential property.

A storm between a 2- and 5-year design storm could be handled with a smaller 13 to 15-foot wide by 3-foot high replacement culvert and no sanitary sewer relocation. Upstream gabion walls, wingwalls, and parapet walls could potentially reduce road overtopping further. Upstream and downstream channel and bank grading modifications would be needed. Depending upon the exact size, it may be possible to maintain the utility pole in its existing location for this smaller replacement culvert. Construction and grading would still require access to street right-of-way, City property, and private residential property.

ATTACHMENT A
Existing Features Plan Sheet

\\PROJECTS\CNEW\NEW\1604-1604.dwg PLOTTED: 7/20/16 4:49 PM BY: William Hahnman PROJECT STATUS: — PLOTTED BY: Pencon V25.4b



TOPO PLAN
SITE LOCATION: TIMBERLINE DR
PROJECT NO: 1604
DRAWING SCALE: 1"=20'
PREPARED BY NEWARK, DELAWARE SURVEY DIVISION 0604:
FIELD CREW: T.J. JZ
DATE(S) SURVEYED: 16/02/19
DRAFTED BY: ESL
HORIZONTAL DATUM: NAD83
VERTICAL DATUM: NAVD83
SITE BENCHMARK: 100
PROJECT DATUM: STATE PLANE
THE PROJECT BENCHMARK IS BASED UPON RTK GPS, ...

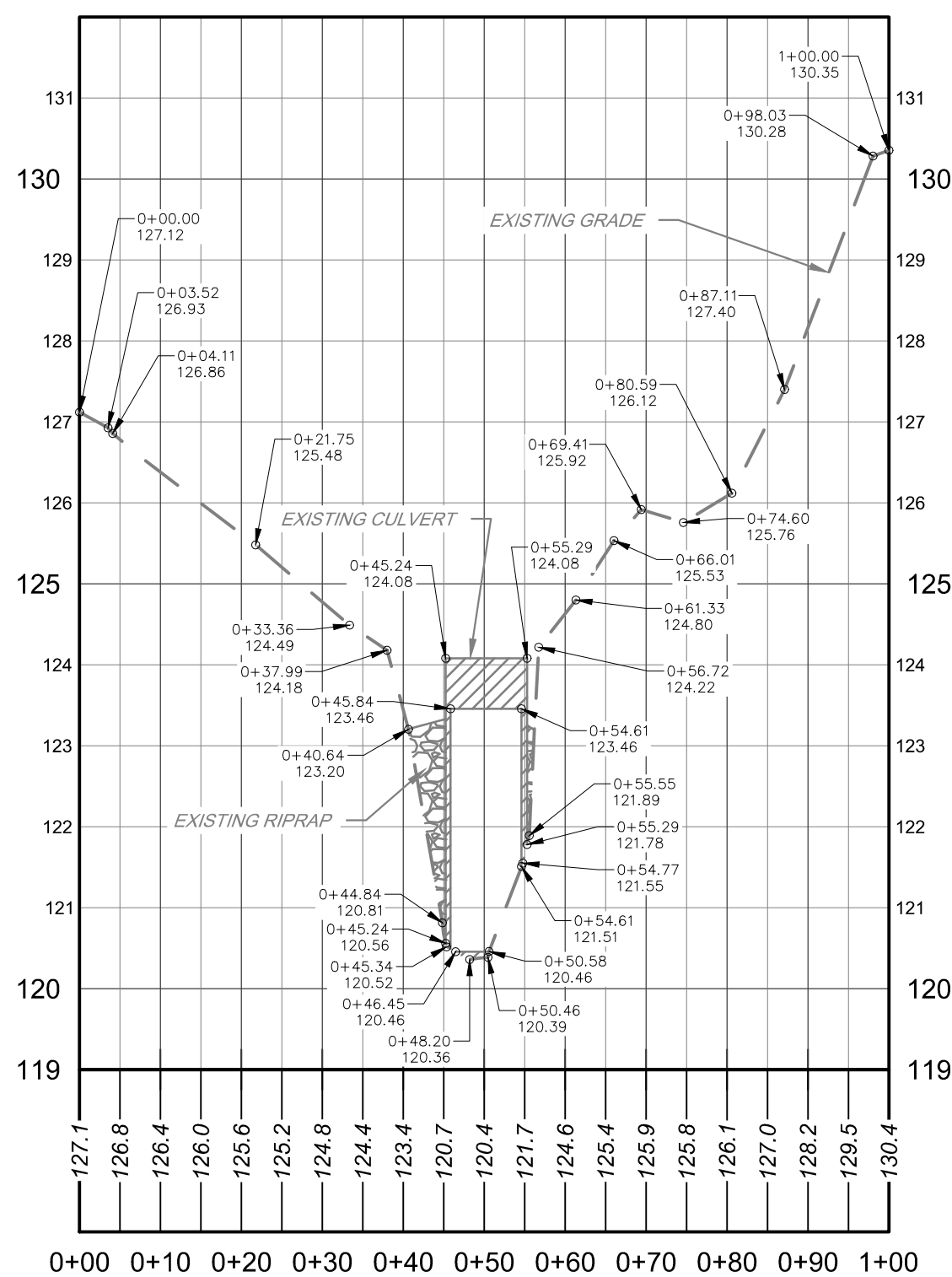
GIS DATA SOURCES:

FEMA:
ORIGIN: FEDERAL EMERGENCY MANAGEMENT AGENCY, PUBLICATION DATE:
FEBRUARY 16 2016, TITLE: NATIONAL FLOOD HAZARD LAYER (NFHL), ONLINE
LINK: [HTTPS://MSC.FEMA.GOV](https://msc.fema.gov)

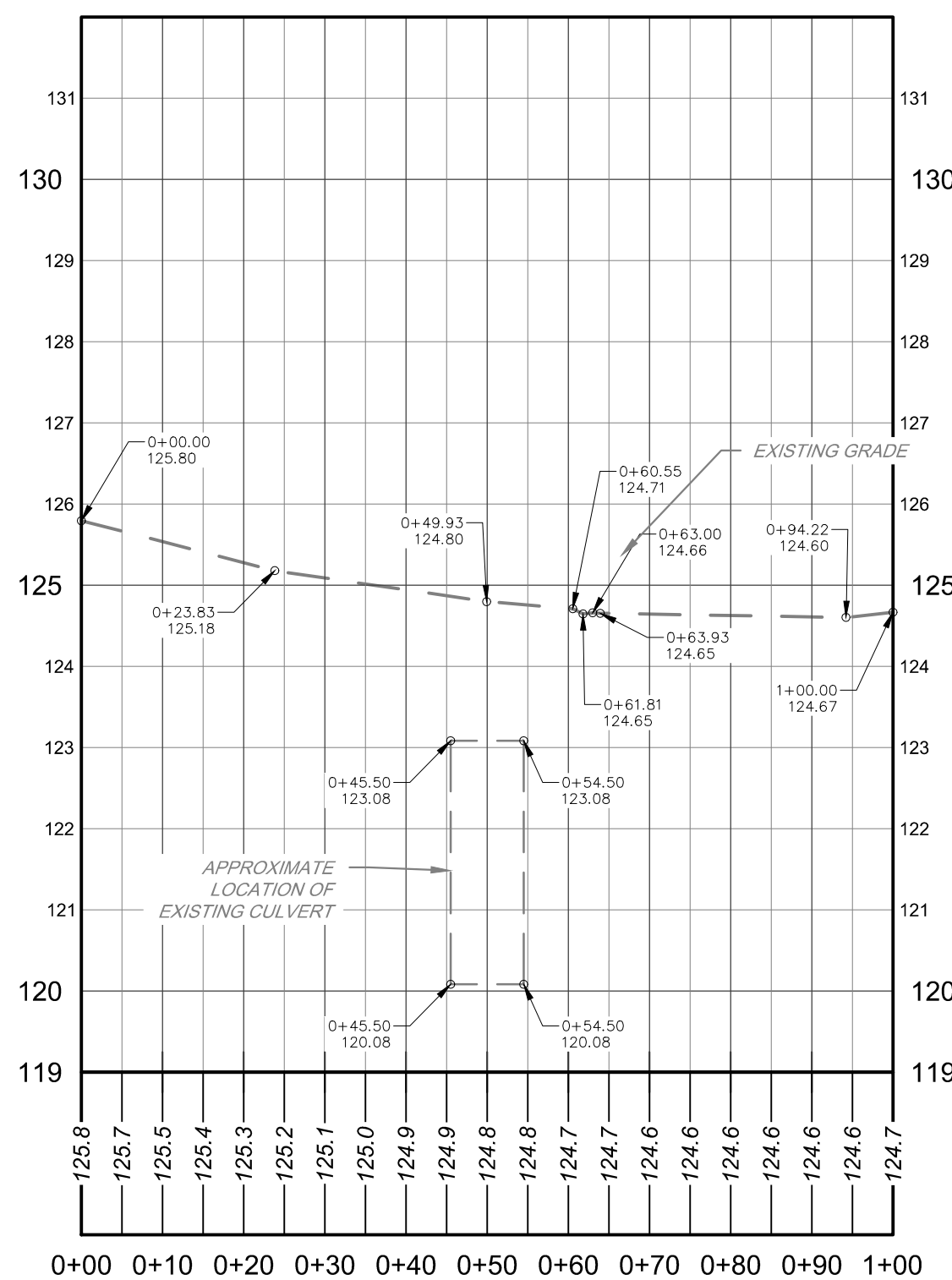
PARCELS, AND STREAM CENTERLINE DOWNLOADED FROM
[HTTP://OPENDATA.FIRSTMAP.DELAWARE.GOV/](http://opendata.firstmap.delaware.gov/)

LEGEND

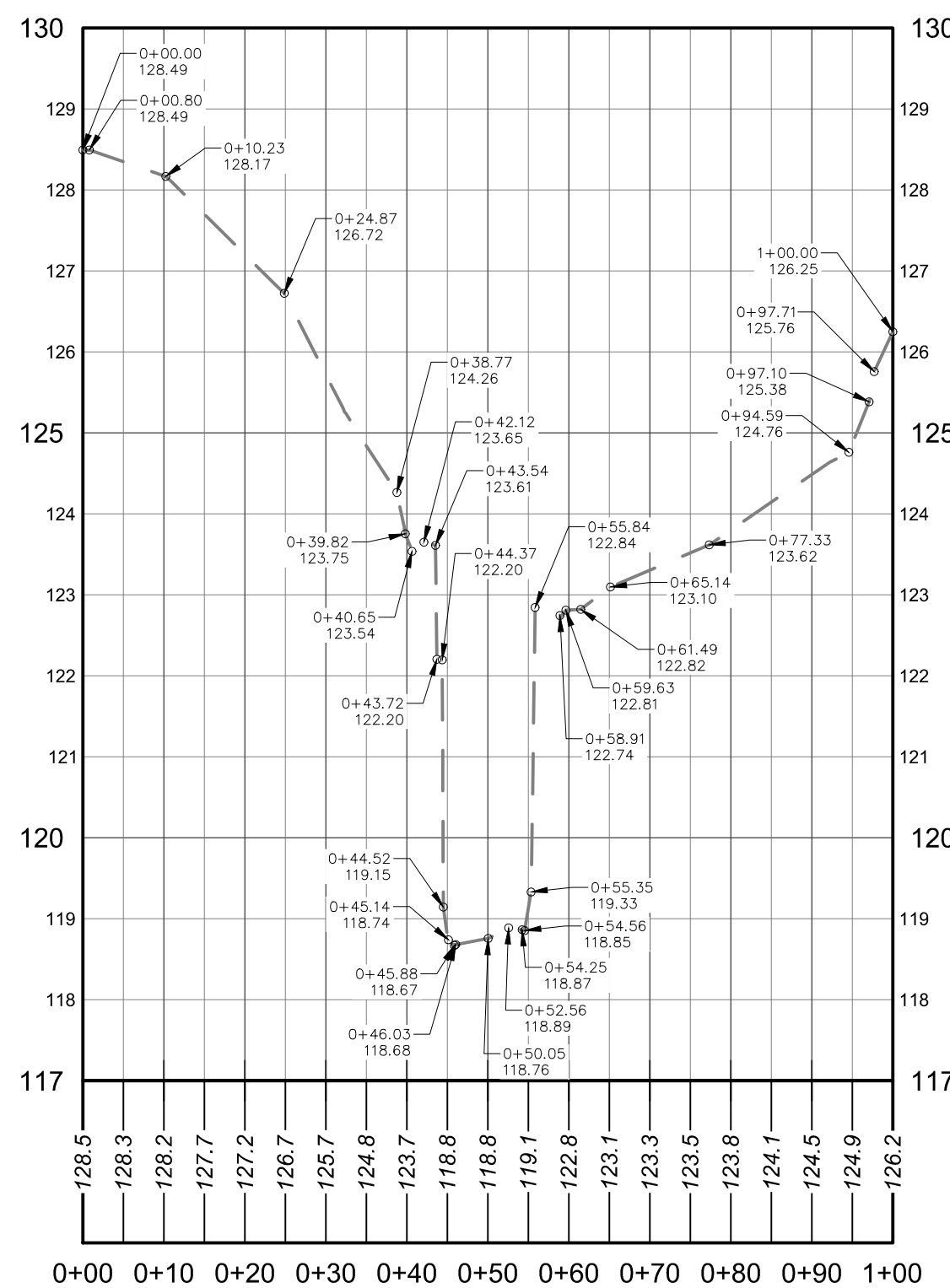
EXISTING	DESCRIPTION
	EDGE OF PAVEMENT
	EDGE OF GRAVEL
	EASEMENT
	FENCE
	POWER, LIGHT
	POWER, MANHOLE
	POWER, OVERHEAD
	POWER, UNDERGROUND
	POWER, UTILITY POLE
	PROPERTY, LINE LEGAL
	RIGHT-OF-WAY
	PROPERTY, CORNER FOUND
	PROPERTY, CONCRETE MONUMENT
	PROPERTY, ADJOINING LINED
	SITE, TRAFFIC SIGN
	SOIL BOUNDARY
	SOIL LABEL
	SANITARY SEWER, CLEAN-OUT
	SANITARY SEWER, FORCE MAIN
	SANITARY SEWER, LATERAL
	SANITARY SEWER, MANHOLE
	SANITARY SEWER, UNDERGROUND (4" DIA TO 10" DIA)
	SANITARY SEWER, SEPTIC TANK
	SANITARY SEWER, VALVE
	STREAM
	STORM SEWER, INLET STORM
	SEWER HEADWALL
	STORM SEWER, MANHOLE
	STORM SEWER, UNDERGROUND
	TOPOGRAPHY, MINOR CONTOUR
	TOPOGRAPHY, MAJOR CONTOUR
	TOPOGRAPHY, SPOT ELEVATION
	UNIDENTIFIED, OVERHEAD WIRE
	VEGETATION, TREE LINE
	VEGETATION, TREE
	WATER, FIRE HYDRANT
	WATER, UNDERGROUND
	WATER, VALVE



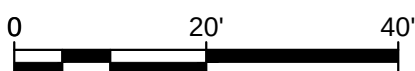
STREAM CROSS SECTION A-A
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 2'



ROAD CROSS SECTION B-B
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 2'



STREAM CROSS SECTION C-C
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 2'



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Christiana Executive Campus
121 Continental Drive, Suite 207
Newark, DE 19713-4310
T 302.655.4451 F 302.654.2895

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AND OWNER MUST BE NOTIFIED OF ANY
DISCREPANCIES BEFORE PROCEEDING WITH WORK

TIMBERLINE DRIVE CULVERT ANALYSIS

TIMBERLINE DRIVE
NEWARK, DELAWARE

EXISTING CONDITIONS PLAN

CITY OF NEWARK DEPARTMENT OF PUBLIC WORKS
AND WATER RESOURCES
220 SOUTH MAIN STREET
NEWARK, DE 19711

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PROJECT	CNEW1604
DATE	2016-03-11
DRAWING SCALE	1" = 20'
DRAWN BY	MWF
APPROVED BY	BWM

CS0201

SHEET 1 OF 2

ATTACHMENT B
Drainage Area Plan

\\PROJECTS\NEW\NEW1604\Includes\Draw\Color_Analysis\SSSOL_0181604.dwg PLOTTED: 8/20/16 10:24 PM BY: Michael Ferraro PLOTSTYLE: Pennon1.ncs.dwg PROJECT STATUS: —

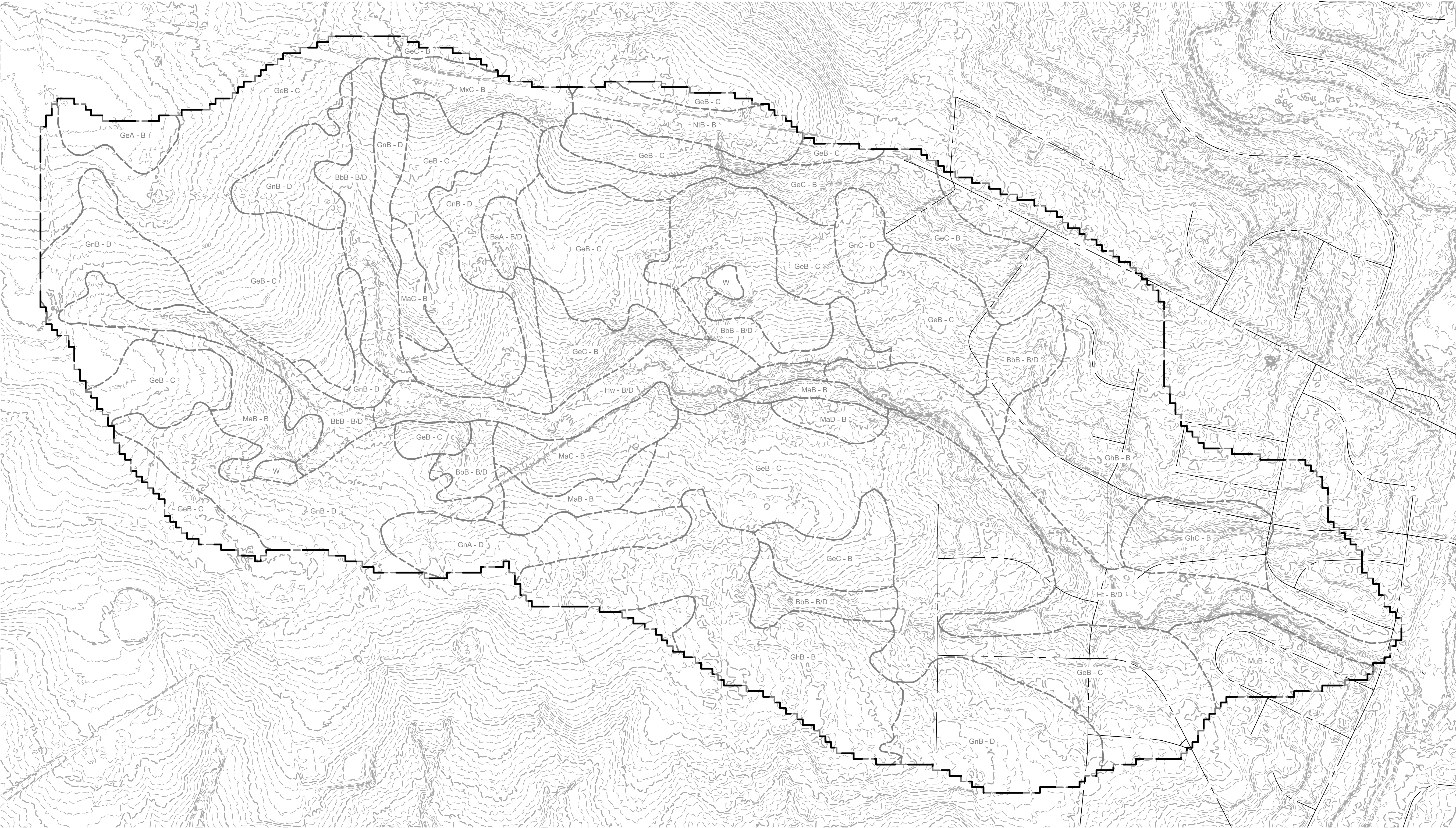
GIS DATA SOURCES:

FEMA:
ORIGIN: FEDERAL EMERGENCY MANAGEMENT AGENCY, PUBLICATION DATE:
FEBRUARY 16 2016, TITLE: NATIONAL FLOOD HAZARD LAYER (NFHL), ONLINE
LINK: [HTTPS://MSC.FEMA.GOV](https://MSC.FEMA.GOV)

LIDAR TOPOGRAPHY, ROADS, PARCELS, AND LAND USE DOWNLOADED FROM
[HTTP://OPENDATA.FIRSTMAP.DELAWARE.GOV/](http://OPENDATA.FIRSTMAP.DELAWARE.GOV/)

NRCS / USDA:
SOILS DATA DOWNLOADED FROM
[HTTP://WEBSOILSURVEY.NRCS.USDA.GOV/APP/WEBSOILSURVEY.ASPX](http://WEBSOILSURVEY.NRCS.USDA.GOV/APP/WEBSOILSURVEY.ASPX)

DRAINAGE AREA:
DRAINAGE AREA PROVIDED BY STREAMSTATS USING TIMBERLINE DRIVE
CULVERT AS DRAINAGE POINT. ([HTTP://WATER.USGS.GOV/OSW/STREAMSTATS](http://WATER.USGS.GOV/OSW/STREAMSTATS))



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TIMBERLINE DRIVE CULVERT ANALYSIS

TIMBERLINE DRIVE
NEWARK, DELAWARE

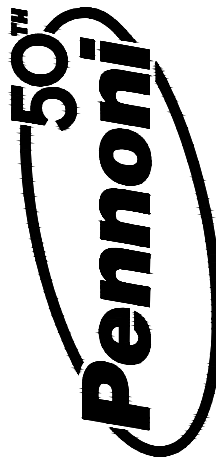
DRAINAGE AREA PLAN

CITY OF NEWARK DEPARTMENT OF PUBLIC WORKS
AND WATER RESOURCES
220 SOUTH MAIN STREET
NEWARK, DE 19711

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PROJECT	CNEW1604
DATE	2016-03-11
DRAWING SCALE	1" = 300'
DRAWN BY	MWF
APPROVED BY	BWM

DA-1
SHEET 2 OF 2



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ATTACHMENT C

General Site Location Figures

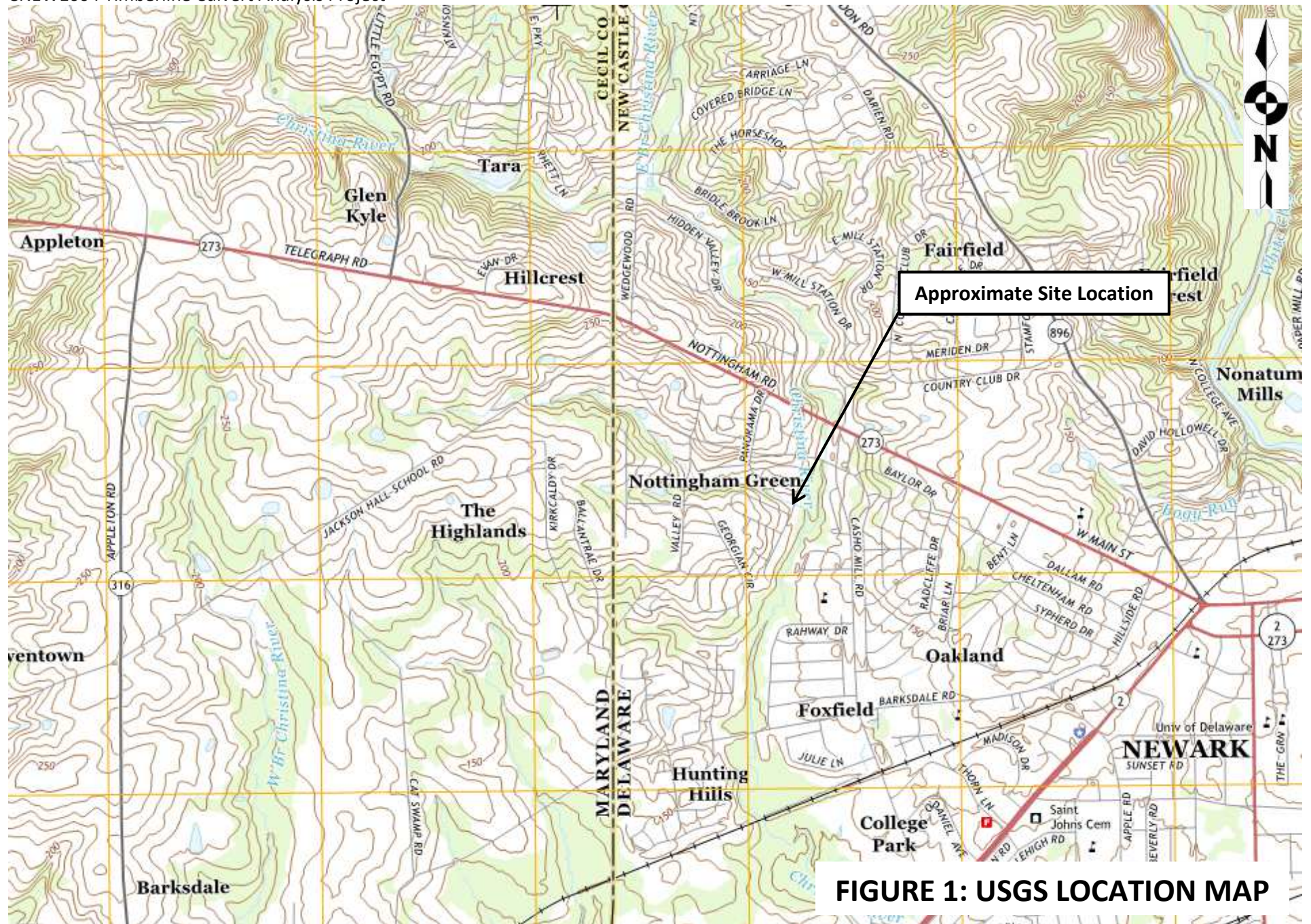
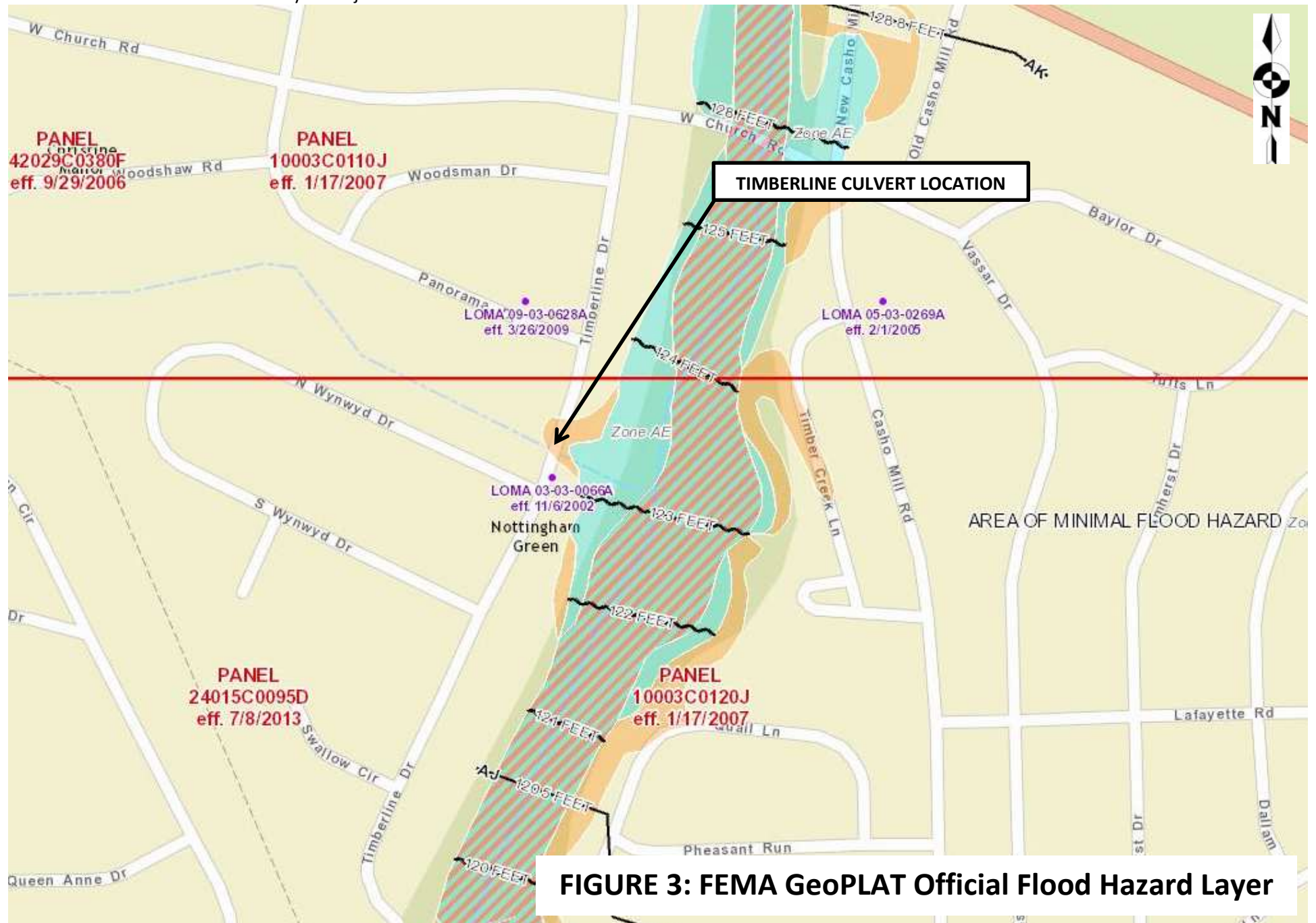


FIGURE 1: USGS LOCATION MAP



FIGURE 2: AERIAL LOCATION MAP



Hydrologic Soil Group—Cecil County, Maryland, and New Castle County, Delaware (GlobalWatershed)

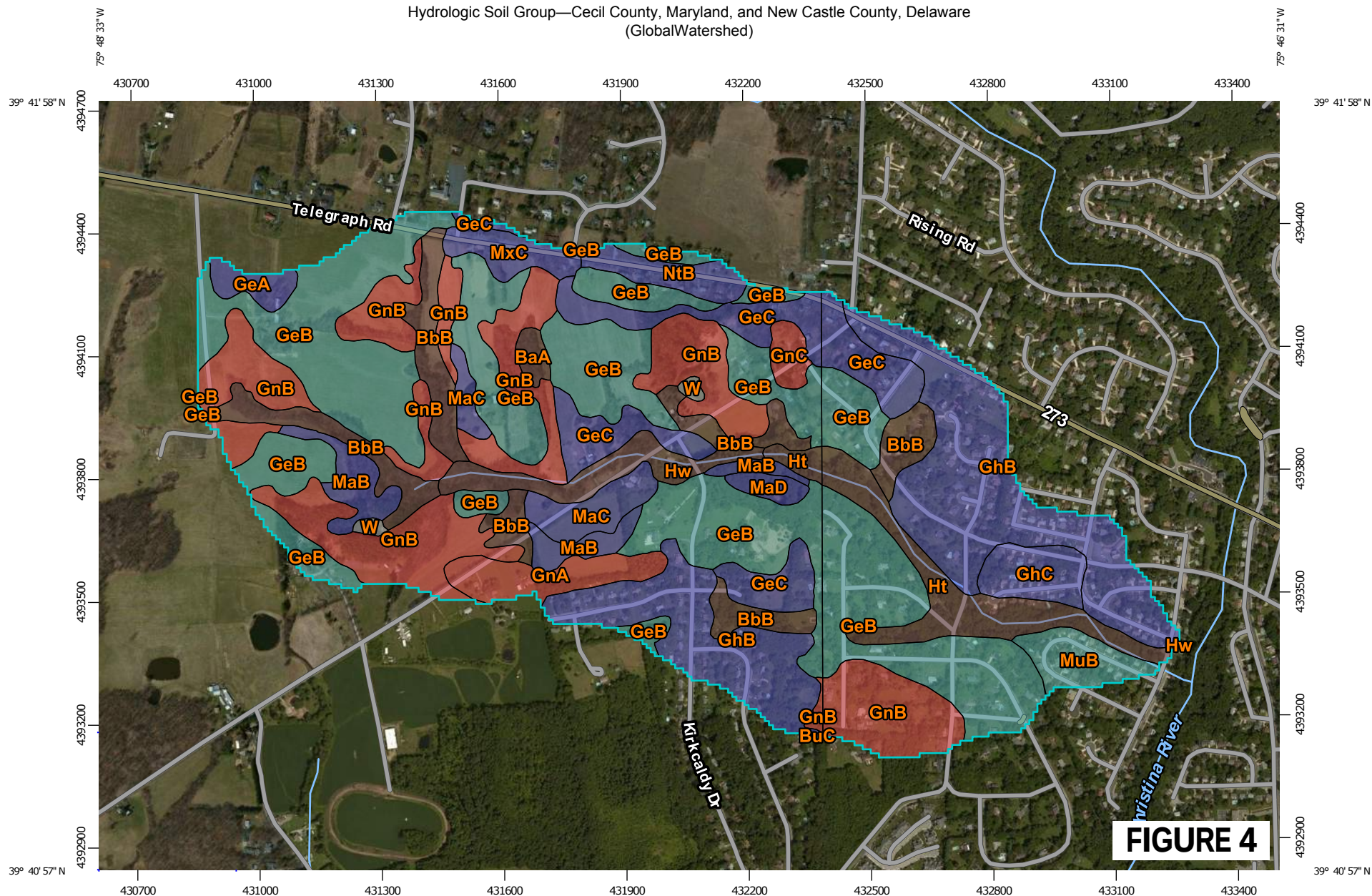
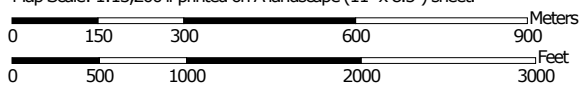


FIGURE 4

Map Scale: 1:13,200 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

3/17/2016
Page 1 of 5

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Lines

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Points

-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available

Water Features

-  Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

-  Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cecil County, Maryland
Survey Area Data: Version 12, Sep 30, 2015

Soil Survey Area: New Castle County, Delaware
Survey Area Data: Version 9, Sep 29, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 19, 2011—Sep 22, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Cecil County, Maryland (MD015)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BaA	Baile silt loam, 0 to 3 percent slopes	B/D	2.2	0.4%
BbB	Baile-Glenville complex, 3 to 8 percent slopes	B/D	28.6	5.9%
BuC	Butlertown silt loam, 5 to 10 percent slopes	D	0.0	0.0%
GeA	Glenelg loam, 0 to 3 percent slopes	B	3.9	0.8%
GeB	Glenelg loam, 3 to 8 percent slopes	C	114.5	23.5%
GeC	Glenelg loam, 8 to 15 percent slopes	B	24.9	5.1%
GhB	Glenelg-Wheaton-Urban land complex, 0 to 8 percent slopes	B	27.4	5.6%
GnA	Glenville silt loam, 0 to 3 percent slopes	D	10.3	2.1%
GnB	Glenville silt loam, 3 to 8 percent slopes	D	66.9	13.7%
GnC	Glenville silt loam, 8 to 15 percent slopes	D	3.3	0.7%
Ht	Hatboro silt loam, 0 to 3 percent slopes, frequently flooded	B/D	2.0	0.4%
Hw	Hatboro-Codorus complex, 0 to 3 percent slopes, flooded	B/D	11.1	2.3%
MaB	Manor loam, 3 to 8 percent slopes	B	12.2	2.5%
MaC	Manor loam, 8 to 15 percent slopes	B	10.2	2.1%
MaD	Manor loam, 15 to 25 percent slopes	B	2.6	0.5%
MxC	Montalto silt loam, 8 to 15 percent slopes	B	6.5	1.3%
NtB	Neshaminy silt loam, 3 to 8 percent slopes	B	6.8	1.4%
W	Water		1.3	0.3%
Subtotals for Soil Survey Area			334.8	68.8%
Totals for Area of Interest			486.9	100.0%

Hydrologic Soil Group— Summary by Map Unit — New Castle County, Delaware (DE003)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BbB	Baile-Glenville complex, 0 to 8 percent slopes	B/D	4.9	1.0%
GeB	Glenelg loam, 3 to 8 percent slopes	C	41.2	8.5%
GeC	Glenelg loam, 8 to 15 percent slopes	B	8.2	1.7%
GhB	Glenelg-Wheaton-Urban land complex, 0 to 8 percent slopes	B	47.2	9.7%
GhC	Glenelg-Wheaton-Urban land complex, 8 to 15 percent slopes	B	8.1	1.7%
GnB	Glenville silt loam, 3 to 8 percent slopes	D	15.0	3.1%
Ht	Hatboro silt loam, 0 to 3 percent slopes, frequently flooded	B/D	19.4	4.0%
Hw	Hatboro-Codorus complex, 0 to 3 percent slopes, frequently flooded	B/D	0.0	0.0%
MuB	Mattapex-Urban land complex, 0 to 5 percent slopes	C	8.0	1.6%
Subtotals for Soil Survey Area			152.1	31.2%
Totals for Area of Interest			486.9	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

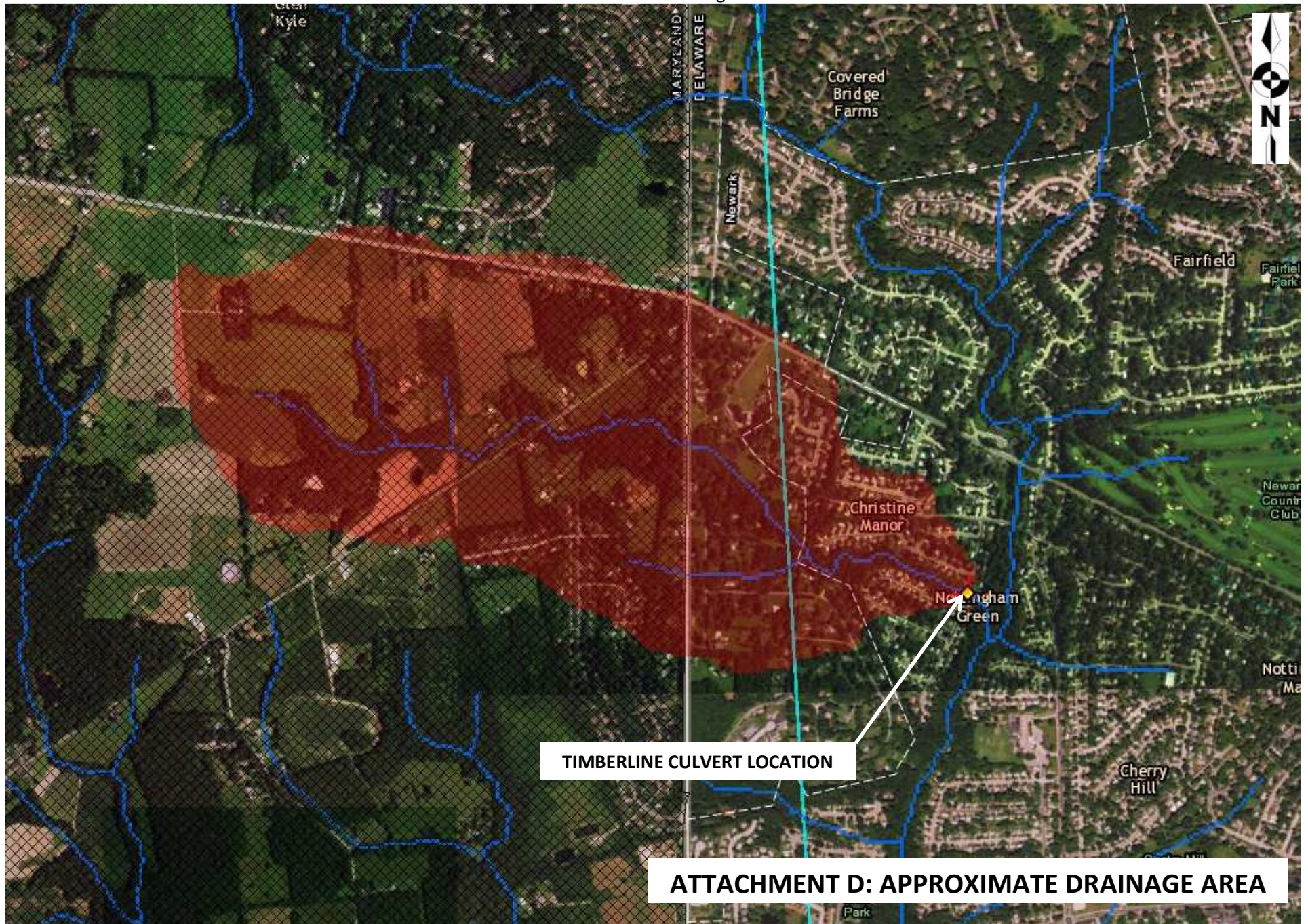
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

ATTACHMENT D

StreamStats Drainage Area and Flow Statistics

StreamStats Delaware Point Drainage Area Delineation



TIMBERLINE CULVERT LOCATION

ATTACHMENT D: APPROXIMATE DRAINAGE AREA

StreamStats Version 3.0

Basin Characteristics Ungaged Site Report

Date: Wed Apr 6, 2016 5:45:58 PM GMT-4

Study Area: Delaware

NAD 1983 Latitude: 39.6872 (39 41 14)

NAD 1983 Longitude: -75.7786 (-75 46 43)

Label	Value	Units	Definition
DRNAREA	0.76	square miles	Area that drains to a point on a stream
BSLDEM10M	5.97	percent	Mean basin slope computed from 10 m DEM
FOREST	15.1144	percent	Percentage of area covered by forest
IMPNLCD01	3.752	percent	Average percentage of impervious area determined from NLCD 2001 impervious dataset
SOILA	3.8728	percent	Percentage of area of Hydrologic Soil Type A
STORNHD	0.8222	percent	Percent storage (wetlands and waterbodies) determined from 1:24K NHD
LC11IMP	5.53	percent	Average percentage of impervious area determined from NLCD 2011 impervious dataset
LC11DEV	38.1	percent	Percentage of land-use from NLCD 2011 classes 21-24

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U.S. Department of the Interior | U.S. Geological Survey

URL: http://streamstatsags.cr.usgs.gov/v3_beta/BCreport.htm

Page Contact Information: [StreamStats Help](#)

Page Last Modified: 01/26/2016 12:44:09 (Web1)

[Streamstats Status](#)

[News](#)



StreamStats Version 3.0

Flow Statistics Ungaged Site Report

Date: Fri Mar 4, 2016 10:47:00 AM GMT-5

Study Area: Delaware

NAD 1983 Latitude: 39.6872 (39 41 14)

NAD 1983 Longitude: -75.7786 (-75 46 43)

Drainage Area: 0.76 mi²

2001 NLCD Impervious: 3.7520 percent

Peak Flows Basin Characteristics			
100% Piedmont Region (0.76 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	0.76	0.31	319
Percent Forest (percent)	15.1144	4.07	84.9
Percent Storage from NHD (percent)	0.8222	0	2.92
Percent Hydrologic Soil Type A (percent)	3.8728	0	7.22
Percent Impervious NLCD2001 (percent)	3.7520	0.1	38.3

Peak Flows Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
PK2	172	ft ³ /s	29	4.1	103	288
PK5	371	ft ³ /s	28	6.7	229	602
PK10	427	ft ³ /s	30	8.4	246	741
PK25	554	ft ³ /s	31	11	311	984
PK50	647	ft ³ /s	33	13	352	1190
PK100	745	ft ³ /s	35	14	389	1430
PK200	838	ft ³ /s	38	14	416	1690
PK500	967	ft ³ /s	48	14	447	2090

<http://pubs.usgs.gov/sir/2006/5146/> (<http://pubs.usgs.gov/sir/2006/5146/>)

Ries_ K.G._ III_ and Dillow_ J.J.A._ 2006_ Magnitude and frequency of floods in Delaware: Scientific Investigations Report 2006-5146_ 59 p.



ATTACHMENT E
Flow Master Culvert Analysis

Worksheet for Timberline Culvert

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01500	ft/ft
Normal Depth	3.00	ft
Height	3.00	ft
Bottom Width	9.00	ft
Discharge	408.85	ft ³ /s

Results

Flow Area	27.00	ft ²
Wetted Perimeter	24.00	ft
Hydraulic Radius	1.13	ft
Top Width	9.00	ft
Critical Depth	4.00	ft
Percent Full	100.0	%
Critical Slope	0.00362	ft/ft
Velocity	15.14	ft/s
Velocity Head	3.56	ft
Specific Energy	6.56	ft
Froude Number	1.54	
Discharge Full	408.85	ft ³ /s
Slope Full	0.01500	ft/ft
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for Timberline Culvert

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.00	ft
Critical Depth	4.00	ft
Channel Slope	0.01500	ft/ft
Critical Slope	0.00362	ft/ft

ATTACHMENT F
HY8 Existing Conditions Analysis

HY-8 Culvert Analysis Report

Project Notes

Project Title: Timberline Culvert Existing Conditions

Designer: WKH

Project Date: Thursday, July 07, 2016

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: Timberline Drive Culvert

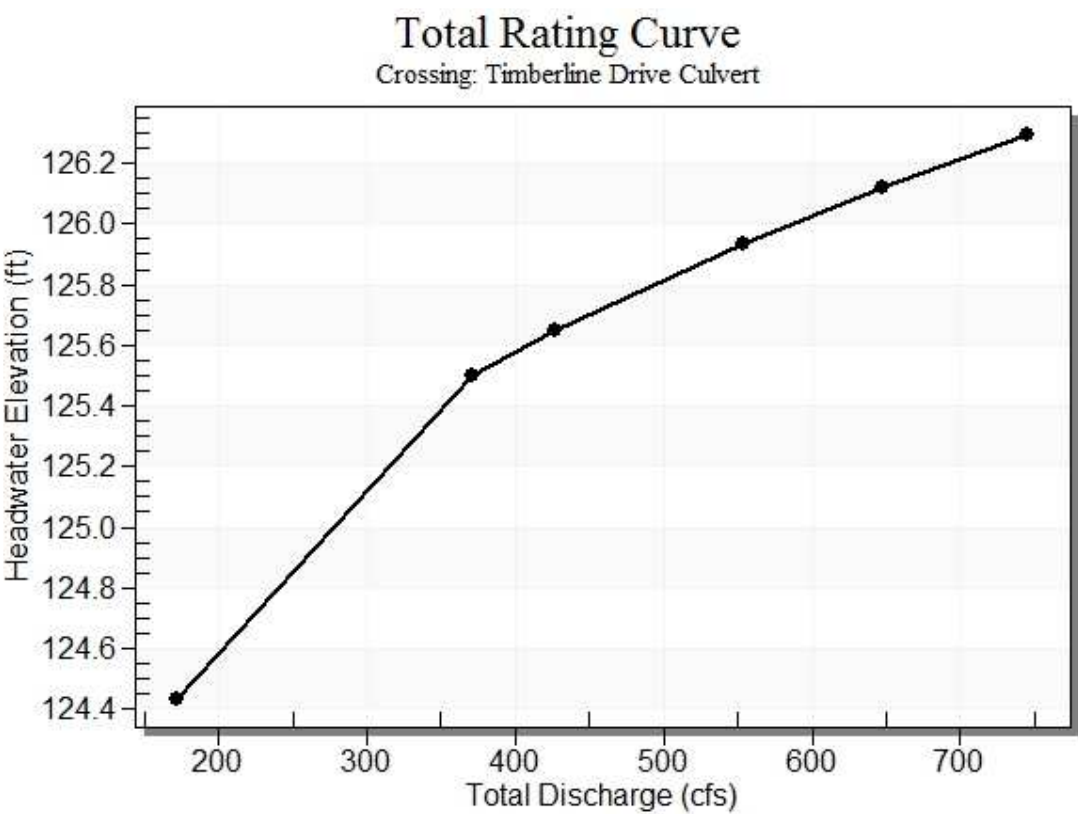
Crossing Discharge Data

Discharge Selection Method: User Defined

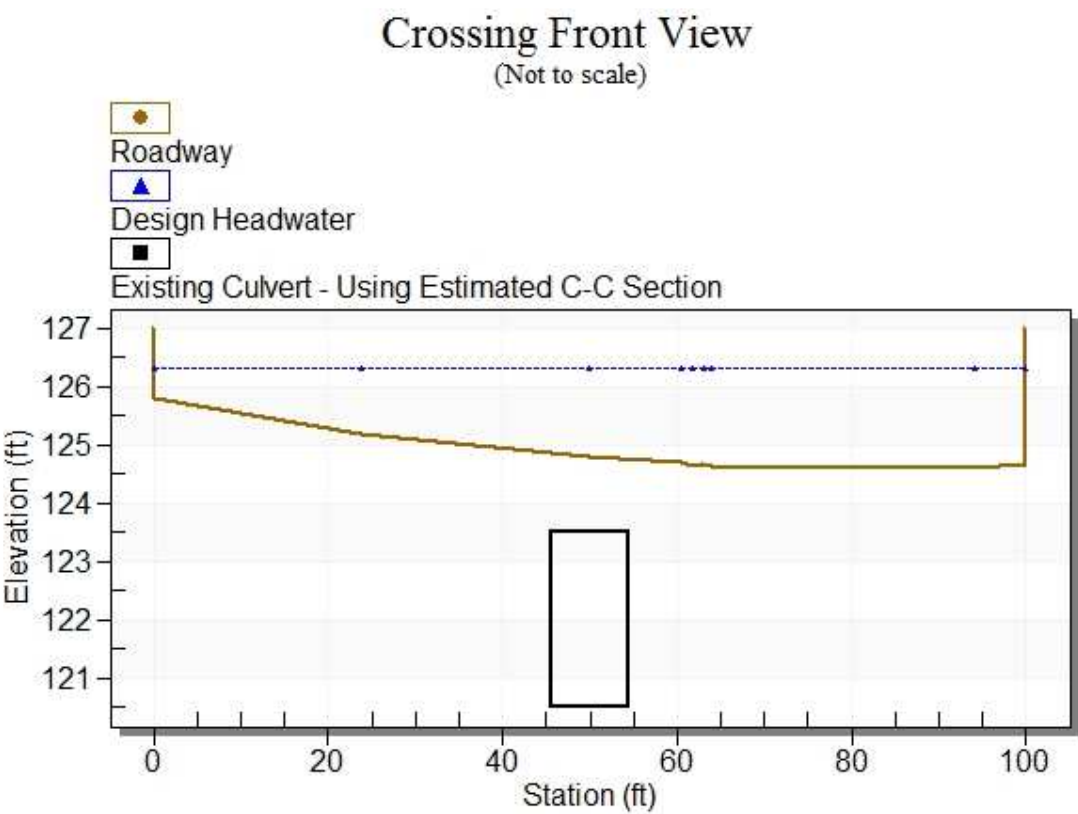
Table 1 - Summary of Culvert Flows at Crossing: Timberline Drive Culvert

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Existing Culvert - Using Estimated C-C Section Discharge (cfs)	Roadway Discharge (cfs)	Iterations
124.44	PK2	172.00	172.00	0.00	1
125.50	PK5	371.00	220.48	150.04	5
125.65	PK10	427.00	226.52	200.31	5
125.94	PK25	554.00	237.64	315.94	4
126.12	PK50	647.00	244.51	402.37	4
126.30	PK100	745.00	250.99	493.48	3
124.60	Overtopping	180.09	180.09	0.00	Overtopping

Rating Curve Plot for Crossing: Timberline Drive Culvert



Crossing Front View (Roadway Profile): Timberline Drive Culvert



Culvert Notes: Existing Culvert - Using Estimated C-C Section

Table 2 - Culvert Summary Table: Existing Culvert - Using Estimated C-C Section

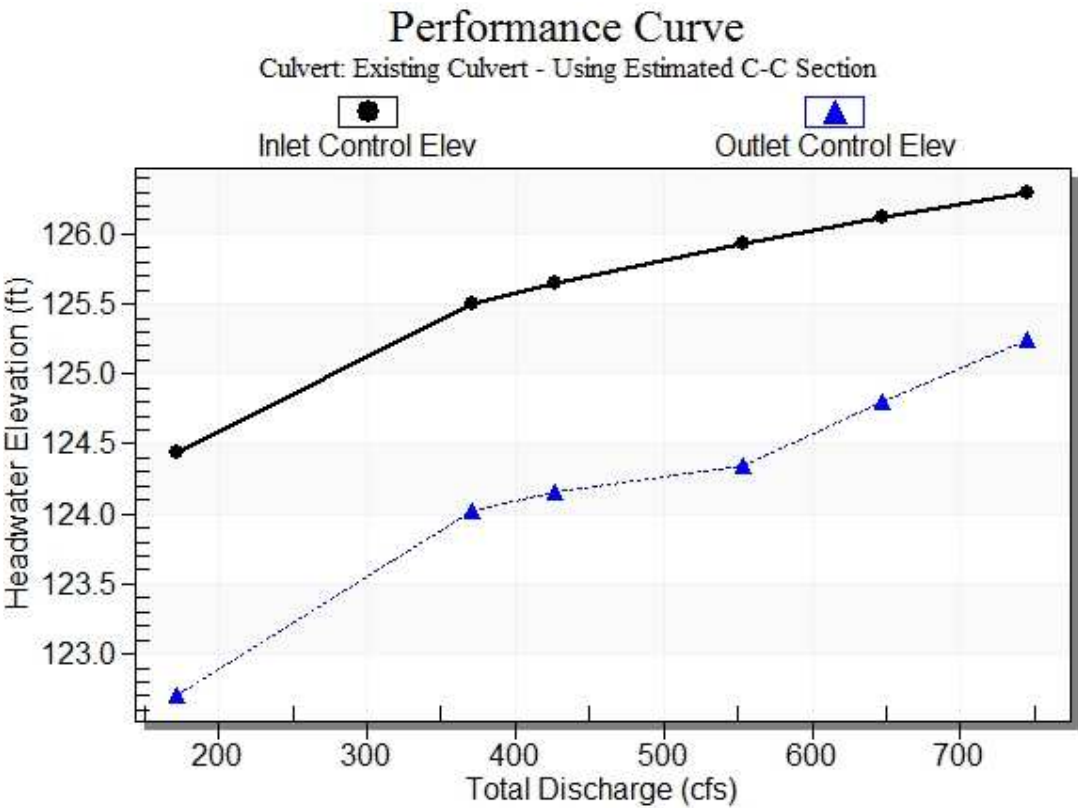
Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
PK2	172.00	172.00	124.44	3.936	2.203	5-S2n	1.336	2.247	1.528	1.795	12.504	9.535
PK5	371.00	220.48	125.50	5.001	3.526	5-S2n	1.572	2.651	1.840	2.762	13.313	12.873
PK10	427.00	226.52	125.65	5.150	3.655	5-S2n	1.602	2.700	1.878	2.993	13.400	13.593
PK25	554.00	237.64	125.94	5.435	3.851	5-S2n	1.656	2.787	1.947	3.474	13.565	15.030
PK50	647.00	244.51	126.12	5.618	4.304	5-S2n	1.688	2.841	1.988	3.797	13.664	15.888
PK100	745.00	250.99	126.30	5.796	4.751	5-JS1f	1.717	2.891	3.000	4.118	9.296	16.677

Straight Culvert

Inlet Elevation (invert): 120.50 ft, Outlet Elevation (invert): 119.30 ft

Culvert Length: 80.01 ft, Culvert Slope: 0.0150

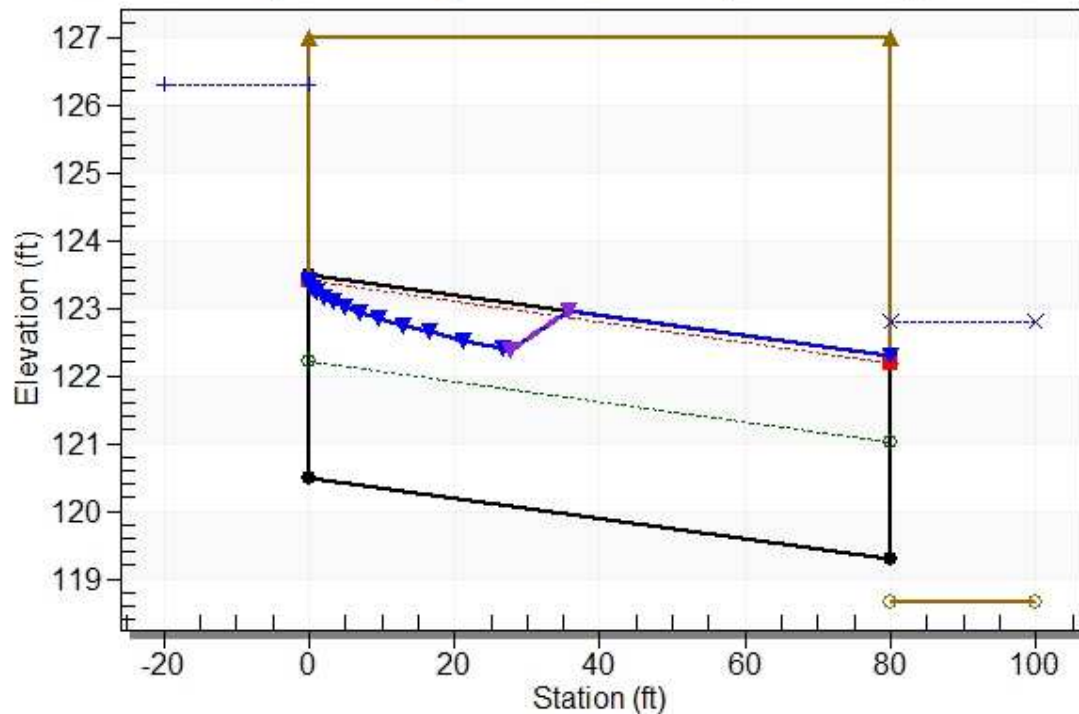
Culvert Performance Curve Plot: Existing Culvert - Using Estimated C-C Section



Water Surface Profile Plot for Culvert: Existing Culvert - Using Estimated C-C Section

Crossing - Timberline Drive Culvert, Design Discharge - 745.0 cfs

Culvert - Existing Culvert - Using Estimated C-C Section, Culvert Discharge - 251.0 cfs



Site Data - Existing Culvert - Using Estimated C-C Section

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 120.50 ft

Outlet Station: 80.00 ft

Outlet Elevation: 119.30 ft

Number of Barrels: 1

Culvert Data Summary - Existing Culvert - Using Estimated C-C Section

Barrel Shape: Concrete Box

Barrel Span: 9.00 ft

Barrel Rise: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0130

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: Timberline Drive Culvert)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
172.00	120.46	1.79	9.53	3.02	1.32
371.00	121.43	2.76	12.87	4.65	1.42
427.00	121.66	2.99	13.59	5.04	1.44
554.00	122.14	3.47	15.03	5.85	1.47
647.00	122.47	3.80	15.89	6.40	1.53
745.00	122.79	4.12	16.68	6.94	1.66

Tailwater Channel Data - Timberline Drive Culvert

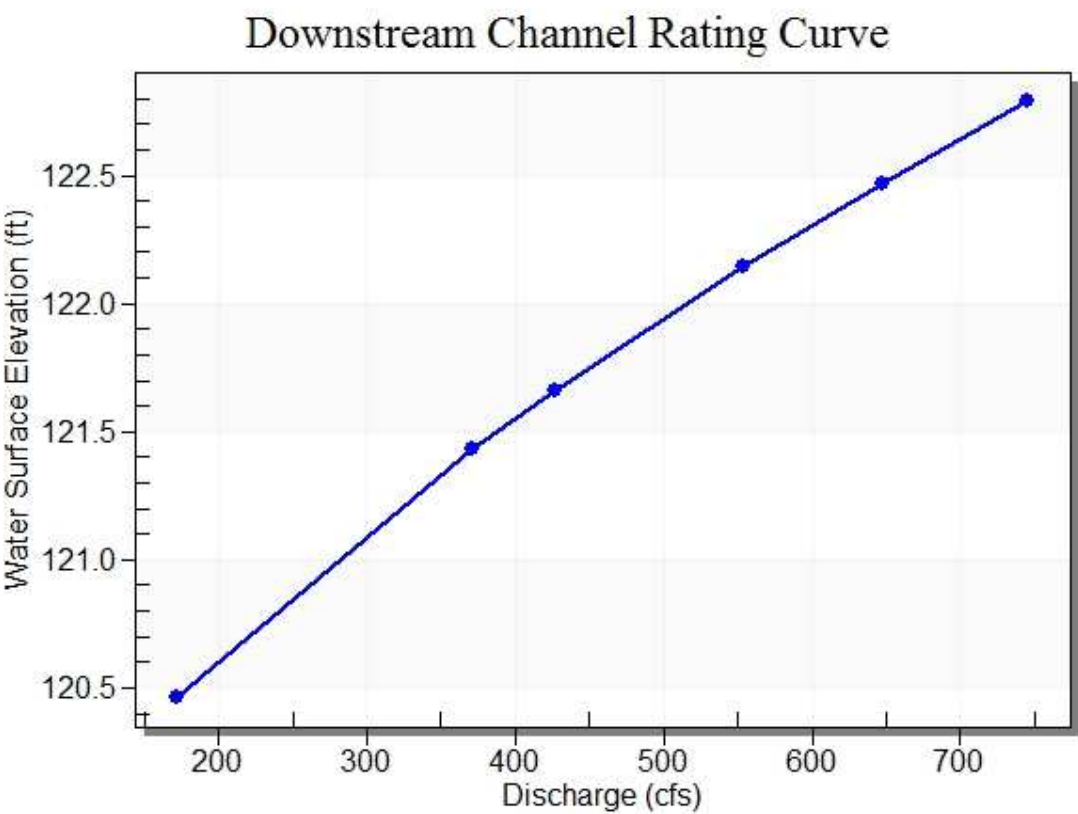
Tailwater Channel Option: Irregular Channel

Channel Slope: 0.0270

User Defined Channel Cross-Section:

Coord No.	Station (ft)	Elevation (ft)	Manning's n
1	0.00	128.49	0.0300
2	10.23	128.17	0.0300
3	24.87	126.72	0.0300
4	38.77	124.26	0.0300
5	39.82	123.75	0.0300
6	40.65	123.54	0.0300
7	42.12	123.65	0.0400
8	43.54	123.61	0.0400
9	43.72	122.20	0.0400
10	44.37	122.20	0.0400
11	44.52	119.15	0.0350
12	45.14	118.74	0.0350
13	45.88	118.67	0.0350
14	46.03	118.68	0.0350
15	50.05	118.76	0.0350
16	52.56	118.89	0.0350
17	54.25	118.87	0.0350
18	54.56	118.85	0.0350
19	55.35	119.33	0.0400
20	55.84	122.84	0.0400
21	58.91	122.74	0.0400
22	59.63	122.81	0.0300
23	61.49	122.82	0.0300
24	65.14	123.10	0.0300
25	77.33	123.62	0.0300
26	94.59	124.76	0.0300
27	97.10	125.38	0.0300
28	97.71	125.76	0.0300
29	100.00	126.25	0.0000

Tailwater Rating Curve Plot for Crossing: Timberline Drive Culvert



Roadway Data for Crossing: Timberline Drive Culvert

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	-0.01	127.00
1	0.00	125.80
2	23.83	125.18
3	49.93	124.80
4	60.55	124.71
5	61.81	124.65
6	63.00	124.66
7	63.93	124.65
8	94.22	124.60
9	100.00	124.67
10	100.01	127.00

Roadway Surface: Paved

Roadway Top Width: 80.00 ft

ATTACHMENT G
Site Photographs – Figures 1 through 8



Figure 1 - Downstream Side of Box Culvert



Figure 2 - Upstream Side of Box Culvert



Figure 3 – Upstream Box Culvert Opening (Note root growth into the culvert)



Figure 4 – Root Growth into Culvert



Figure 5 - Upstream Channel



Figure 6 - Downstream Gabion Wall



Figure 7 - Downstream Channel



Figure 8 - Gabion Wall Channel Looking Upstream



