2024 APWA Awards Program

Nomination Application For:
Project of the Year
Less than $5 Million
Community Engagement

Celadon Lane Gravity Sewer Replacement

County of Fairfax

Department of Public Works and Environmental Services

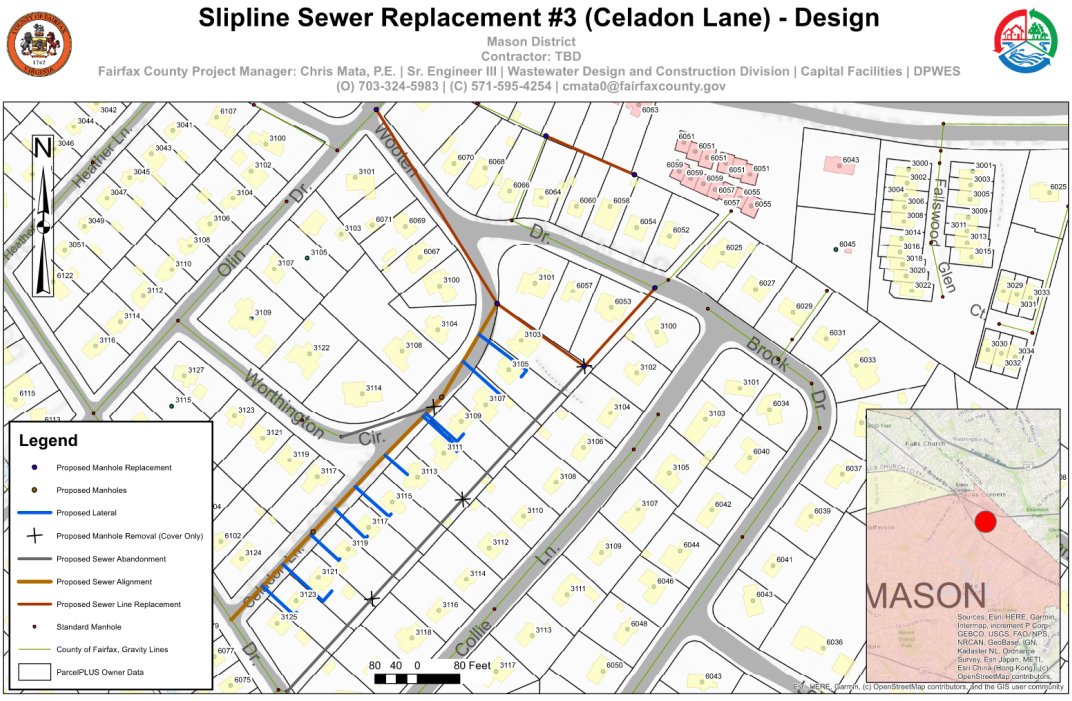
November 2023

PROJECT BACKGROUND

The purpose of the Celadon Lane Gravity Sewer Replacement Project is to replace a failing gravity sewer that runs from Wooten Drive to Brook Drive. The new replacement sewer is 8-inches in diameter and runs in the right-of-way. In addition to the replacement sewer, the project also includes installation of ten (10) new sewer house connections (laterals).

The Celadon Lane Gravity Sewer project site is located between Route 50 (Arlington Boulevard) and Route 7 (Leesburg Pike) southeast of the Seven Corners area in Fairfax County. It serves a residential area of single-family homes developed in the late 1940s. The original Celadon Lane gravity sewer (original sewer) was installed in the 1940s and slip lined with high density polyethylene (HDPE) pipe in the 1990s. It consists of 1,844 linear feet (LF) of 6-inch polyvinyl chloride (PVC) and cast iron pipe (CIP). The liner is failing in several locations which has led to back-ups of sewage into residential basements.

The original sewer runs behind the homes on Celadon Lane and Worthington Circle. It runs below backyards and under fences, which makes it difficult for Fairfax County staff to access the manholes for maintenance.



Project Location

The Seven Corners area is considered fully developed. There are no plans to increase the flows to the original sewer, so the existing capacity is expected to be adequate for the foreseeable future.

PLANNING, DESIGN, AND CONSTRUCTION PHASES

Starting in 2017, the staff engineers within the Department of Public Works and Environmental Services (DPWES) collected various maintenance records, as-builts, sewer system condition information, and other asset information from the existing asset management system database. The County retained Arcadis to assess the condition of the original sewer, evaluate rehabilitation options, and ultimately design a new sewer system.

During the early portions of the design phase the team assessed the condition of the existing pipes and manholes. The condition assessment investigation identified defects in the slipliners, multiple locations of sags in the sewer, and multiple locations where roots had penetrated the sewer through lateral connections. The pictures below capture some of the defects. The County and Arcadis determined that rehabilitating the sewer was not feasible and it needed to be replaced.

The next step of the project was to prepare a Preliminary Engineering Report (PER) to evaluate replacement of the original sewer.

Community Factor:

During this initial investigation, the project team found several instances where the failing sewer system caused residential basements to backup. This level of service to the Fairfax County residents was not acceptable and was the basis for moving forward with this critical sewer infrastructure project.

PRELIMINARY ENGINEERING REPORT AND DESIGN PHASE

PER Phase

The PER phase included evaluation of alternatives for replacing the original sewer and the preliminary design of the selected alternative. The County and Arcadis evaluated the following alternatives:

A. Replacing the original sewer in the existing alignment
    a. This alternative would have required significant disturbance to the impacted properties because of the need to excavate through backyards and to remove fences, trees, sheds, etc. Further, this alternative would not resolve the lack of access to sewer segments challenges faced by the County, and the minimal elevation difference between the sewer line and the lowest residential basements.
B. Replacing the original sewer with a new sewer in parallel with the existing alignment,
    a. Similar to Alternative A, this alternative would have required significant disturbance to the impacted properties and not resolved the lack of access to the sewer segments.
C. Replacing the original sewer with a sewer in the right of way of Celadon Lane and Worthington Circle.
    a. This alternative relocated the majority of the sewer segment onto the public

right-of-way increasing the ease of access. This alternative would require the relocation of ten (10) sewer laterals so extensive coordination with the impacted homeowners was required. Further, this alternative would allow the project team to design a new sewer line with a great distance between the lowest residential basement elevation and the sewer main (mitigating future risk of sewage back-ups into residential basements).

The County and Arcadis compared the alternatives using a total of seven categories:

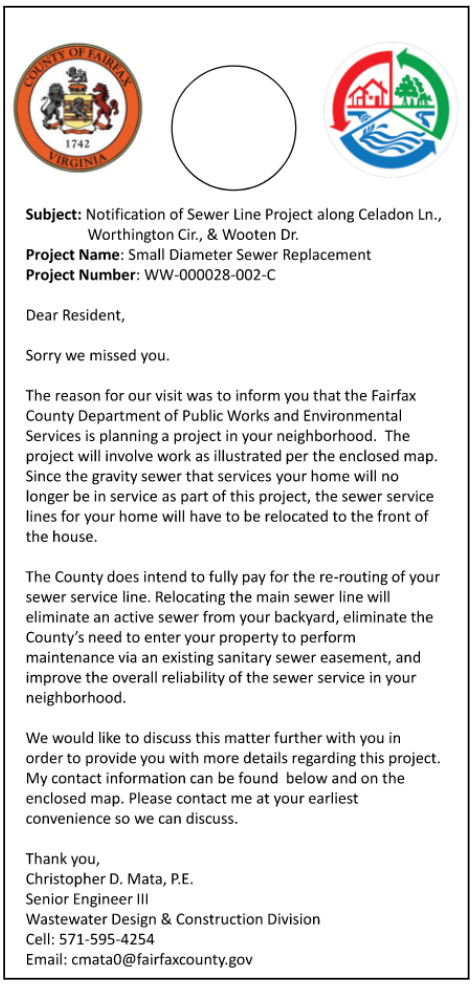
1. Constructability
2. Construction Cost
3. Permitting Requirements
4. Easement Requirements
5. Schedule
6. Community Impacts
7. Operations and Maintenance Access Needed

The desktop alternative evaluation conducted by the project team determined that the Alternative C (relocation of the existing sewer alignment to the right of way) had the best score in the comparison, so the County and Arcadis selected to install the new sewer.

<u>Community Engagement During Pre-Design</u>:

After determining the optimal technical solutions for both the community and the County, the County Project Manager (PM) initiated coordination with the Fairfax County Board of Supervisors (BOS) for the Mason District. After the meeting with the BOS office, the PM undertook a comprehensive door-to-door community survey. This involved personal visits to each impacted homeowner to engage in discussions about the County's chosen path forward.

During these face-to-face interactions, the County PM not only outlined the proposed solutions but also documented all conversations and gauged residents' sentiments regarding the sewer project.



Subject: Notification of Sewer Line Project along Celadon Ln., Worthington Cir., & Wooten Dr.
Project Name: Small Diameter Sewer Replacement
Project Number: WW-000028-002-C

Dear Resident,

Sorry we missed you.

The reason for our visit was to inform you that the Fairfax County Department of Public Works and Environmental Services is planning a project in your neighborhood. The project will involve work as illustrated per the enclosed map. Since the gravity sewer that services your home will no longer be in service as part of this project, the sewer service lines for your home will have to be relocated to the front of the house.

The County does intend to fully pay for the re-routing of your sewer service line. Relocating the main sewer line will eliminate an active sewer from your backyard, eliminate the County's need to enter your property to perform maintenance via an existing sanitary sewer easement, and improve the overall reliability of the sewer service in your neighborhood.

We would like to discuss this matter further with you in order to provide you with more details regarding this project. My contact information can be found below and on the enclosed map. Please contact me at your earliest convenience so we can discuss.

Thank you,
Christopher D. Mata, P.E.
Senior Engineer III
Wastewater Design & Construction Division
Cell: 571-595-4254
Email: cmata0@fairfaxcounty.gov

The County PM maintained a meticulous record of these interactions within a spreadsheet for future reference and analysis. In this initial round of visits, the PM successfully connected with approximately one-third of the residents. For those homeowners who were unavailable during the visit, the PM left behind a door hanger (see attached image) along with a project map, ensuring that even absent residents had access to essential project information.

This proactive outreach proved instrumental in garnering full community support, especially from those residents directly impacted by the sewer relocation project. Establishing direct communication and addressing concerns at the grassroots level fostered transparency and collaboration, laying the groundwork for a successful and community-endorsed implementation of the project.

Design Phase

The design of the new Celadon Lane Gravity Sewer posed several challenges. Re-routing the sewer to the right of way required the sewer to be deeper than is typical. It also required working with homeowners to obtain temporary construction easements (TCEs) to allow for the installation of new laterals to connect to the new sewer. The work on private property also required negotiations with homeowners about cutting down trees that would be subject to significant root damage during construction.

Date: December 13, 2019
Subject: Follow-up Visit – Seeking Existing Sewer Service Line Information
Project Name: Celadon Ln. Sewer Replacement
Project #: WW-000028-002-C

Dear Resident,

Sorry we missed you. As a follow-up to our visit earlier this year (April 2019), we are seeking information to further assist the County in the design of this sewer relocation project. The information we seek relates to the existing sewer line that exits your home and is listed below. I'd like to coordinate with you to retrieve this information.

- If facing home from the street, what direction does the sewer service line exit the home (left, right, back)?
- Does your home have a finished basement?
- Is the basement serviced by sewer?
- What is the distance from the nearest interior back corner of the home to where the sewer service line exits?

This information will be valuable for us to deliver a successful project and improve sewer service reliability for your home.

Thank you,
Christopher D. Mata, P.E.
Senior Engineer III
Wastewater Design & Construction Division
Cell: 571-595-4254
Email: cmata0@fairfaxcounty.gov

To request this document in an alternate format please call 703-324-5111, TTY 711

The County and Arcadis decided the new Celadon Lane Gravity Sewer should discharge into the existing 8-inch sewer on Brook Drive, similar to the original sewer. This decision meant that the new sewer would be deeper than typical. The new sewer is over 20 feet deep in some places in order to maintain gravity flow for all of the pipes it serves.

Re-routing the sewer from behind the homes on Celadon Lane and Worthington Circle required re-routing the laterals connecting the ten (10) homes to the new sewer. All of the lateral routes outside of the right-of-way were on private property. In order for the construction contractor to access the routes, the County reached out to the affected homeowners to obtain a TCE for each property. After the 95% design was complete, the County began the process of contacting homeowners to obtain the TCEs.

Community Engagement During Early Design:

As the design phase advanced, the project team found the need to gather more specific details concerning the existing sewer lateral for each of the ten homes undergoing line relocations. To accomplish this, the County Project Manager conducted an additional round of in-person visits, knocking on doors and seeking permission to enter homes. This hands-on approach was crucial for documenting and measuring the exit points of the existing sewer laterals accurately.

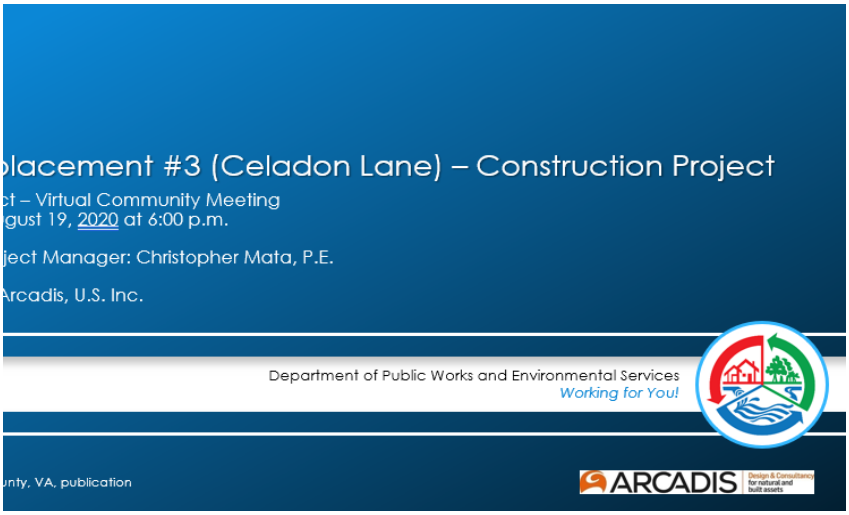
In cases where residents were not available, the Project Manager left behind door hangers containing a set of questions that required addressing. This thoughtful strategy ensured that even when direct interaction was not possible, residents still had a convenient means to provide essential information. Through this outreach effort, the County successfully captured the majority of the requested data, allowing for a comprehensive understanding of the existing sewer lateral configurations. The data obtained was meticulously incorporated into the design plans, serving as a crucial foundation for the seamless execution of the upcoming sewer line relocations. This personalized and thorough approach underscored the project team's commitment to precision and collaboration with the affected residents.

For more than a year, the County focused on getting Temporary Construction Easements (TCEs). This was a challenge because homeowners worried about major digging on their properties. Other challenges included COVID-related social distancing, home sales, and planned renovations affecting plumbing. After securing the TCEs, the County and Arcadis prepared bid documents and obtained permits for traffic control from VDOT and a Land Disturbance permit from Fairfax County.

Community Engagement Late in Design:

As the design phase approached its conclusion, the project team proactively organized two virtual community meetings to engage with the broader community. These sessions served as platforms to introduce the project, offer insights into the progress made, and outline the anticipated commencement of construction. The initial meeting unfolded in August 2020, followed by a second session in September 2020. Notably, it was during these outreach endeavors that the project team became aware of the existence of a Citizens Association unofficially representing the community.

Upon establishing communication with the Citizens Association President, the project team experienced enhanced efficacy in disseminating information to the residents through the Association's Social Media page. This newfound collaboration facilitated a

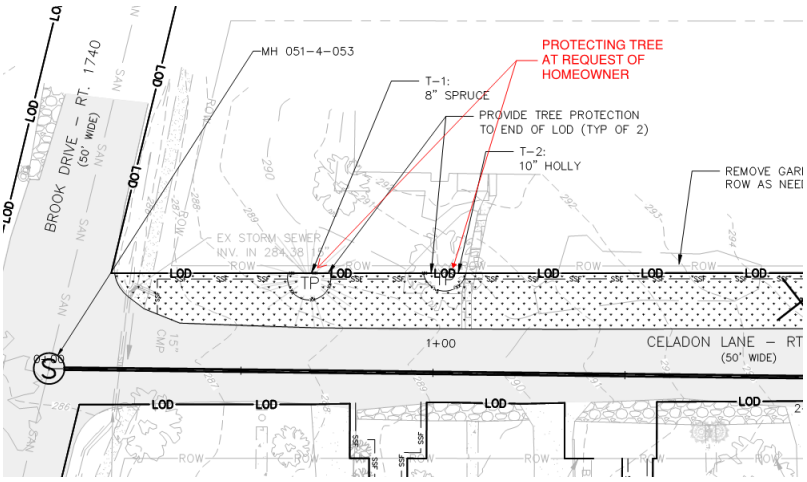


streamlined and efficient means of communication, ensuring that updates, notifications, and project-related content reached a broader audience within the community. The engagement with the Citizens Association underscored the project team's commitment to fostering transparent and accessible communication channels, reinforcing a sense of community involvement and awareness. This collaborative synergy between the project team and the Citizens Association exemplified a dynamic partnership that significantly contributed to the success of the outreach initiatives and overall community engagement efforts.

Due to the project's location within a neighborhood constructed nearly 80 years ago and the need to perform work on private property, the construction process had a substantial impact on the existing trees and landscaping. The intricate challenge arose from the presence of numerous trees within or near the sewer alignment, some of which were situated on private property, necessitating careful negotiations with homeowners for their removal. Recognizing the historical and aesthetic significance of these trees, the County engaged in collaborative discussions with homeowners to obtain consent for the removal of certain trees deemed unavoidable.

In instances where removal was not the ideal recourse, a collaborative effort between the County and Arcadis culminated in the development of a comprehensive tree protection strategy. This strategic approach was meticulously crafted to safeguard the integrity of the trees while simultaneously accommodating the exigencies of construction activities and the temporary rerouting of traffic. The goal was to strike a delicate balance, ensuring the preservation of the neighborhood's greenery while facilitating the necessary modifications for the construction process. This collaborative endeavor showcased a commitment to harmonizing

infrastructure development with environmental preservation, acknowledging the intrinsic value of the neighborhood's mature trees and landscaping.



ENVIRONMENTAL CONSIDERATIONS

The project prioritized environmental considerations throughout its various phases. This project utilized Fairfax County's newly developed Spill Prevention and Control Plan, tailored for all US EPA and OSHA-listed hazardous waste chemicals. On-site OSHA-regulated chemicals required documentation, containment, and specific spill kits. The plan outlined procedures for notification, management, and cleanup, including personnel training for potential spill cleanup operations. While sewage discharges were already highly regulated, the document aimed to manage other on-site chemicals.

Additionally, the project integrated a newly developed Fairfax County bypass pumping specification. Despite efforts to minimize its use, bypass pumping was necessary for specific connections and transfers between gravity mains. Key modifications to the specifications included defined inspection intervals, clarification of the bypass system components, documentation requirements, acceptable piping materials, pumping control allowances, and the responsibilities of the contractor setting up the bypass system. Secondary containment for pumps and fuel was also stipulated.

Since the main portions of the project required street excavation, maintaining erosion and sediment control was the primary focus. The project also involved obtaining the Certificate to Construct permit from the Virginia Department of Environmental Quality.

CONSTRUCTION PHASE

To initiate the procurement process, the project was extensively advertised across various platforms, including the eVA procurement website. In an effort to facilitate clarity and address any inquiries from potential bidders, a pre-bid meeting was convened, with attendance deemed non-mandatory. Subsequently, following the advertising phase, the project garnered two responsive bids. Fort Myer Construction Corporation (FMC) emerged as the lowest responsive and responsible bidder, submitting a bid of $3,499,479.

The bid was officially awarded in August 2022, and the Notice to Proceed was issued on October 26, 2022, marking the commencement of the project. With a defined contract duration of 450 days, the project was slated for substantial completion on January 19, 2024.

The overarching project management responsibilities were entrusted to the Fairfax County Wastewater Design and Construction Division (WDCD). Within the purview of WDCD's management role, a strategic focus was maintained on four key areas: design and construction schedule management, budget and change management, rigorous quality control, and a steadfast commitment to construction safety. These pillars of management underscored the comprehensive approach taken to ensure the successful execution of capital projects, emphasizing efficiency, fiscal responsibility, and the highest standards of construction quality and safety.

Community Engagement During Construction:

Upon the successful awarding of the contract, the project team took a proactive step by organizing a comprehensive third community meeting in March 2023. Recognizing the importance of transparent communication, especially as construction was on the horizon, the virtual assembly aimed to furnish the community with a detailed overview of the expectations associated with the

upcoming project.

This interactive session delved into various crucial aspects, covering a spectrum of topics vital to the residents' understanding and preparedness. Among the key subjects explored were the projected road closures, specifications regarding trench excavation widths, stringent safety protocols, meticulously planned traffic control measures, as well as the strategies in place for noise mitigation and vibration monitoring. By addressing these elements, the project team sought to not only keep the community well-informed but also to foster a sense of collaboration, ensuring that residents were equipped with the knowledge necessary to navigate and adapt to the upcoming construction activities seamlessly. The emphasis on virtual engagement underscored the commitment to inclusivity, allowing for a broader reach and enabling community members to participate in the discussion from the comfort of their homes.

COMMUNITY ENGAGEMENT

As detailed earlier, the community engagement initiative for this project commenced in its early stages and persisted throughout the entirety of construction. The proactive approach to community outreach enabled the project team to establish a foundation of trust and confidence with the residents, crucial for the successful execution of this vital sewer project.

An illustrative moment captured during the project is featured on the cover of this report. The photograph encapsulates a meaningful interaction where the contractor's staff graciously accepted refreshing lemonade and cups with ice from a thoughtful resident on a particularly hot summer workday. This simple heartfelt gesture resonated deeply with both the project team and Fairfax County leadership, symbolizing the positive rapport that was cultivated between the construction efforts and the local community. Such instances of camaraderie not only contributed to a favorable working atmosphere but also underscored the collaborative spirit that defined the relationship between the project stakeholders and the residents. This shared appreciation for the challenges faced during construction further solidified the commitment to open communication and mutual support, reinforcing the project's overall success.

CONCLUSION

This project demanded effective coordination and collaboration among various stakeholders, including Citizen Associations, VDOT, state and federal government bodies, designers,

contractors, subcontractors, subconsultants, and numerous individual residential property owners. Despite encountering difficulties in sewer lateral design and construction, the project team successfully upheld a positive relationship with the community by prioritizing communication and safety throughout the construction process.

Public outreach played a pivotal role in every project phase, ensuring the project team remained responsive to the community's needs. Engaging with the public not only provided valuable insights and feedback for project design and implementation but also helped minimize conflicts and disruptions. Throughout construction, the proper conveyance of wastewater was meticulously maintained, preventing upstream sewer backups and sanitary sewer overflows.

The project team demonstrated cohesion in addressing the challenges posed by the project, devising effective solutions and ultimately completing the project in a timely manner.