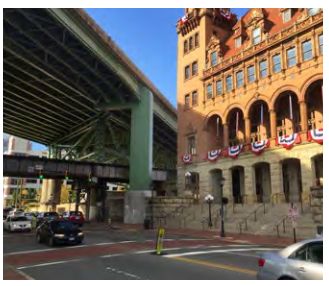
Technical Proposal > Volume I
Contract ID No. C00108069DB87

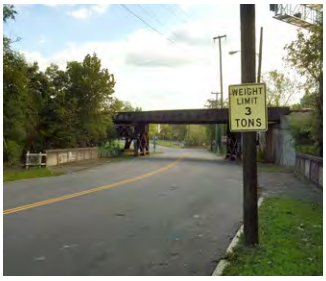
GRTC BUS RAPID TRANSIT

From Broad Street to Orleans Drive

Design-Build Project
County of Henrico & Richmond, Virginia

VDOT
Virginia Department of Transportation





LANE | in association with STV 100 Years

LANE

February 29, 2016

Bryan Stevenson, P.E.
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

Reference: GRTC Bus Rapid Transit (BRT) Project
Contract ID Number: C00108069DB87

Dear Mr. Stevenson:

The Lane Construction Corporation (LANE) is pleased to present our Technical Proposal for the above referenced Design-Build (D-B) project. Our response contains all information requested in the RFP dated November 24, 2015 and Addenda 1, 2, 3, and 4. LANE is teamed with STV Incorporated dba STV Group Incorporated (STV), Lead Designer, to provide the Virginia Department of Transportation (VDOT) a team with a solid reputation for completing complex projects innovatively, on time, and often ahead of schedule. Our Team's experience enables us to deliver the high quality and technically-sound project that VDOT, numerous other stakeholders, and the public expects. Our Team has taken every opportunity to include enhancements, provide value-added features, manage and mitigate risk, and reduce both construction and long-term maintenance costs. By focusing on our quality, safety, public information, and environmental protection programs, VDOT, the traveling public, and business and residential stakeholders will benefit from the final results of this completed project.

4.1.1 OFFEROR'S FULL LEGAL NAME AND ADDRESS

The Lane Construction Corporation
90 Fieldstone Court
Cheshire, CT 06410

4.1.2 DECLARATION OF INTENT

It is the Offeror's intent, if selected, to enter into a contract with VDOT for the Project in accordance with the terms of this respective RFP.

4.1.3 120 DAY DECLARATION

Pursuant to Part 1, Section 8.2, we declare the offer represented by the Technical Proposal will remain in full force and effect for 120 days after the date of the Technical Proposal is actually submitted to VDOT.

4.1.4 OFFEROR'S POINT OF CONTACT INFORMATION

Mr. Donald E. Bryson, Jr. is the authorized representative and point of contact for the LANE Team for all matters associated with this Technical Proposal.

Donald E. Bryson, Jr., Pursuit Manager
14500 Avion Parkway, Suite 200
Chantilly, VA 20151
Tel: (703) 222-5670 Fax: (703) 222-5960
Email: DEBryson@laneconstruct.com

4.1.5 OFFEROR'S PRINCIPAL OFFICER INFORMATION

Mr. Mark A. Schiller is a Principal Officer of LANE.

Mark A. Schiller, Senior Vice President
14500 Avion Parkway, Suite 200
Chantilly, VA 20151
Tel: (703) 222-5670 Fax: (703) 222-5960
Email: MASchiller@laneconstruct.com

4.1.6 INTERIM MILESTONE AND FINAL COMPLETION DATES

In accordance with RFP Section 2.3.1, LANE proposes an Interim Milestone Date of March 30, 2018 and a Final Completion Date of June 30, 2018.

4.1.7 PROPOSAL PAYMENT AGREEMENT

An executed Proposal Payment Agreement (Attachment 9.3.1) can be found in the Appendix of Volume 1.

4.1.8 CERTIFICATION REGARDING DEBARMENT FORMS

Certifications for Debarment for both Primary and Lower Tier Transactions have been completed and executed for the Offeror and all subconsultants, subcontractors, and other entities as identified as members of the LANE Team. These can be found in the Appendix of Volume 1.

The LANE Team appreciates the opportunity to present our Proposal for this extremely important project. We look forward to working closely with VDOT and the stakeholders in our development and delivery to make the GRTC BRT project a landmark success for the citizens of Virginia.

Respectfully submitted,

Donald E. Bryson, Jr.
Pursuit Manager
The Lane Construction Corporation

4.2 OFFEROR'S QUALIFICATIONS

4.2.1 QUALIFICATIONS OF KEY PERSONNEL

LANE confirms all information presented in the Statement of Qualifications (SOQ) remains true and accurate in accordance with Part 1, Section 11.4. As demonstrated in the organizational chart presented on the following page, the Team proposed by LANE, including but not limited to our organizational structure, lead contractor, lead designer, key personnel, and other individuals identified pursuant to Part 1, Section 4.2, will remain intact for the duration of the contract.

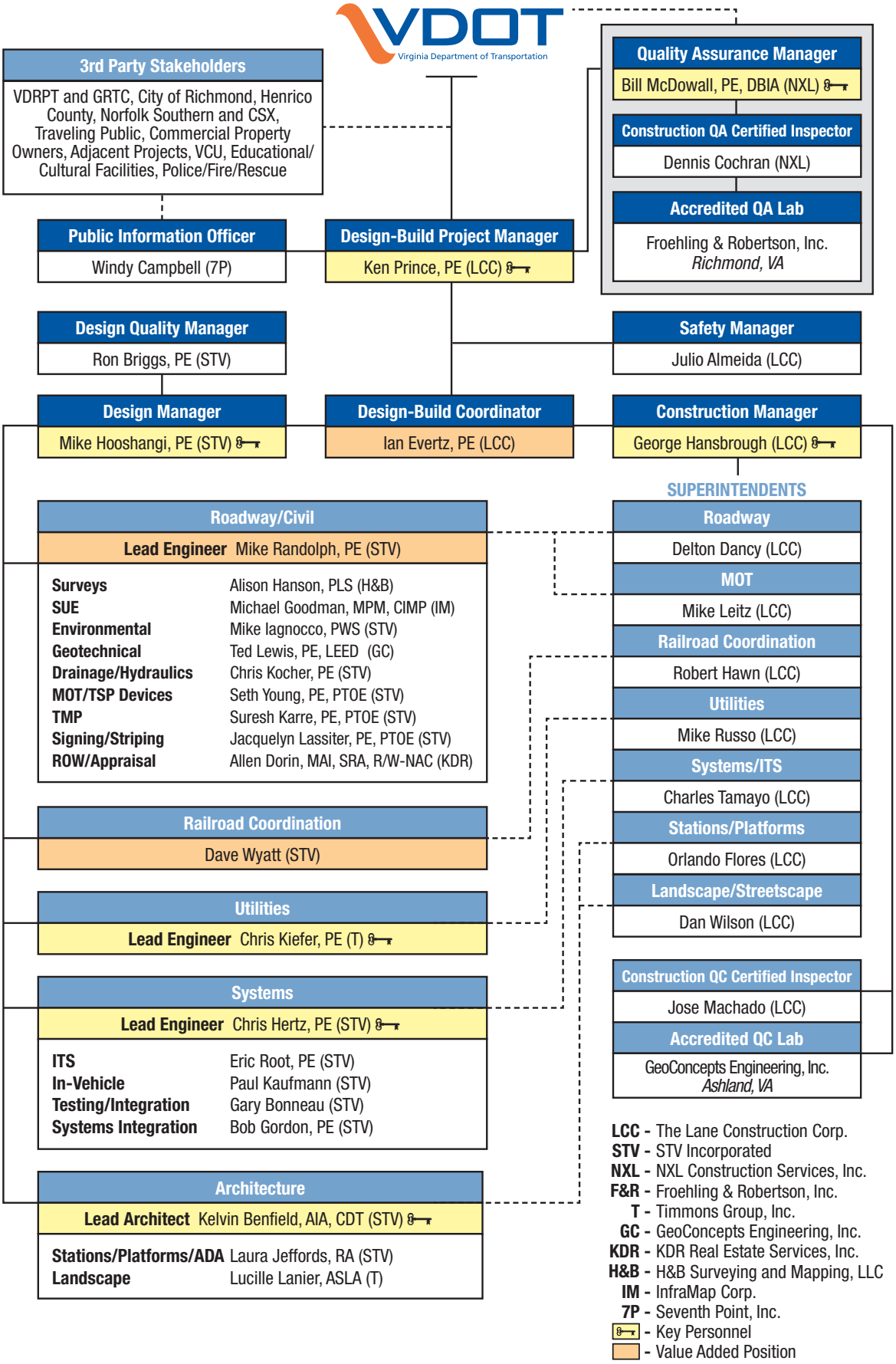
There are no personnel changes from the SOQ submitted to VDOT in November 2015.

4.2.2 ORGANIZATIONAL CHART

Under the leadership of our Design-Build Project Manager (DBPM), Ken Prince, PE, the LANE Team is structured to effectively manage and deliver the design and construction of this project. The LANE Team is organized to provide VDOT with a single-source point of contact, responsible for all design and construction activities. Our Team organization has a straightforward chain of command, with individual tasks and functional responsibilities clearly identified. This organizational chart identifies key personnel and major functions to be performed for the successful management, design, and construction of the project.

Though reporting relationships are rigid, the lines of communication within the team will remain fluid and flexible to meet the requirements of each individual project task. In order to prevent unnecessary project delays, at times it may be prudent for other members within the LANE Team to communicate directly with their counterparts at VDOT. This will be directed and authorized in advance by Mr. Prince and VDOT's Project Manager.

4.2.2 ORGANIZATIONAL CHART



4.3 DESIGN CONCEPT

INTRODUCTION OF DESIGN STRATEGY

The LANE/STV Team successfully delivered the first BRT in the Commonwealth—Route 1 in Alexandria.

The GRTC BRT project is another critical step forward in addressing the region's mobility issues. The LANE Team is very familiar with the existing corridor and the planned improvements. In addition to numerous shared transportation projects, LANE and STV also successfully delivered the first BRT in the Commonwealth (Route 1), running through a highly congested section of Alexandria. STV has delivered transit (BRT and LRT) projects across the nation, and our Team's collective experience with BRT systems will facilitate a design to minimize impacts to the traveling public and provide long-term asset performance and durability, while delivering an efficient design to VDOT, the City of Richmond, and other stakeholders.

Our Design Concept is shown in Volume II – Conceptual Plans, and provides a comprehensive product including various enhancements:

- Providing early work packages for the station foundations and columns to provide schedule acceleration
- Implementing mitigation strategies that reduce impacts to utilities
- Reducing the total linear feet of boring and days of traffic control up to 50% by using our Falling Weight Deflectometer (FWD) approach

4.3.1 CONCEPTUAL ROADWAY PLANS

The LANE Team's Conceptual Roadway plans meet or exceed all RFP requirements. Our concept does not include design elements requiring design exceptions or design waivers beyond what is shown in the RFP documents.

Conceptual Roadway Plans – Base Scope (Provided in Volume II)

The Conceptual Plans summarize the individual design elements and conform to AASHTO, VDOT and RFP requirements, including those listed in RFP Part 2, Attachment 2.2.1. Enhancements to the RFP Plans are highlighted in our Conceptual Roadway Plans. Plans will be prepared using AutoCad and provided in .dwg and .pdf formats, as well as paper prints at the submission milestones outlined in the RFP. Record plans depicting the as-built condition will be provided in accordance with VDOT requirements.

(a) General Geometry including the Number and Widths of Lanes

STV understands that a combination of design standards will be used for this Project. VDOT and Henrico County design standards will govern from Byrd Avenue to the Henrico County/City of Richmond border. Within the City of Richmond, AASHTO geometric standards will govern.

The general geometry and roadway widths are depicted on the typical sections found in Volume II. For the two mixed traffic segments, no changes to the number of lanes or lane widths are proposed.

For the dedicated transitway segments (curb and median running), generally two through lanes and one BRT lane are provided in each direction. Left and right turn lanes are provided at select intersections and are detailed in Volume II.

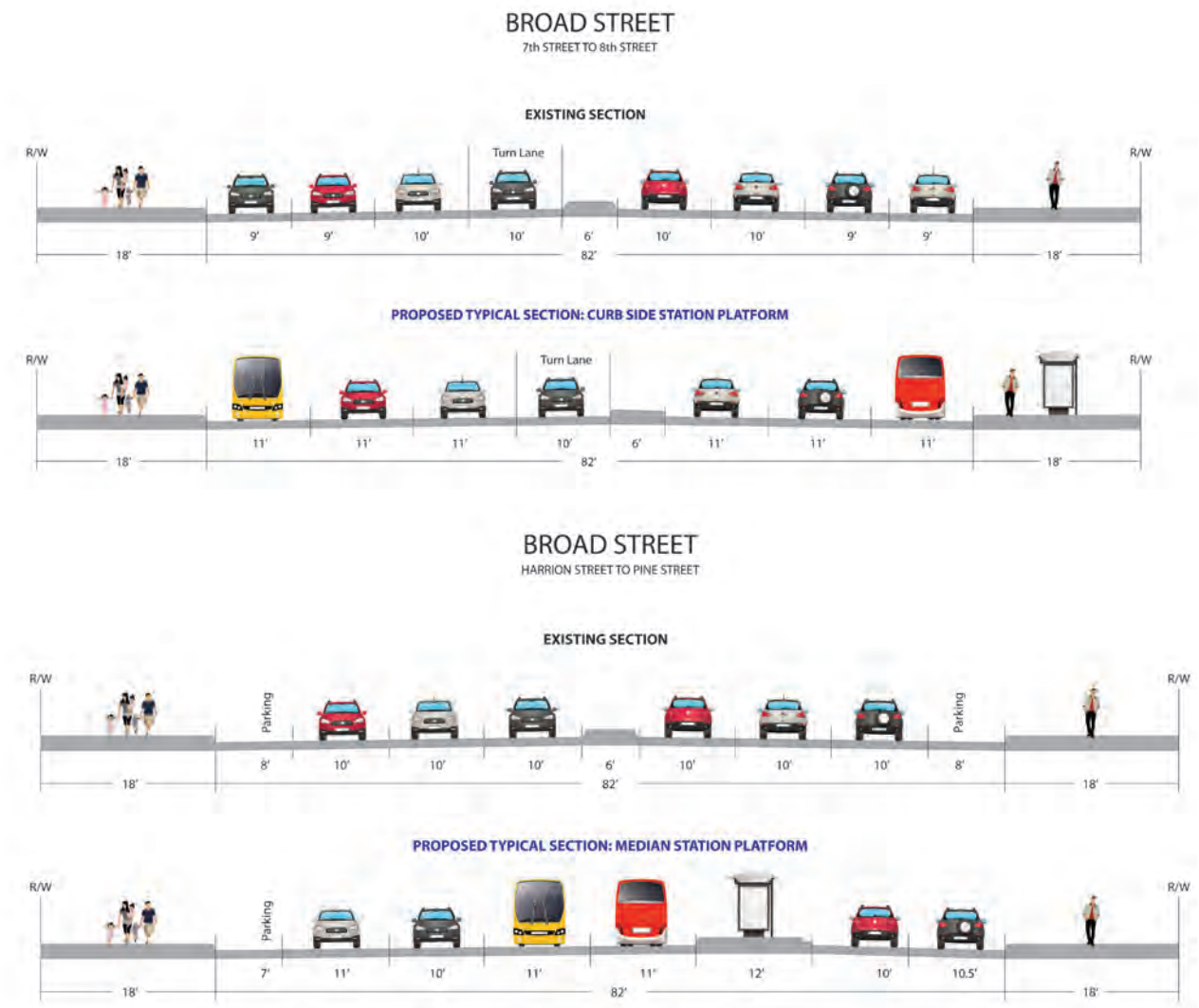
For the median running transitway segments (North Thompson Street to Foushee Street), lane widths for mainline Broad Street vary from 9 to 11 feet and the dedicated BRT lanes are 11 feet. For the curb running transitway segments (Foushee Street to Old 14th Street), mainline Broad Street and the dedicated BRT lanes are 11 feet with left turn lanes 10 feet as detailed in the Typical Sections and Conceptual Roadway Plans in Volume II.

(b) Horizontal Alignments

The proposed horizontal alignments are consistent with the RFP Conceptual Plans provided by VDOT.

(c) Typical Sections of the Roadway Segments

Typical Sections for each segment of roadway for the Project are provided in the Conceptual Roadway Plans in Volume II.



Curb side station platform typical (top); median station platform typical (bottom)

(d) Conceptual Hydraulic and Stormwater Management Design

We will develop drainage and stormwater management plans for each station per the design guidelines of the City of Richmond, Henrico County, and VDOT. We will incorporate an environmentally sensitive design (ESD) with a low impact design (LID) approach for each station to the maximum extent practicable (MEP) to control and treat stormwater from redevelopment. The BRT corridor design will fall under linear development requirements which control post development stormwater runoff in accordance with a site-specific stormwater management plan. The project includes a total of 14 BRT stations with a total 26 separate platforms which fall within either the Municipal Separate Storm Sewer System or the Combined Stormwater Sanitary Sewer areas.

Our design concept uses the existing storm drain system (curb inlets, pipes, and manholes) to the maximum extent possible to reduce the cost and keep land disturbance for each BRT station to a minimum. Per our initial study and analysis of the drainage system, we do not anticipate any change to the pre-development runoff characteristics of the land surface after the completion of construction and final stabilization. Our hydraulic and stormwater management design concept has been incorporated into the Conceptual Roadway Plans.

(e) Right of Way Limits

The proposed improvements are within the right of way limits shown in the RFP Conceptual Plans. The proposed permanent, temporary construction, permanent drainage, and utility easements are detailed on the Conceptual Roadway Plans in Volume II.

(f) Modifications to any Existing or New Medians

For the dedicated transitway segments (curb and median running), the existing median will be removed and a new median will be constructed per the Typical Sections and Conceptual Roadway Plans in Volume II.

For the median running transitway segments (North Thompson Street to Foushee Street), the new median will vary from 2 feet to 4 feet between BRT stations and widen to 11 feet at each BRT station platform.

For the curb running transitway segments (Foushee Street to Old 14th Street), the new median will vary from 4 feet to 15 feet (6 feet typical).

The LANE/STV Team provided median running stations within the Alexandria BRT corridor.

(g) Milling and Overlay Limits

Milling and overlay limits will be as shown on the Conceptual Roadway Plans in Volume II.

(h) Limits of Proposed Full Depth Pavement

The limits of full depth pavement are shown on the Conceptual Roadway plans in Volume II. Full Depth asphalt pavement is proposed along Broad Street in locations where existing medians and curb lines are being demolished to provide additional travel lane widths. Additional full depth asphalt pavement is proposed along Main Street/Old Osborne Pike at Orleans Street to provide left turn lanes. Full depth concrete pavement bus pads are proposed at each station along Broad Street and Main Street.

(i) Sidewalk

We are providing sidewalk connections to each proposed BRT Station as required by the RFP and shown on the Conceptual Roadway Plans in Volume II.

(j) Curb Ramps

We are providing curb ramps at each intersection as required by the RFP and shown on the Conceptual Roadway Plans in Volume II.

(k) Entrances or Driveways

All entrances and driveways are maintained as per the RFP Conceptual Plans. Some driveways and entrances are reconstructed to facilitate pedestrian movement as detailed in the Conceptual Roadway Plans in Volume II.

(l) Curb

Curb reconstruction is detailed in the Conceptual Roadway Plans in Volume II.

(p) Pavement Markings

Pavement markings will be installed as detailed in the Conceptual Roadway Plans in Volume II.

(q) Proposed Utility Impacts

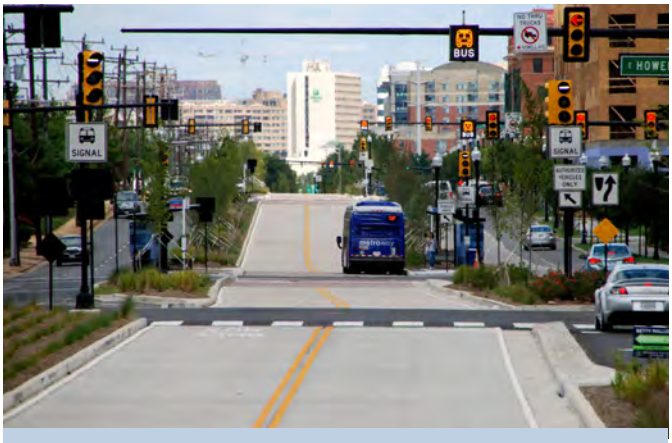
Identification of potential utility conflicts, evaluation of the potential conflicts, and resolution of them (as necessary) as early as practical is our goal to provide the necessary lead time to allow for the adjustments to take place well ahead of the selective critical path items involved in this complex project.

The LANE Team is in communication with the utility companies in the corridor, and coordination has already begun.

To meet the aggressive completion schedule, our design has and will minimize utility impacts wherever possible. We have met with each of the utility owners along the corridor to identify and possibly avoid the needs for disruptions and relocations of their facilities. In our meetings with the utility owners we gained extensive knowledge of the utility impacts that will be encountered, what measures can be used for avoidance and when unavoidable, how to most efficiently mitigate the conflict with the least impact to the project, the facility owner, and VDOT.

The LANE Team has performed an in-depth conflict analysis of all utilities in the corridor and developed strategies to address the conflicts. Due to the condensed schedule involved with this project, it is vital to the success of the project to successfully manage, direct and prioritize all dealings associated with the various utility providers throughout the project corridor. Our team is focused first on minimizing the conflicts where possible and creating solutions that would best benefit the accelerated schedule. A detailed matrix in Section 4.4 demonstrates the extensive array of utilities, impacts, and mitigation strategies. **Advanced communications and coordination has already begun**; utility conflicts summaries are presented below.

Verizon – We are able to avoid most of the telecommunications lines owned and operated by Verizon but there are a few items that will need to be coordinated with them. At the Willow Lawn Station, the duct bank line will need to be relocated out from under the proposed station limits. The relocation of this line will need to be coordinated with Henrico County DPU as we will need to move their waterline in the same area for the same reason. In addition, at the Staples Mill West Station, we have spoken with Verizon and they will need to abandon their old line under the proposed station and disconnect the stub line inside the manhole located at the eastern end of the run.



The LANE/STV Team effectively mitigated numerous utility impacts along the busy Route 1 BRT corridor in Alexandria.

Lastly, at the Main Street East station the Verizon vault will be avoided so that the manhole vault and associated duct banks are not affected, averting potential schedule delays. Our proposed final station layout will avoid direct conflict with the vault.

Kinder Morgan Plantation Pipeline (KMPP) – There is only one conflict location between the planned work and this utility provider and it is at the Rocketts Landing station. The current line is not in service today but KMPP wants to keep the opportunity to reactivate the line in the future. The line will need to be offset to get out from under the station and the footers. This process will be coordinated early on in the schedule to allow for the relocation by KMPP to be designed, bid and constructed ahead of time.

Dominion Resources (DR) – It is vital to the project schedule to minimize disruptions and potential relocations or adjustments to the DR facilities throughout the corridor. At the Staples Mill West station, we plan to coordinate with DR to temporarily de-energize an overhead line for a brief period while we are setting the station in place. At the Allison Street West station, we plan to secure test holes to verify the location of the duct bank and then situate the station to avoid having to adjust the station. Similarly at the 3rd/4th Street West station, the 9th Street West station, the Main Street East station, the 24th Street West station, and the Rocketts station, we will verify the locations of the lines and situate the footers of the station to avoid having to adjust the duct banks. Additionally, at the Main Street East station, we will coordinate to have one power pole moved back. Lastly, at the 24th Street West station, we propose a slight shift in the station transition ramp to avoid having the DR manhole frame and cover placed on uneven ground.

AT&T – Many of the AT&T facilities are housed within the Verizon duct banks throughout the corridor and therefore will be adjusted or secured along with the Verizon lines. At the 9th Street East station, the RFP plans state that there is one AT&T line that will need to be avoided by the construction. In speaking with the representatives of AT&T, they indicate that this line is abandoned and no longer in service. We plan to verify this in final discussions with AT&T at the onset of the Project.

County of Henrico (Public Works Department) – A small portion of the Project extends into Henrico County (out of the City of Richmond) on the western end. Henrico owns and operates its own waterline in this vicinity. At the Willow Lawn station, the existing 12-inch watermain will need to be relocated with an offset to be a minimum of 10 feet from the station. This work will be designed and constructed by the D-B team in coordination with the Henrico County Public Works Department.

City of Richmond (Department of Public Utilities)

A. Waterline – Our Team will continue to coordinate with the Department of Public Utilities (DPU) on the waterline items that need to be relocated and/or adjusted. The City is in final stages

of design development for plans to relocate the 12" watermain that would be situated under the Robinson Street East station. They plan to move this line by July 30, 2016. One of the most critical elements of the station layout and construction is at the same station. It is vital that we design and construct the foundations at this station to avoid impacts to the existing 36" watermain. All remaining adjustments to existing waterlines, service lines, and associated appurtenances will be designed by, coordinated by, and constructed by our Team. The watermain offsets will be completed to stay a minimum of 10' off the stations for future maintenance considerations. Adjustments are to be performed at the following stations: Staples Mill East, Allison Street West, Adams Street West, Adams Street East, 12th Street East, and Rocketts Landing. Other adjustments (service line, fire hydrant, etc.) will be made at the following stations: Staples Mill East, Cleveland Street West, Shafer Street East, Adams Street East, 3rd/4th Street West, and 3rd/4th Street East.

B. Sanitary Sewer/Storm Sewer/Combined Sewer – At the Staples Mill West station, our Team will design and construct the foundations of the station to avoid impacts to the existing 12" Sanitary Sewer line. There are several stations (Staples Mill East, Cleveland Street West, Cleveland Street East, Robinson Street West, 3rd/4th Street West, 3rd/4th Street East, 9th Street East, and 12th Street West) where the City of Richmond will complete the cured-in-place linings (MH to MH) by September 30, 2016. There are two stations (Robinson Street West and Allison Street West) that our Team will design and construct the foundations to avoid impacts. There are several stations (Staples Mill East, 3rd/4th Street East, 9th Street East, 12th Street East, and 24th Street East) where the D-B team will place protective casings around the service laterals. Our Team will perform a structural analysis of the new tie to the 27'x15' CSO line and 17'x12' CSO line to ensure that the new tie in will not cause issues.

C. Lighting – The orangeburg material duct bank between Laurel and Sheppard Street will be replaced by the D-B Team along with the associated station construction as well as new median work. We will coordinate the placement of the new lines with associated junction boxes and then coordinate with the DPU to have their crews pull the facilities through the newly provided duct work. At the 12th Street East, Main Street West, 12th Street West stations and 24th Street East, our Team will coordinate with DPU to construct a new conduit for them to pull through each facility as well. In addition, our Team will remove all of the poles and associated luminaries (ornamental and functional) in conflict with our design and coordinate the relocation and re-setting of these lines to provide "in kind" lighting coverage.

D. Traffic – There are many instances along the corridor where the traffic communications lines and the lighting power lines share a duct bank. The RFP indicates where the traffic conduits will need to be split off from the lighting duct bank, while maintaining communications throughout the signal network systems.

E. Natural Gas – Gas line adjustments are necessary at many of the station locations including Staples Mill East, Cleveland Street East, Cleveland Street West, Robinson Street West, Adams Street West, 3rd/4th Street West, 9th Street West, 12th Street West, and Route 5 East. The City of Richmond DPU is in design development of these adjustments at the time of the RFP. Our Team will coordinate with DPU and verify that the planned improvements will suffice for our final design to avoid rework.

Miscellaneous – There are other unknown lines and stray telecommunication lines (Windstream, Lumos, Level 3, etc.) that will also be coordinated and verified that they are abandoned or have been successfully relocated into the Verizon duct banks throughout the corridor. In addition, we will coordinate with the City arborist to have trees removed within the corridor to have "in kind" mitigation replacements performed.

(r) Station Locations

The Station locations are detailed in the Conceptual Roadway Plans in Volume II. The base design of the stations uses the reduced size station. This layout is placed along the same centerline as the longer station in Option 3. The station is reduced from each end to provide more flexibility in moving the station if conflicts with utilities occur. The RFP provides the flexibility of moving the station up to 15 feet in either direction along the alignment. Main Street East Station is an example of a station that may be shifted to avoid combined storm/sanitary sewer utility.

GRTC Technical Assistance Study and Local Bus Stop Relocation and Removal

Bus stops located along the BRT Corridor will be consolidated, relocated, or removed based on a BRT Technical Assistance Study and as listed in the RFP. A total of four stops will be consolidated into the new BRT stations. A total of seven stops will be relocated, using the existing signage and furnishings. A total of fourteen stops will be removed in their entirety. Sidewalks will be repaired as required at locations where elements are removed.

(s) Other Key Project Features

Interface/Systems

The Systems approach and System Integration Plan, discussed in detail in Section 4.4.1, provides the method for identification, documentation, tracking, and reconciliation of the systems interface in the design documents. Please refer to Volume II, sheets 31-32.

Safety/Security

The LANE Team is intimately familiar with the Federal Transit Administration (FTA) Safety and Security requirements and is fully equipped to address the tasks described in the RFP. The STV Safety and Security Services team brings the expertise of the following safety and security personnel:

- Certified safety professionals (CSP)
- Certified safety and security directors (WSO-CSSD)
- Certified physical security professionals (PSP)
- Certified protection professionals (CPP)
- Certified fire protection specialists (CFPS)
- Certified quality auditors (CQA)
- Certified crime prevention through environmental design (CPTED) professionals

Furthermore, members are associate staff for the Federal Department of Transportation's FTA's Transportation Safety Institute in the area of Transit Safety and Security. Recognized by the USDOT FTA as subject matter experts, they provide instruction to domestic and international transit agencies on industry best safety and security practice, FTA regulations 49 CFR 659, including Safety and Security Certification Plan (SSCP) development and management.

The LANE Team has recent, relevant experience. Through our SSCP Safety and Security Services, STV has developed and managed certification for the following capital projects:

- Houston METRO LRT system
- Charlotte Area Transit System (CATS) Lynx Blue Line
- ConnDOT Commuter Rail Program
- Metrolink light rail (Bi-State Development Company) in St. Louis, MO, and St. Clair County, IL
- City of Ottawa's Confederation Line
- Los Angeles County Metropolitan Transportation Authority Metro Wilshire BRT
- Tri-County Metropolitan Transit (TriMet) Portland Airport MAX Light Rail Extension
- Santa Clara Valley Transportation Authority and Denton County Transportation Authority (multiple projects)

We will provide dedicated staff to participate in all tasks prescribed in the RFP, from the Safety and Security Committee (SSC) to performing Hazard and Vulnerability Analyses, to supporting GRTC with Final Security and Security Certifications.

Foundations

The foundations for each station will be evaluated for the specific condition at each platform. Typical foundations are proposed to be spread footings with the depth varied to avoid producing a surcharge load on the nearby utilities. Stations with known utility conflicts may require the use of an alternate foundation design to avoid the conflict if it is not possible to move the platform and avoid it. The alternate foundation design may consist of off-setting the spread footings to clear the utility, designing the spread footings to span over the utility or using a different foundation type, such as a drilled pier, to bypass the utility and bear at a lower elevation.

Geotechnical

The LANE Team will use Falling Weight Deflectometer (FWD) Approach to provide cost and time savings during the geotechnical field investigation. The LANE Team has successfully delivered on previous projects using the FWD approach, including most recently on the I-581 at Valley View Interchange Project for VDOT. For this project, the FWD approach is anticipated to reduce the total number/linear feet of borings and days of traffic control by approximately half.

The Falling Weight Deflectometer (FWD) approach provides cost and schedule savings.

ITDP

LANE supports the project goal of achieving a "Silver" rating as defined by the Institute for Transportation and Development Policy (ITDP). The LANE Team's proposed design as provided in the Conceptual Roadway and Architectural Plans in Volume II meet or exceed the project requirements described in the RFP.

Traffic Signals

LANE will provide traffic signal modifications as shown in the RFP Conceptual Plans and detailed in the signal pole certification report provided by VDOT.

Signing

LANE will provide the signing proposed on the traffic signal in the RFP Conceptual Plans for the BRT and mainline traffic operations. In addition, LANE will relocate signs impacted during construction or in direct conflict with proposed construction.

LANE and STV designed and constructed the traffic signals, pavement markings, and signage for the Alexandria BRT Project.

4.3.2 CONCEPTUAL ARCHITECTURAL PLANS

We have prepared Station Site Plans based on the "Stations Basis of Design Report" prepared by KHA, showing approximate station locations and associated station site layouts. Our final design will confirm the placement along the alignment and modify these site plans to address precise requirements for each location of all station site elements, beginning with the final location of the bus lanes, platforms, curb lines, and sidewalks. ADA Accessibility will be maintained at each station with level boarding to ease loading for all passengers.

Conceptual Architectural Plans- Base Scope (Provided in Volume II)

Stations/Platforms/Canopies

The 14 stations will be designed to represent the locale and city using materials and elements from each area and incorporating permanence through the use of steel and masonry with the warmth of cedar. Station amenity standardization provides uniformity at each station to provide a consistent and intuitive experience for the transit patrons. Stations will be designed to handle patrons efficiently, economically, safely, conveniently, and comfortably. Public safety and compliance with ADA and other codes will guide basic design elements at each location.

Our design approach will be to analyze the information provided in the RFP Conceptual Plans and address each station individually. The base design for the stations reflects the parameters as outlined in the RFP Document and in AD-01 through AD-04. The reduced loading area on the platforms will allow one bus to load and unload the door spacing of a 40-foot bus. The rub rail and warning pavers will be along the edge of the station. The depth of the station will remain unchanged to accommodate the passenger loading area. The height of the canopy will be reduced to reflect the base design narrative.

The 14 stations along the BRT Corridor are a mixture of curb stations and median stations. The basic elements of each station will be the same to provide continuity for the patron. Five median stations (10 platforms) contain additional safety precautions for the patrons along the vehicle travel lanes. Guard rails separate the passengers from vehicle traffic from the platform to the pedestrian crosswalks where bollards prevent traffic from entering the pedestrian space. Additional provisions have been made to provide a zone for bicycles to be loaded onto the front of the bus.

Nine curb stations (16 platforms) typically occur with platforms in each direction of traffic. Two stations contain a single platform. Due to the site constraints there are several different configurations of pedestrian flow in and around these stations. Separate paths for pedestrians and passengers are generally established. Nine platforms allow for pedestrians to walk through the station. The remaining seven curb platforms have pedestrians moving behind the station and not mixing with passengers. Rerouting pedestrian traffic away from the construction will require staging the platforms at each station. The goal is to minimize pedestrian traffic disruption.

Safety considerations are primarily the same for the station platforms. Each station will provide a predictable and safe environment for both passengers and pedestrians. The approach to the different station types will be addressed independently. Railings and knee walls provide protective barriers at the stations and delineate the Fare Zone. The station platform separates the pedestrians from the BRT patron at most locations. The pedestrian passes behind the station on a sidewalk or an extension of the platform that is not covered.

The station amenities will follow the narrative for the reduced length platform. The future ticket vending machine (TVM) location will be designed to have provisions for installation without disturbing the existing finishes.

Station Locations

Our design approach for the reduced length stations is for the station locations to remain as given in the RFP Conceptual Plans, AD-01 through AD-04, using the station centerline to align the platform on the site. Stations are parallel to the alignment of the street. With the reduction in the column spacing, each station will be reevaluated for conflicts with utilities and adjusted accordingly or provide a foundation that will accommodate any unique conditions. Shifting stations to avoid conflicts is the preferred approach.

Station Map and Windscreen Graphics

Adjustments to the length of the Station Structure will require modification to the graphic map. The length of the map will be reduced to fit the area and the image shifted as needed. Development of the graphics for each station will include an overall area map for the entire system with the unique information for each neighborhood encoded in a QR Code on the center windscreen. QR codes will be created and tested prior to providing them to GRTC.

An Alexandria BRT station with glass wind screens and station map.

Point-supported tempered laminated glass will be used for the windscreens. VDOT's Project Manager will provide approval of the final graphic before it is released for production. A sample with the graphics will be provided for approval. The current glass printing processes identified in the Special Provisions for Station Technical Requirements do not meet the Buy America without requesting an exception.

The Art-In-Transit program will be coordinated at each station as directed by VDOT. Coordination with the artists will be needed at each station.

Bicycle Racks

Stations will have different passenger and pedestrian movements, but all stations will include bicycle racks. The location of the bicycle racks will be consistent at each station and additional racks will be added at a future date as needed. An access ramp for loading a bike at the front of the bus will be visible to the driver for the safest movement of passengers. An overlay of manufacturer's clearances will be used to locate bike racks appropriately. This information will be provided on one typical plan layout. Existing bike racks being displaced can be used in other locations or at station platforms as directed by VDOT.

Level Boarding Requirements

Station platforms will be level for boarding across the entire length of the platform. The tolerance of the paving finishes at the street and the station platform will be crucial to providing a level boarding area. The station platform will maintain a height of 14 inches above the street. It will follow the longitudinal slope of the street where the street is not level. Cross slopes will not exceed 2%. The rub rail will be coordinated with the GILLIG BRT PLUS Bus to maintain the proper 2-inch gap between the bus and the station platform per ADA. Tactile warning pavers at the edge of the station platform will indicate the edge of platform and will be detailed with the rub rail.

LANE and STV are incorporating art-in-transit, bicycle racks, and other amenities at stations along the CATS Blue Line.

Security and Lighting

A primary station feature is the totem that indicates the timing of the bus arrival. Integration with the bus arrival time will require coordination of the automated vehicle location (AVL) bus location data with the electrical and ITS systems design. Compatibility of owner furnished data/equipment and lighting sequencing equipment will need to be confirmed during the design process.

Lighting in the station will be provided to meet the parameters set forth in the applicable IES Guidelines for bus loading and requirements for camera image clarity as outlined in the RFP. Passenger approach paths will determine the placement of motion sensors that control light levels in the station if unoccupied.

Safety is paramount. All stations will have tactile warning pavers at the edge of the station platform, like this example from our Alexandria BRT project.

Details for camera mounting will be incorporated into the structure and finishes with concealed wiring routing. Refer to plans for locations. Details will be provided for locations which require special construction to conceal electrical and communication wiring.

Stations with Special Requirements

Special provisions and coordination with third parties for the following stations will be a part of the design of these stations:

- At Willow Lawn, coordination of parking restriction signs with Kevin McFadden of the Rebkee Company
- At East Bound Main Street Station, provide lighting at the back of the station platform for the adjacent parking
- At Route 5 Station, coordinate station location with the East Riverfront Transportation Project widening of Route 5

Landscaping and Pavement at Stations

Rain water harvesting will be used to irrigate the planters at each station. The water will be evenly distributed to the planters to the capacity of the planter with the overflow directed to the storm sewer.

Project Permitting

Station plans will be prepared for review by the City of Richmond and Henrico County for conformance to the Virginia Uniform Building Code. Since plans were previously approved, only revisions will be provided to the City's Urban Design Committee if changes are made to approved plans.

4.4 PROJECT APPROACH

The LANE Team has proactively taken steps to identify, assess, and mitigate risks based on experience from our successful delivery of the Route 1 BRT in Alexandria.

The LANE Team's approach to the Project is to engage highly qualified permitting, design, and construction personnel, expert subject matter specialists, and experienced subconsultants with the professional ability to provide VDOT the proficiency required to manage and control all permit, design, and construction activities. Our Team's knowledge and composition allows VDOT to function strictly in an oversight role, and allows the Project to be continuously advanced through the Project Milestones, having diligently planned for and managed risk, cost, and schedule. We will work closely with VDOT and other stakeholders to maintain strong and open lines of communication using practical work sessions to address concerns and needs. This proactive management of the project will result in a D-B process that foresees stumbling blocks, mitigates their risks, and facilitates successful delivery.

Our Project Approach highlights the following benefits:

- Mitigating impacts to the traveling public through effective planning, staging, and sequencing of construction operations
- Accelerating construction of stations (prefabrication)
- Identifying issues for rapid resolution through an efficient escalation process to prevent schedule impacts
- Implementing a comprehensive quality program and transparent reporting system
- Producing solutions that reduce schedule and costs by partnering with VDOT and other stakeholders
- Informing all stakeholders impacted by the Project (e.g., the public, utility providers, and other third parties) consistently and in a proactive manner to maintain support for the Project
- Fully engaging VDOT engineering, construction, operations, and maintenance personnel in the Project development process to produce a completed facility with maximum life-cycle value
- Providing a value-added position for railroad coordination to expedite ROW agreements

4.4.1 APPROACH TO THE SYSTEM

Systems Integration

The effective integrated operation of the various elements of the project that comprise the BRT System is a primary concern that encompasses all aspects of the planning, design, construction, and subsequent operation of the bus rapid transit system. This goal is achieved by implementation of a comprehensive System Integration Plan in conjunction with a comprehensive System Design Management Process that focuses on making sure that all elements of the system provided under the various construction, procurement, and installation contracts conform to the contract documents and function harmoniously.

The system integration plan, procedures, and processes are developed to make sure interfaces between the systems elements and other project disciplines are identified, documented, tracked, and reconciled in the design documents. The Systems Integration Manager will collaborate with and assist the various disciplines to make sure that substantive interdisciplinary reviews of design documents are performed. We will verify interoperability and interface requirements early in the project cycle through the use of the proven V-Model System Engineering methodology, as shown in Figure 1.

The system design management process includes concept of operations, system-level requirements generation, a basis of design, system-level specifications, systems interfaces, peer reviews, design lead review, and interdisciplinary reviews. An immediate design review of the plans and specifications will be conducted upon Project award. Subsequent formal design reviews will be conducted at each design stage through final construction design. Systems integration and interfaces will be reviewed at each of these design stages as well as between design stages through working meetings, subsystem designs, and product submittals.

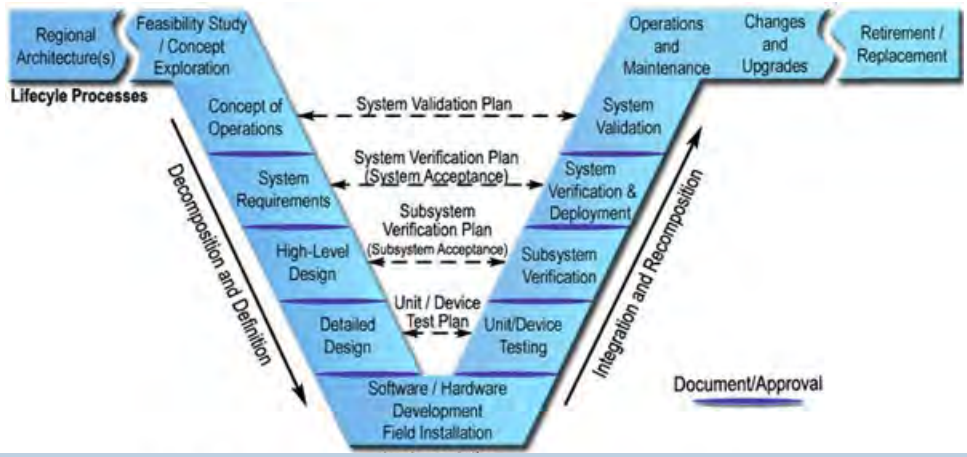


Figure 1: V-Model System Engineering Methodology.

System interfaces will be verified for proper integration with existing systems through conducting interface control working group meetings, participating in design reviews, developing an interface management and control matrix, developing the systems integration test plan, participating in systems integration tests, and preparing integration test reports. We will verify requirements are tracked and traced throughout the design phases through the use of Interface Control Documents (ICDs) that are mapped through a Requirements Traceability Matrix (RTM). The basis of our planned approach is to determine that the System Integration is completely "integrated" in the design and verified in the validation process.

In advance of systems installations, we will determine that shop drawings, wiring diagrams, and other vendor-provided documents are developed and approved for field use. The interfaces identified during the design process will also be reconfirmed to confirm that the multitude of interconnects and terminations are documented, which will facilitate troubleshooting and as-built drawing development.

Verification and validation tests are performed and documented throughout the acceptance of each systems element concluding with the final testing of the overall system. We will verify that interoperability test plans validate the established requirements and interfaces. We will oversee and support the testing of all systems and subsystems and pre-revenue testing.

Concept of Operations

One of our most important lessons learned when integrating systems is that the complex process of assembling individual pieces into a whole functioning unit often requires detailed planning that clearly defines the operational requirements of the integrated system and the internal interfaces between all components as well as all external (input and output) interfaces. The intricacy of the process usually necessitates an iterative approach where small pieces are integrated together in steps with each step resulting in a larger functional unit until the whole system is successfully integrated together.

Often not enough time is focused on the integration planning processes. In our experience an often overlooked, but necessary process in the integration of systems, is the use of systems engineering methodology to develop a Concept of Operations (ConOps) and to clearly and concisely define the system requirements. A ConOps will identify what the system will do but not how the system will do it. The requirements must be clear and measurable so that they can feed into the system design and be used in a system verification traceability matrix that maps user needs to the system components and the verification and validation phases of the project.

STV will work directly with VDOT and stakeholders to develop a ConOps for the Project. This document will define the Owner's project requirements, and will provide an overview of system elements and how they are intended to be used by the owners and operators. ConOps will include the following at a minimum:

- A statement of the goals and objectives of the BRT systems
- Strategy, tactics, policies, and constraints affecting the BRT systems
- Identification of organizations, activities, and interactions among users and departments
- A clear statement of responsibilities and authorities
- Specific operational procedures for the system
- Processes for maintaining the system

Systems Integration Plan

The System Integration Plan focuses on ensuring that all elements of the system provided under the various construction, procurement, and installation contracts conform to the Contract Documents. In addition, the System Integration Plan provides opportunities for participation by stakeholders. The System Integration Plan procedures and processes will be developed to make sure interfaces between the systems elements and other project disciplines are identified, documented, tracked and reconciled in the design documents.

Interface control of the systems design phases of the project is required to account for elements of the transit system design that are included in each system's package. Each design lead is responsible for defining, assigning and coordinating the interface. It is also necessary that required interfaces are specifically documented to facilitate the coordination efforts. Development and implementation of a comprehensive Interface Control Plan provides a formal process so that project interfaces are coordinated and integrated to minimize conflicts. The Interface Control Plan will assist all stakeholders in maintaining the visibility of design implementation, will identify substantial interface detail, and will be updated and maintained in cooperation with the Systems Manager, the technical leads, and the project team through design completion.

The product of the Interface Control Plan are Interface Control Documents that define and track each interface. Each design lead will comply with the defined interfaces for each design phase. Responsibility for an interface will be assigned to a specific discipline (Primary) and the information will be disseminated to the other disciplines with which coordination is required (Secondary). Results of the coordination effort will be documented and communicated to the affected parties for incorporation into their design. All interfaces will be tracked through the Requirements Traceability Matrix (RTM).

Testing

An overall test program plan is recommended to be developed early in a given project. This plan will identify the critical elements and interfaces that must be inspected or tested, and where the requirements for these inspections and tests will be documented. The testing plan identifies the testing and commissioning project elements required to demonstrate that the installed components and all their elements are safe, functional and reliable. The testing plan will:

- Include, at a minimum, the specific tests identified in the contract documents and relevant authorities for civil and systems
- Identify all tests to be carried out as required for each system element, as well as any test that may be necessary to verify performance compliance, the scheduled test date and location of the test, the function to be tested and/or requirement to be demonstrated and the Party responsible for the testing
- Identify tests for qualification, acceptance, and field commissioning

As part of the design effort, we will develop technical and construction specifications that will include all requirements for inspection and testing, in many cases replicating the indicative specifications that were included with the RFP documents. Wherever possible, these requirements will reference industry standards where the inspection/test procedures and acceptance criteria are already developed.

Factory Acceptance Testing (FAT) – The LANE Team will provide FAT submittals that include reports, plans, forms, procedures, and certifications. Approval of the test procedures will be obtained prior to the factory test. The manufacturer will certify all test results. FAT plans will provide the appropriate degree of quality for items manufactured or fabricated for this project. Any deficiency or discrepancy found during testing will be reported and rectified immediately.

Production Verfication Tests – The LANE Team will perform subsystem level tests in the shop before installation in order to verify equipment and systems perform in accordance with final approved designs.

Construction Inspection Tests – The LANE Team will conduct construction inspection testing to verify that proper installations are performed on the equipment. This includes pre-installation and verification tests; post-installation acceptance tests, and systems acceptance tests which will be performed in accordance with approved procedures. Before performing any construction inspection testing, the LANE Team will take all reasonable measurements and perform all necessary work to protect equipment and circuitry from damage due to the installation. Construction inspection testing will be conducted to confirm that the equipment has the capability to perform safely on the system. VDOT/GRTC representatives will be present during the construction inspection testing.

Acceptance

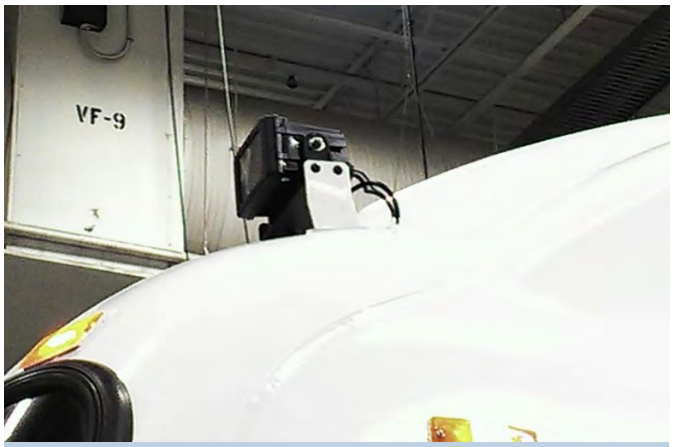
The LANE Team will provide acceptance testing that will be performed over a consecutive 90-day period under real-world operation conditions without system failure. The goal of this test is verification and documentation to determine conformance. Practical construction experience and sound engineering judgment, combined with a thorough understanding of project requirements are critical to a successful acceptance testing program.

Traffic Signal Priority (TSP)

The TSP system provided by the LANE Team will expedite the buses movement through traffic-signal controlled intersections which will improve schedule adherence and transit travel time efficiency while minimizing impacts on normal traffic flow. The TSP system will actively assign priority using red light truncation, green light extension and queue jumping functionality as present in the Econolite and Eagle M50 controllers (with controllers upgraded as required). The priority control strategies developed with our VISSIM modeling will determine factors such as how long the traffic light will remain green or will the red signal change quicker than normal. All strategies will comply with all federal, state and local regulations. To maximize flexibility while minimizing cost, the location and schedule adherence information from Clever Devices AVL will be used to request TSP activation.

We are proposing a distributed TSP system using onboard encoded emitters and wayside detectors to locally request priority via intersection check-in. Priority will not be requested until the system determines the bus is within a set range from the intersection. TSP middleware will be provided to interface the Clever Devices with the Centracs ATMS and the traffic controllers. The system will also log all TSP data, provide reports and provide real-time feedback to GRTC Transit Operation Center. With the exception of the VDOT intersection, TSP parameters will be adjustable from a central controller.

STV recently developed the technical specification for the Traffic Signal Priority system that was installed on the new SANDAG/MTS articulated buses that were procured for the I-15 Corridor BRT service. In this application, the existing traffic signal infrastructure dictated the emitter technology. The team specified radio frequency transceivers and GPS units to inform the traffic control system that a priority vehicle is approaching. This is exactly the professional services required to be sure the Project also initiates revenue service with the advantages of TSP controls in place.



STV developed the technical specifications for the TSP on SANDAG/MTS buses similar to what is required for this project.

Communications

The LANE Team will design two independent, fault-tolerant Ethernet networks to service the GRTC BRT system and the City of Richmond's Advanced Traffic Management System (ATMS), respectively. The network design will be comprised of the existing Layer 3 (L3) Core switches, existing and proposed L3 aggregation switches, and existing and proposed managed Layer 2 (L2) 10/100/1000 Ethernet edge switches.

The L2 Field Switches will be "daisy chained" together in groups using fiber optic cable networks with each end of the daisy chain terminating at an L3 Aggregation Switch in a redundant configuration. The Aggregation switches will connect to the existing CoreL3 Switches. The LANE Team will install and integrate new L2 Field Ethernet Switches for the BRT system in all BRT station cabinets and integrate new L3 Field Aggregation Switches in two designated station cabinet locations at Adams Street Station and 9th Street Station.

LANE Team members have extensive experience designing and deploying network drops throughout large transit networks. Our network design will take into consideration both current and future application capacity needs, as well as other application-specific requirements, such as delay sensitivity and recovery requirements. Our approach allows for easily expanding to support additional application requirements by adding interface modules.

At the beginning of the project, the LANE Team will obtain user requirements for the application that is to be transported over the network and incorporated into the Requirements Definition Document (RDD). Information may include:

- Types of services to be transported over the network; this includes a description of whether it is TDM service, low-speed data service, or high-speed data service (video, database replication)
- Service level requirements; this includes a description of the capacity required for the service, delay sensitivity of traffic, and disruption sensitivity of traffic
- Number and type of circuits for each application; this includes information on the number of end-devices that are to be installed under the project and the types of output interfaces supported by the devices' end-points for the circuits; this includes information on the specific location where the end-devices will be installed and any aggregation points prior to connecting to the network, the central/hand-off point at the Control Center
- Specific locations where end-devices and network drop-off points will need to be installed
- Any security sensitivity requirements requiring firewalls or other security measures

Any design will include spare interface/port/slot capacity, as well as spare switching/backplane fabric capacity.

The network design will be based on using open standards for all components, e.g., device level specifications, interface level specifications, and protocol level specifications. This will allow for ease of integration into the existing network management system, and support ease of management. Integration into an existing network management system may not be appropriate if a different manufacturer or later generation equipment is to be furnished. The LANE Team will assist the City of Richmond with a cost benefit analysis for determining if integration into the existing network management system may require updating and upgrading of the management system hardware platform to an up-to-date release to support new features/functions of the equipment.

In any design effort, care will be taken to minimize disruption to existing traffic before, during, and after installation and commissioning of the network.

The LANE Team will thoroughly test the network using a Stand Alone Testing (SAT) on each of the L2 Field Ethernet Switches and L3 Field Aggregation Switches, fiber Channel System Testing (CST) on each completed optical fiber channel, and a network System Test (NST) that demonstrates successful local operation of field equipment operating from the L2 Field Ethernet Switches as well as successful control of the equipment from the City Hall Traffic Operations Center and the GRTC Transit Operations Center.

The network elements will be interconnected through two 96-strand single mode fiber (SMFO) cables. Fiber will be routed through a combination of new conduit and existing duct bank as detailed in our proposed design drawings. Please refer to our attached RFP Conceptual plans for the proposed Fiber Optic Cable Plant design.

The LANE Team will perform bi-directional OTDR test on each fiber, including unused fibers. If any fiber exceeds maximum allowable attenuation or if fiber properties of the cable have been impaired, the LANE Team will take appropriate actions up to and including replacement of the fiber cable.

The LANE Team understands that leased wireline communications between the GRTC Transit Operations Center and five BRT stations located at Willow Lawn, Staples Mill, 24th Street, and Rocketts Landing are required. We will make sure that the leased communications provide sufficient bandwidth to accommodate station video feeds, real-time bus arrival information, and fare collection data.

Station Equipment

Station Equipment Connectivity

The LANE Team will furnish, install, and integrate the following communications systems at each of the 26 station platform locations:

Real-Time Information System (RTIS): The RTIS system will be composed of a message sign at strategic locations shown on our proposed design plans. We will install power and communications cabling to each message sign. Clever Devices will integrate and test each message sign once power and communications are connected.

Push Button and Loudspeaker: The LANE Team will furnish and install one push button actuator mounted on the station structural beam closest to the station benches for ADA accessibility for the transit user with a loudspeaker mounted directly above.

CCTV: In accordance with the American Public Transportation Association (APTA) recommended criteria, cameras will be placed for the following purposes:

- To view pedestrian and vehicular entrances and exits to the station
- To view the entire length and width of the station platform and platform edge to monitor passenger activity
- Each station will have a sufficient number of cameras to provide an overview of the facility
- The cameras will provide a recognizable image of the person(s) involved in TVM transactions

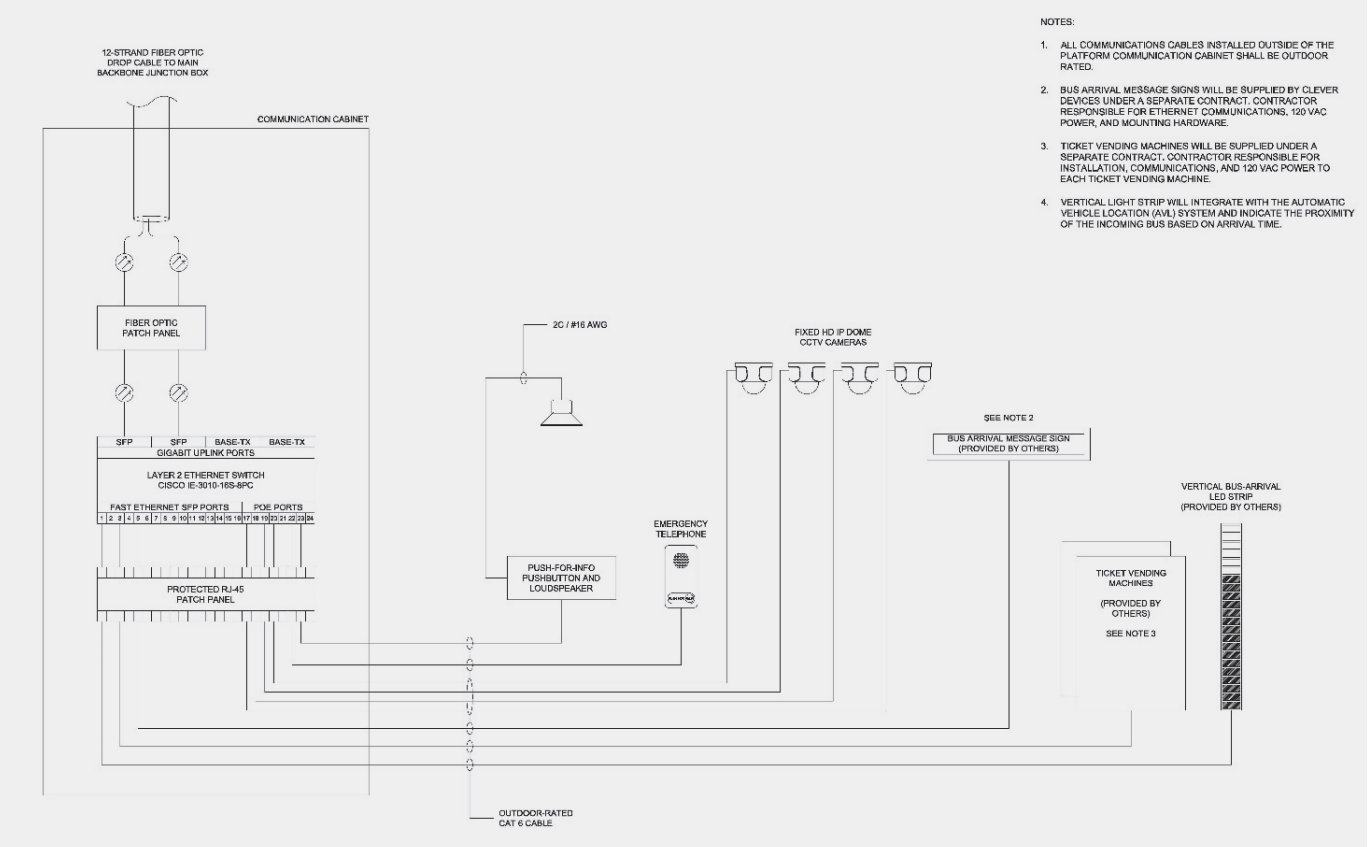


Figure 2: Communications Typical Stop Diagram

Fare Collection

The LANE Team will provide site preparation, electricity, and Payment Card Industry Data Security Standard (PCI DSS) compliant communications for fare collection components at each BRT station. The TVMs will be supplied by SPX Genfare under a separate contract.

Bus Operations

The purpose of the Project is to develop a more efficient transit system, support transit-oriented land use, and provide an attractive alternative to the automobile for east-west travel. This will be accomplished by implementing a dedicated BRT System operating over a combination of dedicated BRT lanes and mixed traffic operations. In order to achieve this goal, it is imperative to implement a Systems Integration strategy that allows for compatibility among the various elements and phases of the project and between the project and the existing transit system. Elements that need to be integrated in order to make sure new and existing bus operations are optimized include the stations, traffic signal system, communication system, roadway elements, and various technology components such as passenger information systems and station monitoring systems.

4.4.2 UTILITIES

Approach to Utility Coordination

Our Design Utility Manager, Chris Kiefer, PE, with Timmons Group, has been working with local utilities for over 25 years. Mr. Kiefer has established excellent working relationships with the providers impacted by this project.

Utility coordination is an important part of the project and vital to the success of delivering the project on schedule and for construction cost. Identification of potential utility conflicts, evaluation of the potential conflicts, and resolution of them (as necessary) as early as practical is our goal to provide the necessary lead time to allow for the adjustments to take place ahead of the selective critical path items involved in this complex project. The LANE Team proposes a comprehensive utility program that allows for a maximum amount of flexibility.

An important first step is to identify the utility owners and owners' representatives who will be involved in the project and then conduct a utility partner meeting immediately after notice-to-proceed. This meeting is with each utility owner in the field to discuss a mutually beneficial plan to locate existing utilities, identify potential conflicts, discuss avoidance-versus-relocation options, and (based on those options) develop agreeable "rules of practice" for expeditious conflict resolution. We will also coordinate with City officials to determine that franchise agreement conditions will be invoked. We will review base maps provided (SUE files) to provide a utility sweep to verify that the pre-award work being undertaken by various utility providers (City gas, City water, Verizon, etc.) is sufficient to avoid reconstruction. This will lead to a thorough conditions map for finalizing the design and coordinating with the utility providers throughout the corridor.

We have assembled a preliminary utility matrix (Table 1 on the following pages) that identifies potential utility conflicts and the respective location, type, and owner. We will update the matrix to include the owner contact information and initial cost responsibility of utility adjustments, based on our investigation and conflict analyses. This will include a review of proposed improvements relative to existing facilities, and test holes to determine the depth, size, and condition of the existing facilities. A report will be provided that summarizes potential conflicts and alternatives to avoid or minimize (e.g., redesign a storm sewer run, etc.). A careful review of schedule impacts will be a determining factor.

We will coordinate and communicate with the team to determine the path to final design with an eye on schedule, costs, constructability items, and the ramifications. We will follow up with the impacted utility providers to communicate utility conflicts and establish cost and schedule commitments for the adjustments.

Our approach to utilities will allow for a maximum amount of flexibility.

There will be frequent communication with the Team and the utility providers, with the intention of minimizing or limiting utility impacts. We will also routinely communicate with the various utility providers in the corridor to determine that project commitments (blue lines, plan and estimate, etc.) and schedule commitments are being met. Based on the utility owner's adjustment plans, we will review the final cost determinations of the utility owner's adjustment plans and make recommendations to the project team. We will check that utility providers work to obtain City permits and agreements (as applicable) or within their respective franchise agreements.

Once utilities have been cleared, we will provide the team with documentation. During construction, we will coordinate closely with utility providers to make sure that the agreed-upon adjustments are being executed. We will also monitor construction activity with a focus on utility related issues.

Drawing	Location/Station	Potential Conflict	Mitigation Strategy
CU-102	Willow Lawn	Private irrigation line	RFP states that it is to be relocated by the property owner; D-B team to coordinate this effort
		Verizon fiber optic line	Line must be moved; work with Verizon to have the line relocated
		8" City gas main	City is in design development on the relocation of the line; City to move the line; D-B to verify
		12" Henrico County water main	D-B team to design a horizontal offset and tie in a minimum of 10' off the station
CU-103	Staples Mill West	Out of service Verizon duct	Empty conduit that is in conflict will be permanently abandoned in place or removed by Verizon
		Verizon manhole	Manhole to have abandoned conduit hole permanently sealed and adjust rim to grade as necessary by Verizon
		12" City sanitary sewer	D-B team to design foundation to avoid conflict with existing deep sanitary sewer and protect it during construction
		Dominion power overhead	D-B team to coordinate with Dominion to de-energize the over-head line for the placement of the station
		Comcast, Lumos & DPU OVHD Communication lines	D-B to coordinate with Tier 1, 2, & 3 overhead communication line providers to verify that their lines do not need to be adjusted as they cross over the station canopy
CU-104	Staples Mill East	City water service line	City is in design development on the relocation of the line; City to move the line; D-B to verify
		12" City water main	D-B team to design and construct a horizontal offset and tie in a minimum of 10' off the station
		City light pole	D-B team to relocate the existing light pole & luminare to behind new curb line
		City gas valves & service lines	D-B team to coordinate with City Gas to have the valves relocated outside the footprint of the station
		City sanitary sewer laterals	D-B team to design station foundation to avoid conflict or to relocate the Sanitary laterals out of conflict
		City sanitary sewer lining	City DPU will complete the cured-in-place lining of the sanitary sewer line from manhole to manhole prior to September 30, 2016
		Comcast & DPU OVHD Communication lines	D-B to coordinate with Tier 1 & 2overhead communication line providers to verify that their lines do not need to be adjusted as they cross over the station canopy

Table 1: Utilities Mitigation Matrix

Drawing	Location/Station	Potential Conflict	Mitigation Strategy
CU-105	Cleveland St. East	City 12" gas main	D-B team to confirm that this 12" Gas Main (intermediate pres-sure) that was constructed in 2001 is in fact abandoned
		City sanitary sewer lining	City DPU will complete the cured-in-place lining of the sanitary sewer line from manhole to manhole prior to September 30, 2016
CU-106	Cleveland St. West	City water service line	D-B team to place a protective sleeve around the existing copper line
		City sanitary sewer lining	City DPU will complete the cured-in-place lining of the sanitary sewer line from manhole to manhole prior to September 30, 2016
		City gas service line	City is in design development on the relocation of the line; City to move the line; D-B to verify
CU-107	Robinson St. East	12" City water main	City is in design development on the relocation of the lines; City to move the lines by July 30, 2016; D-B to verify
		City electrical duct bank	D-B team to relocate Electrical Duct Bank (Lighting and Traffic Control) to outside the station limits
		36" City water main	D-B team to design station or shift station to avoid conflict with the existing 36" City Water main
CU-108	Robinson St. West	2" City gas main	City is in design development on the relocation of the line; City to move the line; D-B to verify
		City Orangeburg duct line	D-B team to design & construct new duct bank (DB) and coordinate with City to have existing lines relocated into DB
		16"x24" City CSO Line	D-B team to design & construct station foundation to minimize loading & impact to existing CSO rectangular line
		City sanitary sewer lining	City DPU will complete the cured-in-place lining of the sanitary sewer line from manhole to manhole prior to September 30, 2016
CU-109	Allison St. West	City 8" water main	D-B team to design a horizontal offset and tie in a minimum of 10' off the station
		30"x45" City CSO Line	D-B team to design & construct station foundation to minimize loading & impact to existing CSO rectangular line
		City sanitary sewer line	D-B team to design & construct station foundation to minimize loading & impact to existing line
		Dominion power duct bank	D-B team to design & construct station to avoid duct bank; Test holes required to verify
		City Light pole (station 247+10)	D-B team to relocate the existing light pole & luminare to behind new curb line
		City Light pole (station 246+27)	D-B team to relocate the existing light pole & luminare to behind new curb line
		City Light pole (sta. 245+45)	D-B team to relocate the existing light pole & luminaire to behind the new curb line

Table 1: Utilities Mitigation Matrix (continued)

Drawing	Location/Station	Potential Conflict	Mitigation Strategy
CU-110	Allison St. East	City Orangeburg duct line	D-B team to design & construct new duct bank (DB) and coordinate with City to have existing lines relocated into DB
CU-111	Shafer St. West	Unknown utility	D-B team to verify that the line marked in RFP plans as unknown is in fact abandoned
		6" City water main	D-B team to protect lines with sleeves
CU-112	Shafer St. East	City Orangeburg duct line	D-B team to design & construct new duct bank (DB) and coordinate with City to have existing lines relocated into DB
		City water service line	D-B team to place a protective sleeve around the existing copper line
CU-113	Adams St. West	City 6" water main	D-B team to design a horizontal offset and tie in a minimum of 10' off the station
		City sanitary sewer service	D-B team to protect ex. Sanitary sewer laterals
		City 6" Gas main	City is in design development on the relocation of the line; City to move the line; D-B to verify
		City water service line	D-B team to place a protective sleeve around the existing copper line
CU-114	Adams St. East	City 6" water main	D-B team to design a horizontal offset and tie in a minimum of 10' off the station
		City water service lines	City is in design development on the relocation of the line; City to move the line; D-B to verify
CU-115	3rd/4th St. West	City gas service line	City is in design development on the relocation of the line; City to move the line; D-B to verify
		City water fire hydrant	City is in design development on the relocation of the line; City to move the line; D-B to verify
		City light pole	D-B team to perform photometric analysis & relocate pole and light to provide same lighting levels
		Dominion duct bank 1	D-B team to design & construct station foundation to minimize loading & impact to existing Duct Bank
		Dominion duct bank 2	D-B team to design & construct station foundation to minimize loading & impact to existing Duct Bank
		City sanitary sewer lining	City DPU will complete the cured-in-place lining of the sanitary sewer line from manhole to manhole prior to September 30, 2016

Table 1: Utilities Mitigation Matrix (continued)

Drawing	Location/Station	Potential Conflict	Mitigation Strategy
CU-116	3rd/4th St. East	City DPU fire hydrant	City is in design development on the relocation of the line; City to move the line; D-B to verify
		City DPU water line to FH	City is in design development on the relocation of the line; City to move the line; D-B to verify
		City DPU electric duct bank	D-B team to design & construct a new duct bank and coordinate with the City to have the lines relocated
		City DPU ornamental lights	D-B team to perform photometric analysis & relocate poles and lights to provide same lighting levels
		City DPU light & pole	D-B team to perform photometric analysis & relocate pole and light to provide same lighting levels
		City sanitary service lines	D-B team to place a protective sleeve around the existing lines
CU-117	9th St. East	City arborist	D-B team to coordinate with City Arborist on the three trees that will need to be removed
		City DPU light & pole	D-B team to perform photometric analysis & relocate pole and light to provide same lighting levels
		AT&T fiber optic	D-B team to confirm that this line has been abandoned and moved into Verizon Duct Bank
		City sanitary service lines	D-B team to place a protective sleeve around the existing lines and/or design station foundation to avoid
		City sanitary sewer lining	City DPU will complete the cured-in-place lining of the sanitary sewer line from manhole to manhole prior to September 30, 2016
CU-118	9th St. West	Dominion duct bank	D-B team to retrieve test holes and verify that this line will not be impacted by construction
		City DPU light & pole	D-B team to perform photometric analysis & relocate pole and light to provide same lighting levels
		Unknown utility	D-B team to verify that the line marked in RFP plans as unknown is in fact abandoned
		City gas line	D-B team to confirm that this abandoned gas main is in fact out of service

Table 1: Utilities Mitigation Matrix (continued)

Drawing	Location/Station	Potential Conflict	Mitigation Strategy
CU-119	12th St. West	City 2" Gas main	City is in design development on the relocation of the line; City to move the line; D-B to verify
		City DPU light & pole	D-B team to perform photometric analysis & relocate pole and light to provide same lighting levels
		Unknown utility	D-B team to verify that the line marked in RFP plans as unknown is in fact abandoned
		City DPU electric duct bank	D-B team to design & construct a new duct bank and coordinate with the City to have the lines relocated
		City sanitary sewer lining	City DPU will complete the cured-in-place lining of the sanitary sewer line from manhole to manhole prior to September 30, 2016
CU-120	12th St. East	City 16" water main	D-B team to design a horizontal offset and tie in a minimum of 10' off the station
		City DPU light & pole	D-B team to perform photometric analysis & relocate pole and light to provide same lighting levels
		City DPU electric duct bank	D-B team to design & construct a new duct bank and coordinate with the City to have the lines relocated
		City sanitary service line	D-B team to design & construct a connection of this lateral or design to avoid the conflict
		City arborist	D-B team to coordinate with City Arborist on the three trees that will need to be removed
		City sanitary sewer line	D-B team to confirm that the line is abandoned
CU-121	Main St. West	City power service pole	D-B team to coordinate with City Lighting to have this existing service pole relocated out of the station ramp area
		City DPU electric duct bank	D-B team to design & construct a new duct bank and coordinate with the City to have the lines relocated
		City DPU light & pole	D-B team to perform photometric analysis & relocate pole and light to provide same lighting levels
		36" City storm sewer	D-B team to verify that this line is abandoned
		City DPU ornamental lights	D-B team to perform photometric analysis & relocate poles and lights to provide same lighting levels
		City 27'x15' CSO Line	D-B team to perform structural analysis of any new storm sewer ties to this facility

Table 1: Utilities Mitigation Matrix (continued)

Drawing	Location/Station	Potential Conflict	Mitigation Strategy
CU-122	Main St. East	Verizon vault	D-B team to shift station to avoid impacts to Verizon Vault or coordinate with Verizon to have access points to vault modified
		City DPU light & pole	D-B team to perform photometric analysis & relocate pole and light to provide same lighting levels
		Dominion Power pole	D-B team to meet with Dominion to have pole relocated
		Dominion Power U/G lines	D-B team to meet with Dominion to ensure that the station foundation will not impact their U/G facilities
		City 17'x12' CSO Line	D-B team to perform structural analysis of any new storm sewer ties and for foundation calculations on this shallow facility
CU-123	24th St. West	Dominion duct bank	D-B team to retrieve test holes and verify that this line will not be impacted by construction
		Dominion manhole lid	D-B team to shift station location or adjust design to ensure that this F&C is level
		City DPU ornamental light	D-B team to perform photometric analysis & relocate poles and lights to provide same lighting levels
		City DPU electric duct bank	D-B team to design & construct a new duct bank and coordinate with the City to have the lines relocated
		City arborist	D-B team to coordinate with City Arborist on the three trees that will need to be removed
CU-124	24th St. East	City DPU electric duct bank	D-B team to design & construct a new duct bank and coordinate with the City to have the lines relocated
		City sanitary service lines	D-B team to place a protective sleeve around the existing lines and/or design station foundation to avoid
		City DPU ornamental light	D-B team to perform photometric analysis & relocate poles and lights to provide same lighting levels
		City arborist	D-B team to coordinate with City Arborist on the three trees that will need to be removed
CU-125	Rte 5 West	n/a	
	Rte 5 East	City DPU light & pole	D-B team to perform photometric analysis & relocate pole and light to provide same lighting levels
		City 2" Gas main	City is in design development on the relocation of the line; City to move the line; D-B to verify

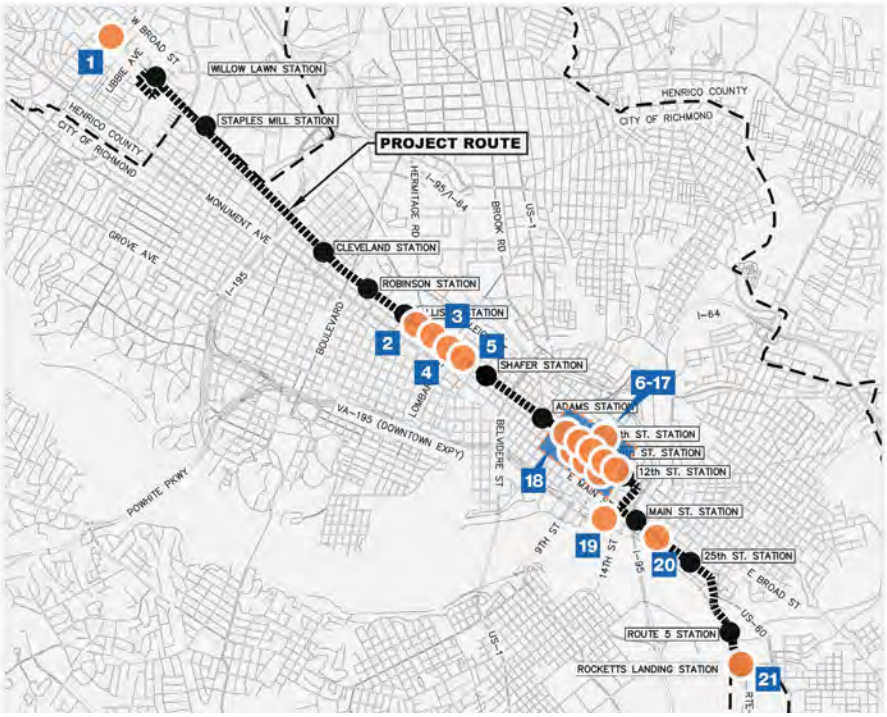
Table 1: Utilities Mitigation Matrix (continued)

Drawing	Location/Station	Potential Conflict	Mitigation Strategy
CU-126	Rocketts Landing	Kinder Morgan Plantation	D-B team to coordinate with Kinder Morgan Plantation Pipeline to have the existing line relocated into the street
		City filterras	D-B team to relocate existing filterras
		City DPU ornamental light	D-B team to perform photometric analysis & relocate poles and lights to provide same lighting levels; D-B to coordinate with Rocketts Landing
		Dominion duct bank	D-B team to retrieve test holes and verify that this line will not be impacted by construction
Multiple	Curb returns (54)		D-B team to design to avoid additional impacts caused by ramps, pedestrian poles, etc.
CT-204	NE quadrant	City DPU light & pole	D-B team to perform photometric analysis & relocate pole and light to provide same lighting levels; work into signal design
		City gas	D-B team to get test hole on gas and coordinate with City on the placement of the pole
CT-206	South side	Dominion power overhead	D-B team to coordinate with Dominion to de-energize the over-head line for the placement of the station
	North side	ROW	D-B team to coordinate with Dominion to de-energize the over-head line for the placement of the station
CT-211	SE quadrant	City sanitary sewer line	D-B team to retrieve test holes and verify that this line will not be impacted by construction
CT-213	NW quadrant	City traffic engineering	D-B team to verify that clear zone on existing signal pole is not violated or will need to re-design the pole location
CT-214	NE quadrant	City traffic engineering	D-B to re-design CG-12 ramp to avoid pushing pedestrians into signal pole
CT-223	NW quadrant	City sanitary sewer	Evaluate the placement of the proposed signal pole foundation to verify no U/G utility impacts
CT-233	SE quadrant	City gas	D-B team to retrieve test holes and verify that this line will not be impacted by construction
	SW quadrant	City water	D-B team to retrieve test holes and verify that this line will not be impacted by construction
	NE quadrant	City water	D-B team to retrieve test holes and verify that this line will not be impacted by construction
CT-234	SW quadrant	City gas	D-B team to retrieve test holes and verify that this line will not be impacted by construction

Table 1: Utilities Mitigation Matrix (continued)

Local Expertise

Our utility team has extensive knowledge of the City of Richmond, having been a continuous on-call consultant for the City of Richmond on Street and Sewer design and Stormwater Contracts for over 15 years. As shown in Figure 3 below, our experience along the project path is extensive. The Timmons Group has designed 21 projects (including 17 traffic signals) in the Broad Street and BRT path. In addition, we have designed other City infrastructure design projects (stormwater related) for the City of Richmond as well as private land development projects in the same vicinity.



1	Libbie/W. Broad St. Traffic Signal
2	N. Meadow/W. Broad St. Traffic Signal
3	N. Allen/W. Broad St. Traffic Signal
4	N. Lombardy/W. Broad St. Traffic Signal
5	Bowe St./W. Broad St. Traffic Signal
6	N. 1st St./E. Broad St. Traffic Signal
7	N. 2nd St./E. Broad St. Traffic Signal
8	N. 3rd St./E. Broad St. Traffic Signal
9	N. 6th St./E. Broad St. Traffic Signal
10	N. 9th St./E. Broad St. Traffic Signal
11	N. 5th St./E. Broad St. Traffic Signal
12	N. 7th St./E. Broad St. Traffic Signal
13	N. 8th St./E. Broad St. Traffic Signal
14	N. 5th St./E. Grace St. Traffic Signal
15	N. 6th St./E. Grace St. Traffic Signal
16	N. 7th St./E. Grace St. Traffic Signal
17	N. 6th St./E. Marshall St. Traffic Signal
18	CDA St. Improvements
19	12th St. Sidewalk Improvements
20	18th St./W. Main St. Improvements
21	Route 5 Improvements

Figure 3: The Timmons Group has designed 21 projects (including 17 traffic signals) in the Broad Street and along the BRT path

Railroad Expertise

STV has specialized in providing complete engineering services for railroad track and bridge planning, design, and inspection since 1961, including ongoing involvement in the Main Street Bridge through Norfolk Southern (NS) for the past 20 years. STV has handled over 3,000 public project/right-of-entry agreements for CSX and NS, and is one of a handful of firms that holds on-call contracts with CSX and NS. This experience has taught them that when an outside party becomes involved on railroad ROW, the railroad wants to protect its interests. With offices across the street from CSX in Atlanta and NS in Jacksonville, STV has beneficial proximity for expediting agreements.

Dave Wyatt—a former railroad employee—will be responsible for communicating and coordinating directly with CSX. Mr. Wyatt has more than 40 years of experience managing railroad projects, with an emphasis on those that interface with rail ROW. Mr. Wyatt will coordinate with CSX early to foster an understanding of the impacts and, more importantly, construction sequencing considerations to maintain traffic with minimal disruption.

Examples of Utility Mitigations Made During Construction

Despite all the pre-planning and advanced coordination that takes place in advance of a project moving into construction, from time to time a few unforeseen field conditions can pop up without knowledge and need to be dealt with in order to keep a construction project on time and on schedule. Here are two specific examples where we have been brought in to solve an unforeseen situation:

STV has handled over 3,000 public project/right-of-entry agreements for CSX and NS, and is one of a handful of firms that holds on-call contracts with CSX and NS.

1. On a roadway project that we were working on that was in the final two months of construction (with an owner contingency fund still intact), the owner asked if we could integrate additional landscaping into the project and still finish on time. We were charged with grading a sloped area adjacent to a roadway for planting landscaping items (trees, bushes, flowers, etc.). One area adjacent to the road was in a cut section and the landscaping would have been planted higher than the roadway minimizing the visual effect of the landscaping. We discussed it with the owner who wanted the landscaping added to the project and we told them that if we graded a shelf behind the ditch even with the road elevation, we could achieve the visual affect they were seeking. The problem was that there was a Verizon line buried in the slope that was critical to providing telecommunication redundancy to the industrial park and it would have cost $100,000 and taken three or four months to have had Verizon move the line. We spoke with the roadway contractor and asked if they would unearth the Verizon direct buried line, drop it into a deeper trench while they were doing their shelf grading. Verizon sent an engineer out to the field to go over instructions and to observe the handling of their line. The line was lowered in place, the shelf was graded, the landscaping was planted, and the owner achieved the visual effect desired in the park.

2. On a recent sidewalk project in a suburban subdivision we had a known crossing of a proposed 36-inch concrete pipe of an existing Verizon 900 par cable. During design development, we secured a test hole of the crossing location. We reduced the data, analyzed the situation, and determined that if we placed the 36-inch pipe at a certain elevation and grade we would provide enough clearance to make Verizon and VDOT feel comfortable for long-term maintenance. During construction when the trench for the 36-inch pipe was being excavated, it was discovered that the Verizon line bottomed out and then turned up on a severe change in gradient that even though the invert of the pipe cleared the facility with the comfortable clearance, the side of the pipe would have been too close to the Verizon line. Within the same afternoon that we were notified of the situation we went out to the field, looked at the situation, received an elevation, reviewed the situation of the pipe run already constructed just downstream of this crossing, developed a couple of alternatives, discussed the situation with the County, made a recommendation, brought the recommendation to the contractor and discussed it, and resolved the matter the next morning. The contractor only lost approximately two hours of production one afternoon but resumed work the next morning. The design fix involved an adjustment to the pipe gradient of the upstream pipe, coupled with an adjustment to the horizontal alignment change, and a slight lowering of the drop inlet. The project moved on and the contractor was able to switch to another pipe run for the two hours we were problem solving. To have waited on Verizon to design, requisition, and contract the lowering of the line, the contractor trying to build the road would have been forced to move on to another location, resulting in delays and cost overruns to the County.

Chris Kiefer's proactive utility coordination positively impacts the bottom line by helping to avoid costly delays.

Mitigation Strategies to Offset the Potential Impacts of Utility Relocations Exceeding Estimated Timeframes or Unidentified/Non-located Utilities Being Discovered During Construction

Team member Timmons Group has had an on-call contract with the City of Richmond for over 15 years to provide street design, storm sewer design, traffic signal design, etc. Timmons knows the Project corridor very well, but a utility issue can arise that no one knew about or that was added. During the RFQ and RFP stages of this Project our Team's preliminary research discovered some utilities that were not originally identified as issues. Our utility approach has been developed to minimize potential impacts. Our Team is in contact with—and will maintain contact with the utility providers—until the utility is deemed to be cleared. Our knowledge of and past work along the existing streets is a tangible benefit to choosing the LANE Team.

When an unknown utility is identified we will notify VDOT immediately. If discovery is made in the design stage, we will engage in discussions with the utility provider. If the design stage has passed, we will still communicate the issue with the utility provider. Depending on the nature of the potentially "late discovered utility," we would first try to design around it to avoid adjustment. In the event that the unknown utility is first discovered during construction, we would identify the utility owner, make contact to verify that the line is still in service (many times an unknown conduit is discovered to be an old abandoned line), uncover the utility and survey its location, review the design to see if it is in conflict, and, if in conflict, we would review alternatives (have the utility moved or redesign around it). The goal is to solve the problem in the most expeditious manner agreeable to all parties. In the past, we have employed many different mitigation strategies depending on the situation (redirected the storm sewer pipe or added a structure, place split encasement pipe around existing facility to protect the line, worked out a situation whereby the construction can proceed with the understanding that the utility would be relocated after the work, etc.). In the event that an adjustment to the design cannot be made to accommodate the hypothetical new utility, we would have to work with the utility provider to have an adjustment made to accommodate the construction.

Demonstrate that the Utility Coordination, Adjustments, and Relocations are Well-Integrated into Project Sequencing as to Minimize the Possibility of Schedule Delays

Please refer to the utility approach (above) as well as the project schedule for the integration of utilities. The utility coordination is tightly integrated into the design process as the two disciplines work in concert with each other. The key to efficient delivery is keeping the iterations between utility conflict resolution and design alternatives to a minimum.

In general, the construction of the platforms and stations is the critical path on the Project. The schedule is developed to start the construction of as many of the stations as possible early on in the overall schedule. The stations where we clear the utilities first or design around the utility conflicts will be critical in the delivery of the project schedule as our team plans to commence construction on these stations first while the more complicated utility issue stations are reserved to the middle or end of the project to account for the longer lead items involved.

In the event that a utility provider exceeds the agreed upon adjustment/relocation time frames, we will convene the utility provider's designer, construction manager, utility contractor (or superintendent if the utility adjustment work is being self-performed), members of the Design-Build Team, and the owner team representative(s) (VDOT, City, GRTC). At this meeting, we will seek to understand the issue and focus on problem solving, assess the project schedule, and make adjustments to the critical path, as needed, to maintain the schedule.

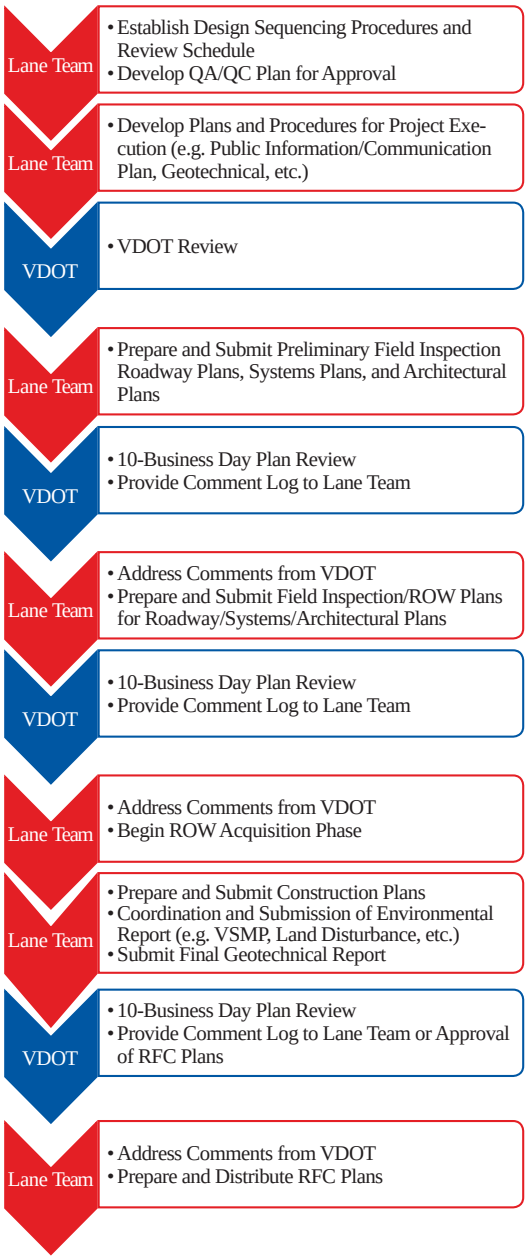


Figure 4: QA/QC Process

4.4.3 Quality Assurance/Quality Control (QA/QC)

The LANE Team believes quality in both design and construction is a hallmark of our collective experience, and is a critical element of every action taken by the team to deliver important infrastructure projects safely and on time. The highlights of our QA/QC process are shown in the chart below and detailed following.

Design QA/QC

STV's design QA/QC plan will address procedures and responsibilities to verify that project design standards are met, reviews are performed, and approvals are received. Each of the design disciplines will have a dedicated design checker (e.g., QC) who is a registered professional in the Commonwealth of Virginia. It is Ron Briggs' responsibility, as the design quality manager, to perform independent QA, thereby confirming that the QC was performed according to standard.

Each design submittal of plans, calculations, or reports (whether intermediate or final) will undergo an independent quality review. The team will use a QA/QC design log to track the completion of design and the status of QA and QC reviews. Each review is tabulated on a review summary form, which indicates by signature that the QA and QC Reviewers have completed their respective reviews and that the Design Manager has confirmed that all review comments have been properly incorporated into the plans. The review documents, including the review summary form, become a permanent part of the project files. Quality reviews will also be conducted for any design changes that may be necessary during construction.

Construction QA/QC

Construction QA/QC is established in our enhanced QMP to provide clear and complete procedures for construction inspection, testing, and the oversight of the project and its processes. While VDOT will provide verification, our enhanced QMP will continue to reduce their involvement level by providing a streamlined process with readily available access to reports/documents, such as inspection forms and photos that we will create, maintain, and submit through the HCSS Heavy Job Project Management system. All Team members, as well as the subcontractors and suppliers for the project, will be required to submit corresponding Quality Plans that are compliant with respect to our enhanced QMP. Any variance from the implemented standards will not be tolerated and as such, continuous audits will be performed to verify QA/QC adherence and to deploy updates, betterments, and amendments as the project progresses.

LANE has established, documented, and maintains a quality system as a means of ensuring that our product conforms to specified requirements. A list of elements will be outlined in the Quality Plan to identify procedures used to uphold LANE's Mission Statement and provide a quality product to VDOT.

The Quality Plan developed will have outlined procedures consistent with the requirements of American National Standard Q9001-1994 to effectively comply with the contract requirements. The QMS is based on the philosophy that quality is:

- Achieved by individuals performing work functions carefully, thoughtfully, and with knowledge of the owner's expectations
- Controlled by planning, coordination, supervision, and technical direction, through definition of job requirements and procedures, and through the use of skilled personnel
- Verified through review, checking, and surveillance of work activities with documentation by individuals who are not directly responsible for performing the initial work activity
- Assured by assigning a Construction Quality Control Manager (CQCM) to audit QC functions consisting of surveillance, inspection, testing, and auditing of the work according to the prescribed design and construction QMS programs

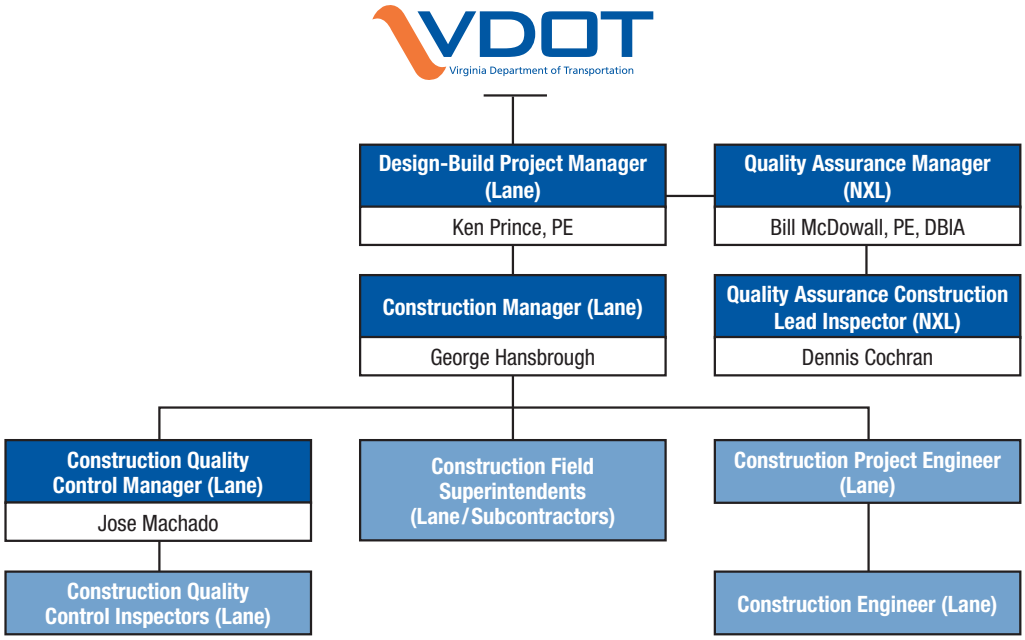


Figure 5: Our Construction QA/QC team is structured to provide VDOT a quality organization that is specifically tailored for the Project, that meet the highest industry standards, and enforce LANE's rigorous standard to accomplish the work with zero defects

Construction Quality Control (QC) - LANE is responsible for the QC during construction where it begins at the working level with LANE's QC inspectors. Management and leadership is provided by Jose Machado in his role of Construction QC Manager and ultimately with Ken Prince as the DBPM. All work will be in accordance with the enhanced QMP derived from LANE's in-house construction QC Plan, the requirements of the RFP and VDOT's Minimum Requirements for Quality Assurance and Quality Control on Design-Build and Public-Private Transportation Act Projects. The QC Program will make continuous assessments of all activities and when necessary make adjustments to methods or materials to achieve or exceed the required quality levels. Our QC personnel for this project will possess and maintain current VDOT certifications. This proven and strong QC program is self-contained with respect to operations, management, and documentation thus requiring minimal oversight by VDOT's resources.

Construction Quality Assurance (QA) - Led by Quality Assurance Manager (QAM), Bill McDowall, (NXL), the Quality Assurance program operates independently from the construction QC program and has oversight/verification responsibilities for all QC testing and monitoring activities. The QAM provides confirmation that all RFP requirements, specifications, and special provisions are being met

or exceeded. The independent role of the QAM provides direct information to the DBPM and VDOT outside of the Construction QC chain of command. Additionally, the QA operation will monitor and audit QC procedures and activities to verify proper performance. A high level of authority is given the QAM to make certain that the Construction QA function does its job and as such minimizes the requirement of resources and involvement by VDOT. The QAM is authorized to stop any and all work on this project if quality measures and controls are not being properly maintained.

QA/QC Approach to the Unique Construction Project Element: Systems Fiber Optic Cabling

The LANE Team understands the challenges phasing/staging a fiber optic network upgrade can bring and has gained valuable expertise from our recent project with CATS Blue Line Light Rail System in which two new 144-Strand fiber optic cables were installed the length of the alignment and spliced to existing fiber optic infrastructure. For any planned upgrade, it is imperative to know the status of the existing fiber that may have degraded since being installed such as the existing fiber optic cables installed between Laurel & Broad Street and 14th Street & Main St. Some of these fibers are dark and have never been used. The accuracy of STV's fiber optic splice diagrams will depend on the operational availability of the existing fiber.

The LANE Team can assist in evaluating the existing fiber to determine its working condition. LANE will test the integrity of the fiber for any insertion loss throughout the length of the fiber through the use of Optical Loss Test Sets (OLTS; power meter and source), Optical Time Domain, Reflectometer (OTDR), and fiber inspection microscope. The LANE Team will analyze all splices as part of determining the integrity of the fiber run and can provide an analysis of all traceability reports. A thorough test report will provide a detailed description identifying each fiber, the length of each optical fiber, test results for attenuation and channel measurements, link and channel traces for the appropriate wavelengths, and identified all labels, tags, and patch panel designations. Generating this information early in the project will prove invaluable to the accuracy of the design drawings and the functionality of the Transit Signal Priority System, as the system is only as good as the backbone.

The RFP is very clear who the GRTC's preferred supplier of the Transit Signal Priority System is, and the LANE Team will make every effort to utilize this system, which should reduce the amount of time necessary for the approval process and streamline the system testing. Once the local testing has been performed, and the backbone has been tested and determined to be operational, the demonstration period should be accomplished without any problems or issues.

QA/QC Approach to the Unique Design Project Element: Systems Fiber Optic Cabling

The LANE Team prides itself on quality control/quality assurance and is more than capable of providing this service to VDOT for the systems elements of this project. A key step for Systems QA/QC reviews includes detailed technical checks on the design, including check of calculations, drawings, specifications, reports and other deliverables.

As an example, the fiber optic network design for the BRT will require detailed point-to-point fiber optic splice diagrams that identify each termination and splice of each of the individual strands of fiber used throughout the project. In this case, the technical reviewer will be responsible to make sure that the identification scheme for each fiber strand, buffer tube, and splice/patch equipment meets the EIA/TIA-598, "Optical Fiber Cable Color Coding" standard. Accuracy in these diagrams is critical, so that the installer can correctly stage the fiber optic cable installation in the field.

4.4.4 Stakeholder Communication

As with any major transportation project, a proactive and comprehensive public outreach program will keep the public and key stakeholders fully engaged and informed throughout the construction phase

of the Project. The LANE Team believes that an effective outreach process must be integrated into both design and construction. Our approach to the Project will encourage multiple communcation channels that both push information out to the public and pulls it in to find news and information. This kind of open and transparent process that deals honestly with VDOT and stakeholders will help create community buy-in on Project timetables and milestones. This will help ease concerns and avoid potential issues regarding lane closures, detours, and impacts to the traveling public.

Seventh Point's past and current work with VDOT on other major transportation projects has included strategically executed community engagement and stakeholder meetings on projects that include Virginia Beach Transit Extension Study, Gilmerton Bridge, I-264 Pavement Rehabilitation, Elizabeth River Tunnels, and Route 60 Widening in Midlothian.

LANE has partnered with Seventh Point Transportation PR (Seventh Point) to carefully craft and execute public outreach strategies and tactics to keep the community aware of project impacts and activity throughout final design and construction. Our Team will collaborate with GRTC, VDOT, and Project Partners (Virginia Department of Rail and Public Transportation, City of Richmond, and Henrico County) to build an environment of trust in the community, serving as a source of information. Communication will focus on project awareness and its benefits, traffic impacts, and safety.

Windy Campbell, a public relations specialist with Seventh Point who is based in Richmond, will serve as the Project's public information officer (PIO). The PIO, with input from the DBPM, will coordinate with GRTC and VDOT to successfully and efficiently execute the strategies and tactics defined in the RFP. GRTC already has done outreach with stakeholders during the project's preliminary design and public comment period. Through the final design and construction phases, the LANE Team will build on this foundation, collaborating with GRTC and VDOT to reach out to stakeholder groups that will be impacted during construction.

Seventh Point has developed and managed results-driven public relations and community outreach programs for transportation infrastructure and roadway improvement projects. We will effectively implement the following during the project's construction phases:

- **The GRTC Pulse Construction Hotline.** The LANE Team will establish a dedicated Project construction hotline to receive public comments and information requests. Before launching the hotline, we will establish protocols with VDOT and GRTC for call monitoring and management, including follow-up, appropriate messaging and reporting methods. This includes reporting relevant, up-to-date messaging featuring weekly project updates and traffic impacts.

- **Stakeholder Informal Meetings.** Community meetings are essential in building public awareness and stakeholder support, encouraging continued business and retail activity, and ensuring safety for motorists and the Project crews, as well as for cyclists and pedestrians. These meetings will be attended by key Team members and serve as a consistent method of engaging with stakeholders. All meetings will feature detailed materials and information about the project, and we will offer updates from each of these meetings online for community members and project stakeholders not able to physically attend the meetings. Shortly after NTP we will schedule a Citizen Information

Meeting to present our proposed design concepts, explain the construction sequencing, and discuss the project schedule. We envision this initial meeting to be held in a "Town Hall" format allowing for "two-way communications" that would include a presentation from our Team and an opportunity for participants to ask questions. At this meeting we will also introduce our communication plan, project website, social media, and phone hotline and register stakeholders for e-mail and/or postal newsletters.

- **Project Communication Strategy.** The LANE Team will develop a construction information strategy, for GRTC's review and approval, consistent with the values, needs and goals of VDOT and GRTC. The strategy will outline a tentative schedule to include stakeholder meetings; planned radio public service announcements (PSAs); and print and radio advertising placements.

- **Collateral Materials.** The LANE Team will work with VDOT and GRTC to develop approved collateral materials for direct community engagement and education. All messaging contained in the collateral pieces will alert the general public to any changes to traffic patterns during construction, pertinent detour information, continuous and pertinent safety messages, and the overall benefits of the project. Target audiences include the traveling public, businesses, and residents along the project corridor; as well as tourism, hotel, trucking, and other industries. Uniformity among all collateral will be easily identifiable to target audiences and will convey credibility for the project.

- **Project Signs.** We will concept, design, and produce Project signs, based on VDOT's specifications and approval, to be placed at key locations along the Project corridor. These will inform the traveling public of the Project, the Project funding sources and website or hotline for more information. We understand the importance of travel readability, and these signs will be produced to meet all safety and engineering specifications.

- **Brochures.** The Project brochure will provide information such as construction schedule, impacts, benefits, safety messaging, project map(s) and contact information. As the project progresses, and as we meet with various stakeholder groups, we will update the brochure with specific messaging tailored to these groups, including maps of construction underway in their areas, traffic impacts and detours, and more. We can supplement the project brochure with one-page information sheets to be distributed to local outreach targets including retailers, businesses and government entities, prior to Project impacts in their localities. These materials also will be produced in electronic versions and made available to the public via respective websites of GRTC, VDOT, and project partners.

- **Advertising.** The Team will develop, produce, and place advertising in two of Richmond's leading newspapers and rotate across six local radio stations throughout construction. We will seek review of and obtain approval from GRTC for all advertising, including PSAs and radio alerts, prior to placement.

Our goal is to build an environment of trust in the community, and to provide a source of information to affected stakeholders. We will develop key messaging and content focused on safety, Project purpose and benefits; motorist impact awareness; project impacts on business and retail; and an overall project timeline and milestones.

Seventh Point has served consistently as a strategic communications and marketing partner to VDOT, numerous municipalities, and transportation partners. LANE is confident that Seventh Point will deliver thoughtful, strategic, and on-time communication and messaging throughout the life of the BRT project with seamless collaboration among all project parties involved. Based on our experience, the following Table 2 illustrates the type and frequency with which we foresee meeting with stakeholders.

Stakeholders	Frequency	Regular Reporting/ Meetings	Citizen Information Meetings	Newsletters / Other Collateral	Project Website	Phone Hotline	Social Media	Variable Message Signs	Partnering	Discipline-Specific Meetings
VDOT	As Needed	●							●	●
GRTC	As Needed	●							●	●
Traveling Public	Daily		●	●	●	●	●	●		
DRPT	As Needed								●	●
VDOT TOC	Weekly	●							●	●
City of Richmond	Weekly	●	●	●	●					
Henrico County	Weekly	●	●	●	●					
VDOT Public Affairs	Monthly	●	●	●	●					
Adjacent Property Owners, Churches, Community Associations, Universities, Hospitals, Business Owners	As Needed		●	●	●	●	●			
Utilities	As Needed								●	●
Police, Fire, Rescue	As Needed		●	●	●	●	●		●	●
Environmental Permitting Agencies	As Needed								●	●

Table 2: Stakeholder Type and Communication Frequency Matrix

Partnering

The LANE Team will facilitate communications amongst project stakeholders, of which the major ones are identified in the Stakeholder Communication table above, by engaging in a partnering meeting within two months of NTP. This initial partnering meeting will establish an understanding of individual stakeholder expectations to arrive at common goals surrounding the project schedule, issue resolution, the communication plan, and public outreach. Subsequent meetings will be held as needed to discuss major changes in maintenance of traffic, lane closures, and detours.

4.5 CONSTRUCTION OF THE PROJECT

LANE has been ranked the #1 Top Highway Contractor by Engineering News-Record for the last three years. LANE's history of successful projects, including local D-B projects of similar size and complexity (e.g., Route 1 BRT in Alexandria), further demonstrates our ability to undertake this Project.

This "fast track" design-build construction project is situated in a congested, historical area of Richmond. The Project's construction scope includes the construction 26 station platforms, median replacement, roadway reconstruction, milling-and-overlaying of existing pavement, the modification of traffic signals, and the installation of an ITS system. The LANE Team has approximately 16 months to complete all of the aforementioned construction work to achieve the Interim Milestone and Final Completion dates of March 30, 2018 and June 30, 2018, respectively. This Project requires a heightened degree of coordination among engineering, procurement, and construction. This is essentially the definition of a "fast track" project. Remarkably, LANE has completed numerous projects that fall under the "fast track" delivery concept including the nationally recognized and award winning I-95 Express Lanes.

4.5.1 SEQUENCE OF CONSTRUCTION (SOC)

The LANE Team has developed a specialized approach to the SOC that recognizes the following key features of this Project:

- 26 station platforms – 10 in the medians and 16 on curb side
- Roadway work around all 10 median station platforms, but only 5 of the curb station platforms
- Utility and Right-of-Way requirement will affect majority of the station platforms
- CSX Railroad Bridges at Main Street Station East and West
- 11 curb station platforms are "isolated" from roadway and signalization work, and can be constructed largely independent of the each other, and roadway work

The LANE Team has devised a group approach for constructing the stations. Group 1 and 2 contain the median station platforms; Group 3 and 4 consist of the curb station platforms with associated roadway work; and Group 5 contains the 11 "isolated" station platforms plus the associated roadway widening on Route 5. Our Team will construct Groups 1, 2, 3, and 4 in sequence. While Groups 1-4 are being constructed, additional crews will construct the Group 5 stations.

Construction Phasing

Based on the aforementioned station grouping, the Project will essentially be constructed in two parallel paths:

- Path 1 – Construction of Groups 1, 2, 3, and 4 (in sequential order). The hold-point between the start of each station group is the substantial completion of the roadway and the installation of the station structures.
- Path 2 – Construction of Group 5. The 11 curb station platforms in this Group have no construction interdependence, therefore the construction sequence of these stations will be based on the availability of work areas (utility relocation and ROW requirement) and the availability of resources.

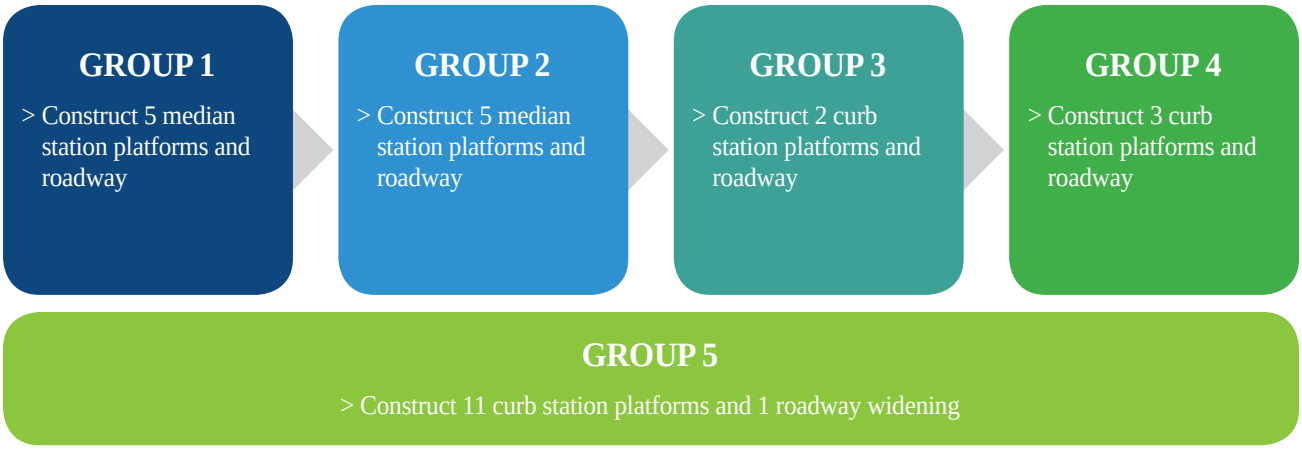


Figure 1: Construction Phasing

The elements of work for each Group are very similar. As a result, they will share various typical sequences of construction. The LANE Team has defined six typical construction sequences throughout the Project, and they are:

Typical Construction Sequence for Median Stations (Group 1 and 2):

- Group 1 station platforms - Allison East, Shafer West, Shafer East, Adams West, and Adams East
- Group 2 station platforms - Cleveland East, Cleveland West, Allison West, Robinson East, and Robinson West
- Commence pavement and concrete demolition of the median throughout the Group
- Adjust drainage as needed
- Prepare subgrade and place base stone
- Install new concrete/knee wall and asphalt at median stations, which include foundations and structures (canopy – columns, and roof truss)
- Construct station signs
- Install electrical systems/ITS, signal testing (installation of lighting on canopy, ramps etc.)

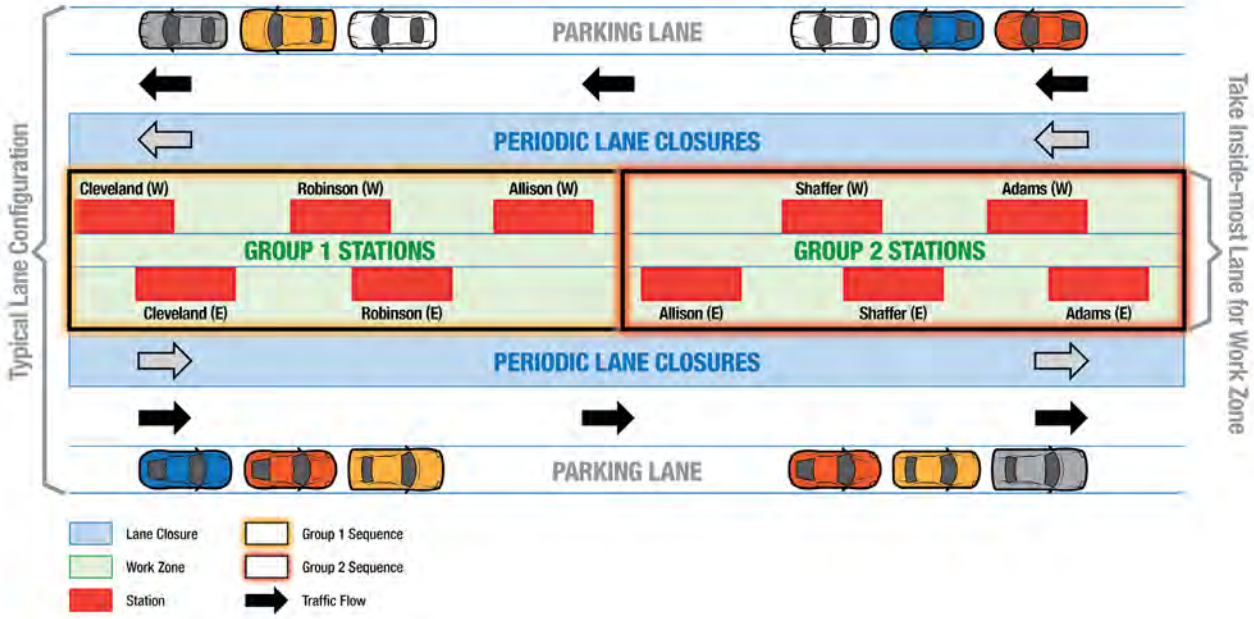


Figure 2: Typical Construction Sequence for Median Stations (Group 1 and 2)

Typical Construction Sequence for Curb Stations (Group 3, 4 and 5):

- Group 3 station platforms - 9th St. West, and 12th St. West
- Group 4 station platforms - 3rd/4th St. East, 9th St. East, and 12th St. East
- Group 5 station platforms - Willow Lawn, Staples Mill East, 3rd/4th St. West, Staples Mill West, Main St. West, Main St. East, 24th St. West, 24th St. East, Route 5 West, Route 5 East, and Rocketts Landing
- Commence pavement and concrete demolition of the shoulders stations throughout the corresponding station group
- Adjust drainage as needed
- Install sections of sidewalk as needed
- Prepare subgrade and place base stone
- Install new concrete/knee wall and asphalt at shoulder stations, which include foundations and structures (canopy – columns, and roof truss)
- Construct station signs
- Install electrical systems/ITS, signal testing (installation of lighting on canopy, ramps etc.)

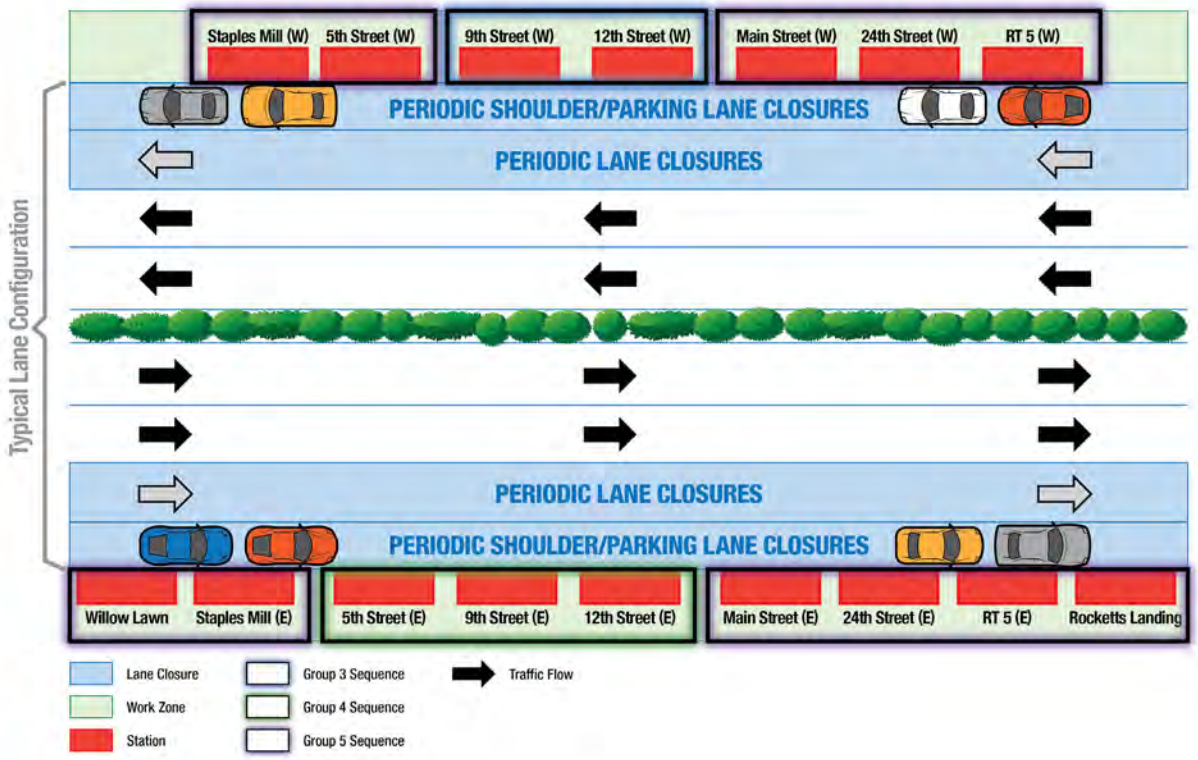


Figure 3: Typical Construction Sequence for Curb Stations (Group 3, 4 and 5)

LANE's demonstrated level of success has been achieved by paying specific attention to detail in controlling and managing our work.

Typical Construction Sequence for Drainage outside of Median and Shoulder Stations (All Groups):

- Proposed drainage alignment survey
- Excavation
- Install new drainage
- Backfill/grade for base and final paving

Typical Construction Sequence for Milling and Paving (All Groups):

- Mill existing asphalt at main line/median stations (two lanes on each side of the median) throughout the project limits
- Install temp striping as needed
- Install new pavement
- Install permanent striping as needed
- Mill existing asphalt at outside lane/shoulders throughout the project limits
- Install temp striping as needed
- Install new pavement
- Install permanent striping as needed

Typical Construction Sequence for Landscaping Median Station Areas of Group 1 and 2:

- Determine drainage from canopy (which waters landscaping) is installed correctly
- Fill in median station planting areas with top soil
- Install seasoned plants/trees

Typical Construction Sequence for Landscaping Shoulder Station Areas of Group 3-5:

- Determine drainage from canopy (which waters landscaping) is installed correctly
- Fill in shoulder station planting areas with top soil
- Install seasoned plants/trees

The roadway portion of this Project will be completed by March 30, 2018 and provide the City beneficial use of the BRT. Due to restricted landscape planting season, the total contract will not be complete until June 30, 2018.

Public Safety Consideration

Throughout the construction phase, our Team will remain continually focused on minimzing the impacts to the public and local businesses and keeping the public safety. LANE has the well-deserved reputation for being a good neighbor and this project will be no exception. Our MOT designs will be continuously evaluated for effectiveness to minimize impacts and safety. Due to the location of the Project, in the heavily congested corridor of downtown Richmond, controlling impacts will permeate all activities from signing to flagging to public outreach as discussed in subsequent sections. Safety training will be required of all workers to include discussions on being good neighbors and the need to minimize impacts be it from noise, to keep access open to all commercial and residential facilities, or the simple policing of trash generated on the worksite. The busy holiday shopping season will be respected to the greatest extent possible so as to maintain the economic viability of this busy commercial area. Pardon our Dust meetings, multi-media and other forms of advertisements will be used to alert motorists and residents to the changing traffic patterns. Regular meetings will be held with the appropriate EMS and other public safety, City or utility staff to keep them informed of our future traffic shifts as well as to listen to their concerns.

Limiting Disruptions

During construction, LANE will ensure that limited disruption will be caused by vehicles, pedestrians, and adjacent public transportation facilities/railroad. LANE will meet this challenge by:

- Installing chained linked fence around work areas
- Permanently closing specific travel lanes to ensure work zones are easily identified
- Installing specific barriers and MOT devices to direct the traveling public and pedestrians
- Ensuring all utilities are marked and illuminated with MOT devices
- Instructing our public outreach to inform radio stations as to what phase of construction is currently underway

Existing public transportations stops will not be blocked or relocated without prior discussions with the appropriate stakeholders. LANE will develop a relocation plan for impacted stops and, with support from Seventh Point, will coordinate and communicate with the impacted stakeholders. These potential relocations will be marked (upstream or downstream from exiting public transportation stops) with proper signs for pedestrians to identify.

Safety and Operations

LANE considers the safety of its employees, the public, and the operations to be a matter of prime importance. Even though a good safety record is essential, the ultimate goal is to provide a healthy and safe environment for our employees and the general public. We work hard to comply with all applicable Federal, State and local requirements, and be guided by good practice as necessary for location and circumstances.

LANE's projects are continually recognized for outstanding safety. The I-495 Express Lanes project received the ARTBA Work Zone Safety Awareness Award for the "Orange Cones. No Phones" anti-distracted driving campaign.

Keeping all employees, the general public, and operations safe will be accomplished by implementing our "Everyone's Responsibility" program. Our safety values are to strive for the continued safety and well-being of employees, the general public, and for operations to never sacrifice safety for production.

Geotechnical Constraints

According to the Geotechnical Data Report, Revision 3 by Schnabel Engineering (GDR), the design builder can expect to encounter unsuitable materials when excavating for full depth pavement, station platforms/foundations, and/or utilities. Borings will be performed to verify presence of unsuitable soils in areas of proposed New Pavements and station locations.

In lieu of undercutting and replacing up to three feet of unsuitable material with compacted fill or aggregate, LANE will consider using Geosynthetic Base Course Reinforcement, Cement Treated Aggregate Base Course, Roller Compacted Concrete Base Course or Lime or Cement Stabilization of Existing Subgrades. The limits of the geotechnical and pavements validation and investigation will correspond to the limits of proposed new pavement, mill and overlay, and proposed station areas shown in the plans (i.e. the investigation and validation will not occur where pavement modifications or stations are not proposed). No borings or infiltration testing is included for stormwater management facilities.

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Environmental Impacts

Our environmental team will interface closely with the design team in an effort to avoid and minimize environmental impacts and ultimately streamline subsequent permitting efforts. Numerous plan preparations and permits will be required. For example, the architectural review of station design by the Department of Historic Resources could trigger archaeological investigations. The environmental efforts will focus on making sure that the design meets the requirements of the plan review and permitting entities to avoid schedule delays. Another critical role of the environmental team will be to determine that all environmental commitments are achieved in both design and construction. These responsibilities will include compliance with pre-construction and construction-related permit conditions, as well as performing post-construction monitoring in the event this is required by the regulatory agencies.

ROW Acquisition

ROW acquisition will be performed in accordance with VDOT requirements and the RFP. ROW acquisition will begin once our Team receives Notice to Commence Right of Way Acquisition from VDOT. We understand that the process can take four to six months from commencement until a settlement is reached and the property is closed, and we have developed our sequence of construction to be independent of ROW acquisitions in the early stages of construction.

The LANE Team has developed a sequence of construction that does not require any ROW acquisition for the early stages of construction.

Staging and Storage Areas

During the construction phase, the location of our proposed staging and storage areas will be critical to the success of the project in this highly congested area. Key issues that we will address include:

- Safety of the traveling public (both vehicle and pedestrian) as well as security for local residents/business.
- Safe ingress and egress for construction vehicles, workers, and equipment to/from the construction site as well as for the huge quantity of material, equipment, and supplies that will require a temporary home.
- Close proximity to the individual work areas for operations efficiency.
- Removal from the travel ways when prohibited during non-work hours.
- Screening/separation from local business and other nearby commercial or residential establishments
- Adequate size to operate efficiently.
- Appropriate environmental controls as required for the material/equipment stored.

Our intent is to rent existing office space in close proximity to the Project for office facilities. Since existing office space will be used, adequate parking will already be available as will entrances and exits to local streets or highways.

It is assumed that multiple small staging sites will be required near the actual work areas to include:

- Cleveland and Robinson (Group 1)
- Allison and Shafer (Group 2)
- 9th Street and 12th Street West/East (Group 3 & 4)
- Willow Lawn and Rocketts Landing (Group 5)

All yards will be fenced, screened as required, with a nominal number of temporary trailers or storage containers. Security will be provided as required. Since night work is anticipated, they will also be lighted, preferably by power drops from nearby Dominion Power poles vs. generators that could cause either noise or other nuisances. Existing VDOT or City property will be used wherever possible, supplemented with private leases from local landowners. The properties will have stone entrances and

parking areas with tire washes when required to eliminate tracking mud onto the public roads. Sediment and Erosion controls will be installed and maintained as required. All properties will be restored upon completion in accordance with the specific lease requirements.

Public Involvement/Stakeholder Coordination

LANE understands that construction is taking place in a dynamic, active business district, and that the end users—local business/residents—will be affected daily by this Project. Our Team will manage our construction approach to develop a positive public experience and perception of this Project.

LANE's I-495 Express Lanes team received the VDOT and Megaprojects, Commonwealth of Virginia Award of Excellence, Integrated Communications award for its efforts to make sure the public was involved and informed throughout the project.

By using our Team's Public Involvement Program described in Section 4.4.4, stakeholders will be well-informed prior to and during the construction phase. Our PIP will employ many tactics to reach each stakeholder both individually and as a group throughout the lifecycle of the project, including:

- Stakeholder Identification
- Stakeholder Engagement
- Media Relations
- Web/Digital Outreach/Hotlines
- Community Outreach/Public Meetings
- Briefings to Elected Official

The LANE Team will have professional communications staff available and on-call to respond quickly and effectively to any issues that arise. We will use both proactive and reactive communications to address safety and environmental issues, while seeking to enhance mobility, even during peak construction periods.

Governmental Approvals

The Governmental Approvals of Design and Permit is critical for the progress of the Project. The approval of a critical design package—Station Design drives the start of construction. The Project currently assumes that VDOT will take 10 working days (14 calendar days) to approve any construction plan, which is critical to the start of construction. In addition, the approval of permits is also a critical requirement for the start of construction in the Project.

For the Final Acceptance Phase of the stations, the Governmental approval of the final acceptance test procedure is critical to the start of this process. The LANE Team plans to start the final acceptance tests and commissioning process immediately upon completion of the Group 1 stations. This approach will provide additional time for both the Owner and the LANE Team to implement the procedures without impacting the final acceptance of the Project. This will be made possible by the timely approval of the process by various Governmental agencies.

Maximizing Probability of Anticipating and Mitigating Potential Delays to Construction

The LANE Team has developed a scheduling strategy to avoid delays on the Project. The first step of this strategy will be to identify the potential risks of the Project and mitigate them through the design process as much as possible. In doing so, we have identified the following construction risks:

- Unknown utilities/utility location variance
- Delay on the relocation of utilities by the City at various locations
- Delay on the relocation of utilities by third party/utility owners at various locations

- Utility coordination with utility owners at various locations
- Coordination for work adjacent with CSX track at Main Street Station East and West
- Differing site conditions
- ROW Acquisition Delay at six station platforms

In order to mitigate these potential risks, the LANE Team has employed a risk matrix to categorize relative risk level of the stations, as shown in Table 2.

Station Platforms	Risk Level	Potential Risk
Willow Lawn	4	D-B contractor, City, and 3rd party to relocate existing utilities
Staples Mill West	4	ROW acquisition required
Staples Mill East	4	ROW acquisition required
Cleveland St. East	1	No utility conflict or ROW requirement
Cleveland St. West	3	City to relocate existing utilities
Robinson St. East	3	D-B contractor and City to relocate existing utilities
Robinson St. West	3	D-B contractor and City to relocate existing utilities
Allison St. West	3	City to relocate existing utilities
Allison St. East	1	No utility conflict or ROW requirement
Shafer St. West	1	No utility conflict or ROW requirement
Shafer St. East	3	D-B contractor to relocate existing utilities
Adams St. West	4	City to relocate existing utilities
Adams St. East	3	City to relocate existing utilities
3rd/4th St. West	4	D-B contractor and City to relocate existing utilities
3rd/4th St. East	3	D-B contractor and City to relocate existing utilities
9th St. East	4	3rd party to relocate existing utilities (FO)
9th St. West	2	Protect existing utilities
12th St. West	4	D-B contractor, and City to relocate existing utilities
12th St. East	3	D-B contractor, and City to relocate existing utilities
Main St. West	3	D-B contractor, and City to relocate existing utilities; CSX track
Main St. East	5	ROW Acquisition required; CSX Track
24th St. West	4	ROW acquisition required
24th St. East	4	ROW acquisition required
Route 5 West	1	No utility conflict or ROW requirement
Route 5 East	4	D-B contractor and City to relocate existing utilities
Rocketts Landing	5	ROW Acquisition required 3rd party to relocate existing utilities

Table 2- Project Risk Matrix: level 1 = Lowest Risk; level 5 = Highest Risk

The result is our concept to group stations together and develop them into work areas. Based on these risk levels, the LANE Team then employed the Priority Resource Leveling function in P6 schedule software to calculate the sequence of station construction; stations with the lowest risk will be constructed first, while the station with the highest risk will be constructed later so that ample time is available to develop a mitigation strategy through design that can be easily implemented during construction. This approach maximizes the amount of time to resolve any issue arising from the aforementioned risk and increases the schedule's potential for success without delay.

Based on our planned construction sequence that segregates the Group 5 stations we know that if a delay occurs here, the Project can simply re-sequence the work flow of these stations to mitigate the impact. In the event that a schedule delay occurs in Group 1, 2, 3 or 4 stations, the LANE Team may procure additional resources from our local organization and allocate them to the Project to mitigate and reduce the impact. This may include additional night shift work and/or the addition of crews for the station construction. In all cases, the LANE Team will partner with VDOT/City to develop the best recovery plan.

Expediting the Final Completion of the Project

Due to the aggressive schedule specified in the RFP for the Project, proper pre-planning, performance monitoring during both the design and construction phases, and assertive management of the Project are essential for timely on-schedule performance. The LANE Team will focus on several specific considerations during the development stages of the Project to deliver safely and on time:

Organizational Considerations

- Engaging VDOT and City's operations and maintenance personnel in the design process
- Co-locating the design, construction, and VDOT key staff in Richmond following NTP to facilitate open communication, develop clear expectations, and maximize schedule-saving opportunities
- Establishing a fully integrated project team, including design, construction, specialty contractors, and commissioning personnel
- Using team building and partnering practices
- Maximizing decision-making authority at the project level
- Selecting personnel with a positive attitude and a willingness to tackle challenging tasks

Delivery Considerations

- Establishing strategic advance submission packages to move key design and construction elements through the process to allow for advance construction packages to be permitted and designed
- Consideration in the use of highly integrated 3D modeling to avoid existing conflicts and constructability concerns
- Implementing over the shoulder (OTS) reviews with contractors, vendors, designers, and VDOT
- Team members and staff will be selected on the basis of their fast track experience
- Project will be staffed with personnel possessing strong leadership and decision making capabilities
- Procurement decisions will be focused on construction priorities
- LANE's expeditious procurement process will focus on selecting and awarding contracts to subcontractors in a timely manner

Planning Considerations

- Using an aggressive P6 schedule detailing the inter-relations of the permitting, design, utility and ROW design and coordination, QA/QC, and external VDOT and stakeholder requirements
- Emphasizing coordination planning during the design process
- Performing exhaustive front-end planning
- Identifying and procuring long lead time items such as the station prefabrication units
- Monitoring and driving Quality corrective actions through the project controls process
- Providing enough resources for critical path items
- Considering speed of fabrication and construction during the selection design alternative
- Aggressively staffing the project during all phases to maintain schedule compliance (of Groups 1 through 5) and minimizing the allowable road closures and restrictive construction sequences

Execution Considerations

- Working with VDOT to simplify the approval procedures through OTS and clear expectations

- Selecting appropriate and innovative construction methods to save schedule time and enhance the safety of the traveling public and workers
- Conducting frequent and effective project review meetings
- Requesting the start of recording punch list from the owner when major items are complete
- Making sure all document control items are up to date per the contract
- Determining all field deficiencies and NCR's are closed out and signed off by the QAM prior to project completion
- Submitting QA/QC records for review when construction is 50% complete
- Resolving all issues in a timely manner

4.5.2 TRANSPORTATION MANAGEMENT PLAN

The LANE Team has the knowledge, understanding, and experience developing Transportation Management Plans (TMP) involving transit operations that safely and effectively manage both traffic during construction and communications with the project stakeholders.

Maintain Traffic Through All Phases of Construction

The LANE Team will prepare a comprehensive Transportation Management Plan (TMP) consistent with the requirements of VDOT IIM-LD-241.5/TE-351.3. Since the construction of the Project is anticipated to cause sustained and substantial work zone impacts, a Type C (Category V) TMP is needed. The TMP will be developed based on effective and efficient temporary traffic control (TTC) strategies to address the requirements of the City of Richmond and Henrico County and to identify, communicate, and minimize work zone impacts. The TMP will make sure that all construction activities are performed in accordance with the Virginia Work Area Protection Manual (VWAPM), applicable VDOT Standards, and Part 2, Section 2.10.

An analysis of the Work Zone Traffic Impact will be completed for each group/phase of construction described in the Sequence of Construction section. These analyses will be completed using Synchro 9.0 and methodologies consistent with the 2010 Highway Capacity Manual and VDOT Traffic Operations and Safety Analysis Manual (Version 1.0). This analysis will evaluate the construction impacts to traffic and allow our Team to identify and implement any adjustments or improvements that may be required to optimize the safety and mobility of the corridor.

Approach to Proposed Lane or Ramp Closures, Temporary Detours, Time of Day Restrictions

The LANE Team acknowledges the lane, shoulder, and road closure restrictions identified in Section 2.13.4 of the RFP for both the City of Richmond and the County of Henrico, as well as, the Holiday Restrictions in Section 2.13.5 of the RFP. These restrictions will be incorporated into the TMP and verified through the analysis of Work Zone Traffic Impact to identify appropriate mitigation and adjustment to construction schedule. Specific consideration will be given to the maintenance of safe access for ALL users (including pedestrians, bicyclists, transit vehicles, and other motorists) to/from public transportation facilities, as well as commercial and residential access points.

The temporary traffic control plan will use a number of typical applications. Our Team will select a traffic control strategy that best meets the needs of all road users while establishing a safe work zone. Some of the specific examples of those TTC strategies from the 2011 VWAPM Revision 01 that maybe implemented during the construction include the following:

- **Outside Lane Closure Operation on a Four-Lane Roadway (TTC-16.1):** For curb side stations Group 3 and 4
- **Inside Lane Closure Operation on a Four-Lane Roadway (TTC-17.1):** For median stations Group 1 and 2

- **Multi-Lane Closure Operation (TTC-18.1):** For median stations Group 1 and 2
- **Lane Closure on a Two-Lane Roadway Using Flaggers (TTC-23.1):** For mixed traffic operations Group 5
- **Lane Closure Operation in an Intersection (TTC-28.1):** For mixed traffic operations Group 5
- **Turn Lane Closure Operation (TTC-29.1):** For median stations and mixed traffic operations
- **Flagging Operation at a Signalized Intersection (TTC-30.1):** For median stations and mixed traffic operations
- **Sidewalk Closure and Bypass Sidewalk Operation (TTC-35.0):** For curb side stations Group 3 and 4
- **Crosswalk Closure and Pedestrian Detour Operation (TTC-36.1):** For curb side stations and median stations

There are three established types of BRT operation along the project corridor: mixed traffic operations, median running, and curb running. Each of these types present different challenges in maintaining traffic throughout the construction. Similar operation types will be grouped to construct in the most efficient manner. The sequence of construction, detailed in Section 4.8, will be incorporated into the TMP specific to each type of BRT operation.

Traffic signal modifications will take place as the median station construction progresses. Temporary signal timings may be required to aid in the traffic operations as there are lane closures and combined movements, as well as to relieve congestion. All lane closures and lane shifts will be coordinated with, and communicated to, the multiple stakeholders to provide the least amount of disruption to traffic. During curbside construction operations, sidewalk closures will be required, and maintenance of traffic plans will be used to address pedestrian access by providing appropriate and safe pedestrian detours according to the 2011 VWAPM. All pedestrians and bicycles will be protected from the work zone and will account for ADA accessibility.

The LANE Team will work with the City of Richmond and VDOT to adjust traffic signal timings as necessary during construction. We have the relevant expertise in developing traffic signal timings for similar transit projects and have used strategies such as two-stage pedestrian crossings to assure the safe and efficient movement of both vehicles and pedestrians throughout the corridor. The 16-mile Purple Line LRT project in Maryland showcases our design team's experience in developing maintenance of traffic plans for median running, curb running, and mixed/shared use transit operations with emphasis on heavy vehicular and pedestrian activities.

The Capitol Crossing I-395 Air Rights project located in the downtown Washington, DC, is a relevant example of the design team's experience and expertise in developing effective maintenance of traffic plans for shifts within small city blocks. Particular attention has been paid to developing the required temporary traffic signal timings and temporary pedestrian accommodations which accompany these types of construction activities. A set of optimized temporary traffic signal timing packages were developed and provided for each phase of construction. Working in close coordination with DDOT's Transportation Operations Administration (TOA) staff, field verifications were also made during the implementation of these changes and refinements were made, as needed. Effective pedestrian

Capitol Crossing I-395 Air Rights - a set of optimized temporary traffic signal timing packages were developed and provided for each phase of construction.

detours were provided around the city blocks where construction activities were predominant in a way that continuous access to facilities (crosswalks, bus stops, bike stations) and local businesses was maintained. In addition, we are experienced in providing constant advisories to the stakeholders on upcoming construction activities. Due to the complex/dynamic nature, the Capitol Crossing TMP is being maintained as a live document to incorporate regularly scheduled periodic updates.

Maintain Business Access

The TMP will detail how access to existing business entrances will be constructed and how it will be maintained throughout the construction. We will coordinate with business owners on when construction will impact driveways and parking. In coordination with VDOT, and other applicable stakeholders, the Team will work with the business owners to ensure that impacts are minimal as well as to reduce driver confusion.

Maintain Bus Routes

During construction, we will coordinate closely with GRTC on potential impacts to the existing bus routes along the corridor. The TMP will outline the temporary relocation of bus stops and how they will be coordinated with the transit agency in order to maintain continuous operations and provide minimal impact to the users. The Team will work closely with the transit agency to identify safe alternatives and provide advance notice of upcoming construction activities along each of the existing bus routes.

Incident Management Plan

The TMP will also include an Incident Management Plan which will detail our response to incidents. The plan will be developed in coordination with VDOT, City of Richmond, and County of Henrico officials, local EMS, and other Stakeholders to identify the protocols for who will be contacted in case of an incident. The plan will also take into account the type of incident and estimated duration. The plan will define key project team members, emergency response agencies, and the procedure(s) to clear the incidents to meet the requirements in Part 2, Section 2.10.2. These emergency response protocols will be reviewed at regular Project team stakeholder meetings to identify any potential improvements and/or modifications.

Special Events

The LANE Team will coordinate with individual stakeholders to limit the impact of construction activities on special events such as the Monument Avenue 10K, the Richmond Marathon, the Christmas Parade, and Broad Appetit. Additionally, the Team will coordinate with Virginia Commonwealth University (VCU) events and any film productions within or near the project area. The Team will work to ensure there is adequate advanced notice (of the upcoming construction activities) and access during these events.

Project Stakeholders

Impacts to Major Project Stakeholders

The development of the TMP will involve extensive coordination and input from the various design disciplines, members of the construction team, VDOT, FHWA, the City of Richmond, and many other organizations and groups. This is a busy corridor with robust commercial and cultural activity. Even the most efficient schedule will still create some inconvenience to the users of this area.

The LANE Team recognizes that a robust Public Communications Plan is critical to the project's success—communication is key. As such, the TMP will incorporate a public involvement/public relations plan that identifies a comprehensive list of all major stakeholders and the various procedures to keep them informed regarding the project progress and updates on a regular basis throughout the project duration.

Through our Public Communications Plan, including coordination with VDOT, the City of Richmond, the County of Henrico, VCU, and GRTC, we will keep adjacent businesses and communities informed of timely, specific impacts to their properties. We will schedule our work to minimize impacts to their access. Our Team will actively monitor the effectiveness of our coordination and modify the plan as necessary to make sure that stakeholder issues are being addressed in a timely manner.

Stakeholder Identification

As previously discussed, the stakeholders on this Project are extensive, ranging from government officials to local community associations. While the following list is not exhaustive, it represents the key stakeholder groups:

- VDOT
- GRTC
- Department of Rail and Public Transit (DRPT)
- City of Richmond
- City of Richmond Planning Commission - Urban Design Committee
- County of Henrico
- Elected Officials
- GRTC PIOs
- City of Richmond PIOs
- Henrico County PIOs
- Regional cities and counties: Through municipal public affairs officers
- All local Military installations via branch public affairs officers
- Fire and Rescue Emergency Responders
- State Police
- City of Richmond Police Department
- Henrico County Police Department
- Motorists and Professional Trucking Associations
- State and City Government Workers - downtown
- Virginia Division of Motor Vehicles (DMV)
- Local TV Broadcast News, Radio and Print Media News Outlets
- Virginia Tourism / Richmond Tourism groups
- Area Hotels (along/adjacent to Broad Street)
- VCU and other higher education institutions
- Richmond Public Schools
- Private schools and day care centers within the corridor
- Hospitals/Health Care Providers
- Richmond Arts District
- Richmond International Airport (RIC)
- Amtrak / Main Street Station
- Car rental agencies
- Taxi companies and other for-hire transportation (Groome, Uber, etc.)
- Greater Richmond Partnership (and other economic development organizations)
- "Save the Diamond Committee"/New Boulevard Vision
- RVA Coalition for Smart Transit
- Partnership for Smarter Growth (PSG)
- Southeastern Institute of Research
- Richmond Regional Transportation Planning Organization
- Metropolitan Planning Organization (MPO)
- RVA Rapid Transit
- Neighborhood Associations
- Business Associations
- Rotary Clubs (Western Henrico, Richmond, etc.)
- Kiwanis Club (Richmond, Henrico, etc.)
- Church and Faith Leaders
- Other Key Employers along/near the Corridor
- Real Estate Associations
- Cycling/Pedestrian Interests

4.6 NARRATIVE ADDRESSING ELEMENTS OF THE OPTIONS IN RELATIONSHIP TO THE BASE SCOPE

The GRTC BRT Project has three optional work scopes, which may be awarded depending on the availability of funding. The LANE Team has investigated the effect of this optional work on the safety, constructability, cost, and the progress of schedule in the Project. In addition, the LANE Team has investigated the long-term effect of these options on the maintenance of the finished work.

4.6.1 OPTION 1, OPTION 2, AND OPTION 3

At the request of VDOT, the optional design may be executed in place of the base design.

Option 1 will provide full brick knee wall instead of the thin brick veneer described in the Base Scope for each of the station platforms.

Safety Considerations

Full brick construction is more manual labor intensive than thin brick veneer construction. The laborer will be more prone to lifting injuries. Full brick wall will require more on-site storage and housekeeping, as well as increased security to monitor the extra material.

Cost Considerations

Constructing full brick in lieu of thin brick veneer would greatly increase cost, possibly as much as twice the materials/labor or more.

Constructability Considerations

Constructing full brick in lieu of thin brick veneer would create an aesthetics issue at the joint between the platform slab and ramp. The horizontal bricks on the platforms slab will not tie-in the sloped bricks on the ramps smoothly.

Schedule Considerations

This option will affect the overall construction time of station foundation, ramps, erecting canopy, and truss in a negative way, resulting in an increased risk of delay.

Long-Term Maintenance Considerations

Base scope provides a more robust design as the thin brick veneer is less susceptible to damage or vandalism than the full brick construction. The actual cost of repair for full brick construction will be considerably higher than thin brick veneer.

Option 2 will provide 1.5-inch millings and resurfacing with Asphalt Concrete SM-12.5E in lieu of ¾-inch milling with Thin Hot-Mix Asphalt Concrete Overlay (THMACO) described in the Base Scope.

Safety Considerations

The LANE Team has investigated the difference between the asphalt paving operations and determined that there are no noticeable differences in safety between them.

Cost Considerations

Milling 1.5” and replacing 1.5” of Asphalt Concrete will decrease cost considerably despite the higher asphalt tonnage of Option 2. The THMACO application cost per ton will be more than twice the 1.5” asphalt concrete mill-and-overlay cost.

Constructability/Schedule Considerations
THMACO is very difficult to apply and only a few subcontractors are available during the paving seasons. Also, the specification of this mix are very temperature sensitive with no variance. Using this extremely low available material will greatly increase the risk of project delay.

Long-Term Maintenance Considerations
Option 2 asphalt paving should provide 3 years of maintenance free surface, while THMACO may start to unravel in as short as 6 months of application (without any underlying QC issue).

Option 3 is to provide the full size of the platform structures as shown in the original RFP conceptual design intent without the reduced station requirements described in the Base Scope. In addition Option 3 will include the additional station amenities removed from the Base Scope stations including one trash receptacle, one built-in lean rail, one built-in bench, and knee walls are included along the rear side of the station.

Safety Considerations
The larger structure should require a larger crane and higher boom clearance. This will result in a riskier "picking" operation with the crane because of heavier lift, higher wind load sensitivity and tighter boom clearance to the existing overhead utilities; as well as increase in safety requirement for transporting the structure to site.

Cost Considerations
Larger station structure and more amenities will increase the material and installation cost of the station platforms.

Constructability Considerations
The larger station footprint will increase the risk of utility conflict due to existing conditions, because it is more difficult for the larger stations to avoid existing utility conflicts.

Schedule Considerations
Increase in the length and height of the stations will affect the construction time of the station platform foundation, ramps, erecting canopy, and truss in a negative way. This option increases the construction time, gives the Project less time for testing system and reduce the probability of completing the project early.

Long-Term Maintenance Considerations
The larger stations have more material and increased number of items to maintain, which will always increase the maintenance cost of the stations.

4.7 DISADVANTAGED BUSINESS ENTERPRISES

The LANE Team embraces and supports VDOT's DBE program and is committed to meeting or exceeding the 10% goal for the design and construction of this project. Furthermore, we will take all necessary and reasonable steps to provide SWaM firms with the maximum opportunity to compete for and perform services on this contract.

DBE SUBCONSULTANTS

The LANE Team includes the following highly qualified DBE subconsultants:

- **GeoConcepts Engineering, Inc.**—geotechnical engineering (DBE/SWaM)
- **H & B Surveying and Mapping, LLC**—surveying (SWaM)
- **Inframap Corp.**—subsurface utility engineering (SWaM)
- **KDR Real Estate Services, Inc.**—right-of-way (SWaM)
- **NXL Construction Services, Inc.**—quality assurance (DBE/SWaM)
- **Seventh Point, Inc.**—public relations (SWaM)

Subcontracting Plan

LANE implements a subcontracting plan on all of our projects to offer the maximum opportunity for DBE and SWaM subcontractors to qualify for and provide services. The first step is source selection. LANE researches the capabilities of a wide range of subcontractors. This includes an evaluation of past performance, socioeconomic status, financial condition, current availability, and safety performance. Based on this research, a list of potential subcontractors is developed. The second step is the outcome of the proposal process. Once a solicitation for pricing has been set, potential subcontractors have the opportunity to respond with their site specific worker protection program and best price proposals. LANE reviews the price proposal to determine price reasonableness. The final selection of the subcontractor is made by combining the results of the safety and price evaluations to determine the proposal that provides the best value to VDOT and LANE.

Safety is an integral part of any scope of work performed on this project. Accordingly, a subcontractor's safety approach is a key component of our evaluation process. All subcontractors must meet our stringent safety requirements to be a member of the team.

LANE also conducts a technical evaluation of the qualifications presented in the subcontractor's proposal, as well as an independent review of their past performance. References provided with their price proposal are contacted and questioned about the subcontractor's past performance. The topics covered include safety, schedule and cost compliance, and quality of work. If the potential subcontractor has worked for LANE before, its past performance and safety record for LANE will be evaluated. If the potential subcontractor is required to submit a Quality Control Program or Worker Protection Program with their proposal, these documents will also be evaluated. If the subcontractor has not worked for LANE previously, a project interview will be required.

LANE solicits subcontractor and supplier price proposals and evaluates for award of a subcontract or purchase order based on quality, past performance, and competitiveness. Once these reviews are complete, our evaluation team members discuss the results and select the subcontractors and suppliers that best satisfy the requirements of the contract. Any subcontractor that fails to meet these requirements will be eliminated without further consideration. This approach was successfully employed on the I-495 and I-95 Express projects. Both projects obtained their goals; and the I-495 Express Lanes was awarded the Virginia DBE project of the year.

4.8 PROPOSAL SCHEDULE

4.8.1 PROPOSAL SCHEDULE

This Project's complex scope and tight schedule requires a high degree of concurrency among engineering, procurement, and construction, so efficient schedule management and control is imperative.

The CPM proposal schedule (included in Volume II) outlines the LANE Team's plan to successfully construct the Project in compliance with the RFP. The schedule depicts our overall sequence of work, work tasks, and major deliverables required to complete the Project. This Proposal schedule is broken down into major phases of the Project using the hierarchical Work Breakdown Structure, clearly illustrating the anticipated Critical Path, the review responsibilities of VDOT, FHWA, and other regulatory agencies, as well as activities for the LANE Team, its suppliers and subcontractors. In addition, the LANE Team used Resource Loading and Leveling in the development of the Proposal schedule to determine the resource requirement in the Project, and prevent over-allocation of resources. Thus providing a more accurate and robust Proposal Schedule.

4.8.2 PROPOSAL SCHEDULE NARRATIVE

The LANE Team has developed the following Proposal Schedule narrative for our overall plan to execute the work. The narrative includes overall sequencing of the Project, the Critical Path, proposed means and methods, and other key assumptions on which the schedule is based. We also explain how the LANE Team optimizes the benefits of the D-B delivery method to mitigate known risks, conform to MOT requirements, minimize impacts of construction activities on the environment, and deliver the Project on time.

Key Milestone

The LANE Team is committed to a final completion date of June 30, 2018. Table 1 below identifies Key Milestone dates, which in order to be met, will require coordination not only among the D-B Team and VDOT but also other reviewing agencies (City of Richmond, VDGIF, DEQ, etc.). Post Project award, the LANE Team will implement our assertive D-B approach that factors in our local experience and relationships to potentially improve these dates.

Key Milestone	Milestone Date
Notice of Intent to Award	March 21, 2016
Notice to Proceed	April 15, 2016
Scope Validation Period Complete	June 13, 2016
Start of Construction	September 10, 2016
Interim Milestone #1	September 15, 2017
Interim Milestone #2	October 16, 2017
Early Final Completion	December 30, 2017
Interim Milestone	March 30, 2018
Final Completion Date	June 30, 2018

Table 1: Key Milestones

Work Breakdown Structure (WBS)

The WBS is a multi-level, hierarchical arrangement of the work to be performed on the Project. The LANE Team has laid out the WBS to break down the major phases of the Project by Project Element and type of work. The type of work has been broken down by Phases, Areas, and respective components such as Milestones, Project Management, Scope Validation, Environmental/Permitting, ROW, Design, Public Involvement, Utility Relocation, and Construction.

The WBS areas for the Project have been developed as a collaborative effort between the design and construction teams by evaluating the Project as a whole, including the type of work along the alignments, in addition to design considerations and management of the construction efforts.

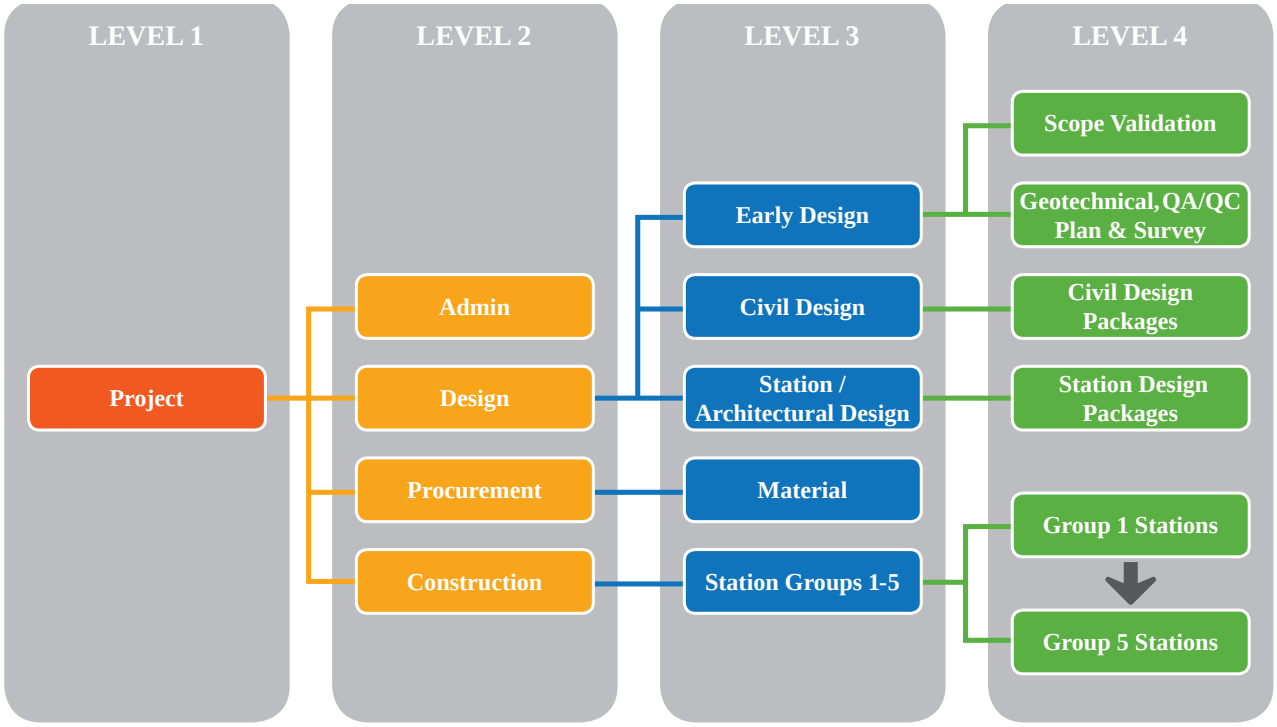

Figure 1: Work breakdown Structure

Levels 2, 3, and 4 of the WBS as depicted in the Proposal Schedule includes but is not limited to the following items for the respective Project components:

- **Administration:** Includes the contract milestones, the start and completion milestones of major Project components, and the monitoring of project durations
- **Design:** Includes survey, geotechnical engineering services, plan development (QA/QC review is included in the plan development activities), VDOT review, and approval of the plans. This section includes additional levels to the WBS—grouping the design activities by the type of design submission packages, which addresses the following:
  - ROW: summarizes the acquisition process for the ROW required including title research, appraisals, offers, and negotiations
  - Environmental and Permitting: comprises the activities required to obtain the key environmental permits. The remaining necessary permits such as cultural resources, stormwater monitoring, and noise evaluations will be added in the Baseline schedule
  - Utility Relocation: includes the activities for development utility relocation plan, which incorporated UFI meetings, preparation of preliminary engineering (PE) estimates, and approval of PE estimates into its activity durations. Utility relocation design, approval of the utility design, and relocation/protection of utilities for construction will then occur
- **Construction:** includes all the components of the station platform construction, roadway reconstruction, and mill-and-overlay paving including but not limited to: MOT, erosion and sediment controls, QA/QC, stormwater management, drainage, lighting, phasing, station construction, mill-and-overlay paving, and roadway construction.

Calendars

The LANE Team uses five different calendars to represent a variety of work scenarios:

- *7-days per Week* – Based on seven days per week and is used for review periods and milestones
- *Design Calendar* – Based on five working days per week and includes standard holidays. Used for design activities and work not impacted by adverse weather and holiday restrictions
- *Construction* – Based on five working days per week, specified holiday restrictions, and anticipated weather days. Used for construction activities
- *5 Days Paving with Holiday* – Based on the *Construction* with non-working periods from December through February. Used for asphalt paving activities
- *5 Days Final Paving with Holiday* – Based on the *Construction* with extended non-working periods from November through March

For weather analysis, LANE has reviewed the weather data (November 2010 to October 2015) provided by NOAA observation center at Richmond International Airport, VA (http://www.ncdc.noaa.gov/cdo-web/). Using 0.1 inch of precipitation per day as the threshold for weather impact, and taking into consideration of weekends, LANE accounts the following number of weather days each month, as shown in Table 2 below:

Month	Anticipated Weather Days
January	5
February	5
March	6
April	5
May	4
June	6
July	6
August	5
September	4
October	4
November	3
December	5

Table 2: Anticipated Weather Delays

LANE will observe the following holidays between 2016 and 2018, and marks the following dates as standard holiday days in the Design calendar in Table 3 below:

Holiday	2016	2017	2018
New Year	1/1/2016	1/2/2017	1/1/2018
Memorial Day	5/30/2016	5/29/2017	3/30/2018
4th of July	7/4/2016	7/4/2017	5/25/2018
Labor Day	9/5/2016	9/4/2017	5/28/2018
Thanksgiving 1	11/24/2016	11/23/2017	
Thanksgiving 2	11/25/2016	11/24/2017	
Christmas	12/26/2016	12/25/2017	

Table 3: Standard Holiday Days (2016-2018)

Per RFP Part 2 – Section 2.13.5 – The LANE Team will follow the holiday restrictions between 2016 and 2018, and marks the following dates (shown in Table 4) as non-work days in the *Construction*, *5 Days Paving with Holiday*, and *5 Days Final Paving with Holiday* calendars:

Holiday Restrictions	2016	2017	2018
New Year 1	1/1/2016	1/2/2017	1/1/2018
Easter	3/25/2016	4/14/2017	3/30/2018
Memorial 1	5/27/2016	5/26/2017	5/25/2018
Memorial 2	5/30/2016	5/29/2017	5/28/2018
Independence	7/3/2017	7/3/2017	
Independence	7/4/2016	7/4/2017	
Labor 1	9/2/2016	9/1/2017	
Labor 2	9/5/2016	9/4/2017	
Thanksgiving 1	11/23/2016	11/22/2017	
Thanksgiving 2	11/24/2016	11/23/2017	
Thanksgiving 3	11/25/2016	11/24/2017	
Christmas 1	12/23/2016	12/25/2017	
Christmas 2	12/26/2016	12/26/2017	

Table 4: Holiday Restriction Non-Work Days

Activity Identification

The LANE Team is proposing a smart activity identification system in the Level II Master Schedule, in which a unique alphanumeric is used. Each activity identification is broken down into four parts identifying the Phase of Work, Work Area, Sub-Location, and Unique Identifier, described in detail below:

As an example is C 100 B 2680

Phase of Work | Work Area | Sub-Location | Unique Identifier

Project Phase of Work – The first digit in the Activity ID pertains to the phase of the Project with the abbreviation and orders as follows:

A = Administration/Project Management

D = Design

P = Procurement

C = Construction

Work Area – The 2nd to 4th digit in the Activity ID pertains to the work area of the Project with the abbreviation and orders as follows:

000 = Project Wide

001, 002, etc. = Station #1, #2, etc.

100, 200, etc. = Area 1, Area 2, etc.

Sub-Location – The 5th digit in the Activity ID pertains to the sub-location within a work area of the Project with the abbreviation and orders as follows:

- = Area Wide

E = East Bound Station

W=West Bound Station

Unique Identifier - The last four digits in the activity identification structure are numeric increments starting with 1,000, and incremented in steps of 10. This is done to leave ample room between activities so that additional activities may be inserted as necessary.

Plan and Strategy

The LANE Team has developed a comprehensive plan to complete the Project in a timely and professional manner. Our goal is to minimize the number of construction phases and traffic switches. This will reduce the overall duration of construction, which, in turn, will diminish any interruptions to the traveling public, and allow LANE to provide a better quality and more economical product to VDOT.

Design

The design process is divided into three main phases, based on the logical separation of the work scope in the Project. This will allow better tracking of the design process, and the design packages are strategically organized to optimize the progress of construction:

- Early Design Process – the work includes the Scope Validation Period, supplemental survey work, geotechnical investigation, and QC/QA Plan
- Civil Design Process – the work includes final design for roadway, drainage, sign/signal, erosion and sediment control, utility, lighting, traffic control, TMP, system, pavement marking, ROW acquisition, and environmental permitting
- Station/Architectural Design Process – the work includes final designs of the stations, which is sub-divided into three packages:
  - *Package 1 - foundations, columns, conduit, and plumbing*
  - *Package 2 - concrete slabs*
  - *Package 3 - roof structure, ceiling, handrails, station amenities, and planter walls*

Environmental /Permitting

Environmental and permitting are critical to the Project success. For the purpose of the proposal schedule, the LANE Team has only showed the permits that have the potential to impact the Project progress, but the baseline schedule will contain all necessary environmental and permitting activities as required.

ROW Acquisition

ROW acquisition will be performed in accordance with VDOT requirements and the RFP. The initiation of the ROW Acquisition phase is dependent on the Approval of the Acquisition and Relocation Plan and obtaining the Notice to Commence Acquisition from VDOT. Our proposal schedule reflects the necessary durations needed to perform all ROW acquisition tasks including Title Reports, Appraisals, Appraisal Reviews, Submittal of Offers, Negotiations, and Settlement/Closing. The LANE Team has minimized schedule risk due to ROW acquisition using the following approaches:

- Per the RFP conceptual plan, two platforms require both temporary and permanent easements, and four platforms require temporary easements.

- Preparing our construction phasing in a manner that minimizes the reliance of early construction stages on ROW acquisition
- The alignment and geometry of the station final design will be contained with the ROW limit shown in the RFP Conceptual Plans. This will minimize modifications to the proposed parcels and allow for a greater ease in the review and approval by VDOT and other stakeholders

Utility Relocation

The proposal schedule incorporates utility relocation activities necessary to clear existing utilities from the work areas. Utility related activities include the Preliminary Utility Status Report, utility designation and location, UFI meetings, utility plan and estimate preparation by utility owners, review and approval of plans and estimates, authorization to relocate, and the relocation of utilities by utility owners. Schedule risk due to utility relocation has been minimized by:

- Design approach which minimizes utility conflicts, e.g., adjusting the station locations to avoid relocation of utility lines
- Strategically scheduling the stations with potential utility conflicts, such as the overhead distribution of power lines and existing fiber optic lines, in the later sequence
- Subsurface exploration to confirm the depth of existing utilities in the proposed work

Public Involvement

Public involvement activities will be performed as required in the contract documents and relevant tasks are included in our proposal schedule. The activities included in our proposal schedule consist of:

- Development of Public Involvement and Relationship Plans (PIRP)
- ROW acquisition duration based on RFP Part 2 - Technical Requirement Section 2.12
- The LANE Team will meet and/or exceed the Public Involvement/Relation requirement per RFP Part 2 - Technical Requirement Section 2.14

QA/QC Inspection, Acceptance and Testing

QA/QC activities will be performed as required in the contract documents and relevant tasks are included in our proposal schedule. The activities included in our proposal schedule consist of:

- QA/QC Plan Submittal – the process is represented by the QA/QC plan development activity (Activity ID “D130-1000”)
- QA/QC Plan Presentation – the process is incorporated in the document review duration by VDOT
- QA/QC review of design packages – the process is taken into account, when determining the design deliverable development duration
- Design and Construction Hold Points – the LANE Team will incorporate hold points in the Baseline schedule
- VDOT Inspections are taken into consideration for estimating the duration of construction operations
- Factory Acceptance Test (FAT) and Production Verification Tests are incorporated into the material fabrication activity duration
- Pre-Installation and Verification Tests and Post-Installation and Verification Tests are taken into consideration for estimating the duration of construction operations
- Systems Acceptance Test is represented by a “System Acceptance Test” activity at each station, and a project wide acceptance test activity for the signalization, ITS, and communication systems
- Observation Period is represented by a 90-day activity (Activity ID “C000-1020”)

Construction

The LANE Team's phases of construction, on which this schedule is based, have been developed to mitigate impacts to the traveling public, delays to construction, and ultimately, facilitate final completion of the Project. Some potential delays include, but are not limited to: geotechnical constraints, environmental impacts, ROW acquisition, and the risk of potential impacts by other active construction projects.

In developing the schedule and construction sequences, the LANE Team put public safety first and included measures to limit disruptions to vehicular and pedestrian traffic. To achieve the above, the LANE Team's approaches to constructing the Project are as follows:

1. The LANE Team will coordinate the roadway construction with the station construction, so construction of the station and the adjacent roadway will occur at the same time. This approach minimizes the overall disruption to vehicular and pedestrian traffic.

2. The LANE Team will limit the length of the roadway and station areas closure based upon our resource availability. This will allow the LANE Team to construct the segment of roadway as quickly and as continuously as possible, thus minimize the scale and duration of lane closures throughout the Project.

3. For median platform construction, the LANE Team will close both inside lanes at the same time, which will provide a larger work area, reduce construction cost, improve overall efficiency, and significantly minimize the overall duration of disruptions of vehicular and pedestrian traffic.

Sequence of Construction

The LANE Team will construct the roadway work (except for mill-and-overlay) in coordination with the station work. Based on the proposed roadway scope and station locations, the LANE Team has divided the station into five groups, and we will construct a segment of the proposed roadway with the corresponding stations. The five groups of stations are as follows:

- Group 1 – There are five median station platforms in this group: Allison East, Shafer West, Shafer East, Adams West, and Adams East. Roadway work on Broad Street from Allison to 5th Street, will be constructed concurrently with the stations. During this phase, LANE will close the inside lanes in both direction from Allison to 5th Street. Upon the completion of the roadway work (except mill and overlay), we will open the roadway for traffic and start the construction of the Group 2 roadway work, while continuing the installation of the station systems, finishes, and landscape.

- Group 2 – There are five median station platforms in this group: Cleveland East, Cleveland West, Allison West, Robinsons East, and Robinsons West. LANE will construct the roadway work on Broad Street from I-195 crossings to Allison, while constructing the stations. During this phase, LANE will close the inside lanes in both direction from I-195 Crossing to Allison. Upon completion of the roadway work, we will start the construction of the Group 3 roadway work, while continuing the installation of the station systems, finishes, and landscape.

- Group 3 – There are two curb station platforms in this group: 9th St. West, and 12th St. West. LANE construct the roadway work on Broad Street from 5th St. to 12th St., while constructing the stations. During this phase, LANE will close the outside lanes for station construction, and close the inside lanes at locations where there is median construction but no station construction. Thus, LANE will only close one lane at any location. Upon completion of the roadway work, we will start the construction of the Group 4 roadway work, while continuing installation of the station systems, finishes, and landscape.

- Group 4 – There are three curb station platforms in this group: 3rd/4th St. East, 9th St. East, and 12th St. East. LANE will construct the roadway work on Broad Street eastbound from 5th St. to 12th St., while we are constructing the stations. During this phase, we will close the outside lanes for station construction, and close the inside lanes at locations where there is median construction but no station construction. Only one lane at any location.

- Group 5 – There are 11 curb station platforms in this group: Willow Lawn East, Staples Mill East, 3rd/4th St. West, Staples Mill West, Main St. West, Main St. East, 24th St. West, 24th St. East, Rte. 5 West, Rte. 5 East, and Rocketts Landing East. These 11 station platforms have no roadway work except for the bus station transition pads. LANE will construct these stations as the resources become available from Groups 1 to 4. We will also perform the roadway work on Route 5 at its intersection with Orleans St., which will be concurrent with the Group 4 roadway work. The LANE Team will follow the roadway closure restrictions per RFP Part 2 Section 2.13.14.

The mill-and-overlay and final paving roadway will be constructed in the last few months before the Interim Project milestone. This will be done to avoid damages to the final surface by other construction activities.

The variance in the station design between station platforms are relatively minor; therefore, the construction sequence of these platforms can be represented in the following typical sequence:

1. Relocate or protect existing utilities as required by the LANE Team or Others.
2. Demolition of existing median or sidewalk.
3. Construction of platform foundation, which includes excavation, backfill, the construction of the platform slab, and the electrical/communication rough-in. It also includes the installation of the tactile warning surfacing.
4. Installation of the station canopy – columns and roof truss.
5. Construction of the knee wall/barrier wall, and it also includes the ramps and the handrails.
6. Option 1 – the knee wall may be constructed in full bricks, the schedule has inserted an activity to represent the additional time required to construct the knee wall in full bricks.
7. Construction of the station sign. Work should be concurrent with knee wall.
8. Installation of lighting for the canopy, the ramps, and the station sign.
9. Installation of the security system and ticket machines, which includes the speaker system, the ticket vending machine, and the security camera.
10. Installation of the finishes, which includes a bench, the LED strip, the bench, and other finishes.
11. Installation of the glazing, which includes center and side wind screens.
12. Option 3 – Full size station structure, an additional bench, ticket vending machine, trash receptacle, and other amenities. The work will increase the duration of finishes and ticket machine duration, which increase the overall construction time of the station platform.
13. Acceptance tests of the various systems at the station platform.

The basic construction sequence for the 26 station platforms is very similar in scope but varies in terms of duration primarily due to utility relocation/protection requirement, grade, and ROW. The landscape and other beautification work at the station will be performed after the station finish work.

Project Scope Options

Per RFP Part 1 Section 1.2, there are three options in the Project. Option 1 is to construct the knee wall in full brick in lieu of thin set brick. Option 2 is to mill-and-overlay 1.5-inches of asphalt SM-12.5R in lieu of 0.75-inch milling with Thin Hot-Mix Asphalt Concrete Overlay (THMACO). Option 3 is to construct the 26 station platforms as shown in the RFP conceptual plans in lieu of the Base Scope.

This proposal schedule has taken into consideration the effect of these optional scopes on the Project. For Option 1 and 3, the LANE Team has inserted two specific activities to represent the effect of the optional scopes in the construction sequence of each station platform—26 station platforms for a total of 52 activities. For Option 2, the LANE Team determines that the change of 0.75-inch mill-and-overlay scope will not have any significant impact on the overall schedule, so this optional work requires no additional activity.

Critical Path

The Critical Path of the Project starts with NTP then follows the Scope Validation Periods and the geotechnical investigation process. The critical path will follow the geotechnical process through the submission of geotechnical report, which has to be 30 days in advance of the 65% submission of the Station Design Package 2. The critical path will stay with the Station Design Package 2 which flows into the shop drawing submittals and procurement of the station structures.

The construction phase of the critical path will start with the construction of the foundations for the five Group 1 stations and the installation of the station structures then continue into the Group 1 roadway work. Completion of Group 1 roadway work will drive the start of Group 2 roadway construction. The critical path will move from Group 2 roadway construction to the Group 2 foundation and station structure installation sequence, then switch back to Group 2 roadway construction. The critical path will continue from Group 2 roadway construction into Group 3 roadway construction then switch to the construction of Group 3 foundation and station structure installation sequence then switch back to Group 3 roadway construction. The completion of Group 3 roadway work will then drive the start of Group 4 roadway work. After the completion of roadway work, the critical path will continue to the construction of the Group 4 stations, and will stay on the construction sequence of the stations until all Group 4 stations are complete. The critical path will continue to the final system integration and acceptance of the stations then the 90-days Observation Period will start and end with the Project Final Completion.

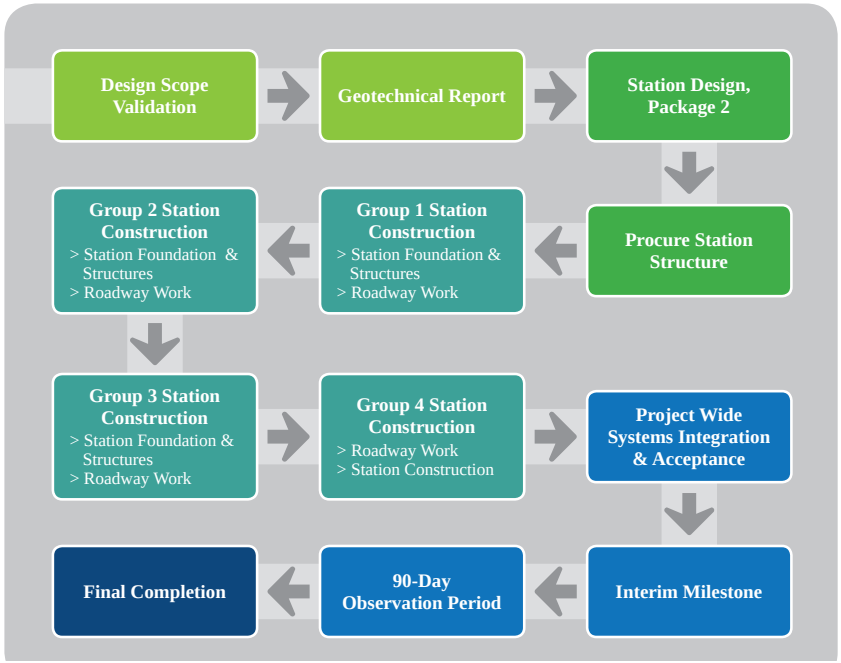

Figure 2: The Critical Path of the Project Starts at NTP

KEY ASSUMPTIONS

The LANE Team made the following key assumptions on which our Proposal Schedule is based:

- Project can close the inside lanes in both directions for the median station platforms

- Project can construct the station finish and system work without 24-hours lane closure
- Project can perform the system acceptance and integration one station at a time
- Project assumes that there is no unknown contaminated soil material in the Project
- For utility relocation to be performed by others, the relocation work will be completed according to the dates shown in RPF Addendum 1
- Commitments made through effective partnering and coordination among the LANE Team, VDOT, and all the key stakeholders are adhered to

Schedule Management

This Project's complex scope and tight schedule requires a high degree of concurrency among engineering, procurement, and construction, so efficient schedule management and control is imperative. The LANE Team will use a proven software package to integrate scheduling, documentation control, cost control, and design functions to execute our Design-Build approach. The LANE Team will develop and maintain the Project Schedule in accordance with the VDOT Special Provision for Design-Build Project Schedule (RFP Exhibit 11.1).

The LANE Team will use Primavera P6 (P6) scheduling software to plan, schedule, and monitor its construction projects. This software is an industry standard of practice for scheduling projects and allows us to plan, organize, and control the Project with the Precedence Diagram Method (PDM) of scheduling. As a management tool, P6 is powerful and flexible enough to handle all Project scheduling needs, including the following capabilities:

- CPM scheduling
- Cost management
- Resource management
- Data exchange
- Reporting capabilities
- Networking

P6 also has tools to assist the Project management team in tracking and forecasting the Project performance from the milestone level to the smallest work activity.

LANE will coordinate the scope of all Project-related activities to establish a timely Critical Path Method (CPM) job schedule that will facilitate on-time completion and identify potential risks. LANE's Project Controls will be coordinated from the on-site Project office. The Project Engineer is responsible for scheduling, cost engineering, and cost forecasting. The Design-Build Project Manager, supported by the Construction Manager, is ultimately responsible for the implementation of the project controls system.

Upon award of the contract, the LANE Team will collaborate to develop the Preliminary and the Baseline schedule based on the proposal design plans. To control time spent on activities, LANE will develop a detailed, time-phased CPM project schedule, prepared with timelines outlined within the scope of work, with the assistance of their Corporate Scheduling Department. After an internal analysis and review of the general schedule logic and critical path, the schedule is completed. The P6 software program is used to generate a time-scaled logic diagram reflecting the interdependencies of all the activities incorporated into the schedule. In addition, other various tabular reports are produced, as required, for submission to the owner.

This schedule will indicate the necessary procurement and construction activities for each area of the Project. Various calendars will be incorporated into the project schedule to reflect holidays, seasonal work, temperature and precipitation restrictions, owner requirements, etc. The activities within the CPM

schedule will be organized according to a WBS that has been developed for the Project. An Activity Coding Structure will be used in the project schedule to organize data output. The project schedule will be the tool used for coordination by both on-site and off-site LANE management. Schedule updates are used by managers to review progress and coordinate the efforts of all entities involved. A full-time on-site engineer is tasked with the responsibility to track schedule progress on a daily basis and provide monthly updates.

Detailed schedules are used to plan and monitor specific items of work and will be prepared as necessary to deal with individual work packages or smaller work activities as the need arises. As the work progresses, start dates, finish dates, percent complete, and remaining durations will be updated to report the progress of each work activity. The Construction Manager will incorporate updated data into the CPM schedule on a monthly basis, review the results internally and with the owner, and prepare the required reports for submittal. Monthly updates of the CPM schedule will provide the foundation of progress reports to be used by the Team.

When changes or unforeseen circumstances arise that impact the project schedule, the LANE Team will immediately notify VDOT (and other appropriate stakeholders) and begin incorporating changes into the "live" CPM schedule. If changes to any task or phase in the schedule result in schedule slippage, the Design-Build Project Manager will divide the task into its components to determine the reason(s) for falling behind. LANE will develop and implement a recovery plan to put the Project back on track. Progress can then be tracked daily via the schedule compared to the previously accepted schedule. LANE's management will evaluate any slippage to determine if additional manpower, equipment, multiple shifts, a change in subcontractor, or additional subcontractors is required. If so, the necessary resources will be mobilized to correct the slippage and maintain the schedule. Scheduling practices and concerns will be clearly communicated to all subcontractors and key suppliers. Delays and schedule slippage will not be tolerated.

CONCLUSION

LANE has developed a Proposal Schedule and Proposal Schedule Narrative that demonstrates our understanding of the complexities and interrelationships of the technical elements of the Project. Additionally, our Proposal Schedule takes into account internal plan reviews, VDOT plan reviews and approvals, environmental permitting, ROW acquisitions, utility relocations, and construction activities.

The LANE Team is committed to improving the enclosed Proposal Schedule to better serve VDOT, all associated stakeholders, and the traveling public. Once we have Notice to Proceed and the final design process begins, our Team will actively work to make this Project more efficient, of the highest quality, and award winning.

Attachment 4.0.1.1
Technical Proposal Checklist

ATTACHMENT 4.0.1.1

GRTC Bus Rapid Transit

TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Offerors shall furnish a copy of this Technical Proposal Checklist, with the page references added, with the Technical Proposal.

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
Technical Proposal Checklist and Contents	Attachment 4.0.1.1	Section 4.0.1.1	no	Appendix
Acknowledgement of RFP, Revisions, and/or Addenda	Attachment 3.6 (Form C-78-RFP)	Sections 3.6, 4.0.1.1	no	Appendix
Letter of Submittal	NA	Sections 4.1		1-2
Letter of Submittal on Offeror's letterhead	NA	Section 4.1.1	yes	1
Identify the full legal name and address of Offeror	NA	Section 4.1.1	yes	1
Authorized representative's original signature	NA	Section 4.1.1	yes	1
Declaration of intent	NA	Section 4.1.2	yes	1
120 day declaration	NA	Section 4.1.3	yes	1
Point of Contact information	NA	Section 4.1.4	yes	2
Principal Officer information	NA	Section 4.1.5	yes	2
Interim Milestone and Final Completion Date(s)	NA	Section 4.1.6	yes	2
Proposal Payment Agreement or Waiver of Proposal Payment	Attachment 9.3.1 or 9.3.2	Section 4.1.7	no	2 & Appendix
Certification Regarding Debarment Forms	Attachment 11.8.6(a) Attachment 11.8.6(b)	Section 4.1.8	no	2 & Appendix
Offeror's Qualifications	NA	Section 4.2		3-4

ATTACHMENT 4.0.1.1

GRTC Bus Rapid Transit

TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
Confirmation that the information provided in the SOQ submittal remains true and accurate or indicates that any requested changes were previously approved by VDOT	NA	Section 4.2.1	yes	3
Organizational chart with any updates since the SOQ submittal clearly identified	NA	Section 4.2.2	yes	4
Revised narrative when organizational chart includes updates since the SOQ submittal	NA	Section 4.2.2	yes	3
Design Concept	NA	Section 4.3		Vol. I: 5-15 Vol. II: 1-32
Conceptual Roadway Plans and description	NA	Section 4.3.1~~.1~~	yes	Vol. I: 5-12 Vol. II: 1-24
Conceptual ~~Structural~~ Architectural Plans and description	NA	Section 4.3.~~1~~.2	yes	Vol. I: 12-15 Vol. II: 25-32
Project Approach	NA	Section 4.4		16-39
~~Environmental Management~~Approach to the System	NA	Section 4.4.1	yes	16-22
Utilities	NA	Section 4.4.2	yes	23-33
~~Geotechnical~~ Quality Assurance/ Quality Control (QA/QC)	NA	Section 4.4.3	yes	34-36
~~Quality Assurance/ Quality Control (QA/QC)~~ Stakeholder Communication	NA	Section 4.4.4	yes	36-39
Construction of Project	NA	Section 4.5		40-52
Sequence of Construction	NA	Section 4.5.1	yes	40-49

ATTACHMENT 4.0.1.1

GRTC Bus Rapid Transit

TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
Transportation Management Plan	NA	Section 4.5.2	yes	49-52
Narrative Addressing Elements of the Options in Relationship to the Base Scope	NA	Section 4.6		53-54
~~Narrative that addresses elements of Option 1~~	~~NA~~	~~Section 4.6.1~~	~~yes~~	
~~Narrative that addresses elements of Option 2~~	~~NA~~	~~Section 4.6.2~~	~~yes~~	
Disadvantaged Business Enterprises (DBE)	NA	Section 4.7		55
Written statement of percent DBE participation	NA	Section 4.7	yes	55
Proposal Schedule	NA	Section 4.8		Vol. I: S1-S11 Vol. II: S12-S24
Proposal Schedule	NA	Section 4.8.1	no	Vol. II: S12-S24
Proposal Schedule Narrative	NA	Section 4.8 .2	no	Vol I: S1-S11
Proposal Schedule in electronic format (CD-ROM)	NA	Section 4.8	no	CD

Attachment 3.6 (form c-78-rfp)
Acknowledgement of Receipt of RFP, Revisions, and/or Addenda

Form C-78-RFP

ATTACHMENT 3.6

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

RFP NO. C00108069DB87

ACKNOWLEDGEMENT OF RFP, REVISION AND/OR ADDENDA

Acknowledgement shall be made of receipt of the Request for Proposals (RFP) and/or any and all revisions and/or addenda pertaining to the above designated project which are issued by the Department prior to the Letter of Submittal submission date shown herein. Failure to include this acknowledgement in the Letter of Submittal may result in the rejection of your proposal.

By signing this Attachment 3.6, the Offeror acknowledges receipt of the RFP and/or following revisions and/or addenda to the RFP for the above designated project which were issued under cover letter(s) of the date(s) shown hereon:

1. Cover letter of RFP – November 24, 2015 (Date)
2. Cover letter of Addendum #1- December 30, 2015 (Date)
3. Cover letter of Addendum #2- January 14, 2016 (Date)
4. Cover letter of Addendum #3- January 29, 2016 (Date)
5. Cover letter of Addendum #4- February 17, 2016 (Date)

SIGNATURE

February 29, 2016
DATE

Donald E. Bryson, Jr.
PRINTED NAME

Pursuit Manager
TITLE

Attachment 9.3.1
Proposal Payment Agreement

ATTACHMENT 9.3.1
PROPOSAL PAYMENT AGREEMENT

THIS PROPOSAL PAYMENT AGREEMENT (this "Agreement") is made and entered into as of this 29th day of February, 2016, by and between the Virginia Department of Transportation ("VDOT"), and The Lane Construction Corporation ("Offeror").

WITNESSETH:

WHEREAS, Offeror is one of the entities who submitted Statements of Qualifications ("SOQs") pursuant to VDOT's November 24, 2015 Request for Qualifications ("RFQ") and was invited to submit proposals in response to a Request for Proposals ("RFP") for the **GRTC Bus Rapid Transit** ("Project"), under a design-build contract with VDOT ("Design-Build Contract"); and

WHEREAS, as part of the procurement process for the Project, Offeror has already provided and/or furnished to VDOT, and may continue to provide and/or furnish to VDOT, certain intellectual property, materials, information and ideas, including, but not limited to, such matters that are: (a) conveyed verbally and in writing during proprietary meetings or interviews; and (b) contained in, related to or associated with Offeror's proposal, including, but not limited to, written correspondence, designs, drawings, plans, exhibits, photographs, reports, printed material, tapes, electronic disks, or other graphic and visual aids (collectively "Offeror's Intellectual Property"); and

WHEREAS, VDOT is willing to provide a payment to Offeror, subject to the express conditions stated in this Agreement, to obtain certain rights in Offeror's Intellectual Property, provided that Offeror submits a proposal that VDOT determines to be responsive to the RFP ("Offeror's Proposal"), and either (a) Offeror is not awarded the Design-Build Contract; or (b) VDOT cancels the procurement or decides not to award the Design-Build Contract to any Offeror; and

WHEREAS, Offeror wishes to receive the payment offered by VDOT, in exchange for granting VDOT the rights set forth in this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants and agreements set forth in this Agreement and other good and valuable consideration, the receipt and adequacy of which are acknowledged by the parties, the parties agree as follows:

1. **VDOT's Rights in Offeror's Intellectual Property**. Offeror hereby conveys to VDOT all rights, title and interest, free and clear of all liens, claims and encumbrances, in Offeror's Intellectual Property, which includes, without restriction or limitation, the right of VDOT, and anyone contracting with VDOT, to incorporate any ideas or information from Offeror's Intellectual Property into: (a) the Design-Build Contract and the Project; (b) any other contract awarded in reference to the Project; or (c) any subsequent procurement by VDOT. In receiving all rights, title and interest in Offeror's Intellectual Property, VDOT is deemed to own all intellectual property rights, copyrights, patents, trade secrets, trademarks, and service marks in Offeror's Intellectual Property, and Offeror agrees that it shall, at the request of VDOT, execute all papers and perform all other acts that may be necessary to ensure that VDOT's rights, title and interest in Offeror's Intellectual Property are protected. The rights conferred herein to VDOT include, without limitation, VDOT's ability to use Offeror's Intellectual Property without the obligation to notify or seek permission from Offeror.

2. **Exclusions from Offeror's Intellectual Property**. Notwithstanding Section 1 above, it is understood and agreed that Offeror's Intellectual Property is not intended to include, and Offeror does not convey any rights to, the Escrow Proposal Documents submitted by Offeror in accordance with the RFP.

3. **Proposal Payment**. VDOT agrees to pay Offeror the lump sum amount of **twenty thousand and 00/100 Dollars ($20,000.00)** ("Proposal Payment"), which payment constitutes payment in full to Offeror for the conveyance of Offeror's Intellectual Property to VDOT in accordance with this Agreement. Payment of the Proposal Payment is conditioned upon: (a) Offeror's Proposal being, in the sole discretion of VDOT, responsive to the RFP; (b) Offeror complying with all other terms and conditions of this Agreement; and (c) either (i) Offeror is not awarded the Design-Build Contract, or (ii) VDOT cancels the procurement or decides not to award the Design-Build Contract to any Offeror.

4. **Payment Due Date**. Subject to the conditions set forth in this Agreement, VDOT will make payment of the Proposal Payment to the Offeror within forty-five (45) days after the later of: (a) notice from VDOT that it has awarded the Design-Build Contract to another Offeror; or (b) notice from VDOT that the procurement for the Project has been cancelled and that there will be no Contract Award.

5. **Effective Date of this Agreement**. The rights and obligations of VDOT and Offeror under this Agreement, including VDOT's ownership rights in Offeror's Intellectual Property, vests upon the date that Offeror's Proposal is submitted to VDOT. Notwithstanding the above, if Offeror's Proposal is determined by VDOT, in its sole discretion, to be nonresponsive to the RFP, then Offeror is deemed to have waived its right to obtain the Proposal Payment, and VDOT shall have no obligations under this Agreement.

6. **Indemnity**. Subject to the limitation contained below, Offeror shall, at its own expense, indemnify, protect and hold harmless VDOT and its agents, directors, officers, employees, representatives and contractors from all claims, costs, expenses, liabilities, demands, or suits at law or equity ("Claims") of, by or in favor of or awarded to any third party arising in whole or in part from: (a) the negligence or wilful misconduct of Offeror or any of its agents, officers, employees, representatives or subcontractors; or (b) breach of any of Offeror's obligations under this Agreement, including its representation and warranty under Section 8 hereof. This indemnity shall not apply with respect to any Claims caused by or resulting from the sole negligence or wilful misconduct of VDOT, or its agents, directors, officers, employees, representatives or contractors.

7. **Assignment**. Offeror shall not assign this Agreement, without VDOT's prior written consent, which consent may be given or withheld in VDOT's sole discretion. Any assignment of this Agreement without such consent shall be null and void.

8. **Authority to Enter into this Agreement**. By executing this Agreement, Offeror specifically represents and warrants that it has the authority to convey to VDOT all rights, title, and interest in Offeror's Intellectual Property, including, but not limited to, those any rights that might have been vested in team members, subcontractors, consultants or anyone else who may have contributed to the development of Offeror's Intellectual Property, free and clear of all liens, claims and encumbrances.

9. **Miscellaneous**.

a. Offeror and VDOT agree that Offeror, its team members, and their respective employees are not agents of VDOT as a result of this Agreement.

b. Any capitalized term used herein but not otherwise defined shall have the meanings set forth in the RFP.

c. This Agreement, together with the RFP, embodies the entire agreement of the parties with respect to the subject matter hereof. There are no promises, terms, conditions, or obligations other than those contained herein or in the RFP, and this Agreement shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties hereto.

d. It is understood and agreed by the parties hereto that if any part, term, or provision of this Agreement is by the courts held to be illegal or in conflict with any law of the Commonwealth of Virginia, validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular part, term, or provisions to be invalid.

e. This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Virginia.

IN WITNESS WHEREOF, this Agreement has been executed and delivered as of the day and year first above written.

VIRGINIA DEPARTMENT OF TRANSPORTATION

By: _____

Name: _____

Title: _____

The Lane Construction Corporation

By: _____

Name: Donald E. Bryson, Jr.

Title: Pursuit Manager

Attachment 11.8.6(a)
Certification Regarding Debarment; Primary Covered Transactions

ATTACHMENT 11.8.6(a)
CERTIFICATION REGARDING DEBARMENT
PRIMARY COVERED TRANSACTIONS

Project Name: GRTC Bus Rapid Transit
Contract ID No.: C00108069DB87

1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency.

b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; and have not been convicted of any violations of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification, or destruction of records, making false statements, or receiving stolen property;

c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1) b) of this certification; and

d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

	February 29, 2016	Pursuit Manager
Signature	Date	Title

The Lane Construction Corporation
Name of Firm

Attachment 11.8.6(b)
Certification Regarding Debarment; Lower Tier Covered Transactions

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project Name: GRTC Bus Rapid Transit
Contract ID No.: C00108069DB87

1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

E. Richard [illegible] 1/9/2016 Senior Vice President
Signature Date Title

STV Incorporated dba STV Group Incorporated
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project Name: GRTC Bus Rapid Transit
Contract ID No.: C00108069DB87

1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

12/2/15 President

Signature Date Title

Froehling & Robertson, Inc.

Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project Name: GRTC Bus Rapid Transit
Contract ID No.: C00108069DB87

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	12/1/15	President
Signature	Date	Title

GeoConcepts Engineering, Inc.
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project Name: GRTC Bus Rapid Transit
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Alvan W. Hanson 12/01/15 President
Signature Date Title

H&B Surveying and Mapping, LLC
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project Name: GRTC Bus Rapid Transit
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The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

	12/1/2015	Vice President Business Development
Signature	Date	Title

InfraMap Corp.

Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project Name: GRTC Bus Rapid Transit
Contract ID No.: C00108069DB87

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The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

	12/2/2015	PRESIDENT
Signature	Date	Title

KDR REAL ESTATE SERVICES
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project Name: GRTC Bus Rapid Transit
Contract ID No.: C00108069DB87

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The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

	12/2/2015	President
Signature	Date	Title

NXL Construction Services, Inc.

Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project Name: GRTC Bus Rapid Transit
Contract ID No.: C00108069DB87

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The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

Dina Campbell 12/3/15 Public Relations Specialist
Signature Date Title

Seventh Point Transportation PR
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project Name: GRTC Bus Rapid Transit
Contract ID No.: C00108069DB87

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2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

Signature	2-24-16 Date	Principal in Charge Title

Timmons Group
Name of Firm

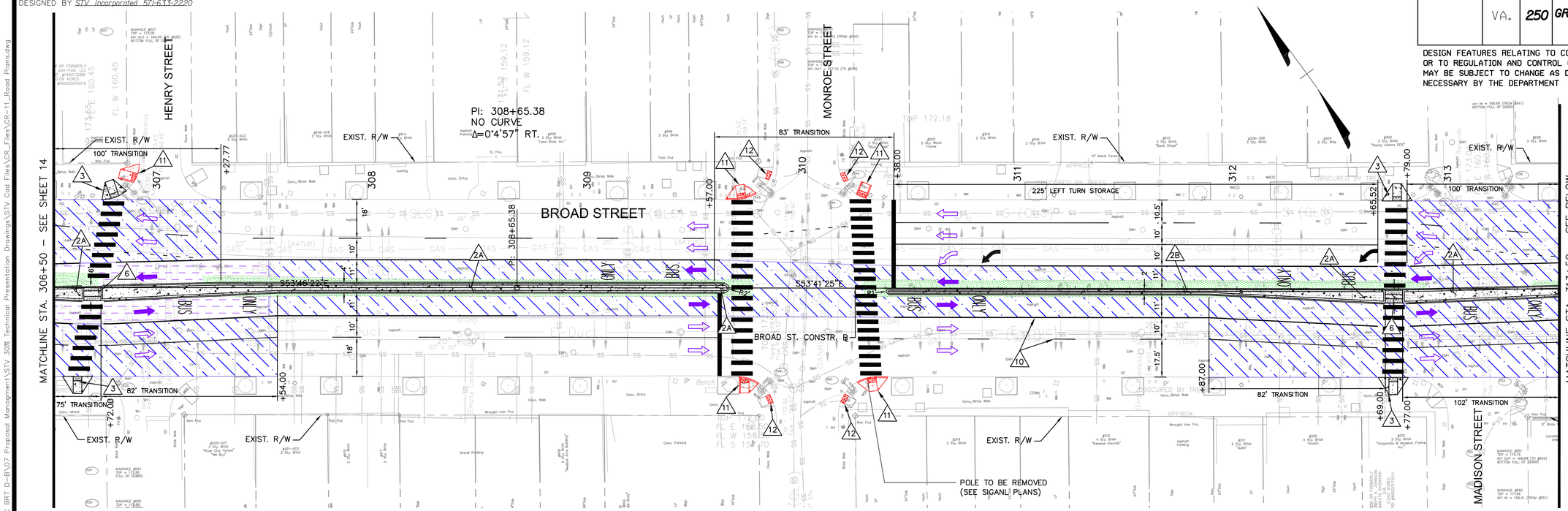
PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

REVISED	STATE	ROUTE	PROJECT	SHEET NO
	VA.	250	GRT BUS RAPID TRANSIT	15

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

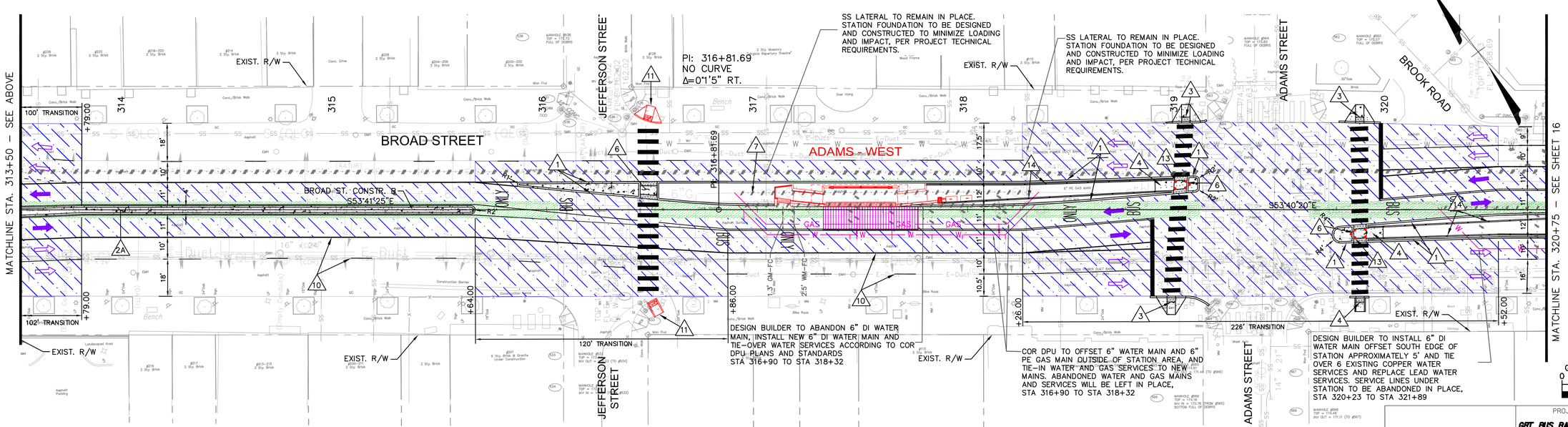
RFP CONCEPTUAL PLANS
THESE PLANS ARE UNFINISHED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION
DATE: 02/29/16

THE LANE CONSTRUCTION CORPORATION



LEGEND

- PROPOSED CONC. ITEMS
- PROPOSED ASPHALT PAVE.
- 2" MILL & OVERLAY/BUILD-UP ASPHALT PAVE.
- 4" MILL & OVERLAY/BUILD-UP ASPHALT PAVE.
- 3/4" MILL & THIN HOT-MIX ASPHALT CONCRETE OVERLAY
- PROPOSED REINFORCED CONC. PAVEMENT
- PROPOSED DEDICATED BRT LANE FLOW ARROW
- FLOW ARROW
- 1 STD. CITY OF RICHMOND CURB REQ'D.
- 2A VDOT STD. MS-1 REQ'D.
- 2B VDOT MOD. MS-1 REQ'D.
- 3 VDOT STD. CG-12, TYPE A REQ'D.
- 4 VDOT STD. CG-12, TYPE B REQ'D.
- 5 REPLACE RAMP SURFACE AND DETECTABLE WARNING SURFACE
- 6 VDOT STD. CG-12, TYPE M2 REQ'D.
- 7 VDOT MOD. MS-2 REQ'D.
- 8 HENRICO STD. CURB & GUTTER REQ'D.
- 9 STD. HYD. CEMENT SIDEWALK REQ'D., W=VARIES
- 10 DENOTES PAVEMENT LINE MARKINGS
- 11 STD. CG-12 ADDED PER ADDENDUM 2
- 12 DETECTABLE WARNING SURFACE ADDED PER ADDENDUM 2
- 13 4" CONCRETE FILLED PIPE (SCH. 80) BOLLARD WITH A YELLOW HPDE PLASTIC COVER
- 14 42"-HIGH PIPE AND TUBE RAILING (SEE ARCH. SHEET)



DESIGN BUILDER TO ABANDON 6" DI WATER MAIN, INSTALL NEW 6" DI WATER MAIN AND TIE-OVER WATER SERVICES ACCORDING TO COR DPU PLANS AND STANDARDS STA 316+90 TO STA 318+32

COR DPU TO OFFSET 6" WATER MAIN AND 6" PE GAS MAIN OUTSIDE OF STATION AREA, AND TIE-IN WATER AND GAS SERVICES TO NEW MAINS. ABANDONED WATER AND GAS MAINS AND SERVICES WILL BE LEFT IN PLACE, STA 316+90 TO STA 318+32

DESIGN BUILDER TO INSTALL 6" DI WATER MAIN OFFSET SOUTH EDGE OF STATION APPROXIMATELY 5' AND TIE OVER 6 EXISTING COPPER WATER SERVICES AND REPLACE LEAD WATER SERVICES. SERVICE LINES UNDER STATION TO BE ABANDONED IN PLACE, STA 320+23 TO STA 321+89

GRAPHIC SCALE IN FEET
0 12.5 25 50

PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	15

February 24, 2016 10:03:11am
Plotted By:Curtis, Todd Sheet Set:Kha Layout:11 – ROADWAY February 24, 2016 10:03:11am I:\Proposals\2015\2015 Proposals\61046_VDOT GRTC BRT D-B\07 Proposal Managment\STV 30% Technical Presentation Drawings\STV Cad Files\GR_Files\GR-11_Road Plans.dwg

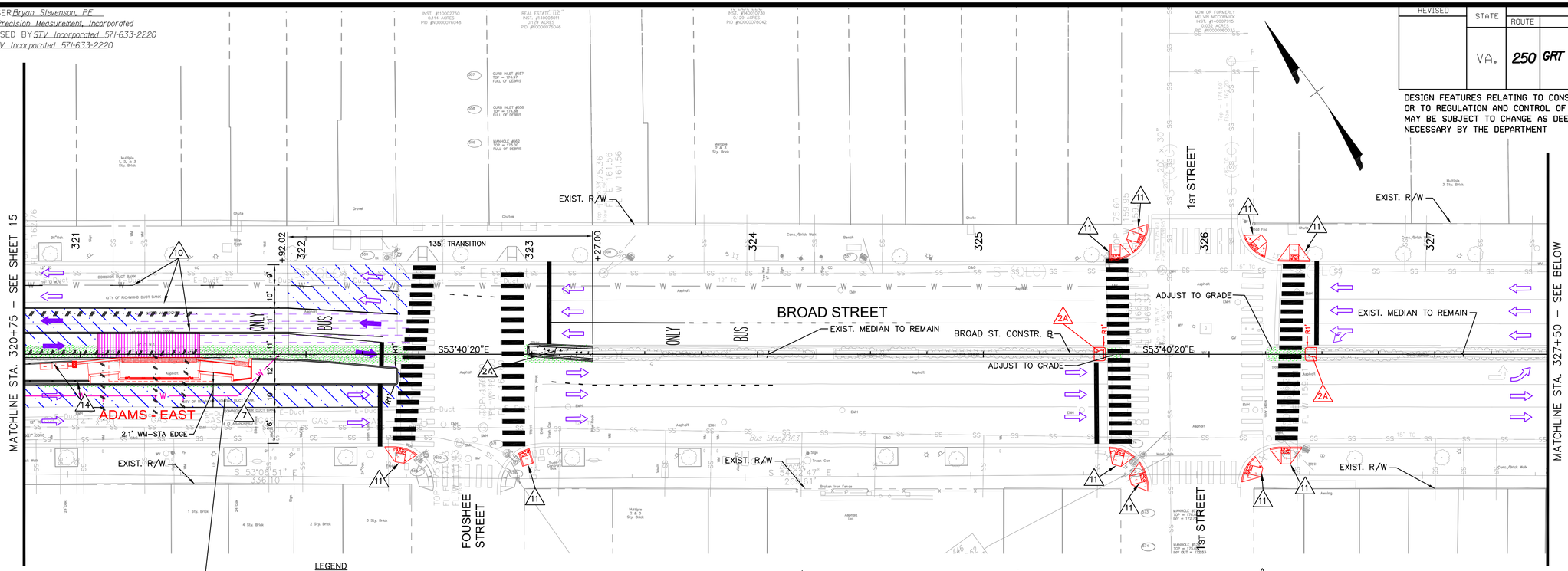
PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

REVISED	STATE	ROUTE	PROJECT	SHEET NO
	VA.	250	GRT BUS RAPID TRANSIT	16

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

RFP CONCEPTUAL PLANS
THESE PLANS ARE UNFINISHED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION
DATE: 02/29/16

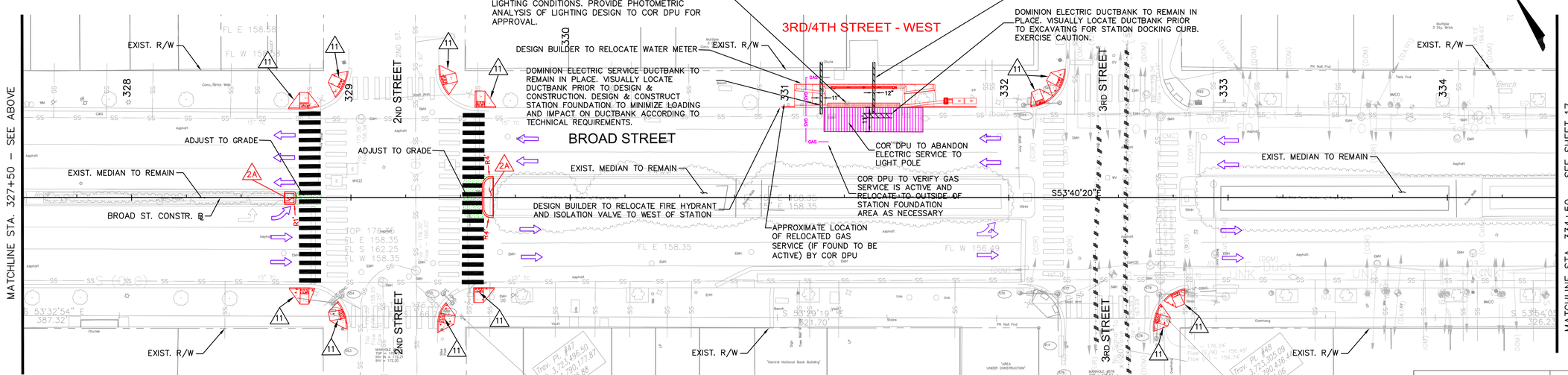
THE LANE CONSTRUCTION CORPORATION



DESIGN BUILDER TO INSTALL 6" DI WATER MAIN OFFSET SOUTH EDGE OF STATION APPROXIMATELY 5' AND TIE OVER 6 EXISTING COPPER WATER SERVICES AND REPLACE LEAD WATER SERVICES. SERVICE LINES UNDER STATION TO BE ABANDONED IN PLACE, STA 320+23 TO STA 321+89

LEGEND

- PROPOSED CONC. ITEMS
- PROPOSED ASPHALT PAVE.
- 2" MILL & OVERLAY/BUILD-UP ASPHALT PAVE.
- 4" MILL & OVERLAY/BUILD-UP ASPHALT PAVE.
- 3/4" MILL & THIN HOT-MIX ASPHALT CONCRETE OVERLAY
- PROPOSED REINFORCED CONC. PAVEMENT
- PROPOSED DEDICATED BRT LANE FLOW ARROW
- FLOW ARROW
- 1 STD. CITY OF RICHMOND CURB REQ'D.
- 2A VDOT STD. MS-1 REQ'D.
- 2B VDOT MOD. MS-1 REQ'D.
- 3 VDOT STD. CG-12, TYPE A REQ'D.
- 4 VDOT STD. CG-12, TYPE B REQ'D.
- 5 REPLACE RAMP SURFACE AND DETECTABLE WARNING SURFACE
- 6 VDOT STD. CG-12, TYPE M2 REQ'D.
- 7 VDOT MOD. MS-2 REQ'D.
- 8 HENRICO STD. CURB & GUTTER REQ'D.
- 9 STD. HYD. CEMENT SIDEWALK REQ'D., W=VARIES
- 10 DENOTES PAVEMENT LINE MARKINGS
- 11 STD. CG-12 ADDED PER ADDENDUM 2
- 12 DETECTABLE WARNING SURFACE ADDED PER ADDENDUM 2
- 13 4" CONCRETE FILLED PIPE (SCH. 80) BOLLARD WITH A YELLOW HPDE PLASTIC COVER
- 14 42"-HIGH PIPE AND TUBE RAILING (SEE ARCH. SHEET)



GRAPHIC SCALE IN FEET
0 12.5 25 50

PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	16

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PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	250	GRT BUS RAPID TRANSIT	17

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

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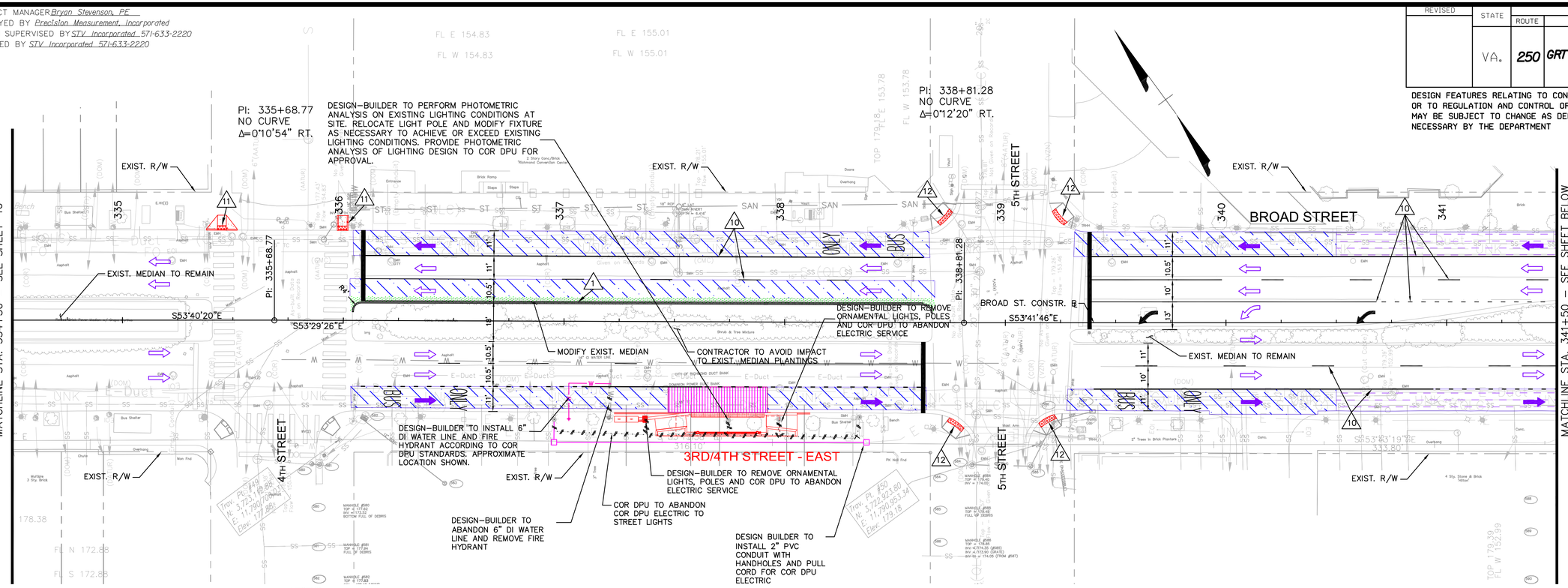
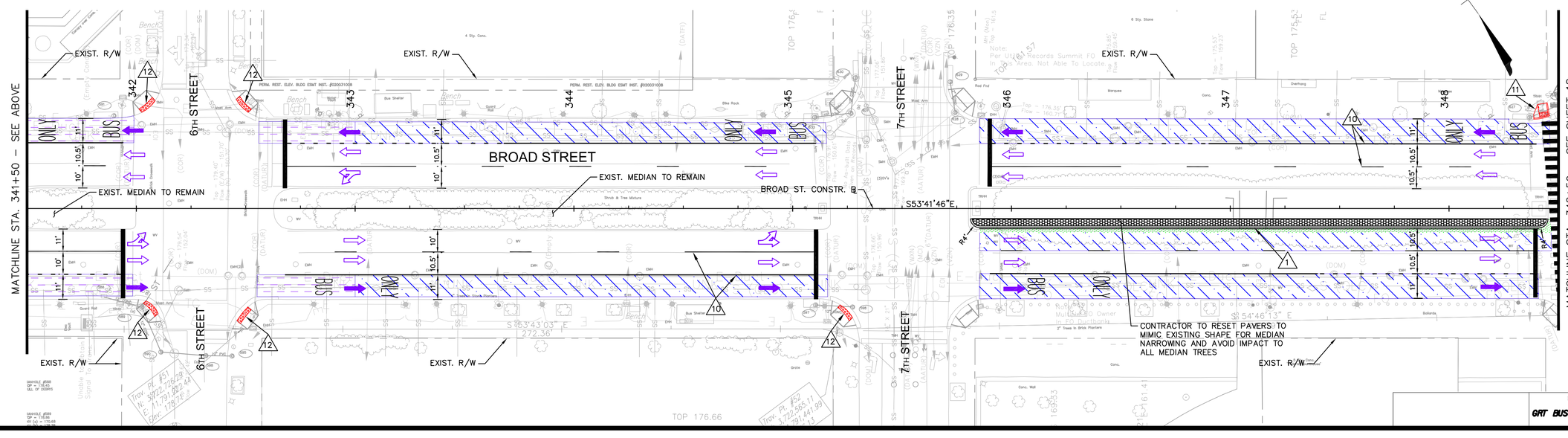
DATE: 02/29/16

THE LANE CONSTRUCTION CORPORATION



LEGEND

- PROPOSED CONC. ITEMS
- PROPOSED ASPHALT PAVE.
- 2" MILL & OVERLAY/BUILD-UP ASPHALT PAVE.
- 4" MILL & OVERLAY/BUILD-UP ASPHALT PAVE.
- 3/4" MILL & THIN HOT-MIX ASPHALT CONCRETE OVERLAY
- PROPOSED REINFORCED CONC. PAVEMENT
- PROPOSED DEDICATED BRT LANE FLOW ARROW
- FLOW ARROW
- (1) STD. CITY OF RICHMOND CURB REQ'D.
- (2A) VDOT STD. MS-1 REQ'D.
- (2B) VDOT MOD. MS-1 REQ'D.
- (3) VDOT STD. CG-12, TYPE A REQ'D.
- (4) VDOT STD. CG-12, TYPE B REQ'D.
- (5) REPLACE RAMP SURFACE AND DETECTABLE WARNING SURFACE
- (6) VDOT STD. CG-12, TYPE M2 REQ'D.
- (7) VDOT MOD. MS-2 REQ'D.
- (8) HENRICO STD. CURB & GUTTER REQ'D.
- (9) STD. HYD. CEMENT SIDEWALK REQ'D., W=VARIES
- (10) DENOTES PAVEMENT LINE MARKINGS
- (11) STD. CG-12 ADDED PER ADDENDUM 2
- (12) DETECTABLE WARNING SURFACE ADDED PER ADDENDUM 2



GRAPHIC SCALE IN FEET
0 12.5 25 50

PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	17

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PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO
	VA.	250	GRT BUS RAPID TRANSIT	18

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

RFP CONCEPTUAL PLANS
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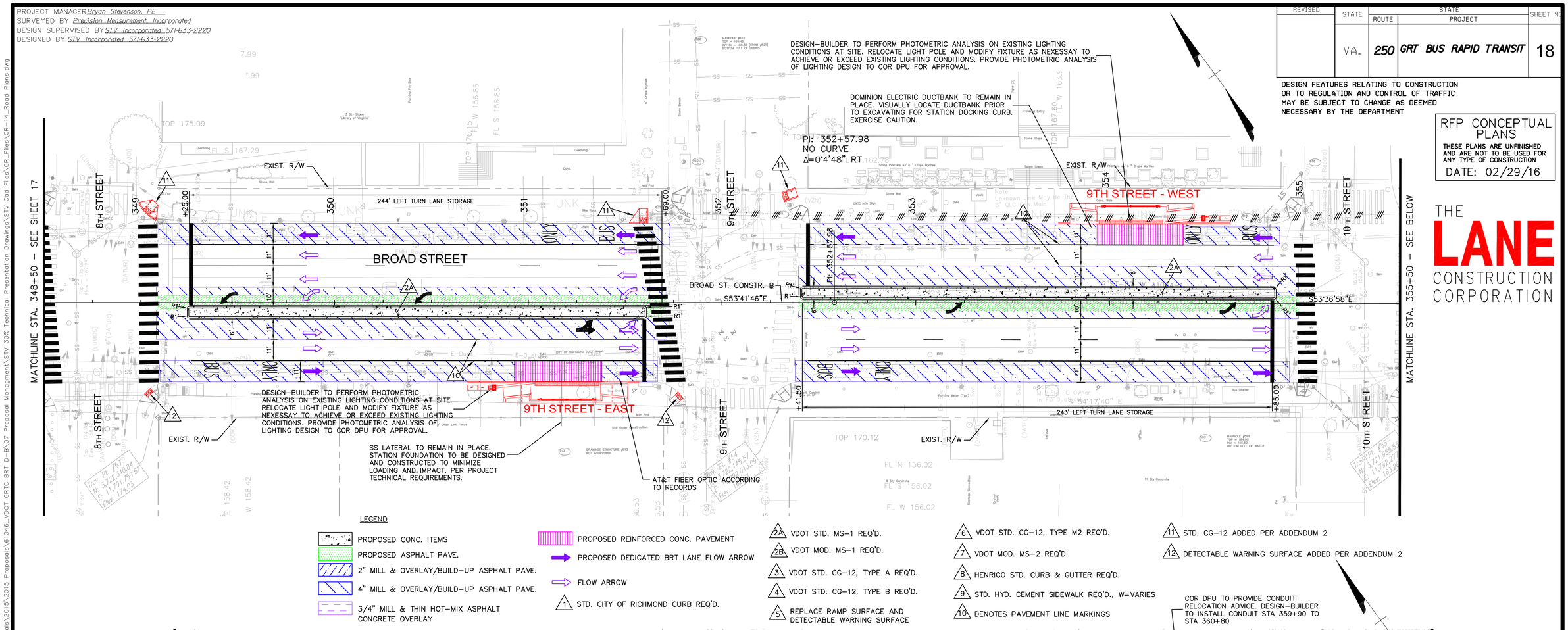
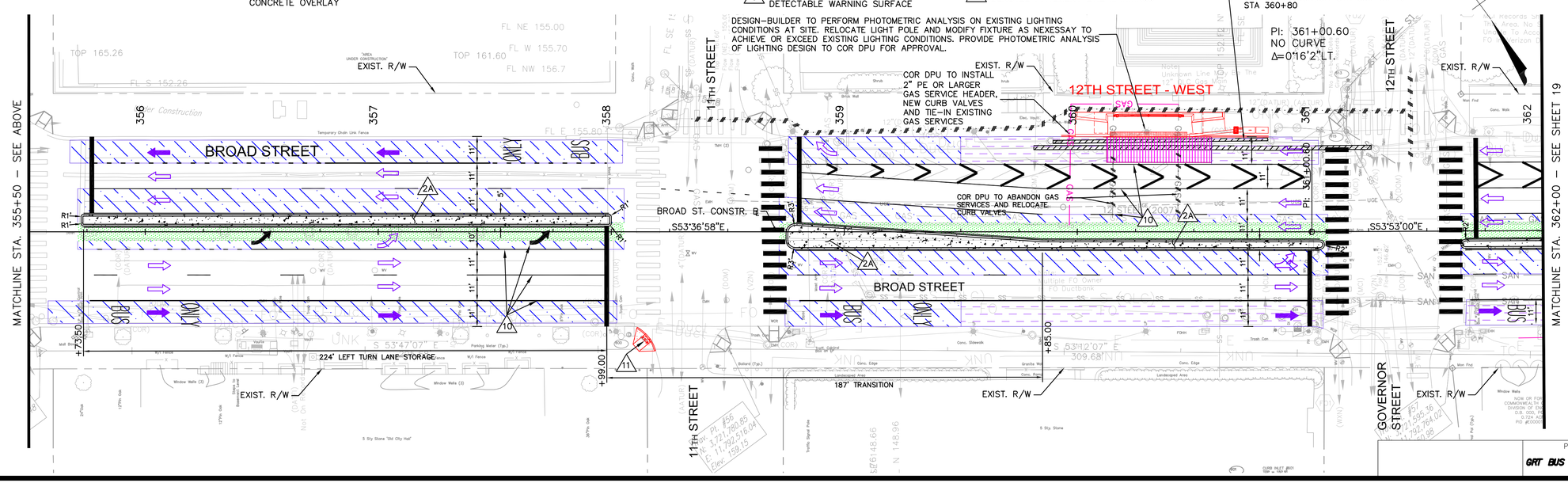
DATE: 02/29/16

THE LANE CONSTRUCTION CORPORATION



LEGEND

- PROPOSED CONC. ITEMS
- PROPOSED ASPHALT PAVE.
- 2" MILL & OVERLAY/BUILD-UP ASPHALT PAVE.
- 4" MILL & OVERLAY/BUILD-UP ASPHALT PAVE.
- 3/4" MILL & THIN HOT-MIX ASPHALT CONCRETE OVERLAY
- PROPOSED REINFORCED CONC. PAVEMENT
- PROPOSED DEDICATED BRT LANE FLOW ARROW
- FLOW ARROW
- 1 STD. CITY OF RICHMOND CURB REQ'D.
- 2A VDOT STD. MS-1 REQ'D.
- 2B VDOT MOD. MS-1 REQ'D.
- 3 VDOT STD. CG-12, TYPE A REQ'D.
- 4 VDOT STD. CG-12, TYPE B REQ'D.
- 5 REPLACE RAMP SURFACE AND DETECTABLE WARNING SURFACE
- 6 VDOT STD. CG-12, TYPE M2 REQ'D.
- 7 VDOT MOD. MS-2 REQ'D.
- 8 HENRICO STD. CURB & GUTTER REQ'D.
- 9 STD. HYD. CEMENT SIDEWALK REQ'D., W=VARIES
- 10 DENOTES PAVEMENT LINE MARKINGS
- 11 STD. CG-12 ADDED PER ADDENDUM 2
- 12 DETECTABLE WARNING SURFACE ADDED PER ADDENDUM 2



GRAPHIC SCALE IN FEET
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PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	18

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PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

REVISED	STATE	ROUTE	PROJECT	SHEET NO
	VA.	250	GRT BUS RAPID TRANSIT	19

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

RFP CONCEPTUAL PLANS
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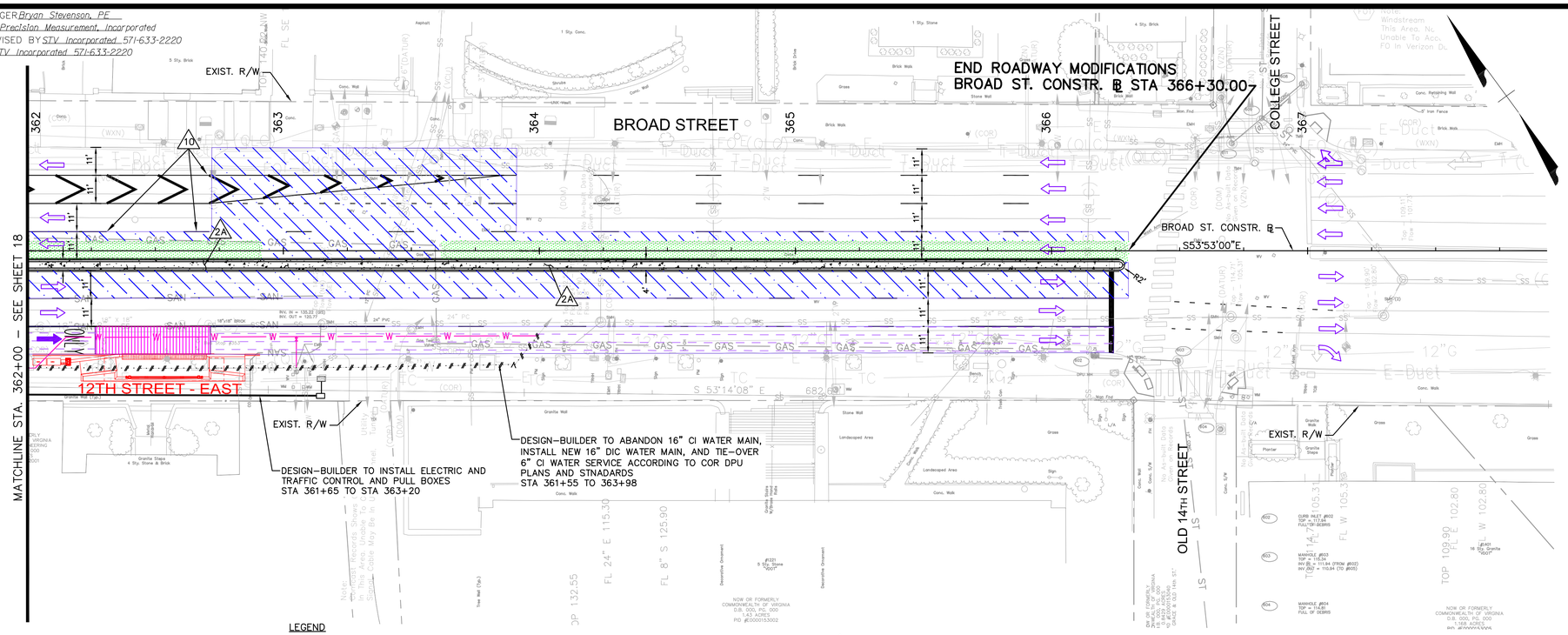
DATE: 02/29/16

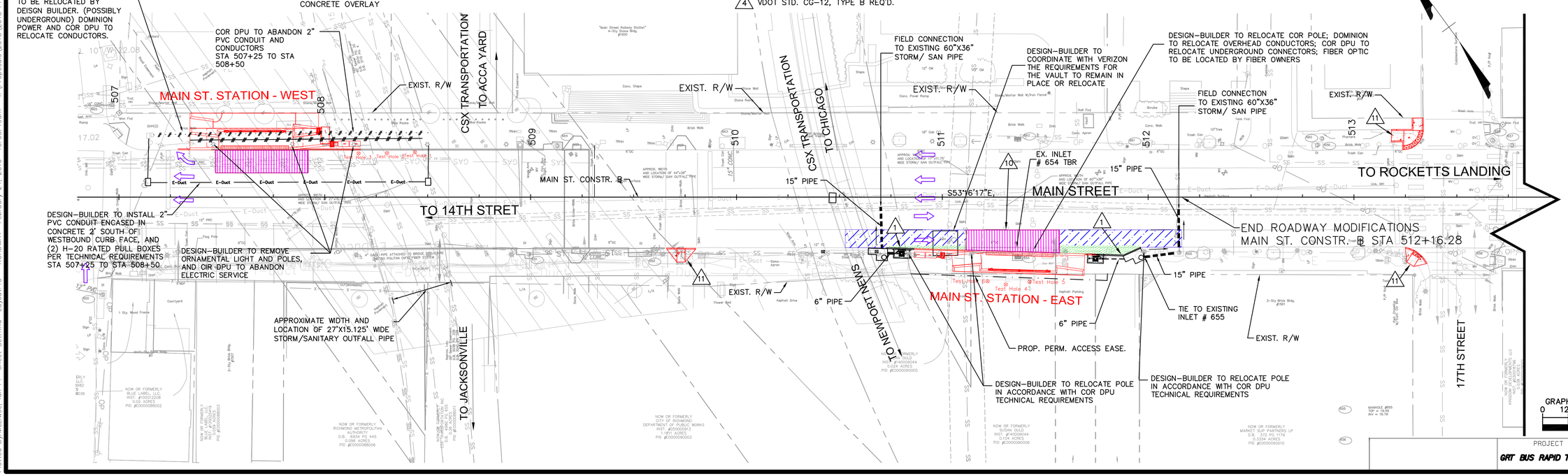
THE LANE CONSTRUCTION CORPORATION



LEGEND

- PROPOSED CONC. ITEMS
- PROPOSED ASPHALT PAVE.
- 2" MILL & OVERLAY/BUILD-UP ASPHALT PAVE.
- 4" MILL & OVERLAY/BUILD-UP ASPHALT PAVE.
- 3/4" MILL & THIN HOT-MIX ASPHALT CONCRETE OVERLAY
- PROPOSED REINFORCED CONC. PAVEMENT
- PROPOSED 8'x6' CONCRETE BOX WITH SOIL MEDIA BIO-FILTER
- PROPOSED VDOT STD.DI-3C, L=8' CURB DROP INLET
- PROPOSED STORM DRAIN PIPE

1. STD. CITY OF RICHMOND CURB REQ'D.
2A. VDOT STD. MS-1 REQ'D.
2B. VDOT MOD. MS-1 REQ'D.
3. VDOT STD. CG-12, TYPE A REQ'D.
4. VDOT STD. CG-12, TYPE B REQ'D.
5. REPLACE RAMP SURFACE AND DETECTABLE WARNING SURFACE
6. VDOT STD. CG-12, TYPE M2 REQ'D.
7. VDOT MOD. MS-2 REQ'D.
8. COUNTY OF HENRICO STD. CURB & GUTTER REQ'D.
9. STD. HYD. CEMENT SIDEWALK REQ'D., W=VARIES
10. DENOTES PAVEMENT LINE MARKINGS
- PROPOSED DEDICATED BRT LANE FLOW ARROW
- FLOW ARROW
11. STD. CG-12 ADDED PER ADDENDUM 2
12. DETECTABLE WARNING SURFACE ADDED PER ADDENDUM



GRAPHIC SCALE IN FEET
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PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	19

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PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	250	GRT BUS RAPID TRANSIT	20

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

RFP CONCEPTUAL PLANS
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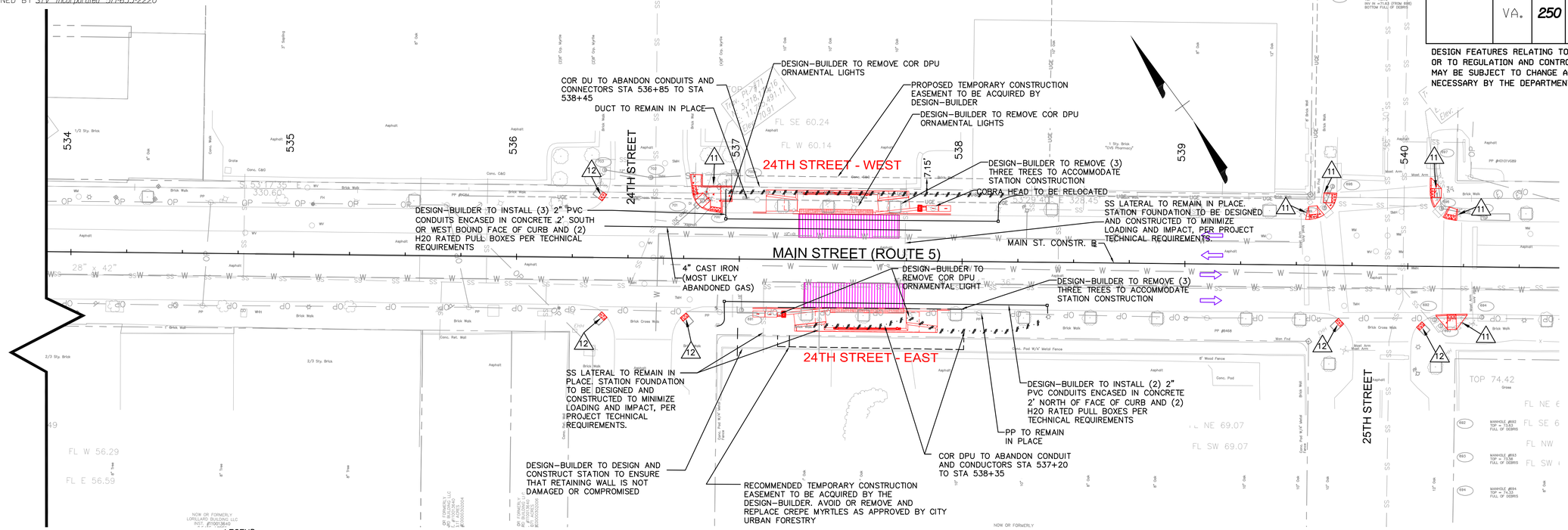
DATE: 02/29/16

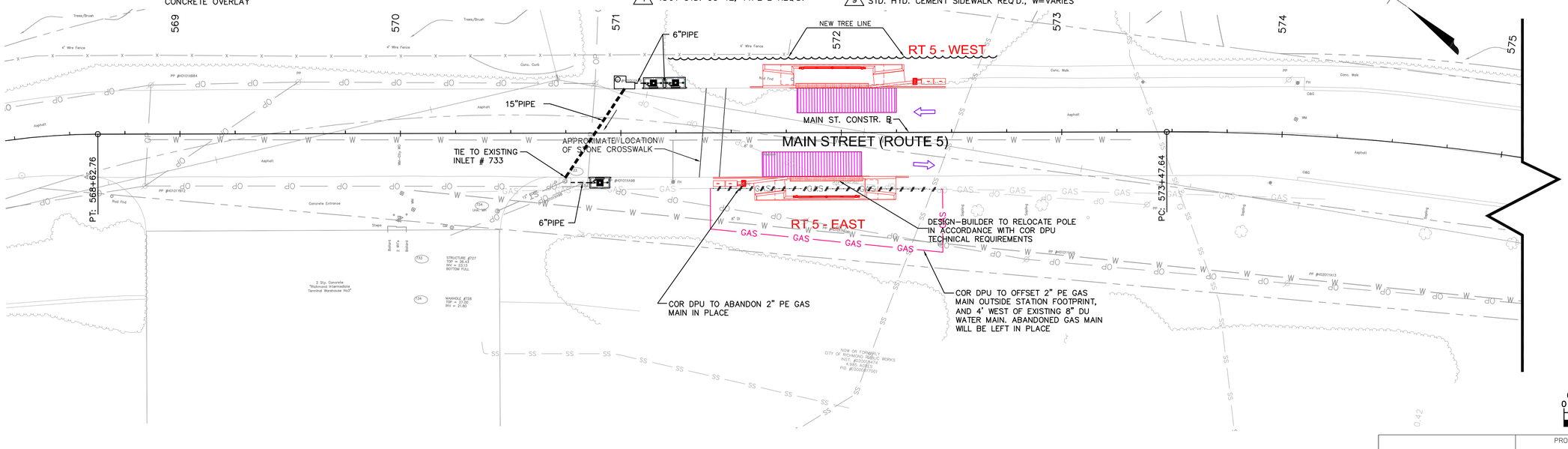
THE LANE CONSTRUCTION CORPORATION



LEGEND

- PROPOSED CONC. ITEMS
- PROPOSED ASPHALT PAVE.
- 2" MILL & OVERLAY/BUILD-UP ASPHALT PAVE.
- 4" MILL & OVERLAY/BUILD-UP ASPHALT PAVE.
- 3/4" MILL & THIN HOT-MIX ASPHALT CONCRETE OVERLAY
- PROPOSED REINFORCED CONC. PAVEMENT
- PROPOSED 8'x6' CONCRETE BOX WITH SOIL MEDIA BIO-FILTER
- PROPOSED VDOT STD. DI-3B, L=8' CURB DROP INLET
- PROPOSED STORM DRAIN PIPE

1. STD. CITY OF RICHMOND CURB REQ'D.
2A. VDOT STD. MS-1 REQ'D.
2B. VDOT MOD. MS-1 REQ'D.
3. VDOT STD. CG-12, TYPE A REQ'D.
4. VDOT STD. CG-12, TYPE B REQ'D.
5. REPLACE RAMP SURFACE AND DETECTABLE WARNING SURFACE
6. VDOT STD. CG-12, TYPE M2 REQ'D.
7. VDOT MOD. MS-2 REQ'D.
8. HENRICO STD. CURB & GUTTER REQ'D.
9. STD. HYD. CEMENT SIDEWALK REQ'D., W=VARIES
11. STD. CG-12 ADDED PER ADDENDUM 2
12. DETECTABLE WARNING SURFACE ADDED PER ADDENDUM 2
- PROPOSED DEDICATED BRT LANE FLOW ARROW
- FLOW ARROW



GRAPHIC SCALE IN FEET
0 12.5 25 50

PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	20

February 24, 2016 10:05:46am
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PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO
	VA.	250	GRT BUS RAPID TRANSIT	21

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

RFP CONCEPTUAL PLANS
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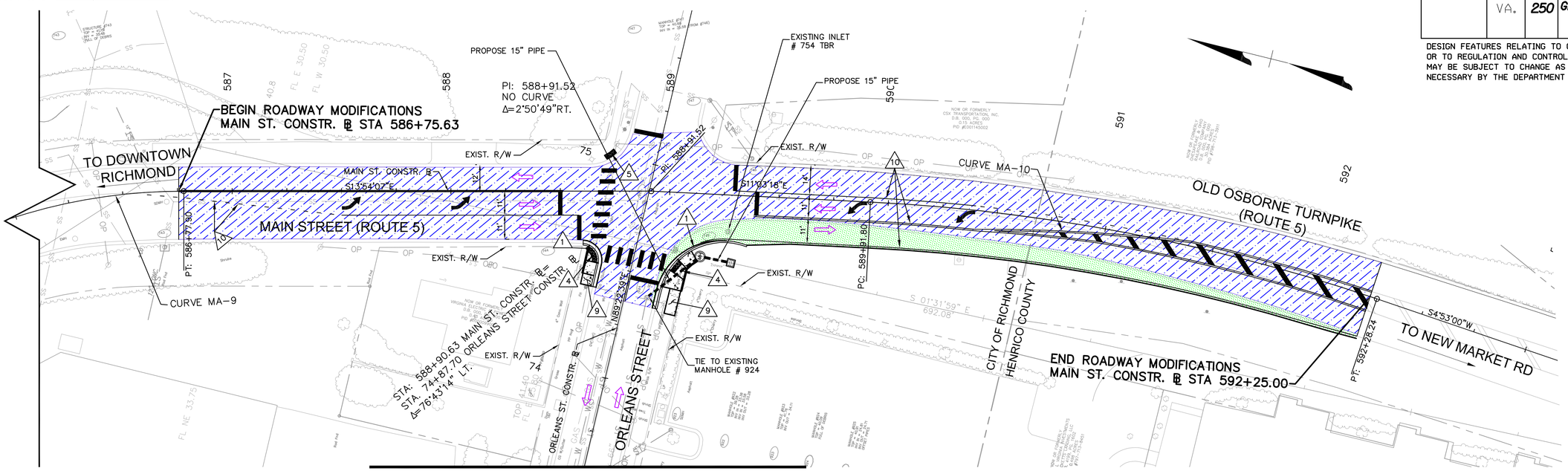
DATE: 02/29/16

THE LANE CONSTRUCTION CORPORATION

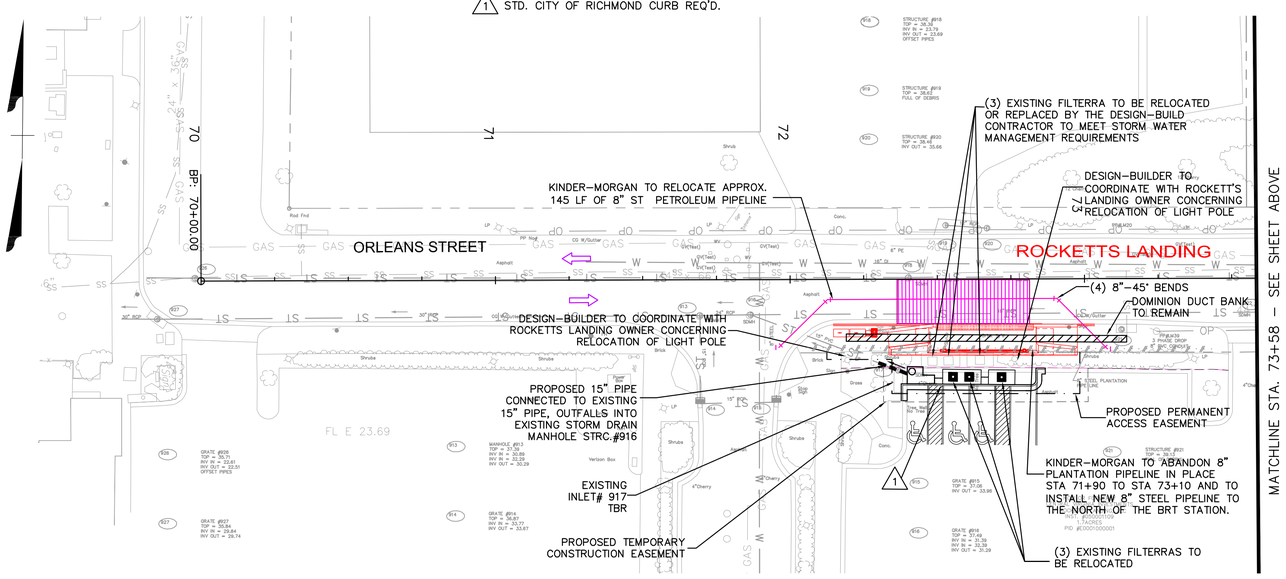


Curve MA-9
PI = 585+65.50
DELTA = 54°43'18.07"
T = 132.93
L = 245.33
R = 256.87
PC = 584+32.57
PT = 586+77.90

Curve MA-10
PI = 591+10.79
DELTA = 15°56'17.15"
T = 118.99
L = 236.45
R = 850.00
PC = 589+91.80
PT = 592+28.24

LEGEND

- PROPOSED CONC. ITEMS
- PROPOSED ASPHALT PAVE.
- 2" MILL & OVERLAY/BUILD-UP ASPHALT PAVE.
- 4" MILL & OVERLAY/BUILD-UP ASPHALT PAVE.
- 3/4" MILL & THIN HOT-MIX ASPHALT CONCRETE OVERLAY
- PROPOSED REINFORCED CONC. PAVEMENT
- PROPOSED VDOT STD. DI-3B, L=8' CURB DROP INLET
- PROPOSED VDOT STD. DI-IA STANDARD DROP INLET
- PROPOSED VDOT STD. MH-2 PRECAST MANHOLE
- PROPOSED STORM DRAIN PIPE
- 1 STD. CITY OF RICHMOND CURB REQ'D.
- 2A VDOT STD. MS-1 REQ'D.
- 2B VDOT MOD. MS-1 REQ'D.
- 3 VDOT STD. CG-12, TYPE A REQ'D.
- 4 VDOT STD. CG-12, TYPE B REQ'D.
- 5 REPLACE RAMP SURFACE AND DETECTABLE WARNING SURFACE
- 6 VDOT STD. CG-12, TYPE M2 REQ'D.
- 7 VDOT MOD. MS-2 REQ'D.
- 8 HENRICO STD. CURB & GUTTER REQ'D.
- 9 STD. HYD. CEMENT SIDEWALK REQ'D., W=VARIES
- 10 DENOTES PAVEMENT LINE MARKINGS
- 11 STD. CG-12 ADDED PER ADDENDUM 2
- 12 DETECTABLE WARNING SURFACE ADDED PER ADDENDUM 2
- PROPOSED DEDICATED BRT LANE FLOW ARROW
- FLOW ARROW



GRAPHIC SCALE IN FEET
0 12.5 25 50

PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	21

February 24, 2016 10:07:41am
Plotted By:McElwee, Ian P. Sheet Set:Kha Layout:17 – ROADWAY February 24, 2016 10:07:41am I:\Proposals\2015\2015 Proposals\61046_VDOT GRTC BRT D-B\07 Proposal Managment\STV 30% Technical Presentation Drawings\STV Cad Files\CR_Files\CR-17_Road Plans.dwg

PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

Curb Ramps Per Addendum 2 Upgrade Requirements Matrix

(Intersection Locations Not Shown on Plan Sheets 5-21)

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO
	VA.	250	GRT BUS RAPID TRANSIT	22

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

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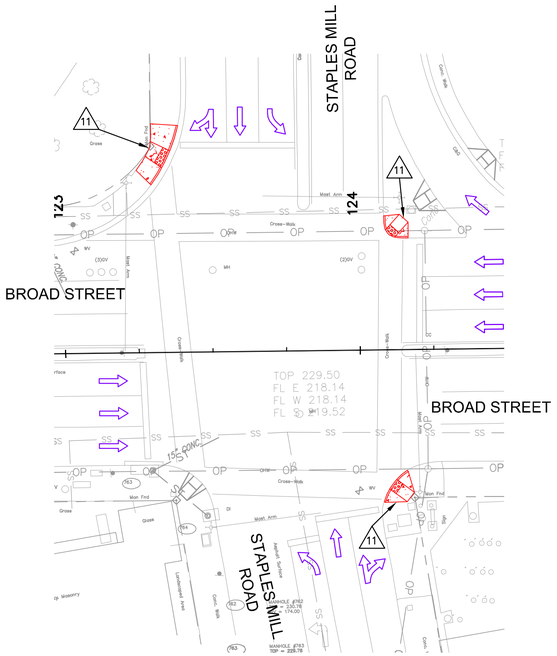
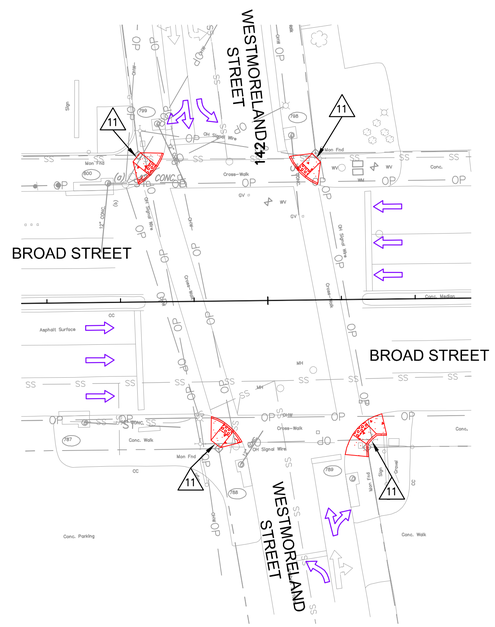
DATE: 02/29/16

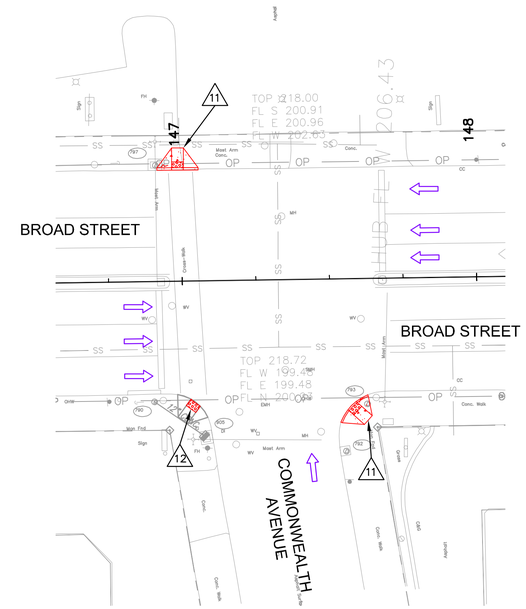
THE LANE CONSTRUCTION CORPORATION



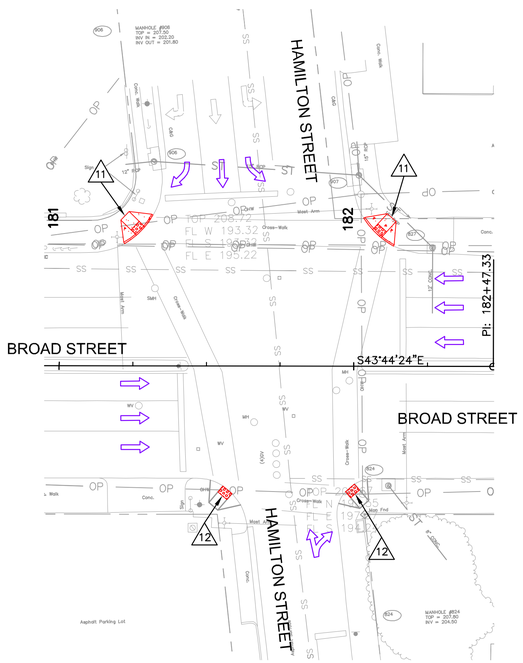
BROAD STREET & STAPLES MILLS ROAD



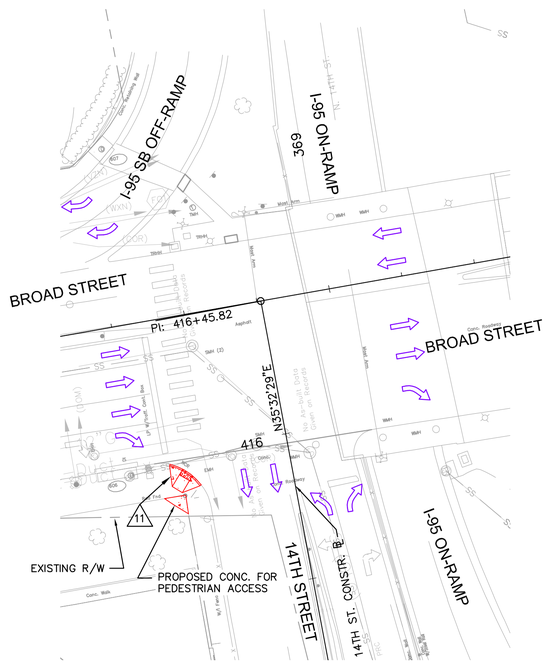
BROAD STREET & WESTMORELAND STREET



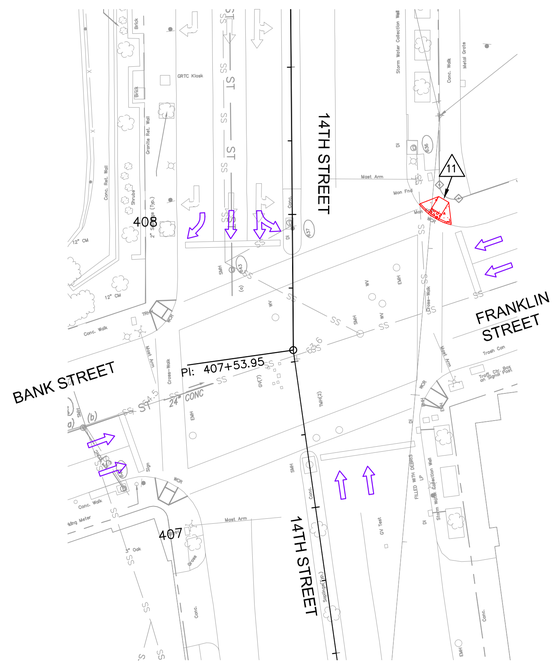
BROAD STREET & COMMONWEALTH AVENUE



BROAD STREET & HAMILTON STREET



BROAD STREET & 14TH STREET



FRANKLIN STREET & 14TH STREET

LEGEND

- 11 — STD. CG-12 ADDED PER ADDENDUM 2
- 12 — DETECTABLE WARNING SURFACE ADDED PER ADDENDUM 2
- FLOW ARROW

GRAPHIC SCALE IN FEET
0 12.5 25 50

PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	22

February 24, 2016 10:09:39am
Plotted By:McElwee, Ian P. Sheet Set:Kha Layout:18 - ROADWAY February 24, 2016 10:09:39am I:\Proposals\2015\2015 Proposals\61046_VDOT GRTC BRT D-B\07 Proposal Managment\STV 30% Technical Presentation Drawings\STV Cad Files\CR_Files\CR-18_Road Plans.dwg

PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

Curb Ramps Per Addendum 2 Upgrade Requirements Matrix

(Intersection Locations Not Shown on Plan Sheets 5-21)

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	250	GRT BUS RAPID TRANSIT	23

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

RFP CONCEPTUAL PLANS
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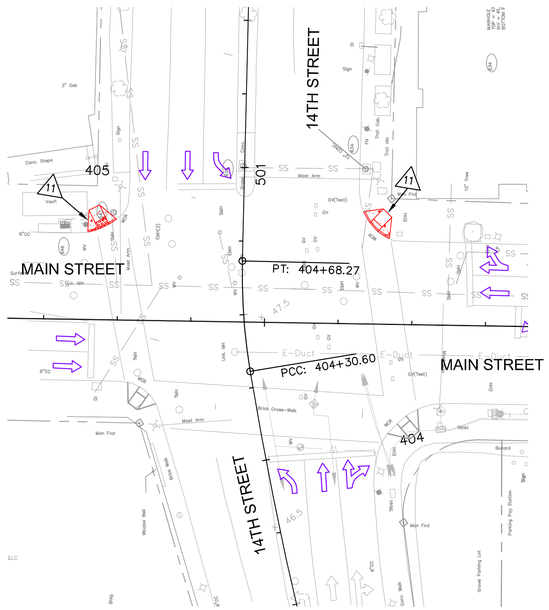
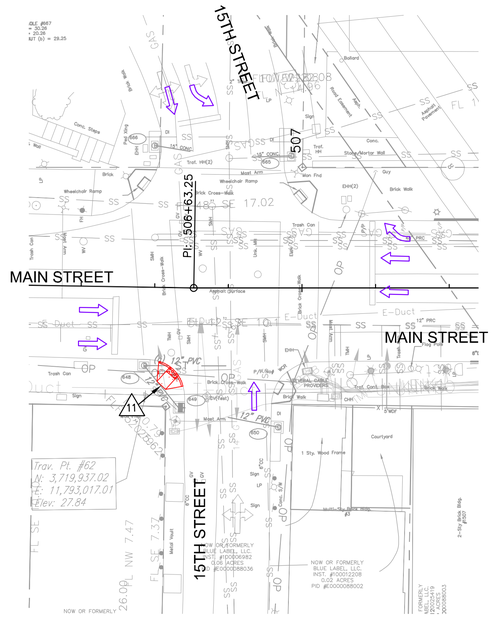
DATE: 02/29/16

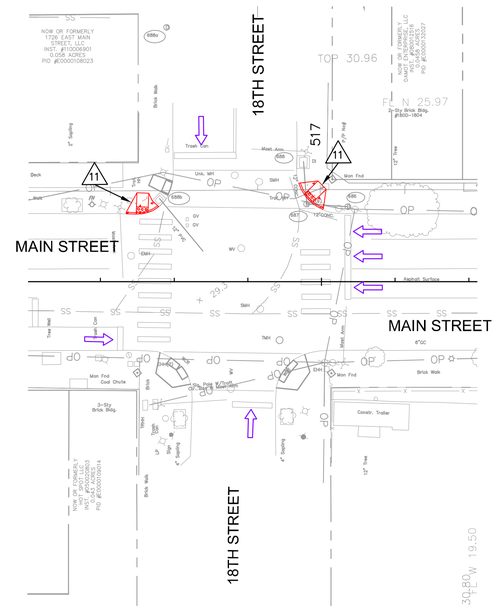
THE LANE CONSTRUCTION CORPORATION



MAIN STREET & 14TH STREET



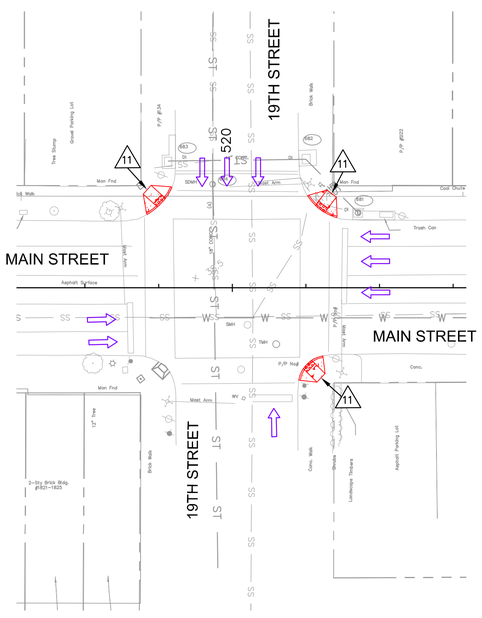
MAIN STREET & 15TH STREET



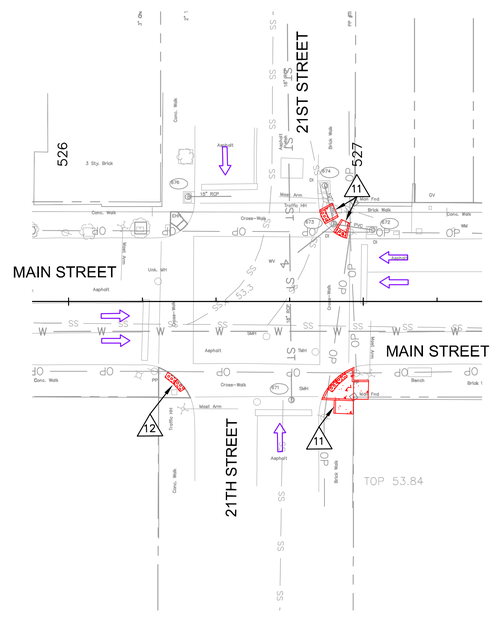
MAIN STREET & 18TH STREET

LEGEND

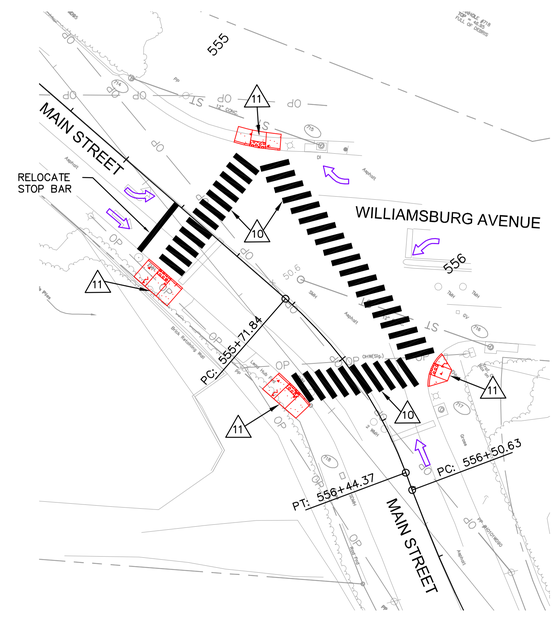
- 10 DENOTES PAVEMENT LINE MARKINGS
- 11 STD. CG-12 ADDED PER ADDENDUM 2
- 12 DETECTABLE WARNING SURFACE ADDED PER ADDENDUM 2
- FLOW ARROW



MAIN STREET & 19TH STREET



MAIN STREET & 21ST STREET



MAIN STREET & WILLIAMSBURG AVENUE

GRAPHIC SCALE IN FEET
0 12.5 25 50

PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	23

February 24, 2016 10:11:29am
Plotted By:McEwee, Ian P. Sheet Set:Kha Layout:19 - ROADWAY February 24, 2016 10:11:29am I:\Proposals\2015\2015 Proposals\61046_VDOT GRTC BRT D-B\07 Proposal Managment\STV 30% Technical Presentation Drawings\STV Cad Files\GR-19_Road Plans.dwg

PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

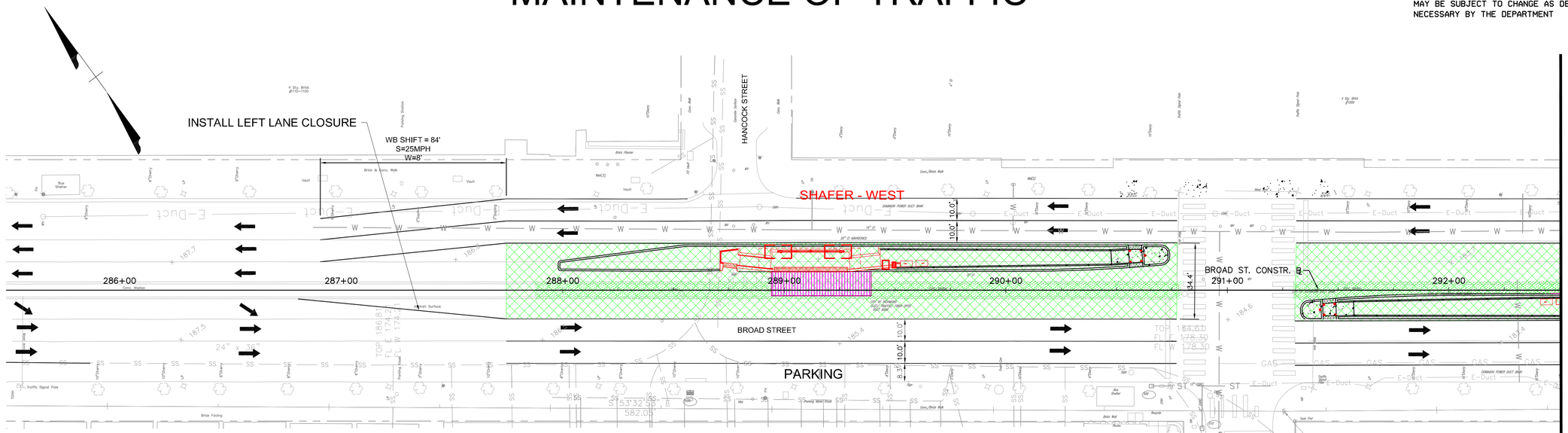
REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO
	VA.	250	GRT BUS RAPID TRANSIT	24

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

RFP CONCEPTUAL PLANS
THESE PLANS ARE UNFINISHED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION
DATE: 02/29/16

THE LANE CONSTRUCTION CORPORATION

MEDIAN STATION TYPICAL APPLICATION
MAINTENANCE OF TRAFFIC



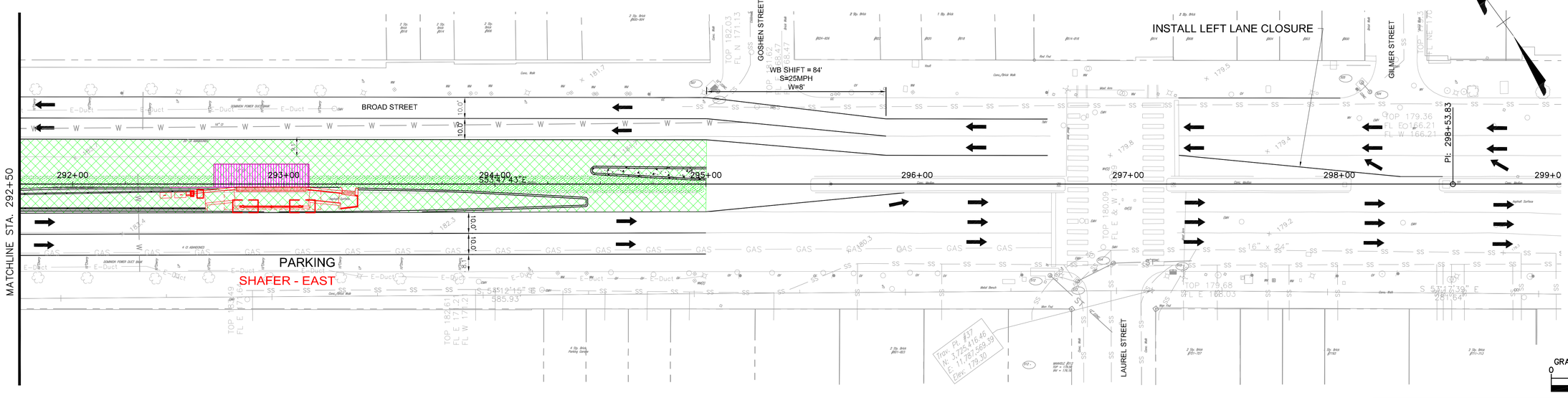
LEGEND

- PROPOSED CONC. ITEMS
- PROPOSED WORK ZONE
- PROPOSED REINFORCED CONC. PAVEMENT
- FLOW ARROWS

(SIGNING AND TCD'S NOT SHOWN)

SEQUENCE OF CONSTRUCTION

- IN THE WB DIRECTION, INSTALL A LEFT LANE CLOSURE IN THE BLOCK OPPOSITE THE WORK ZONE IN ORDER TO ALIGN TRAFFIC FOR THE SHIFT.
- REMOVE THE EXISTING PARKING ALONG THE MEDIAN STATION CURB SIDE (AS PROPOSED IN THE ROADWAY PLAN SHEETS)
- SHIFT THE TWO WB LANES 8' TOWARDS TO OUTSIDE CURB TO ALLOW FOR THE MEDIAN STATION WORK ZONE.
- IN THE EB DIRECTION, INSTALL A LEFT LANE CLOSURE TO ALLOW FOR THE MEDIAN STATION WORK ZONE. PARKING WILL BE MAINTAINED IN THIS DIRECTION.
- IN ORDER TO INSTALL FINAL CURB WORK, AND PERFORM UTILITY WORK, LEFT LANE CLOSURES WITHIN THE WORK ZONE LIMITS WILL BE REQUIRED PERIODICALLY LEAVING ONE LANE OF TRAFFIC. THESE LANE CLOSURES WILL NOT OCCUR IN BOTH DIRECTIONS AT A SINGLE INSTANCE.
- LEFT AND RIGHT TURNS AT THE INTERSECTIONS WILL BE COMBINED WITH THE THRU MOVEMENTS WHERE APPLICABLE.
- THE SEQUENCING OF THE MEDIAN STATIONS WILL OCCUR IN GROUPS ACCORDING TO THE UTILITIES AS DESCRIBED IN THE PROPOSAL.



GRAPHIC SCALE IN FEET
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PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	24

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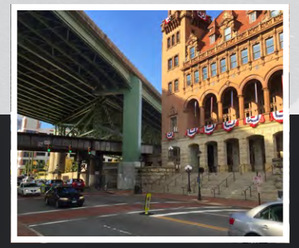
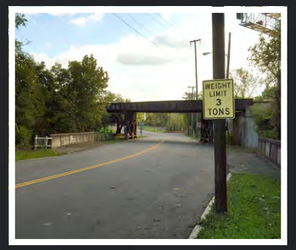
4.3.2 CONCEPTUAL ARCHITECTURAL AND COMMUNICATION PLANS (BASE SCOPE)





PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO
	VA.	250	GRT BUS RAPID TRANSIT	25

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

RFP CONCEPTUAL PLANS
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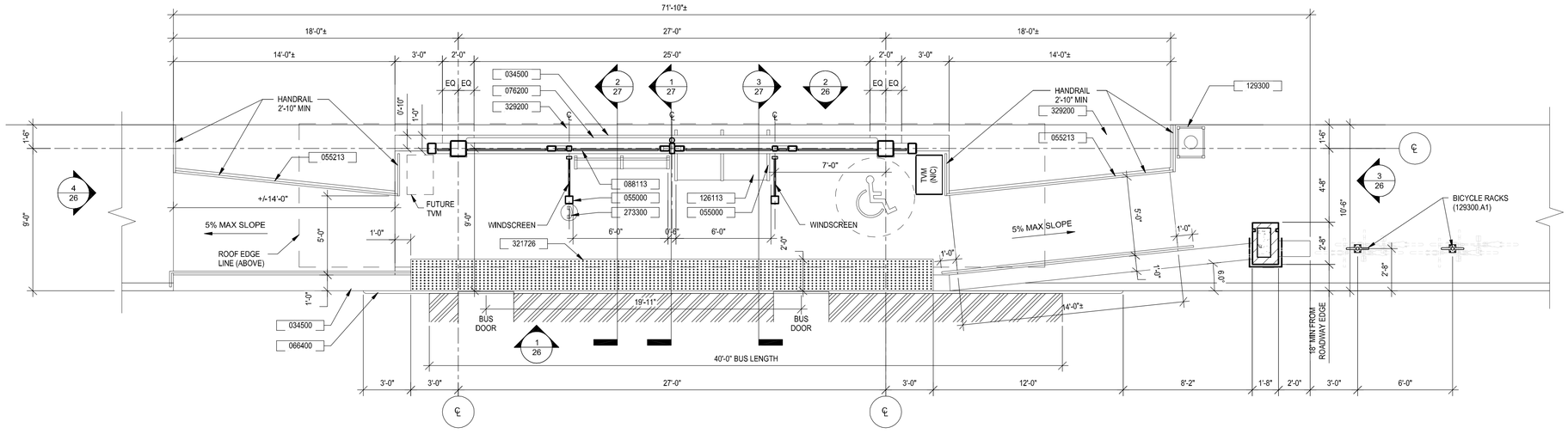
DATE: 02/29/16

THE LANE CONSTRUCTION CORPORATION

Keynote Schedule

Key Value	Keynote Text
034500	PRECAST ARCHITECTURAL CONCRETE
042000.A1	UNIT MASONRY
051200	STRUCTURAL STEEL FRAMING W/ HPC
051213	ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING W/ HPC
055000	METAL FABRICATIONS W/ HPC
055213	PIPE AND TUBE RAILINGS W/ HPC
062013	EXTERIOR FINISH CARPENTRY
066400	POLYETHYLENE PLATFORM EDGE STRIPS
074113.16	STANDING-SEAM METAL ROOF PANELS
076200	SHEET METAL FLASHING AND TRIM
088113	DECORATIVE GLASS GLAZING
101400	PANEL SIGN
126113	PHENOLIC BENCH
129300	SITE FURNISHINGS
129300.A1	BIKE RACK (TYPE A)
265619	LED EXTERIOR LIGHTING
273300	EMERGENCY PHONE SYSTEM
321726	TACTILE WARNING SURFACING
329200	GROUNDCOVERS / PERENNIALS



1 **CURB SIDE FLOOR PLAN, TYP.**
1/4" = 1'-0"

0' 1'-0" 2'-0" 4'-0" 8'-0"
SCALE: 1/4"=1'-0"

PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	25

February 22, 2016 11:01:35am
Plotted By:Boesch, Carl D. Sheet Set:Kha Layout:PLAN - Curb February 22, 2016 11:01:35am I:\Common\Architecture TEMP\Proposals\VDOT BRT\RFP\RFP Package information\Plans and Specifications\RFP_Conceptual Plans\CADD Files\A_S_L_E_P\Architectural\BRT_Proposal_Arch.dwg

PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

REVISED	STATE	ROUTE	PROJECT	SHEET NO
	VA.	250	GRT BUS RAPID TRANSIT	26

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

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DATE: 02/29/16

THE LANE CONSTRUCTION CORPORATION

Keynote Schedule

Key Value	Keynote Text
034500	PRECAST ARCHITECTURAL CONCRETE
042000.A1	UNIT MASONRY
051200	STRUCTURAL STEEL FRAMING W/ HPC
051213	ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING W/ HPC
055000	METAL FABRICATIONS W/ HPC
055213	PIPE AND TUBE RAILINGS W/ HPC
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074113.16	STANDING-SEAM METAL ROOF PANELS
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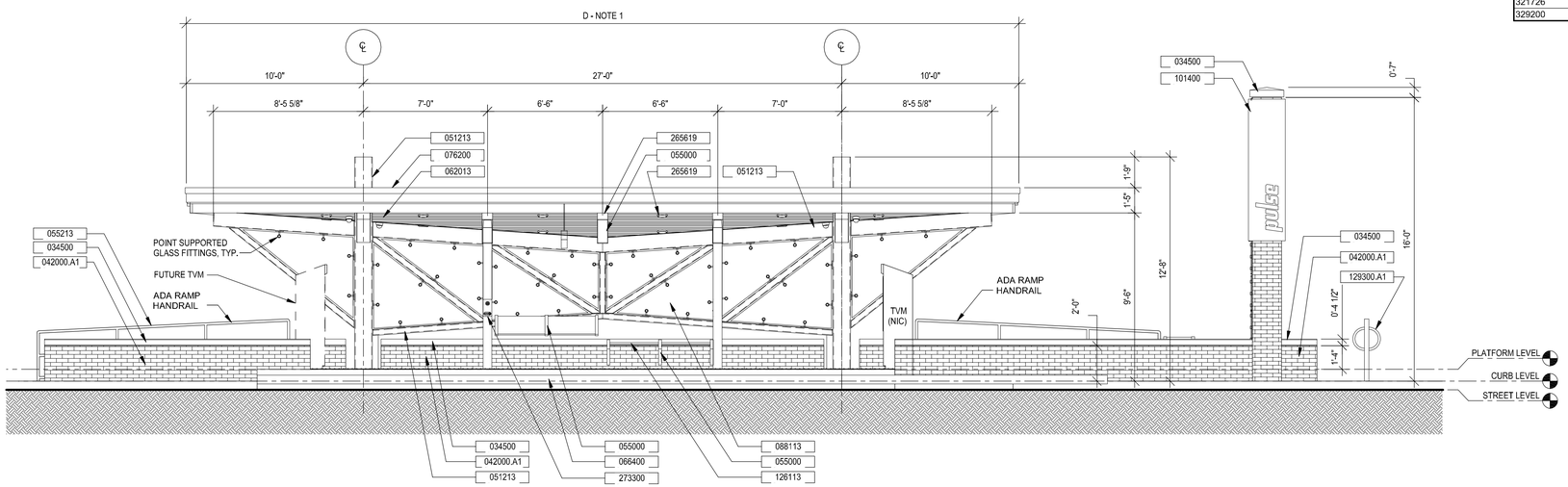
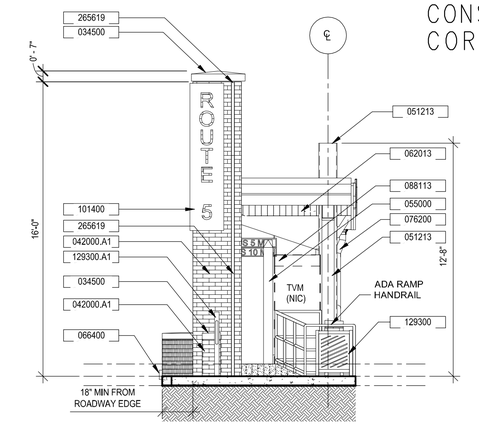
273300	EMERGENCY PHONE SYSTEM
321726	TACTILE WARNING SURFACING
329200	GROUNDCOVERS / PERENNIALS

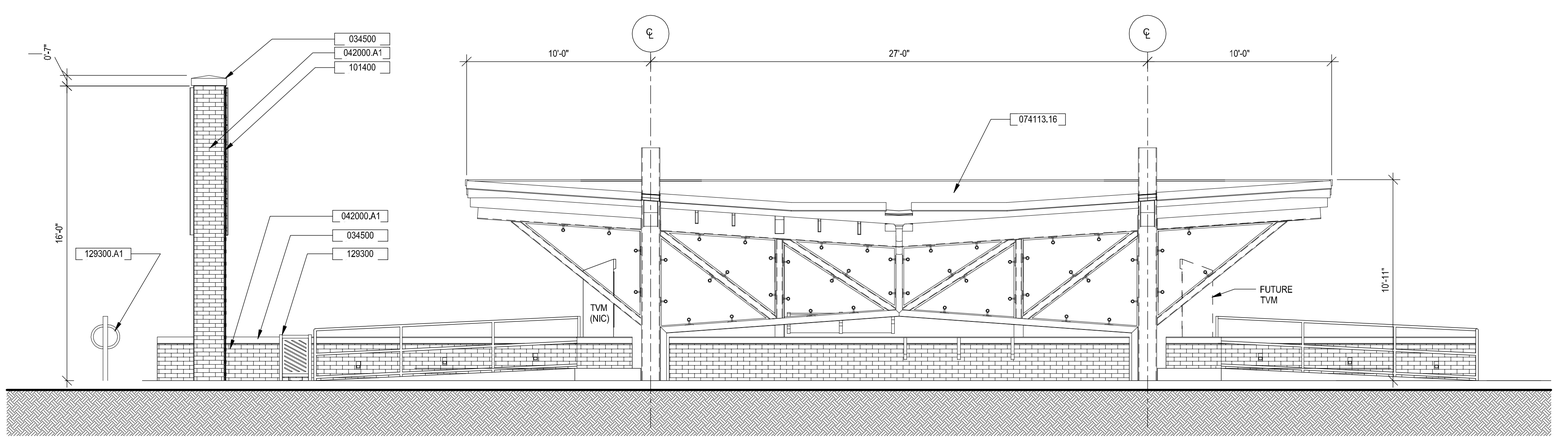


1 **ELEVATION A, TYP. ALL CURB SIDE STATIONS**
1/4" = 1'-0"

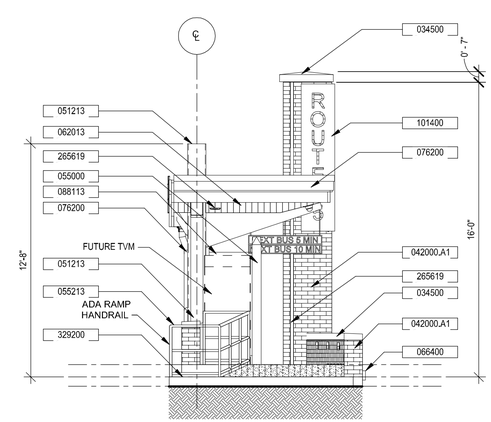


NOTE: STATION NAME INDICATED ON TOTEM IS SAMPLE NAME ONLY, VARIES PER STATION LOCATION.

3 **ELEVATION C, TYP. ALL CURB SIDE STATIONS**
1/4" = 1'-0"



2 **ELEVATION B, TYP. ALL CURB SIDE STATIONS**
1/4" = 1'-0"



NOTE: STATION NAME INDICATED ON TOTEM IS SAMPLE NAME ONLY, VARIES PER STATION LOCATION.

4 **ELEVATION D, TYP. ALL CURB SIDE STATIONS**
1/4" = 1'-0"

0' 1'-0" 2'-0" 4'-0" 8'-0"
SCALE: 1/4"=1'-0"

PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	26

February 22, 2016 11:01:37am
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PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO
	VA.	250	GRT BUS RAPID TRANSIT	27

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

RFP CONCEPTUAL PLANS
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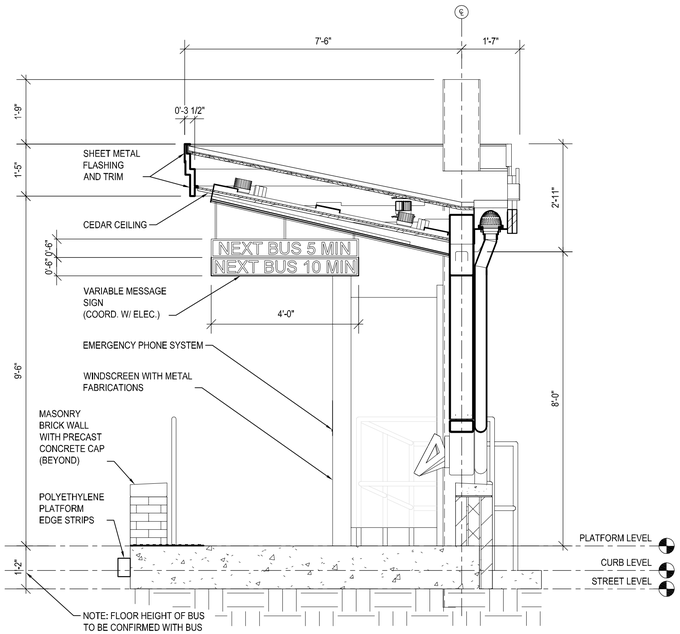
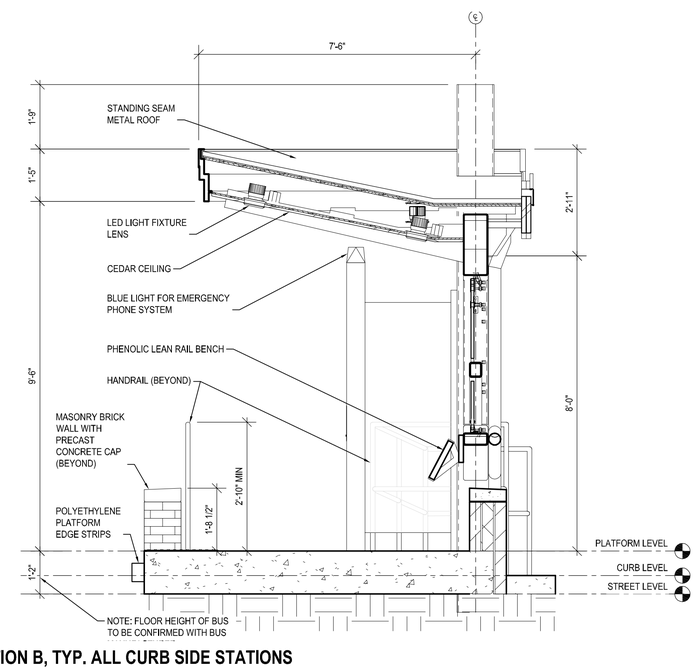
DATE: 02/29/16

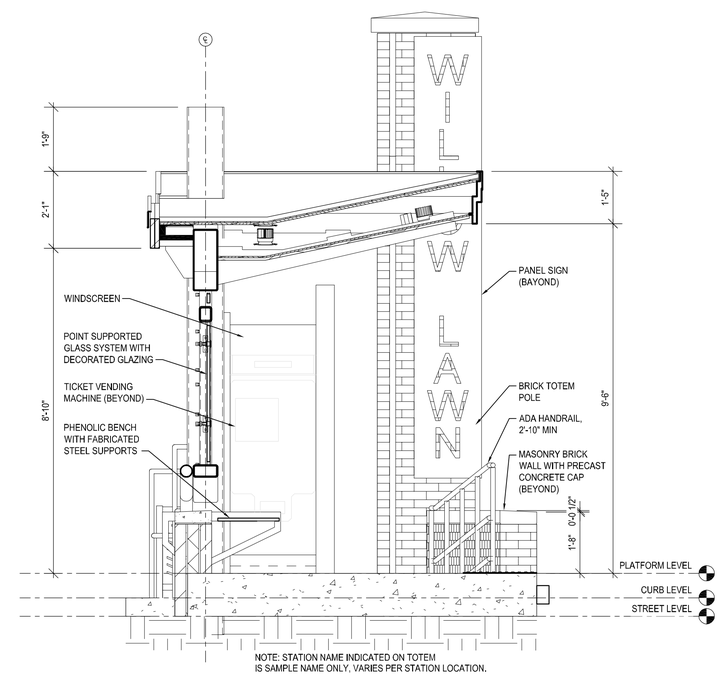
THE LANE CONSTRUCTION CORPORATION



1 **SECTION A, TYP. ALL CURB SIDE STATIONS**
3/4" = 1'-0"



2 **SECTION B, TYP. ALL CURB SIDE STATIONS**
3/4" = 1'-0"



3 **SECTION C, TYP. ALL CURB SIDE STATIONS**
3/4" = 1'-0"

0' 6" 1'-0" 2'-0" 4'-0"
SCALE: 3/4"=1'-0"

PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	27

February 22, 2016 11:01:42am
Plotted By:Boesch, Carl D. Sheet Set:Kha Layout:SECTIONS - Curb February 22, 2016 11:01:42am I:\Common\Architecture TEMP\Proposals\VDOT BRT\RFP\RFP Package Information\Plans and Specifications\RFP_Conceptual Plans\CADD Files\A_S_L_E_P\Architectural\BRT_Proposal_Arch.dwg

PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO
	VA.	250	GRT BUS RAPID TRANSIT	28

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THE LANE CONSTRUCTION CORPORATION

Keynote Schedule

Key Value	Keynote Text
034500	PRECAST ARCHITECTURAL CONCRETE
042000.A1	UNIT MASONRY
051200	STRUCTURAL STEEL FRAMING W/ HPC
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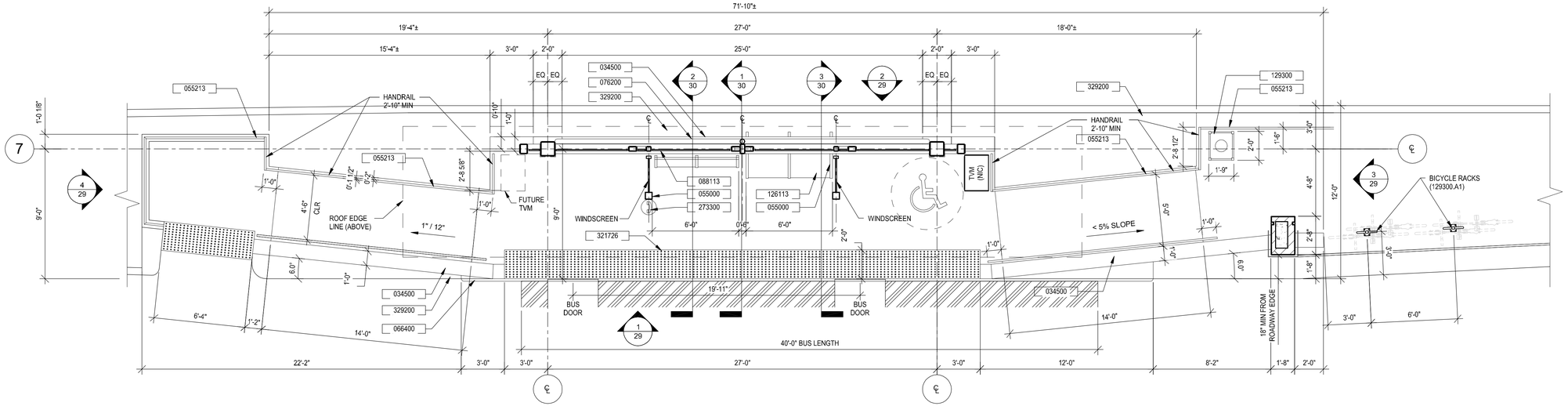
329200	GROUNDCOVERS / PERENNIALS



1 **MEDIAN FLOOR PLAN, TYP.**
1/4" = 1'-0"

0' 1'-0" 2'-0" 4'-0" 8'-0"
SCALE: 1/4"=1'-0"

PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	28

February 22, 2016 11:01:47am
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PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

REVISED	STATE	ROUTE	PROJECT	SHEET NO
	VA.	250	GRT BUS RAPID TRANSIT	29

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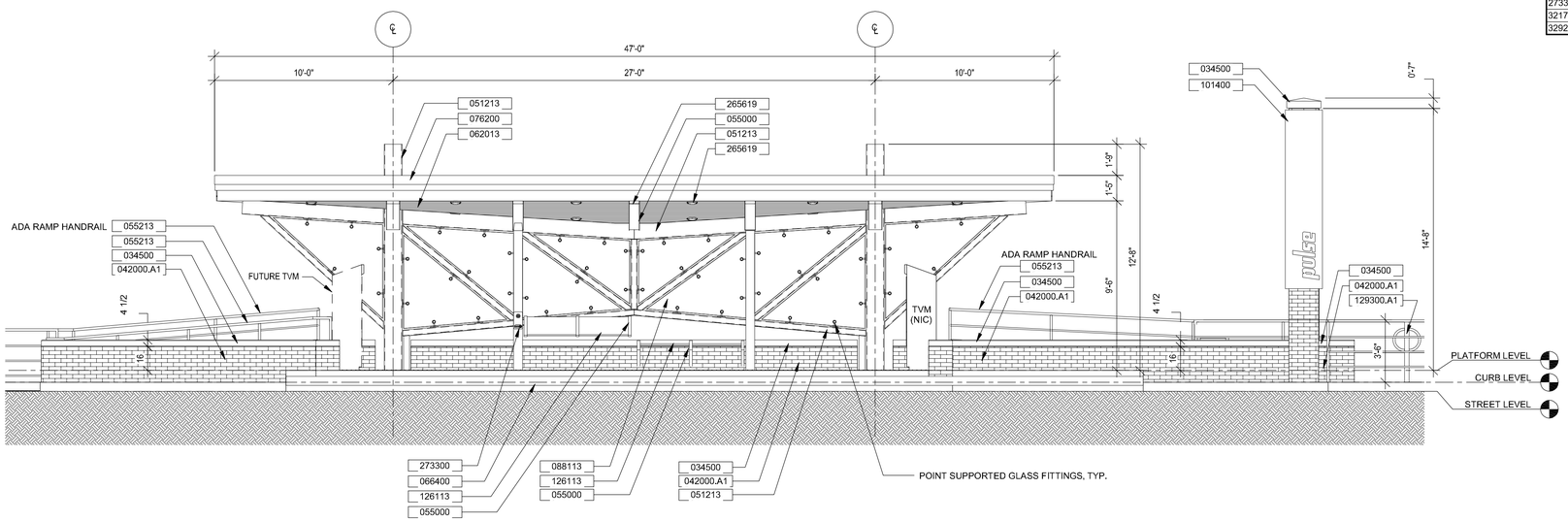
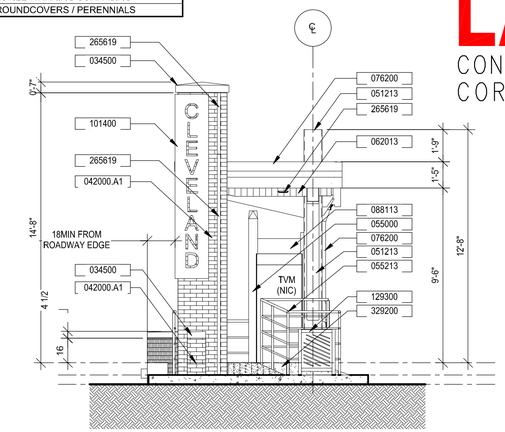
329200	GROUNDCOVERS / PERENNIALS

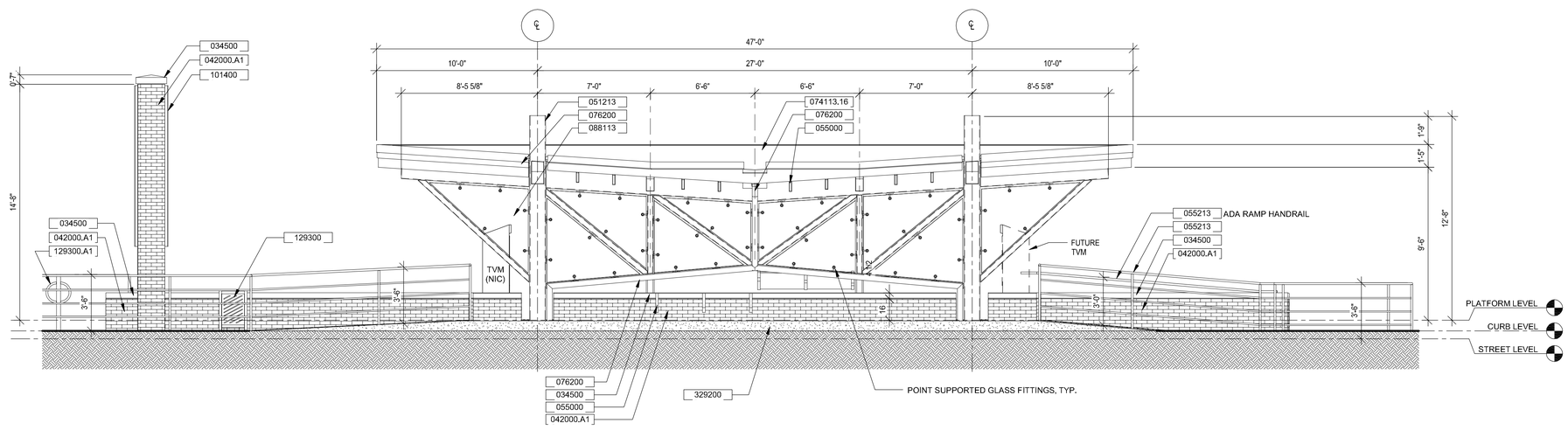


1 **ELEVATION A, TYP. ALL MEDIAN STATIONS**
1/4" = 1'-0"



NOTE: STATION NAME INDICATED ON TOTEM IS SAMPLE NAME ONLY, VARIES PER STATION LOCATION.

3 **ELEVATION C, TYP. ALL MEDIAN STATIONS**
1/4" = 1'-0"



2 **ELEVATION B, TYP. ALL MEDIAN STATIONS**
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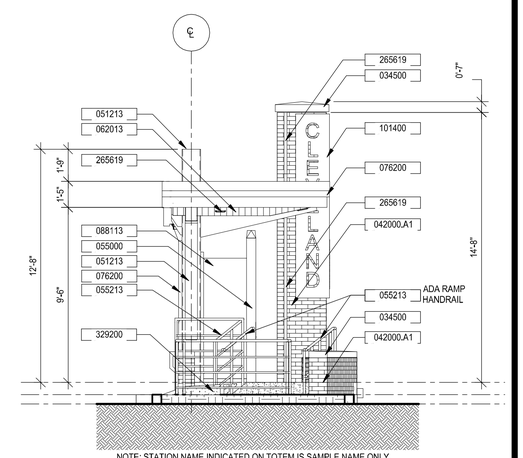

NOTE: STATION NAME INDICATED ON TOTEM IS SAMPLE NAME ONLY, VARIES PER STATION LOCATION.

4 **ELEVATION D, TYP. ALL MEDIAN STATIONS**
1/4" = 1'-0"

0' 1'-0" 2'-0" 4'-0" 8'-0"
SCALE: 1/4"=1'-0"

PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	29

February 22, 2016 11:01:52am
Plotted By:Boesch, Carl D. Sheet Set:Kha Layout:ELEVATIONS – Median February 22, 2016 11:01:52am I:\Common\Architecture TEMP\Proposals\VDOT BRT\RFP\RFP Package information\Plans and Specifications\RFP_Conceptual Plans\CADD Files\VA_S_L_E_P\Architectural\BRT_Proposal_Arch.dwg

PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGN BY STV Incorporated 571-633-2220

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	250	GRT BUS RAPID TRANSIT	30

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

RFP CONCEPTUAL PLANS
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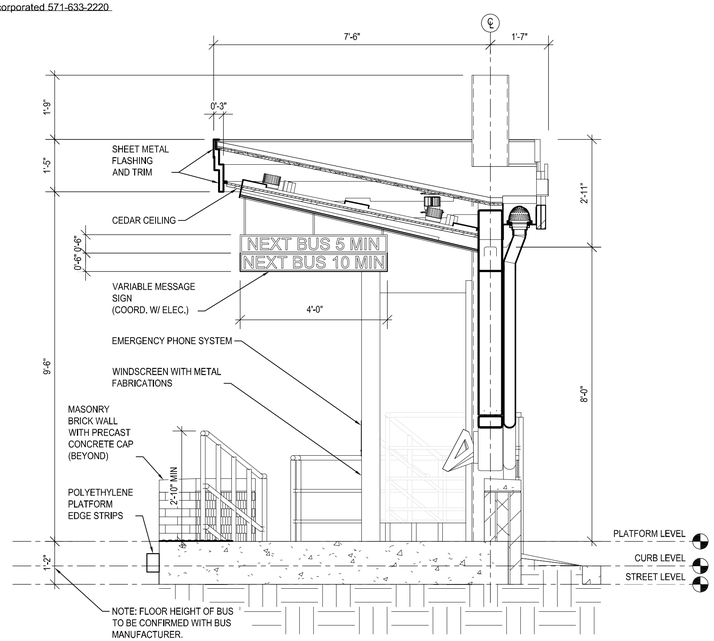
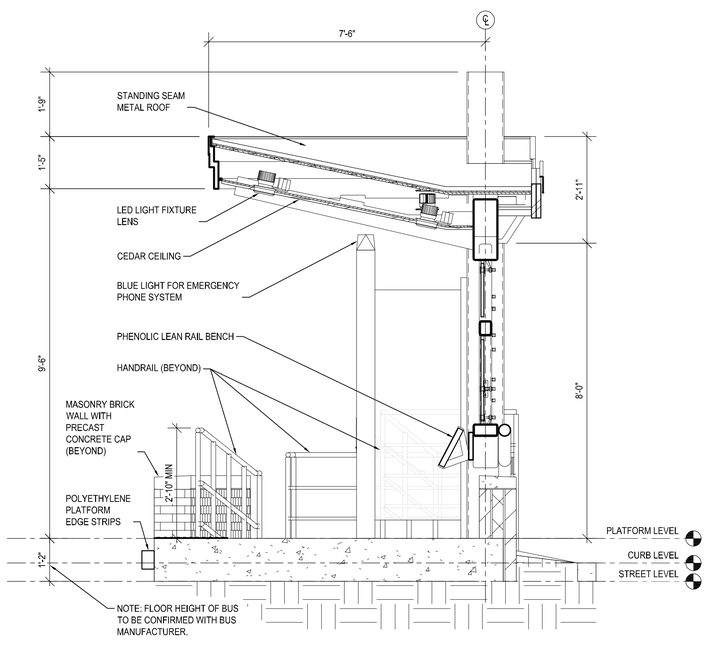
DATE: 02/29/16

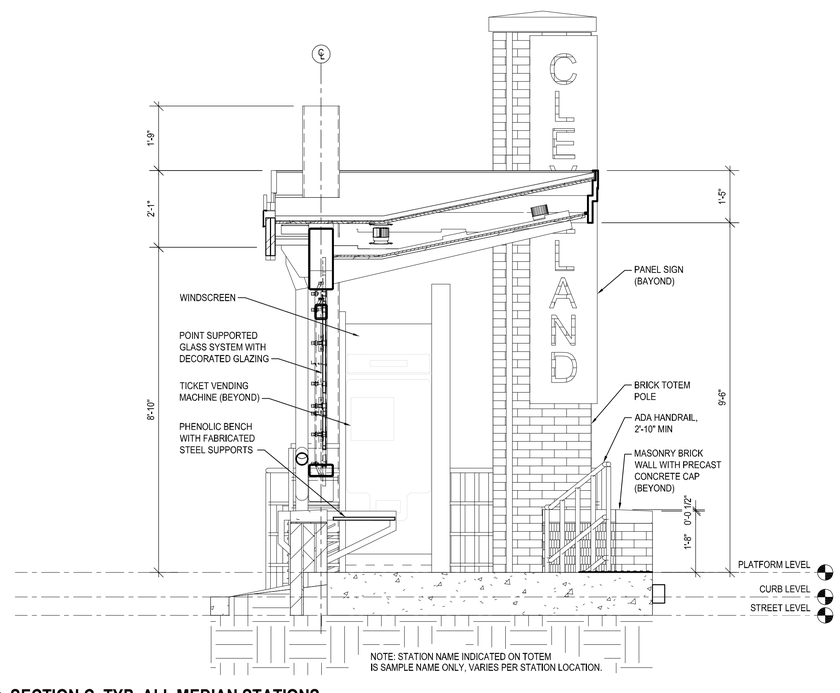
THE LANE CONSTRUCTION CORPORATION



1 **SECTION A, TYP. ALL MEDIAN STATIONS**
3/4" = 1'-0"



2 **SECTION B, TYP. ALL MEDIAN STATIONS**
3/4" = 1'-0"



3 **SECTION C, TYP. ALL MEDIAN STATIONS**
3/4" = 1'-0"

0' 6" 1'-0" 2'-0" 4'-0"
SCALE: 3/4"=1'-0"

PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	30

February 22, 2016 11:01:57am
Plotted By:Boesch, Carl D. Sheet Set:Kha Layout:SECTIONS - Median February 22, 2016 11:01:57am I:\Common\Architecture TEMP\Proposals\VDOT BRT\RFP\RFP Package information\Plans and Specifications\RFP_Conceptual Plans\CADD Files\A_S_L_E_P\Architectural\BRT_Proposal_Arch.dwg

PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

COMMUNICATIONS TYPICAL STOP DIAGRAM

NOTES:

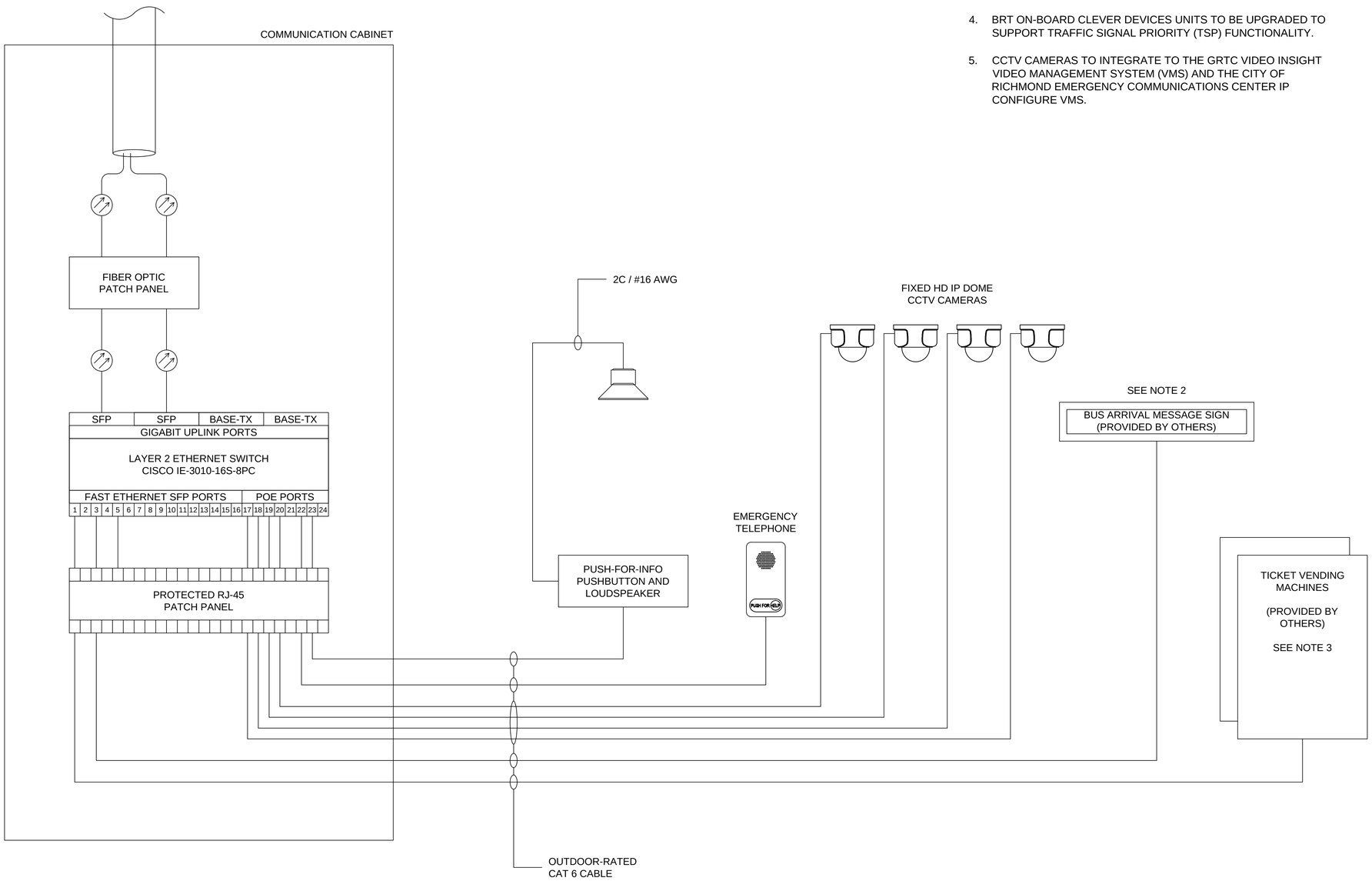
1. ALL COMMUNICATIONS CABLES INSTALLED OUTSIDE OF THE PLATFORM COMMUNICATION CABINET SHALL BE OUTDOOR RATED.
2. BUS ARRIVAL MESSAGE SIGNS WILL BE SUPPLIED BY CLEVER DEVICES UNDER A SEPARATE CONTRACT. CONTRACTOR RESPONSIBLE FOR ETHERNET COMMUNICATIONS, 120 VAC POWER, AND MOUNTING HARDWARE.
3. TICKET VENDING MACHINES WILL BE SUPPLIED UNDER A SEPARATE CONTRACT. CONTRACTOR RESPONSIBLE FOR INSTALLATION, COMMUNICATIONS, AND 120 VAC POWER TO EACH TICKET VENDING MACHINE.
4. BRT ON-BOARD CLEVER DEVICES UNITS TO BE UPGRADED TO SUPPORT TRAFFIC SIGNAL PRIORITY (TSP) FUNCTIONALITY.
5. CCTV CAMERAS TO INTEGRATE TO THE GRTC VIDEO INSIGHT VIDEO MANAGEMENT SYSTEM (VMS) AND THE CITY OF RICHMOND EMERGENCY COMMUNICATIONS CENTER IP CONFIGURE VMS.

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO
	VA.	250	GRT BUS RAPID TRANSIT	31

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

RFP CONCEPTUAL PLANS
THESE PLANS ARE UNFINISHED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION
DATE: 02/29/16

THE LANE CONSTRUCTION CORPORATION



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PROJECT	SHEET NO.
GRT BUS RAPID TRANSIT	31

PROJECT MANAGER Bryan Stevenson, PE
SURVEYED BY Precision Measurement, Incorporated
DESIGN SUPERVISED BY STV Incorporated 571-633-2220
DESIGNED BY STV Incorporated 571-633-2220

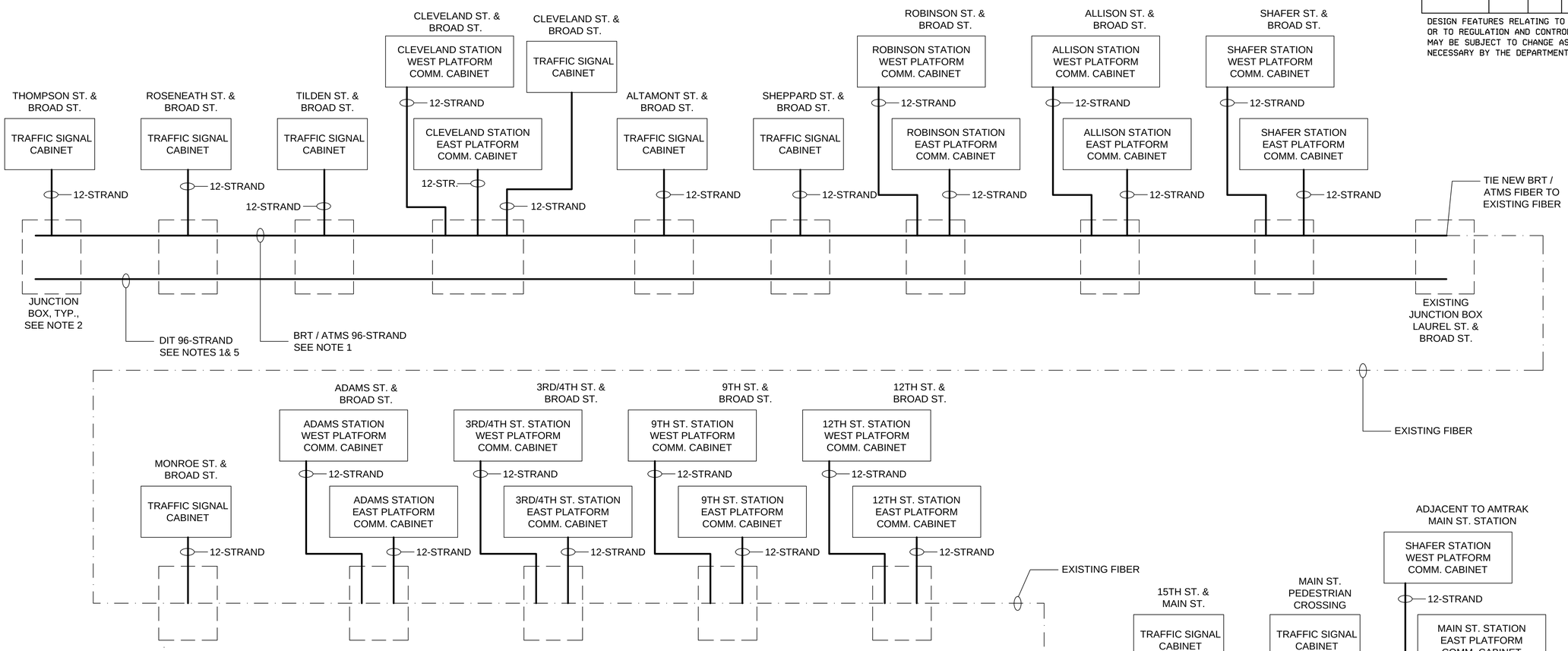
COMMUNICATIONS
FIBER OPTIC CABLE PLANT

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO
	VA.	250	GRT BUS RAPID TRANSIT	32

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

RFP CONCEPTUAL PLANS
THESE PLANS ARE UNFINISHED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION
DATE: 02/29/16

THE LANE CONSTRUCTION CORPORATION



NOTES:

1. FURNISH AND INSTALL TRUNK CABLES IN CONTINUOUS LENGTHS BETWEEN THOMPSON STREET AND LAUREL STREET AND BETWEEN 14TH STREET AND THE MAIN STREET STATION EASTBOUND BRT PLATFORM. FURNISH AND INSTALL DROP CABLE IN CONTINUOUS LENGTHS BETWEEN CABINET TERMINATION POINT TO SPLICE ENCLOSURE TERMINATION POINT.
2. FURNISH AND INSTALL JUNCTION BOXES AT LEAST EVERY 400 FEET.
3. FIBER OPTIC CABLE COILING IS REQUIRED AT ALL JUNCTION BOXES AND SPLICE LOCATIONS. PROVIDE A MINIMUM OF 25 FEET SLACK TRUNK CABLE AND 10 FEET SLACK DROP CABLE IN EACH JUNCTION BOX. PROVIDE MINIMUM 100 FEET SLACK TRUNK CABLE AND 50 FEET SLACK DROP CABLE IN EACH JUNCTION BOX WITH A SPLICE ENCLOSURE.
4. COIL TOGETHER JOINT USE BRT / ATMS FIBER TRUNK AND DROP CABLES. COIL DIT TRUNK CABLES SEPARATELY FROM JOINT USE BRT / ATMS CABLES.
5. ALL DESTINATION SPLICING AND TERMINATION OF NEW DIT 96-STRAND FIBER CABLE SHALL BE COMPLETED BY OTHERS. DIT FIBER CABLE SHALL NOT ENTER SPLICE ENCLOSURES WITH JOINT USE BRT / ATMS CABLES.
6. FURNISH AND INSTALL #12 AWG THWN STRANDED TRACER WIRE IN ALL CONDUIT UTILIZED (NEW OR EXISTING) FOR NEWLY INSTALLED FIBER OPTIC CABLE. SPLICE TRACER WIRE ONLY IN CABINETS, MANHOLES, HANDHOLES, OR JUNCTION BOXES.
7. FURNISH AND INSTALL TWO (2) 2" HDPE CONDUITS ALONG BROAD ST. FROM THOMPSON ST. TO LAUREL ST. AND ALONG MAIN ST. FROM 14TH ST. TO THE MAIN ST. STATION EASTBOUND BRT PLATFORM. CONDUIT SHALL BE CONTINUOUS LENGTHS BETWEEN JUNCTION BOXES, SPLICING OR JOINING CONDUIT IS PROHIBITED. JUNCTION BOXES ARE REQUIRED AT LEAST EVERY 400 FEET.
8. CONDUIT SHALL BE INSTALLED BENEATH THE SIDEWALK ON THE SOUTH SIDES OF BROAD ST. AND MAIN ST. ALL CONDUIT INSTALLATION UNDER SIDEWALK MUST BE BY DIRECTIONAL DRILLING ONLY.

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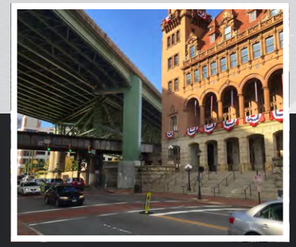
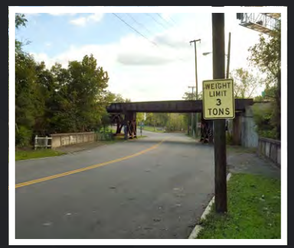
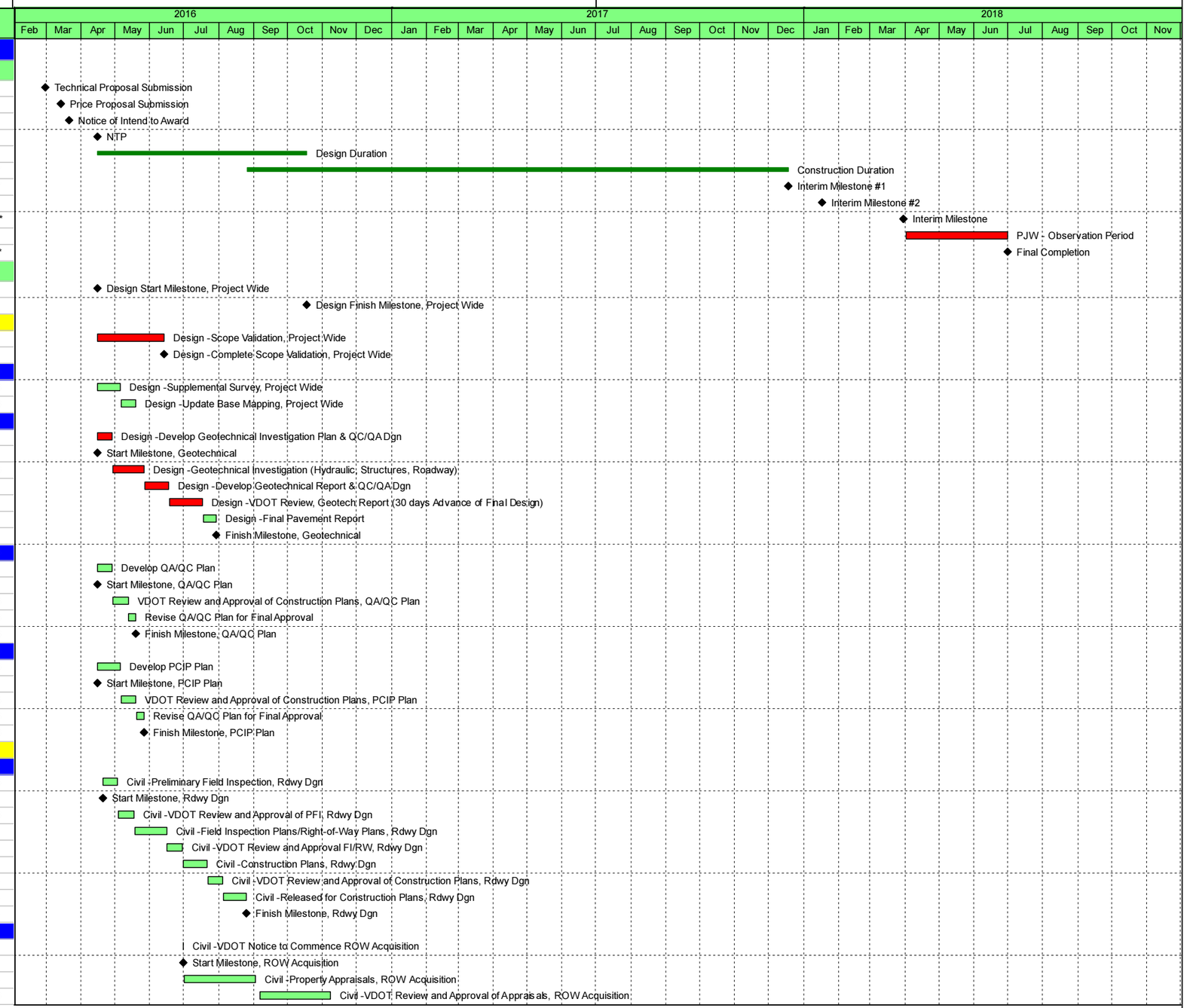
4.8.1 PROPOSAL SCHEDULE





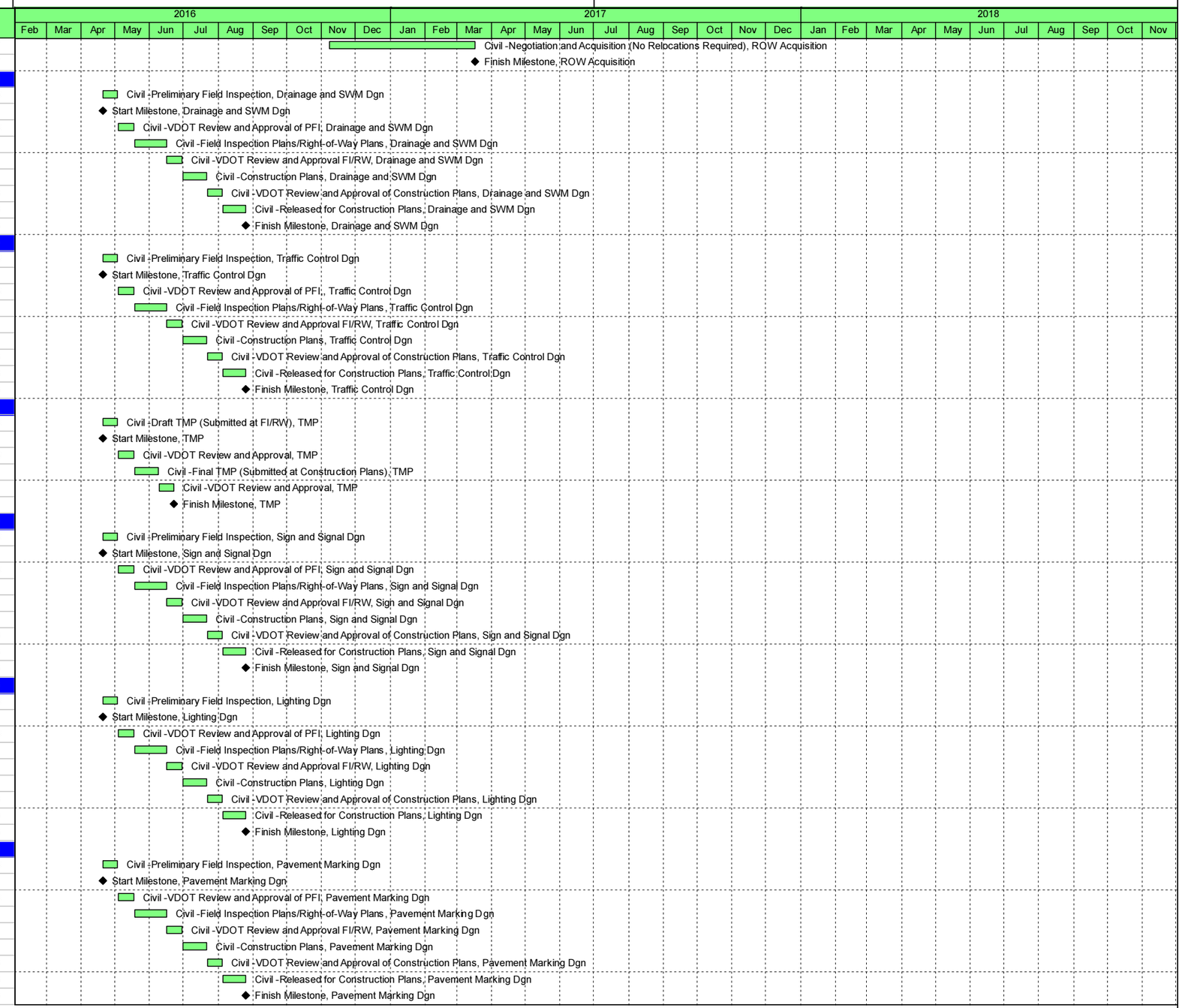
Activity ID	Activity Name	Original Duration	Start	Finish
GRTC BRT Design-Build Proposal Schedule		452	29-Feb-16	30-Jun-18
Admin		452	29-Feb-16	30-Jun-18
ADM-1000	Technical Proposal Submission	0	29-Feb-16*	
ADM-1010	Price Proposal Submission	0	14-Mar-16*	
ADM-1020	Notice of Intend to Award	0	21-Mar-16*	
ADM-1050	NTP	0	15-Apr-16*	
ADM-1070	Design Duration	97	15-Apr-16	17-Oct-16
ADM-1080	Construction Duration	251	26-Aug-16	18-Dec-17
ADM-1090	Interim Milestone #1	0		18-Dec-17
ADM-1100	Interim Milestone #2	0		17-Jan-18
C000-1010	Interim Milestone	0		30-Mar-18*
C000-1020	PJW - Observation Period	90	02-Apr-18	30-Jun-18
ADM-1060	Final Completion	0		30-Jun-18*
Design		177	15-Apr-16	17-Mar-17
D100-1020	Design Start Milestone, Project Wide	0	15-Apr-16	
D100-1030	Design Finish Milestone, Project Wide	0		17-Oct-16
Early Design		54	15-Apr-16	29-Jul-16
D100-1000	Design -Scope Validation, Project Wide	60	15-Apr-16	13-Jun-16
D100-1010	Design -Complete Scope Validation, Project Wide	0		13-Jun-16
Supplemental Survey		25	15-Apr-16	19-May-16
D110-1000	Design -Supplemental Survey, Project Wide	15	15-Apr-16	05-May-16
D110-1010	Design -Update Base Mapping, Project Wide	10	06-May-16	19-May-16
Geotechnical Investigation and Design		54	15-Apr-16	29-Jul-16
D120-1000	Design -Develop Geotechnical Investigation Plan & QC/Q/	10	15-Apr-16	28-Apr-16
D120-1050	Start Milestone, Geotechnical	0	15-Apr-16	
D120-1010	Design -Geotechnical Investigation (Hydraulic, Structures,	20	29-Apr-16	26-May-16
D120-1020	Design -Develop Geotechnical Report & QC/QA Dgn	15	27-May-16	17-Jun-16
D120-1030	Design -VDOT Review, Geotech Report (30 days Advance	30	18-Jun-16	17-Jul-16
D120-1040	Design -Final Pavement Report	10	18-Jul-16	29-Jul-16
D120-1060	Finish Milestone, Geotechnical	0		29-Jul-16
QC / QC Plan		19	15-Apr-16	19-May-16
D130-1000	Develop QA/QC Plan	10	15-Apr-16	28-Apr-16
D130-1010	Start Milestone, QA/QC Plan	0	15-Apr-16	
D130-1030	VDOT Review and Approval of Construction Plans, QA/QC	10	29-Apr-16	12-May-16
D130-1040	Revise QA/QC Plan for Final Approval	5	13-May-16	19-May-16
D130-1020	Finish Milestone, QA/QC Plan	0		19-May-16
Public Information / Communication Plan (PICP)		23	15-Apr-16	26-May-16
D140-1000	Develop PCIP Plan	15	15-Apr-16	05-May-16
D140-1010	Start Milestone, PCIP Plan	0	15-Apr-16	
D140-1020	VDOT Review and Approval of Construction Plans, PCIP F	10	06-May-16	19-May-16
D140-1030	Revise QA/QC Plan for Final Approval	5	20-May-16	26-May-16
D140-1040	Finish Milestone, PCIP Plan	0		26-May-16
Civil Design		175	20-Apr-16	17-Mar-17
Roadway Design		67	20-Apr-16	25-Aug-16
D200-1000	Civil -Preliminary Field Inspection, Rdwy Dgn	10	20-Apr-16	03-May-16
D200-1070	Start Milestone, Rdwy Dgn	0	20-Apr-16	
D200-1010	Civil -VDOT Review and Approval of PFI, Rdwy Dgn	10	04-May-16	17-May-16
D200-1020	Civil -Field Inspection Plans/Right-of-Way Plans, Rdwy Dgn	20	18-May-16	15-Jun-16
D200-1030	Civil -VDOT Review and Approval FI/RW, Rdwy Dgn	10	16-Jun-16	29-Jun-16
D200-1040	Civil -Construction Plans, Rdwy Dgn	15	30-Jun-16	21-Jul-16
D200-1050	Civil -VDOT Review and Approval of Construction Plans, F	10	22-Jul-16	04-Aug-16
D200-1060	Civil -Released for Construction Plans, Rdwy Dgn	15	05-Aug-16	25-Aug-16
D200-1080	Finish Milestone, Rdwy Dgn	0		25-Aug-16
ROW Acquisition		138	30-Jun-16	17-Mar-17
D210-1000	Civil -VDOT Notice to Commence ROW Acquisition	1	30-Jun-16	30-Jun-16
D210-1040	Start Milestone, ROW Acquisition	0	30-Jun-16	
D210-1010	Civil -Property Appraisals, ROW Acquisition	45	01-Jul-16	02-Sep-16
D210-1020	Civil -VDOT Review and Approval of Appraisals, ROW Acc	45	06-Sep-16	07-Nov-16



Remaining Level of Effort | Remaining Work | ◆ Milestone
Actual Work | Critical Remaining Work

LANE

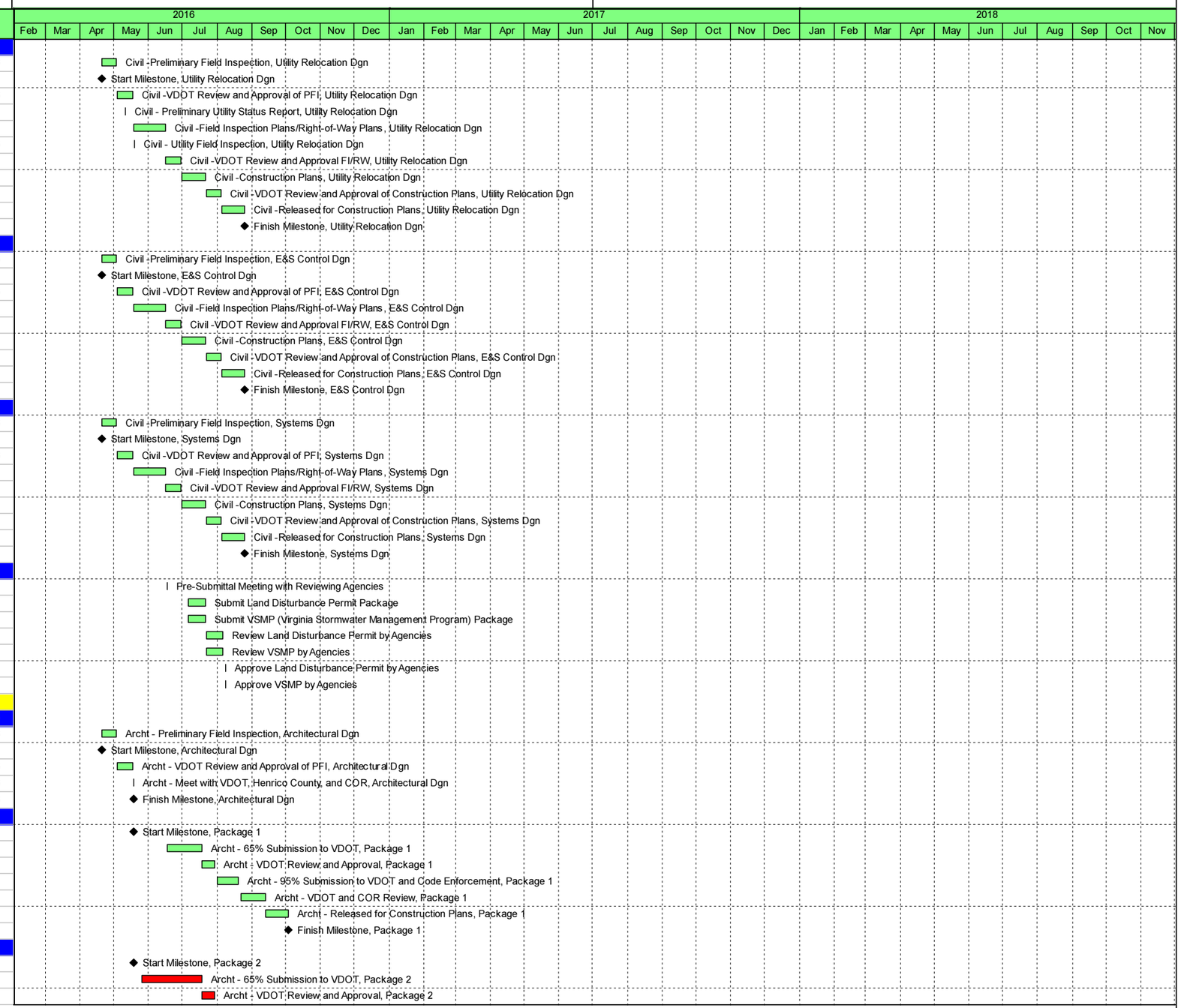
Activity ID	Activity Name	Original Duration	Start	Finish
D210-1030	Civil -Negotiation and Acquisition (No Relocations Required	90	08-Nov-16	17-Mar-17
D210-1050	Finish Milestone, ROW Acquisition	0		17-Mar-17
Drainage and SWM Design		**67**	**20-Apr-16**	**25-Aug-16**
D220-1000	Civil -Preliminary Field Inspection, Drainage and SWM Dgn	10	20-Apr-16	03-May-16
D220-1070	Start Milestone, Drainage and SWM Dgn	0	20-Apr-16	
D220-1010	Civil -VDOT Review and Approval of PFI, Drainage and SV	10	04-May-16	17-May-16
D220-1020	Civil -Field Inspection Plans/Right-of-Way Plans , Drainage	20	18-May-16	15-Jun-16
D220-1030	Civil -VDOT Review and Approval FI/RW, Drainage and S\	10	16-Jun-16	29-Jun-16
D220-1040	Civil -Construction Plans, Drainage and SWM Dgn	15	30-Jun-16	21-Jul-16
D220-1050	Civil -VDOT Review and Approval of Construction Plans, D	10	22-Jul-16	04-Aug-16
D220-1060	Civil -Released for Construction Plans, Drainage and SWM	15	05-Aug-16	25-Aug-16
D220-1080	Finish Milestone, Drainage and SWM Dgn	0		25-Aug-16
Traffic Control / ITS Design		**67**	**20-Apr-16**	**25-Aug-16**
D230-1000	Civil -Preliminary Field Inspection, Traffic Control Dgn	10	20-Apr-16	03-May-16
D230-1070	Start Milestone, Traffic Control Dgn	0	20-Apr-16	
D230-1010	Civil -VDOT Review and Approval of PFI,, Traffic Control D	10	04-May-16	17-May-16
D230-1020	Civil -Field Inspection Plans/Right-of-Way Plans , Traffic Co	20	18-May-16	15-Jun-16
D230-1030	Civil -VDOT Review and Approval FI/RW, Traffic Control D	10	16-Jun-16	29-Jun-16
D230-1040	Civil -Construction Plans, Traffic Control Dgn	15	30-Jun-16	21-Jul-16
D230-1050	Civil -VDOT Review and Approval of Construction Plans, T	10	22-Jul-16	04-Aug-16
D230-1060	Civil -Released for Construction Plans, Traffic Control Dgn	15	05-Aug-16	25-Aug-16
D230-1080	Finish Milestone, Traffic Control Dgn	0		25-Aug-16
TMP		**32**	**20-Apr-16**	**22-Jun-16**
D240-1000	Civil -Draft TMP (Submitted at FI/RW), TMP	10	20-Apr-16	03-May-16
D240-1040	Start Milestone, TMP	0	20-Apr-16	
D240-1010	Civil -VDOT Review and Approval, TMP	10	04-May-16	17-May-16
D240-1020	Civil -Final TMP (Submitted at Construction Plans), TMP	15	18-May-16	08-Jun-16
D240-1030	Civil -VDOT Review and Approval, TMP	10	09-Jun-16	22-Jun-16
D240-1050	Finish Milestone, TMP	0		22-Jun-16
Sign and Signal Design		**67**	**20-Apr-16**	**25-Aug-16**
D250-1000	Civil -Preliminary Field Inspection, Sign and Signal Dgn	10	20-Apr-16	03-May-16
D250-1070	Start Milestone, Sign and Signal Dgn	0	20-Apr-16	
D250-1010	Civil -VDOT Review and Approval of PFI, Sign and Signal D	10	04-May-16	17-May-16
D250-1020	Civil -Field Inspection Plans/Right-of-Way Plans , Sign and	20	18-May-16	15-Jun-16
D250-1030	Civil -VDOT Review and Approval FI/RW, Sign and Signal	10	16-Jun-16	29-Jun-16
D250-1040	Civil -Construction Plans, Sign and Signal Dgn	15	30-Jun-16	21-Jul-16
D250-1050	Civil -VDOT Review and Approval of Construction Plans, S	10	22-Jul-16	04-Aug-16
D250-1060	Civil -Released for Construction Plans, Sign and Signal Dgn	15	05-Aug-16	25-Aug-16
D250-1080	Finish Milestone, Sign and Signal Dgn	0		25-Aug-16
Lighting Design		**67**	**20-Apr-16**	**25-Aug-16**
D260-1000	Civil -Preliminary Field Inspection, Lighting Dgn	10	20-Apr-16	03-May-16
D260-1070	Start Milestone, Lighting Dgn	0	20-Apr-16	
D260-1010	Civil -VDOT Review and Approval of PFI, Lighting Dgn	10	04-May-16	17-May-16
D260-1020	Civil -Field Inspection Plans/Right-of-Way Plans , Lighting D	20	18-May-16	15-Jun-16
D260-1030	Civil -VDOT Review and Approval FI/RW, Lighting Dgn	10	16-Jun-16	29-Jun-16
D260-1040	Civil -Construction Plans, Lighting Dgn	15	30-Jun-16	21-Jul-16
D260-1050	Civil -VDOT Review and Approval of Construction Plans, L	10	22-Jul-16	04-Aug-16
D260-1060	Civil -Released for Construction Plans, Lighting Dgn	15	05-Aug-16	25-Aug-16
D260-1080	Finish Milestone, Lighting Dgn	0		25-Aug-16
Pavement Marking Design		**67**	**20-Apr-16**	**25-Aug-16**
D270-1000	Civil -Preliminary Field Inspection, Pavement Marking Dgn	10	20-Apr-16	03-May-16
D270-1070	Start Milestone, Pavement Marking Dgn	0	20-Apr-16	
D270-1010	Civil -VDOT Review and Approval of PFI, Pavement Markii	10	04-May-16	17-May-16
D270-1020	Civil -Field Inspection Plans/Right-of-Way Plans , Pavemen	20	18-May-16	15-Jun-16
D270-1030	Civil -VDOT Review and Approval FI/RW, Pavement Marki	10	16-Jun-16	29-Jun-16
D270-1040	Civil -Construction Plans, Pavement Marking Dgn	15	30-Jun-16	21-Jul-16
D270-1050	Civil -VDOT Review and Approval of Construction Plans, F	10	22-Jul-16	04-Aug-16
D270-1060	Civil -Released for Construction Plans, Pavement Marking	15	05-Aug-16	25-Aug-16
D270-1080	Finish Milestone, Pavement Marking Dgn	0		25-Aug-16



Remaining Level of Effort | Remaining Work | ◆ Milestone
Actual Work | Critical Remaining Work

LANE

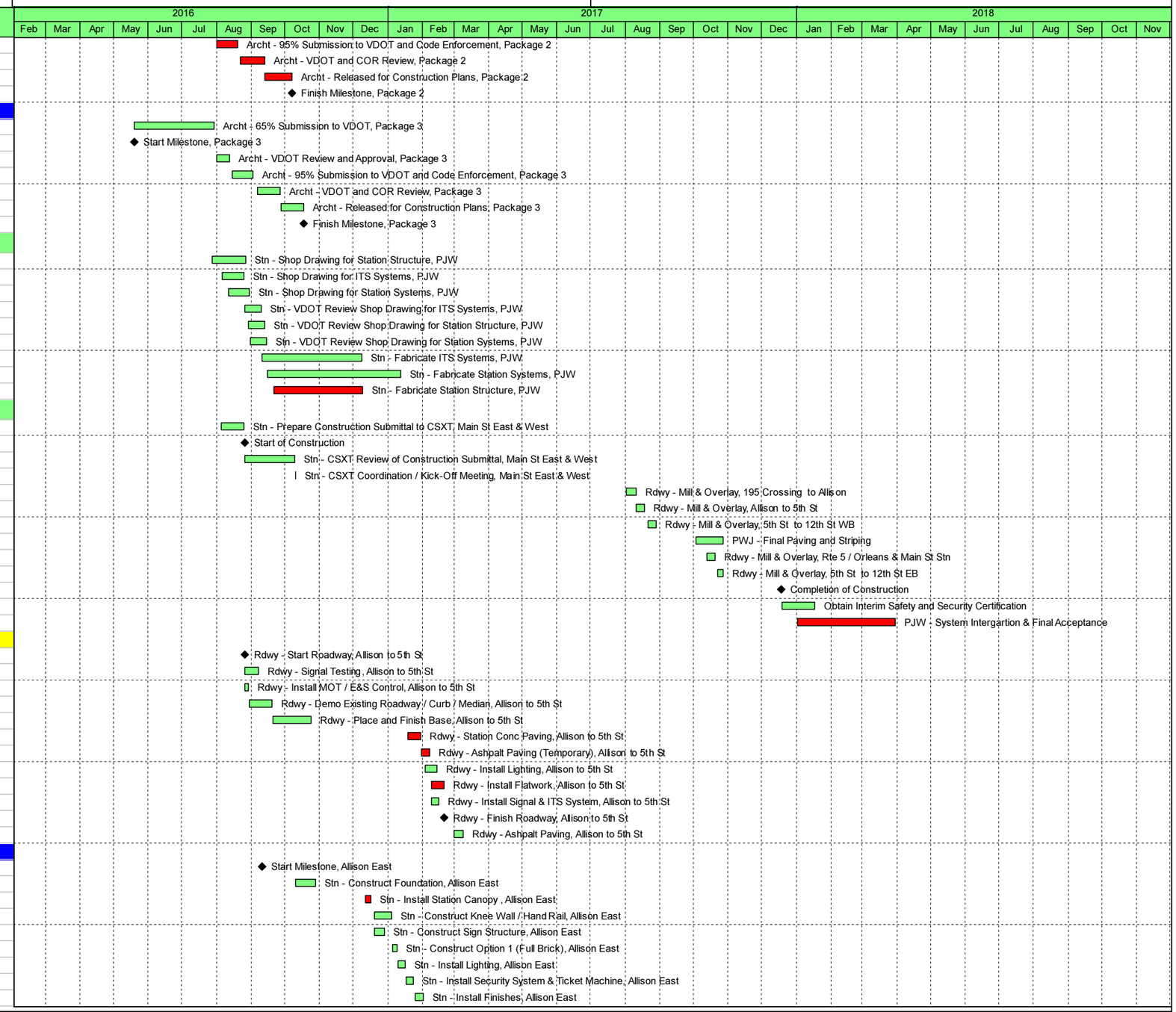
Activity ID	Activity Name	Original Duration	Start	Finish
Utility Relocation Design		**67**	**20-Apr-16**	**25-Aug-16**
D280-1000	Civil -Preliminary Field Inspection, Utility Relocation Dgn	10	20-Apr-16	03-May-16
D280-1070	Start Milestone, Utility Relocation Dgn	0	20-Apr-16	
D280-1010	Civil -VDOT Review and Approval of PFI, Utility Relocation	10	04-May-16	17-May-16
D280-1090	Civil - Preliminary Utility Status Report, Utility Relocation Dg	1	11-May-16	11-May-16
D280-1020	Civil -Field Inspection Plans/Right-of-Way Plans , Utility Rel	20	18-May-16	15-Jun-16
D280-1100	Civil - Utility Field Inspection, Utility Relocation Dgn	1	19-May-16	19-May-16
D280-1030	Civil -VDOT Review and Approval FI/RW, Utility Relocation	10	16-Jun-16	29-Jun-16
D280-1040	Civil -Construction Plans, Utility Relocation Dgn	15	30-Jun-16	21-Jul-16
D280-1050	Civil -VDOT Review and Approval of Construction Plans, U	10	22-Jul-16	04-Aug-16
D280-1060	Civil -Released for Construction Plans, Utility Relocation D	15	05-Aug-16	25-Aug-16
D280-1080	Finish Milestone, Utility Relocation Dgn	0		25-Aug-16
Erosion and Sediment Control Design		**67**	**20-Apr-16**	**25-Aug-16**
D290-1000	Civil -Preliminary Field Inspection, E&S Control Dgn	10	20-Apr-16	03-May-16
D290-1070	Start Milestone, E&S Control Dgn	0	20-Apr-16	
D290-1010	Civil -VDOT Review and Approval of PFI, E&S Control Dgn	10	04-May-16	17-May-16
D290-1020	Civil -Field Inspection Plans/Right-of-Way Plans , E&S Con	20	18-May-16	15-Jun-16
D290-1030	Civil -VDOT Review and Approval FI/RW, E&S Control Dgn	10	16-Jun-16	29-Jun-16
D290-1040	Civil -Construction Plans, E&S Control Dgn	15	30-Jun-16	21-Jul-16
D290-1050	Civil -VDOT Review and Approval of Construction Plans, E	10	22-Jul-16	04-Aug-16
D290-1060	Civil -Released for Construction Plans, E&S Control Dgn	15	05-Aug-16	25-Aug-16
D290-1080	Finish Milestone, E&S Control Dgn	0		25-Aug-16
Systems Design		**67**	**20-Apr-16**	**25-Aug-16**
D300-1000	Civil -Preliminary Field Inspection, Systems Dgn	10	20-Apr-16	03-May-16
D300-1070	Start Milestone, Systems Dgn	0	20-Apr-16	
D300-1010	Civil -VDOT Review and Approval of PFI, Systems Dgn	10	04-May-16	17-May-16
D300-1020	Civil -Field Inspection Plans/Right-of-Way Plans , Systems	20	18-May-16	15-Jun-16
D300-1030	Civil -VDOT Review and Approval FI/RW, Systems Dgn	10	16-Jun-16	29-Jun-16
D300-1040	Civil -Construction Plans, Systems Dgn	15	30-Jun-16	21-Jul-16
D300-1050	Civil -VDOT Review and Approval of Construction Plans, S	10	22-Jul-16	04-Aug-16
D300-1060	Civil -Released for Construction Plans, Systems Dgn	15	05-Aug-16	25-Aug-16
D300-1080	Finish Milestone, Systems Dgn	0		25-Aug-16
Environmental Permit		**29**	**17-Jun-16**	**08-Aug-16**
D310-1090	Pre-Submittal Meeting with Reviewing Agencies	1	17-Jun-16	17-Jun-16
D310-1100	Submit Land Disturbance Permit Package	12	06-Jul-16	21-Jul-16
D310-1110	Submit VSMP (Virginia Stormwater Management Program)	12	06-Jul-16	21-Jul-16
D310-1120	Review Land Disturbance Permit by Agencies	10	22-Jul-16	05-Aug-16
D310-1130	Review VSMP by Agencies	10	22-Jul-16	05-Aug-16
D310-1140	Approve Land Disturbance Permit by Agencies	1	08-Aug-16	08-Aug-16
D310-1150	Approve VSMP by Agencies	1	08-Aug-16	08-Aug-16
Station / Architectural Design		**95**	**20-Apr-16**	**17-Oct-16**
Preliminary Design		**16**	**20-Apr-16**	**18-May-16**
D400-1000	Archt - Preliminary Field Inspection, Architectural Dgn	10	20-Apr-16	03-May-16
D400-1030	Start Milestone, Architectural Dgn	0	20-Apr-16	
D400-1010	Archt - VDOT Review and Approval of PFI, Architectural D	10	04-May-16	17-May-16
D400-1020	Archt - Meet with VDOT, Henrico County, and COR, Archit	1	18-May-16	18-May-16
D400-1040	Finish Milestone, Architectural Dgn	0		18-May-16
Package 1 (Foundations, Columns, Conduit, Plumbing)		**71**	**18-May-16**	**03-Oct-16**
D410-1050	Start Milestone, Package 1	0	18-May-16	
D410-1000	Archt - 65% Submission to VDOT, Package 1	20	17-Jun-16	18-Jul-16
D410-1010	Archt - VDOT Review and Approval, Package 1	10	18-Jul-16	29-Jul-16
D410-1020	Archt - 95% Submission to VDOT and Code Enforcement,	15	01-Aug-16	19-Aug-16
D410-1030	Archt - VDOT and COR Review, Package 1	15	22-Aug-16	12-Sep-16
D410-1040	Archt - Released for Construction Plans, Package 1	15	13-Sep-16	03-Oct-16
D410-1060	Finish Milestone, Package 1	0		03-Oct-16
Package 2 (Concrete Slab & Roof Structure,)		**74**	**18-May-16**	**07-Oct-16**
D420-1050	Start Milestone, Package 2	0	18-May-16	
D420-1000	Archt - 65% Submission to VDOT, Package 2	35	26-May-16	18-Jul-16
D420-1010	Archt - VDOT Review and Approval, Package 2	10	18-Jul-16	29-Jul-16



Remaining Level of Effort | Remaining Work | ◆ Milestone
Actual Work | Critical Remaining Work

LANE

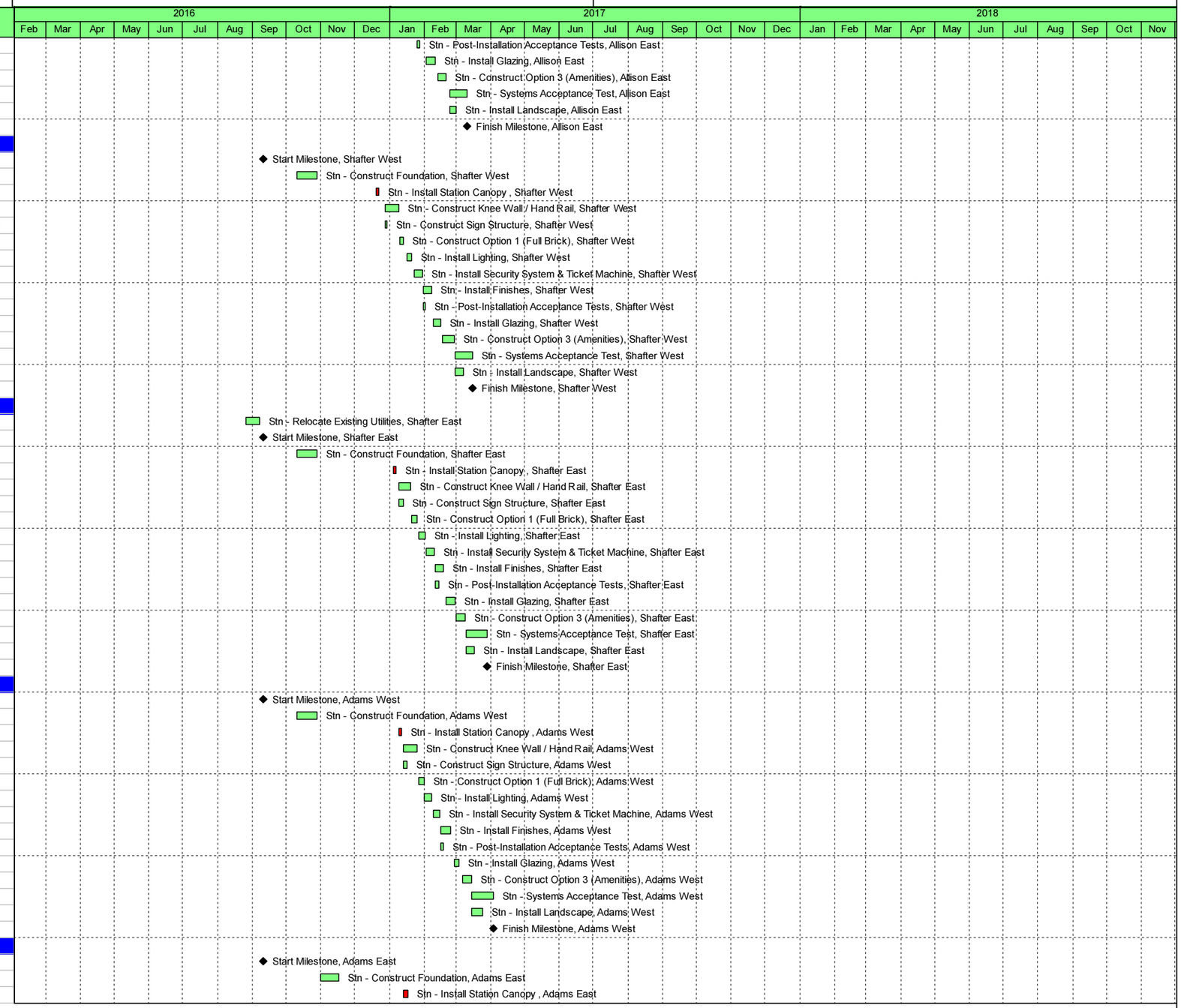
Activity ID	Activity Name	Original Duration	Start	Finish
D420-1020	Archt - 95% Submission to VDOT and Code Enforcement,	15	01-Aug-16	19-Aug-16
D420-1030	Archt - VDOT and COR Review, Package 2	15	22-Aug-16	12-Sep-16
D420-1040	Archt - Released for Construction Plans, Package 2	15	13-Sep-16	07-Oct-16
D420-1060	Finish Milestone, Package 2	0		07-Oct-16
Package 3 (Ceiling, Handrails, Station Amenities, Planter walls)		**79**	**19-May-16**	**17-Oct-16**
D430-1000	Archt - 65% Submission to VDOT, Package 3	50	19-May-16	29-Jul-16
D430-1050	Start Milestone, Package 3	0	19-May-16	
D430-1010	Archt - VDOT Review and Approval, Package 3	10	01-Aug-16	12-Aug-16
D430-1020	Archt - 95% Submission to VDOT and Code Enforcement,	15	15-Aug-16	02-Sep-16
D430-1030	Archt - VDOT and COR Review, Package 3	15	06-Sep-16	26-Sep-16
D430-1040	Archt - Released for Construction Plans, Package 3	15	27-Sep-16	17-Oct-16
D430-1060	Finish Milestone, Package 3	0		17-Oct-16
Procurement		**90**	**28-Jul-16**	**12-Jan-17**
P000-1000	Stn - Shop Drawing for Station Structure, PJW	30	28-Jul-16	26-Aug-16
P000-1060	Stn - Shop Drawing for ITS Systems, PJW	20	06-Aug-16	25-Aug-16
P000-1030	Stn - Shop Drawing for Station Systems, PJW	20	11-Aug-16	30-Aug-16
P000-1070	Stn - VDOT Review Shop Drawing for ITS Systems, PJW	10	26-Aug-16	09-Sep-16
P000-1010	Stn - VDOT Review Shop Drawing for Station Structure, P.	10	29-Aug-16	12-Sep-16
P000-1040	Stn - VDOT Review Shop Drawing for Station Systems, PJ	10	31-Aug-16	14-Sep-16
P000-1080	Stn - Fabricate ITS Systems, PJW	90	10-Sep-16	08-Dec-16
P000-1050	Stn - Fabricate Station Systems, PJW	120	15-Sep-16	12-Jan-17
P000-1020	Stn - Fabricate Station Structure, PJW	80	21-Sep-16	09-Dec-16
Construction		**315**	**05-Aug-16**	**30-Mar-18**
C500R1140	Stn - Prepare Construction Submittal to CSXT, Main St Eas	15	05-Aug-16	25-Aug-16
C000-1000	Start of Construction	0	26-Aug-16	
C500R1150	Stn - CSXT Review of Construction Submittal, Main St Eas	45	26-Aug-16	09-Oct-16
C500R1160	Stn - CSXT Coordination / Kick-Off Meeting, Main St East &	1	10-Oct-16	10-Oct-16
C200R1080	Rdwy - Mill & Overlay, 195 Crossing to Allison	5	02-Aug-17	10-Aug-17
C100R1080	Rdwy - Mill & Overlay, Allison to 5th St	5	11-Aug-17	18-Aug-17
C300R1080	Rdwy - Mill & Overlay, 5th St to 12th St WB	5	21-Aug-17	28-Aug-17
C500R1130	PWJ - Final Paving and Striping	15	03-Oct-17	27-Oct-17
C500R1090	Rdwy - Mill & Overlay, Rte 5 / Orleans & Main St Stn	5	13-Oct-17	20-Oct-17
C400R1090	Rdwy - Mill & Overlay, 5th St to 12th St EB	5	23-Oct-17	27-Oct-17
C000-1030	Completion of Construction	0		18-Dec-17
C000-1040	Obtain Interim Safety and Security Certification	30	19-Dec-17	17-Jan-18
C000-1050	PJW - System Intergartion & Final Acceptance	64	02-Jan-18	30-Mar-18
Group 1 - Allison to 5th Street		**119**	**26-Aug-16**	**07-Apr-17**
C100R1000	Rdwy - Start Roadway, Allison to 5th St	0	26-Aug-16	
C100R1010	Rdwy - Signal Testing, Allison to 5th St	5	26-Aug-16	07-Sep-16
C100R1020	Rdwy - Install MOT / E&S Control, Allison to 5th St	2	26-Aug-16	29-Aug-16
C100R1030	Rdwy - Demo Existing Roadway / Curb / Median, Allison to	10	30-Aug-16	19-Sep-16
C100R1040	Rdwy - Place and Finish Base, Allison to 5th St	20	20-Sep-16	24-Oct-16
C100R1070	Rdwy - Station Conc Paving, Allison to 5th St	6	19-Jan-17	30-Jan-17
C100R1050	Rdwy - Ashpalt Paving (Temporary), Allison to 5th St	5	31-Jan-17	07-Feb-17
C100R1100	Rdwy - Install Lighting, Allison to 5th St	5	03-Feb-17	13-Feb-17
C100R1060	Rdwy - Install Flatwork, Allison to 5th St	7	09-Feb-17	20-Feb-17
C100R1090	Rdwy - Install Signal & ITS System, Allison to 5th St	5	09-Feb-17	15-Feb-17
C100R1110	Rdwy - Finish Roadway, Allison to 5th St	0		20-Feb-17
C100R1120	Rdwy - Ashpalt Paving, Allison to 5th St	5	01-Mar-17	09-Mar-17
Station - Allison East		**97**	**10-Sep-16**	**10-Mar-17**
C009E2000	Start Milestone, Allison East	0	10-Sep-16	
C009E1000	Stn - Construct Foundation, Allison East	12	10-Oct-16	28-Oct-16
C009E1020	Stn - Install Station Canopy , Allison East	3	12-Dec-16	16-Dec-16
C009E1010	Stn - Construct Knee Wall / Hand Rail, Allison East	7	20-Dec-16	04-Jan-17
C009E1030	Stn - Construct Sign Structure, Allison East	4	20-Dec-16	28-Dec-16
C009E1090	Stn - Construct Option 1 (Full Brick), Allison East	3	05-Jan-17	09-Jan-17
C009E1070	Stn - Install Lighting, Allison East	4	10-Jan-17	16-Jan-17
C009E1080	Stn - Install Security System & Ticket Machine, Allison East	4	17-Jan-17	23-Jan-17
C009E1060	Stn - Install Finishes, Allison East	5	25-Jan-17	01-Feb-17



Remaining Level of Effort | Remaining Work | ◆ Milestone
Actual Work | Critical Remaining Work

LANE

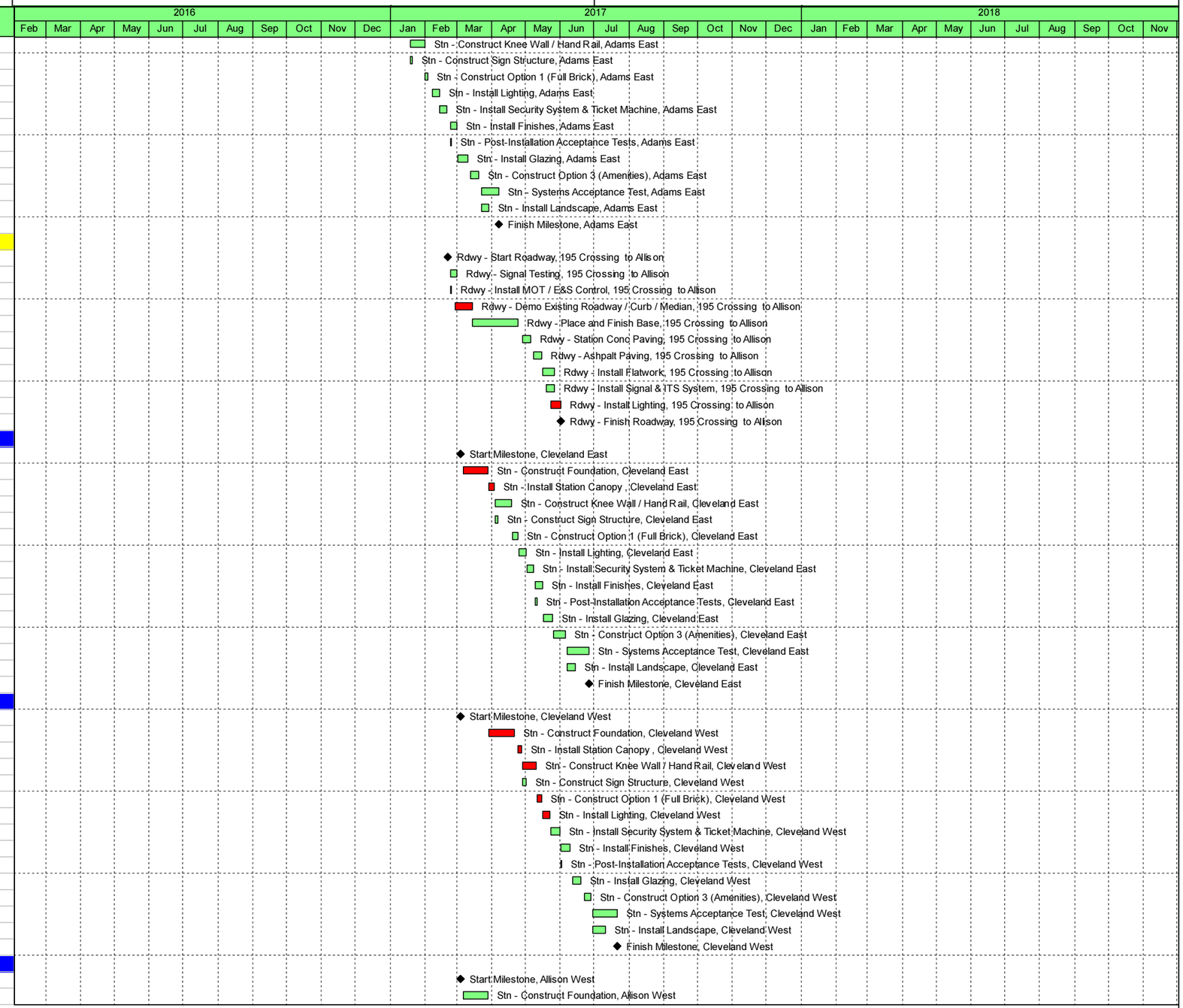
Activity ID	Activity Name	Original Duration	Start	Finish
C009E1120	Stn - Post-Installation Acceptance Tests, Allison East	2	25-Jan-17	27-Jan-17
C009E1050	Stn - Install Glazing, Allison East	5	02-Feb-17	10-Feb-17
C009E1100	Stn - Construct Option 3 (Amenities), Allison East	5	13-Feb-17	20-Feb-17
C009E1110	Stn - Systems Acceptance Test, Allison East	10	23-Feb-17	10-Mar-17
C009E1130	Stn - Install Landscape, Allison East	5	23-Feb-17	01-Mar-17
C009E2010	Finish Milestone, Allison East	0		10-Mar-17
Station - Shafter West		**100**	**10-Sep-16**	**15-Mar-17**
C010W2000	Start Milestone, Shafter West	0	10-Sep-16	
C010W1000	Stn - Construct Foundation, Shafter West	12	10-Oct-16	28-Oct-16
C010W1020	Stn - Install Station Canopy , Shafter West	3	20-Dec-16	22-Dec-16
C010W1010	Stn - Construct Knee Wall / Hand Rail, Shafter West	7	28-Dec-16	09-Jan-17
C010W1030	Stn - Construct Sign Structure, Shafter West	2	28-Dec-16	29-Dec-16
C010W1090	Stn - Construct Option 1 (Full Brick), Shafter West	3	10-Jan-17	13-Jan-17
C010W1070	Stn - Install Lighting, Shafter West	4	16-Jan-17	20-Jan-17
C010W1080	Stn - Install Security System & Ticket Machine, Shafter We	4	23-Jan-17	30-Jan-17
C010W1060	Stn - Install Finishes, Shafter West	5	31-Jan-17	07-Feb-17
C010W1120	Stn - Post-Installation Acceptance Tests, Shafter West	2	31-Jan-17	01-Feb-17
C010W1050	Stn - Install Glazing, Shafter West	5	09-Feb-17	15-Feb-17
C010W1100	Stn - Construct Option 3 (Amenities), Shafter West	5	17-Feb-17	27-Feb-17
C010W1110	Stn - Systems Acceptance Test, Shafter West	10	28-Feb-17	15-Mar-17
C010W2020	Stn - Install Landscape, Shafter West	5	28-Feb-17	07-Mar-17
C010W2010	Finish Milestone, Shafter West	0		15-Mar-17
Station - Shafter East		**113**	**26-Aug-16**	**28-Mar-17**
C011E2020	Stn - Relocate Existing Utilities, Shafter East	5	26-Aug-16	07-Sep-16
C011E2000	Start Milestone, Shafter East	0	10-Sep-16	
C011E1000	Stn - Construct Foundation, Shafter East	12	10-Oct-16	28-Oct-16
C011E1020	Stn - Install Station Canopy , Shafter East	3	04-Jan-17	06-Jan-17
C011E1010	Stn - Construct Knee Wall / Hand Rail, Shafter East	7	09-Jan-17	19-Jan-17
C011E1030	Stn - Construct Sign Structure, Shafter East	4	09-Jan-17	13-Jan-17
C011E1090	Stn - Construct Option 1 (Full Brick), Shafter East	3	20-Jan-17	25-Jan-17
C011E1070	Stn - Install Lighting, Shafter East	4	27-Jan-17	01-Feb-17
C011E1080	Stn - Install Security System & Ticket Machine, Shafter East	4	02-Feb-17	09-Feb-17
C011E1060	Stn - Install Finishes, Shafter East	5	10-Feb-17	17-Feb-17
C011E1120	Stn - Post-Installation Acceptance Tests, Shafter East	2	10-Feb-17	13-Feb-17
C011E1050	Stn - Install Glazing, Shafter East	5	20-Feb-17	28-Feb-17
C011E1100	Stn - Construct Option 3 (Amenities), Shafter East	5	01-Mar-17	09-Mar-17
C011E1110	Stn - Systems Acceptance Test, Shafter East	10	10-Mar-17	28-Mar-17
C011W1000	Stn - Install Landscape, Shafter East	5	10-Mar-17	17-Mar-17
C011E2010	Finish Milestone, Shafter East	0		28-Mar-17
Station - Adams West		**109**	**10-Sep-16**	**03-Apr-17**
C012W2000	Start Milestone, Adams West	0	10-Sep-16	
C012W1000	Stn - Construct Foundation, Adams West	12	10-Oct-16	28-Oct-16
C012W1020	Stn - Install Station Canopy , Adams West	3	09-Jan-17	11-Jan-17
C012W1010	Stn - Construct Knee Wall / Hand Rail, Adams West	7	13-Jan-17	25-Jan-17
C012W1030	Stn - Construct Sign Structure, Adams West	2	13-Jan-17	16-Jan-17
C012W1090	Stn - Construct Option 1 (Full Brick), Adams West	3	27-Jan-17	31-Jan-17
C012W1070	Stn - Install Lighting, Adams West	4	01-Feb-17	07-Feb-17
C012W1080	Stn - Install Security System & Ticket Machine, Adams We	4	09-Feb-17	14-Feb-17
C012W1060	Stn - Install Finishes, Adams West	5	15-Feb-17	24-Feb-17
C012W1120	Stn - Post-Installation Acceptance Tests, Adams West	2	15-Feb-17	17-Feb-17
C012W1050	Stn - Install Glazing, Adams West	5	27-Feb-17	03-Mar-17
C012W1100	Stn - Construct Option 3 (Amenities), Adams West	5	07-Mar-17	14-Mar-17
C012W1110	Stn - Systems Acceptance Test, Adams West	10	15-Mar-17	03-Apr-17
C012W2020	Stn - Install Landscape, Adams West	5	15-Mar-17	24-Mar-17
C012W2010	Finish Milestone, Adams West	0		03-Apr-17
Station - Adams East		**112**	**10-Sep-16**	**07-Apr-17**
C013E2000	Start Milestone, Adams East	0	10-Sep-16	
C013E1000	Stn - Construct Foundation, Adams East	12	31-Oct-16	16-Nov-16
C013E1020	Stn - Install Station Canopy , Adams East	3	13-Jan-17	17-Jan-17



Remaining Level of Effort | Remaining Work | ◆ Milestone
Actual Work | Critical Remaining Work

LANE

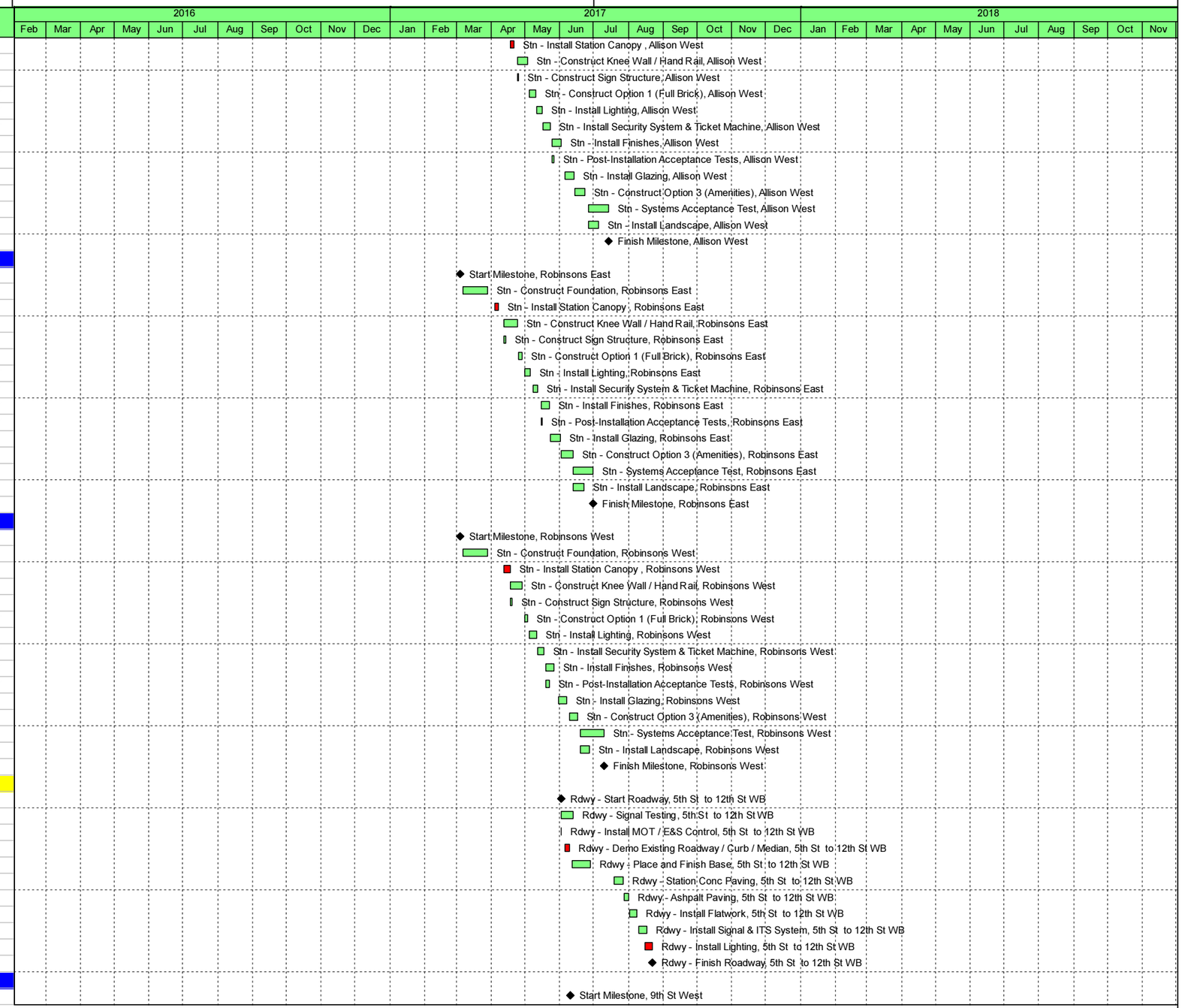
Activity ID	Activity Name	Original Duration	Start	Finish
C013E1010	Stn - Construct Knee Wall / Hand Rail, Adams East	7	19-Jan-17	31-Jan-17
C013E1030	Stn - Construct Sign Structure, Adams East	2	19-Jan-17	20-Jan-17
C013E1090	Stn - Construct Option 1 (Full Brick), Adams East	3	01-Feb-17	03-Feb-17
C013E1070	Stn - Install Lighting, Adams East	4	07-Feb-17	13-Feb-17
C013E1080	Stn - Install Security System & Ticket Machine, Adams East	4	14-Feb-17	20-Feb-17
C013E1060	Stn - Install Finishes, Adams East	5	23-Feb-17	01-Mar-17
C013E1120	Stn - Post-Installation Acceptance Tests, Adams East	2	23-Feb-17	24-Feb-17
C013E1050	Stn - Install Glazing, Adams East	5	02-Mar-17	10-Mar-17
C013E1100	Stn - Construct Option 3 (Amenities), Adams East	5	13-Mar-17	20-Mar-17
C013E1110	Stn - Systems Acceptance Test, Adams East	10	23-Mar-17	07-Apr-17
C013E2020	Stn - Install Landscape, Adams East	5	23-Mar-17	29-Mar-17
C013E2010	Finish Milestone, Adams East	0		07-Apr-17
Group 2 - I 195 to Allison		**77**	**21-Feb-17**	**21-Jul-17**
C200R1000	Rdwy - Start Roadway, 195 Crossing to Allison	0	21-Feb-17	
C200R1010	Rdwy - Signal Testing, 195 Crossing to Allison	5	23-Feb-17	01-Mar-17
C200R1020	Rdwy - Install MOT / E&S Control, 195 Crossing to Allison	2	23-Feb-17	24-Feb-17
C200R1030	Rdwy - Demo Existing Roadway / Curb / Median, 195 Cros	10	27-Feb-17	14-Mar-17
C200R1040	Rdwy - Place and Finish Base, 195 Crossing to Allison	20	15-Mar-17	24-Apr-17
C200R1070	Rdwy - Station Conc Paving, 195 Crossing to Allison	5	28-Apr-17	05-May-17
C200R1060	Rdwy - Ashpalt Paving, 195 Crossing to Allison	5	08-May-17	15-May-17
C200R1050	Rdwy - Install Flatwork, 195 Crossing to Allison	7	16-May-17	26-May-17
C200R1090	Rdwy - Install Signal & ITS System, 195 Crossing to Allison	5	19-May-17	26-May-17
C200R1100	Rdwy - Install Lighting, 195 Crossing to Allison	5	23-May-17	01-Jun-17
C200R1110	Rdwy - Finish Roadway, 195 Crossing to Allison	0		01-Jun-17
Station - Cleveland East		**58**	**04-Mar-17**	**26-Jun-17**
C004E2000	Start Milestone, Cleveland East	0	04-Mar-17	
C004E1000	Stn - Construct Foundation, Cleveland East	12	07-Mar-17	28-Mar-17
C004E1020	Stn - Install Station Canopy , Cleveland East	3	29-Mar-17	03-Apr-17
C004E1010	Stn - Construct Knee Wall / Hand Rail, Cleveland East	7	04-Apr-17	18-Apr-17
C004E1030	Stn - Construct Sign Structure, Cleveland East	2	04-Apr-17	06-Apr-17
C004E1090	Stn - Construct Option 1 (Full Brick), Cleveland East	3	19-Apr-17	24-Apr-17
C004E1070	Stn - Install Lighting, Cleveland East	4	25-Apr-17	01-May-17
C004E1080	Stn - Install Security System & Ticket Machine, Cleveland E	4	02-May-17	08-May-17
C004E1060	Stn - Install Finishes, Cleveland East	5	10-May-17	16-May-17
C004E1120	Stn - Post-Installation Acceptance Tests, Cleveland East	2	10-May-17	11-May-17
C004E1050	Stn - Install Glazing, Cleveland East	5	17-May-17	25-May-17
C004E1100	Stn - Construct Option 3 (Amenities), Cleveland East	5	26-May-17	05-Jun-17
C004E1110	Stn - Systems Acceptance Test, Cleveland East	10	07-Jun-17	26-Jun-17
C004E2020	Stn - Install Landscape, Cleveland East	5	07-Jun-17	14-Jun-17
C004E2010	Finish Milestone, Cleveland East	0		26-Jun-17
Station - Cleveland West		**70**	**04-Mar-17**	**21-Jul-17**
C005W2000	Start Milestone, Cleveland West	0	04-Mar-17	
C005W1000	Stn - Construct Foundation, Cleveland West	12	29-Mar-17	21-Apr-17
C005W1020	Stn - Install Station Canopy , Cleveland West	3	24-Apr-17	27-Apr-17
C005W1010	Stn - Construct Knee Wall / Hand Rail, Cleveland West	7	28-Apr-17	10-May-17
C005W1030	Stn - Construct Sign Structure, Cleveland West	2	28-Apr-17	01-May-17
C005W1090	Stn - Construct Option 1 (Full Brick), Cleveland West	3	11-May-17	15-May-17
C005W1070	Stn - Install Lighting, Cleveland West	4	16-May-17	22-May-17
C005W1080	Stn - Install Security System & Ticket Machine, Cleveland \	4	23-May-17	31-May-17
C005W1060	Stn - Install Finishes, Cleveland West	5	01-Jun-17	09-Jun-17
C005W1120	Stn - Post-Installation Acceptance Tests, Cleveland West	2	01-Jun-17	02-Jun-17
C005W1050	Stn - Install Glazing, Cleveland West	5	12-Jun-17	19-Jun-17
C005W1100	Stn - Construct Option 3 (Amenities), Cleveland West	5	22-Jun-17	28-Jun-17
C005W1110	Stn - Systems Acceptance Test, Cleveland West	10	30-Jun-17	21-Jul-17
C005W2020	Stn - Install Landscape, Cleveland West	5	30-Jun-17	11-Jul-17
C005W2010	Finish Milestone, Cleveland West	0		21-Jul-17
Station - Allison West		**67**	**04-Mar-17**	**14-Jul-17**
C008W2000	Start Milestone, Allison West	0	04-Mar-17	
C008W1000	Stn - Construct Foundation, Allison West	12	07-Mar-17	28-Mar-17



Remaining Level of Effort | Remaining Work | ◆ Milestone
Actual Work | Critical Remaining Work

LANE

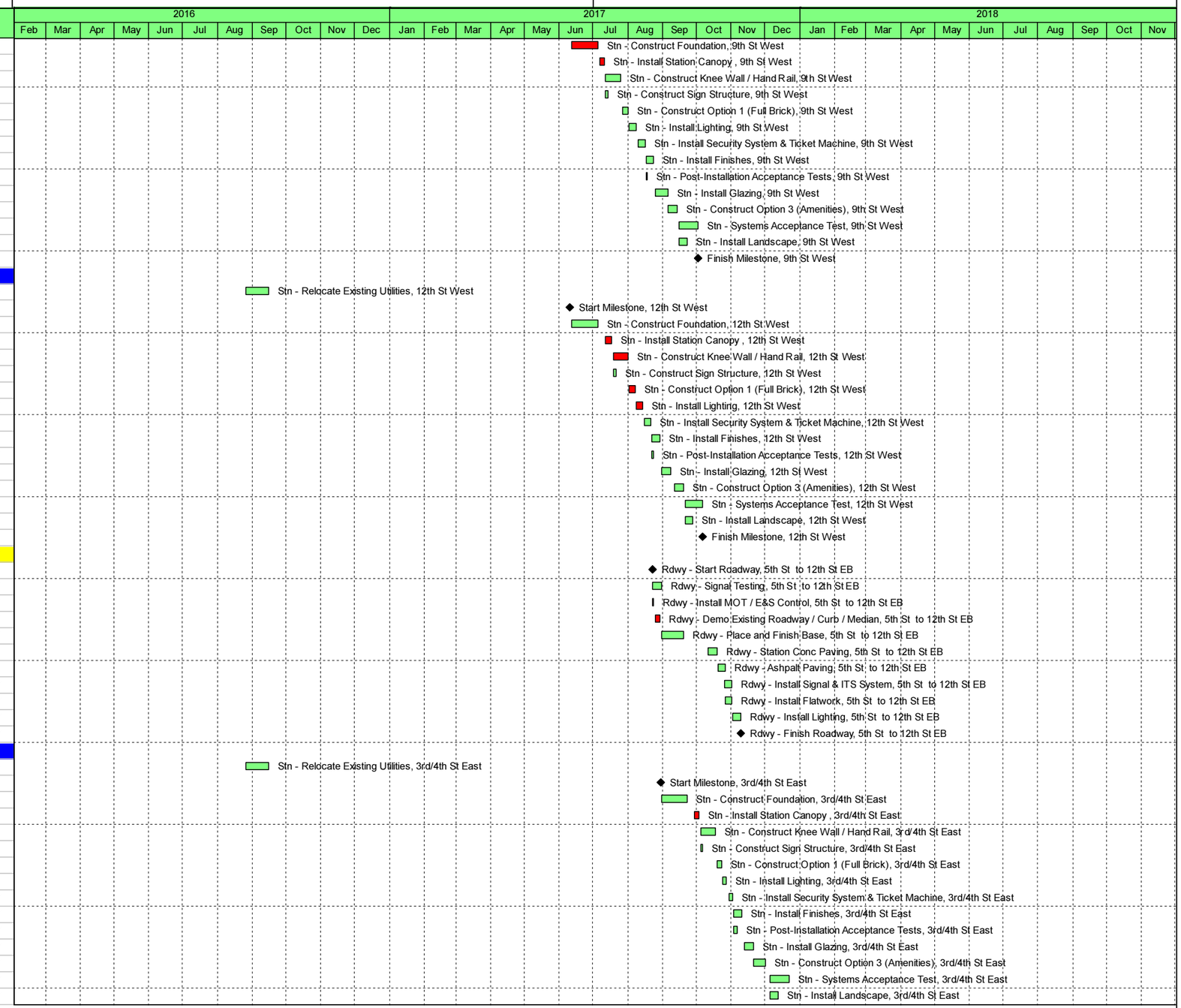
Activity ID	Activity Name	Original Duration	Start	Finish
C008W1020	Stn - Install Station Canopy , Allison West	3	18-Apr-17	21-Apr-17
C008W1010	Stn - Construct Knee Wall / Hand Rail, Allison West	7	24-Apr-17	03-May-17
C008W1030	Stn - Construct Sign Structure, Allison West	2	24-Apr-17	25-Apr-17
C008W1090	Stn - Construct Option 1 (Full Brick), Allison West	3	05-May-17	10-May-17
C008W1070	Stn - Install Lighting, Allison West	4	11-May-17	16-May-17
C008W1080	Stn - Install Security System & Ticket Machine, Allison West	4	17-May-17	23-May-17
C008W1060	Stn - Install Finishes, Allison West	5	25-May-17	02-Jun-17
C008W1120	Stn - Post-Installation Acceptance Tests, Allison West	2	25-May-17	26-May-17
C008W1050	Stn - Install Glazing, Allison West	5	05-Jun-17	13-Jun-17
C008W1100	Stn - Construct Option 3 (Amenities), Allison West	5	14-Jun-17	23-Jun-17
C008W1110	Stn - Systems Acceptance Test, Allison West	10	26-Jun-17	14-Jul-17
C008W2020	Stn - Install Landscape, Allison West	5	26-Jun-17	05-Jul-17
C008W2010	Finish Milestone, Allison West	0		14-Jul-17
Station - Robinsons East		**61**	**04-Mar-17**	**30-Jun-17**
C006E2000	Start Milestone, Robinsons East	0	04-Mar-17	
C006E1000	Stn - Construct Foundation, Robinsons East	12	07-Mar-17	28-Mar-17
C006E1020	Stn - Install Station Canopy , Robinsons East	3	04-Apr-17	07-Apr-17
C006E1010	Stn - Construct Knee Wall / Hand Rail, Robinsons East	7	12-Apr-17	24-Apr-17
C006E1030	Stn - Construct Sign Structure, Robinsons East	2	12-Apr-17	13-Apr-17
C006E1090	Stn - Construct Option 1 (Full Brick), Robinsons East	3	25-Apr-17	28-Apr-17
C006E1070	Stn - Install Lighting, Robinsons East	4	01-May-17	05-May-17
C006E1080	Stn - Install Security System & Ticket Machine, Robinsons	4	08-May-17	12-May-17
C006E1060	Stn - Install Finishes, Robinsons East	5	15-May-17	22-May-17
C006E1120	Stn - Post-Installation Acceptance Tests, Robinsons East	2	15-May-17	16-May-17
C006E1050	Stn - Install Glazing, Robinsons East	5	23-May-17	01-Jun-17
C006E1100	Stn - Construct Option 3 (Amenities), Robinsons East	5	02-Jun-17	12-Jun-17
C006E1110	Stn - Systems Acceptance Test, Robinsons East	10	13-Jun-17	30-Jun-17
C006E2020	Stn - Install Landscape, Robinsons East	5	13-Jun-17	22-Jun-17
C006E2010	Finish Milestone, Robinsons East	0		30-Jun-17
Station - Robinsons West		**64**	**04-Mar-17**	**10-Jul-17**
C007W2000	Start Milestone, Robinsons West	0	04-Mar-17	
C007W1000	Stn - Construct Foundation, Robinsons West	12	07-Mar-17	28-Mar-17
C007W1020	Stn - Install Station Canopy , Robinsons West	3	12-Apr-17	17-Apr-17
C007W1010	Stn - Construct Knee Wall / Hand Rail, Robinsons West	7	18-Apr-17	28-Apr-17
C007W1030	Stn - Construct Sign Structure, Robinsons West	2	18-Apr-17	19-Apr-17
C007W1090	Stn - Construct Option 1 (Full Brick), Robinsons West	3	01-May-17	03-May-17
C007W1070	Stn - Install Lighting, Robinsons West	4	05-May-17	11-May-17
C007W1080	Stn - Install Security System & Ticket Machine, Robinsons	4	12-May-17	17-May-17
C007W1060	Stn - Install Finishes, Robinsons West	5	19-May-17	26-May-17
C007W1120	Stn - Post-Installation Acceptance Tests, Robinsons West	2	19-May-17	22-May-17
C007W1050	Stn - Install Glazing, Robinsons West	5	31-May-17	07-Jun-17
C007W1100	Stn - Construct Option 3 (Amenities), Robinsons West	5	09-Jun-17	16-Jun-17
C007W1110	Stn - Systems Acceptance Test, Robinsons West	10	19-Jun-17	10-Jul-17
C007W2020	Stn - Install Landscape, Robinsons West	5	19-Jun-17	27-Jun-17
C007W2010	Finish Milestone, Robinsons West	0		10-Jul-17
Group 3 - 4th St. to 12th St. WB		**212**	**26-Aug-16**	**06-Oct-17**
C300R1000	Rdwy - Start Roadway, 5th St to 12th St WB	0	02-Jun-17	
C300R1010	Rdwy - Signal Testing, 5th St to 12th St WB	5	02-Jun-17	12-Jun-17
C300R1020	Rdwy - Install MOT / E&S Control, 5th St to 12th St WB	1	02-Jun-17	02-Jun-17
C300R1030	Rdwy - Demo Existing Roadway / Curb / Median, 5th St to	3	05-Jun-17	09-Jun-17
C300R1040	Rdwy - Place and Finish Base, 5th St to 12th St WB	10	12-Jun-17	28-Jun-17
C300R1070	Rdwy - Station Conc Paving, 5th St to 12th St WB	5	19-Jul-17	27-Jul-17
C300R1060	Rdwy - Ashpalt Paving, 5th St to 12th St WB	3	28-Jul-17	01-Aug-17
C300R1050	Rdwy - Install Flatwork, 5th St to 12th St WB	4	02-Aug-17	08-Aug-17
C300R1090	Rdwy - Install Signal & ITS System, 5th St to 12th St WB	5	10-Aug-17	17-Aug-17
C300R1100	Rdwy - Install Lighting, 5th St to 12th St WB	5	16-Aug-17	22-Aug-17
C300R1110	Rdwy - Finish Roadway, 5th St to 12th St WB	0		22-Aug-17
9th St West		**58**	**10-Jun-17**	**02-Oct-17**
C017W2000	Start Milestone, 9th St West	0	10-Jun-17	



Remaining Level of Effort | Remaining Work | ◆ Milestone
Actual Work | Critical Remaining Work

LANE

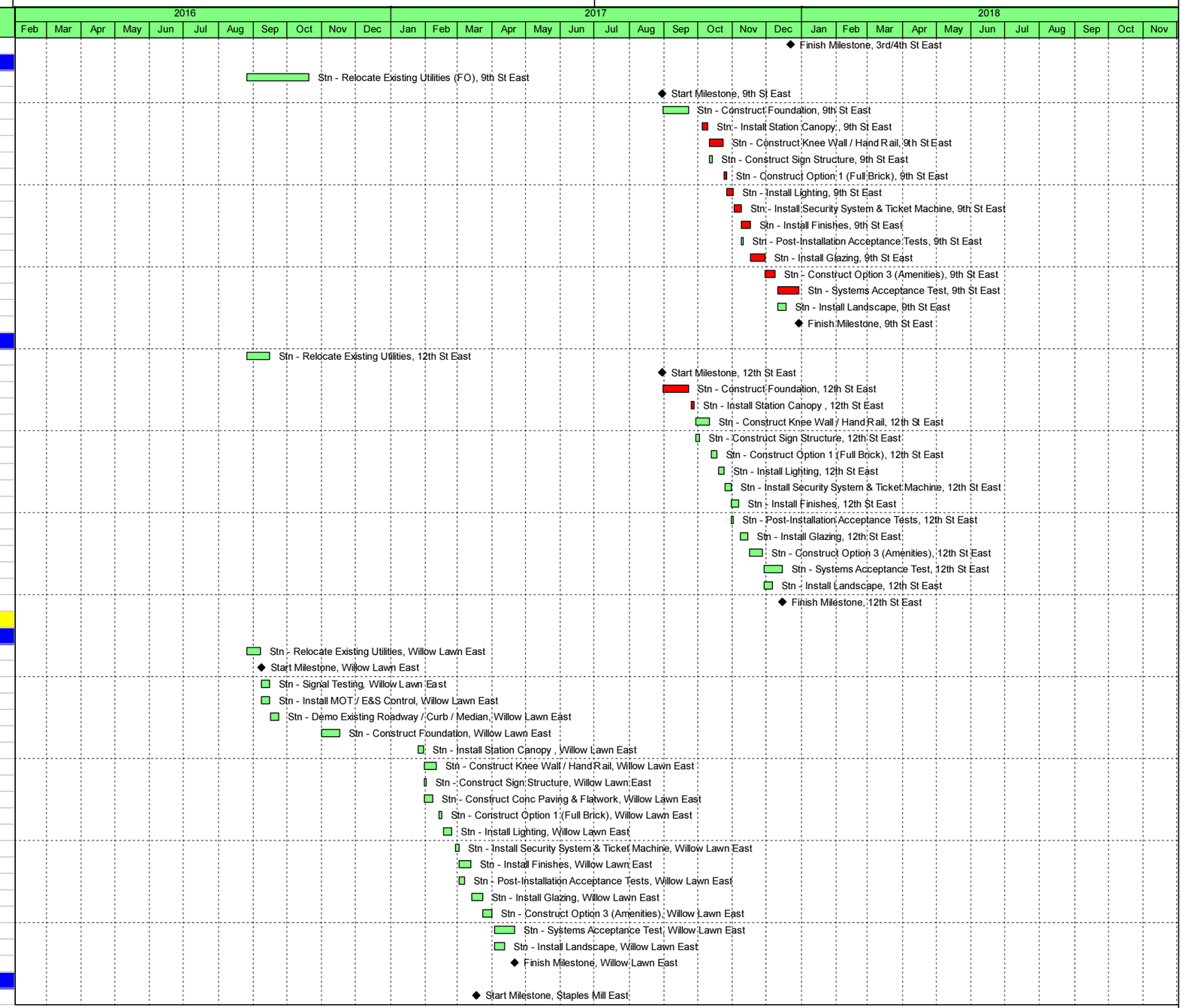
Activity ID	Activity Name	Original Duration	Start	Finish
C017W1000	Stn - Construct Foundation, 9th St West	12	12-Jun-17	05-Jul-17
C017W1020	Stn - Install Station Canopy , 9th St West	3	07-Jul-17	11-Jul-17
C017W1010	Stn - Construct Knee Wall / Hand Rail, 9th St West	7	12-Jul-17	25-Jul-17
C017W1030	Stn - Construct Sign Structure, 9th St West	2	12-Jul-17	14-Jul-17
C017W1090	Stn - Construct Option 1 (Full Brick), 9th St West	3	27-Jul-17	01-Aug-17
C017W1070	Stn - Install Lighting, 9th St West	4	02-Aug-17	08-Aug-17
C017W1080	Stn - Install Security System & Ticket Machine, 9th St West	4	10-Aug-17	16-Aug-17
C017W1060	Stn - Install Finishes, 9th St West	5	17-Aug-17	23-Aug-17
C017W1120	Stn - Post-Installation Acceptance Tests, 9th St West	2	17-Aug-17	18-Aug-17
C017W1050	Stn - Install Glazing, 9th St West	5	25-Aug-17	05-Sep-17
C017W1100	Stn - Construct Option 3 (Amenities), 9th St West	5	06-Sep-17	13-Sep-17
C017W1110	Stn - Systems Acceptance Test, 9th St West	10	15-Sep-17	02-Oct-17
C017W2020	Stn - Install Landscape, 9th St West	5	15-Sep-17	22-Sep-17
C017W2010	Finish Milestone, 9th St West	0		02-Oct-17
12th St West		**212**	**26-Aug-16**	**06-Oct-17**
C018W2020	Stn - Relocate Existing Utilities, 12th St West	10	26-Aug-16	15-Sep-16
C018W2000	Start Milestone, 12th St West	0	10-Jun-17	
C018W1000	Stn - Construct Foundation, 12th St West	12	12-Jun-17	05-Jul-17
C018W1020	Stn - Install Station Canopy , 12th St West	3	12-Jul-17	17-Jul-17
C018W1010	Stn - Construct Knee Wall / Hand Rail, 12th St West	7	19-Jul-17	01-Aug-17
C018W1030	Stn - Construct Sign Structure, 12th St West	2	19-Jul-17	21-Jul-17
C018W1090	Stn - Construct Option 1 (Full Brick), 12th St West	3	02-Aug-17	07-Aug-17
C018W1070	Stn - Install Lighting, 12th St West	4	08-Aug-17	14-Aug-17
C018W1080	Stn - Install Security System & Ticket Machine, 12th St We	4	16-Aug-17	21-Aug-17
C018W1060	Stn - Install Finishes, 12th St West	5	22-Aug-17	29-Aug-17
C018W1120	Stn - Post-Installation Acceptance Tests, 12th St West	2	22-Aug-17	23-Aug-17
C018W1050	Stn - Install Glazing, 12th St West	5	31-Aug-17	08-Sep-17
C018W1100	Stn - Construct Option 3 (Amenities), 12th St West	5	11-Sep-17	19-Sep-17
C018W1110	Stn - Systems Acceptance Test, 12th St West	10	21-Sep-17	06-Oct-17
C018W2030	Stn - Install Landscape, 12th St West	5	21-Sep-17	27-Sep-17
C018W2010	Finish Milestone, 12th St West	0		06-Oct-17
Group 4 - 4th St. to 12 St. EB		**256**	**26-Aug-16**	**29-Dec-17**
C400R1000	Rdwy - Start Roadway, 5th St to 12th St EB	0	23-Aug-17	
C400R1010	Rdwy - Signal Testing, 5th St to 12th St EB	5	23-Aug-17	31-Aug-17
C400R1020	Rdwy - Install MOT / E&S Control, 5th St to 12th St EB	1	23-Aug-17	23-Aug-17
C400R1030	Rdwy - Demo Existing Roadway / Curb / Median, 5th St to	3	25-Aug-17	29-Aug-17
C400R1050	Rdwy - Place and Finish Base, 5th St to 12th St EB	10	31-Aug-17	19-Sep-17
C400R1080	Rdwy - Station Conc Paving, 5th St to 12th St EB	5	11-Oct-17	19-Oct-17
C400R1070	Rdwy - Ashpalt Paving, 5th St to 12th St EB	5	20-Oct-17	26-Oct-17
C400R1100	Rdwy - Install Signal & ITS System, 5th St to 12th St EB	5	26-Oct-17	01-Nov-17
C400R1060	Rdwy - Install Flatwork, 5th St to 12th St EB	4	27-Oct-17	01-Nov-17
C400R1110	Rdwy - Install Lighting, 5th St to 12th St EB	5	02-Nov-17	09-Nov-17
C400R1120	Rdwy - Finish Roadway, 5th St to 12th St EB	0		09-Nov-17
3rd/4th St East		**253**	**26-Aug-16**	**22-Dec-17**
C015E1040	Stn - Relocate Existing Utilities, 3rd/4th St East	10	26-Aug-16	15-Sep-16
C015E2000	Start Milestone, 3rd/4th St East	0	30-Aug-17	
C015E1000	Stn - Construct Foundation, 3rd/4th St East	12	31-Aug-17	22-Sep-17
C015E1020	Stn - Install Station Canopy , 3rd/4th St East	3	29-Sep-17	03-Oct-17
C015E1010	Stn - Construct Knee Wall / Hand Rail, 3rd/4th St East	7	05-Oct-17	17-Oct-17
C015E1030	Stn - Construct Sign Structure, 3rd/4th St East	2	05-Oct-17	06-Oct-17
C015E1090	Stn - Construct Option 1 (Full Brick), 3rd/4th St East	3	19-Oct-17	23-Oct-17
C015E1070	Stn - Install Lighting, 3rd/4th St East	4	24-Oct-17	27-Oct-17
C015E1080	Stn - Install Security System & Ticket Machine, 3rd/4th St E	4	30-Oct-17	02-Nov-17
C015E1060	Stn - Install Finishes, 3rd/4th St East	5	03-Nov-17	10-Nov-17
C015E1120	Stn - Post-Installation Acceptance Tests, 3rd/4th St East	2	03-Nov-17	06-Nov-17
C015E1050	Stn - Install Glazing, 3rd/4th St East	5	13-Nov-17	20-Nov-17
C015E1100	Stn - Construct Option 3 (Amenities), 3rd/4th St East	5	21-Nov-17	01-Dec-17
C015E1110	Stn - Systems Acceptance Test, 3rd/4th St East	10	05-Dec-17	22-Dec-17
C015E2020	Stn - Install Landscape, 3rd/4th St East	5	05-Dec-17	12-Dec-17



Remaining Level of Effort | Remaining Work | ◆ Milestone
Actual Work | Critical Remaining Work

LANE

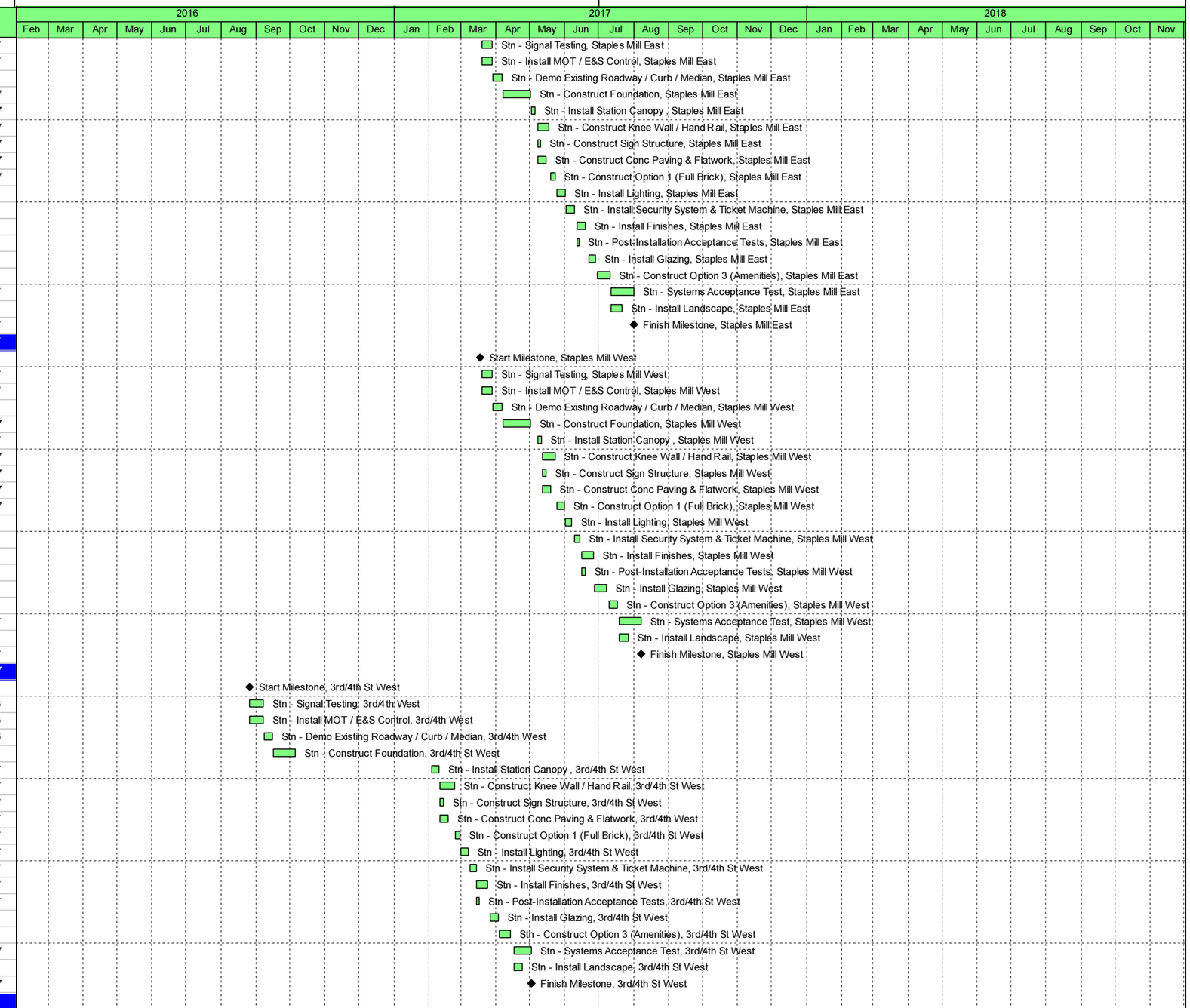
Activity ID	Activity Name	Original Duration	Start	Finish
C015E2010	Finish Milestone, 3rd/4th St East	0		22-Dec-17
9th St East		**256**	**26-Aug-16**	**29-Dec-17**
C016E2020	Stn - Relocate Existing Utilities (FO), 9th St East	30	26-Aug-16	20-Oct-16
C016E2000	Start Milestone, 9th St East	0	30-Aug-17	
C016E1000	Stn - Construct Foundation, 9th St East	12	31-Aug-17	22-Sep-17
C016E1020	Stn - Install Station Canopy , 9th St East	3	05-Oct-17	09-Oct-17
C016E1010	Stn - Construct Knee Wall / Hand Rail, 9th St East	7	11-Oct-17	23-Oct-17
C016E1030	Stn - Construct Sign Structure, 9th St East	2	11-Oct-17	13-Oct-17
C016E1090	Stn - Construct Option 1 (Full Brick), 9th St East	3	24-Oct-17	26-Oct-17
C016E1070	Stn - Install Lighting, 9th St East	4	27-Oct-17	01-Nov-17
C016E1080	Stn - Install Security System & Ticket Machine, 9th St East	4	02-Nov-17	08-Nov-17
C016E1060	Stn - Install Finishes, 9th St East	5	09-Nov-17	16-Nov-17
C016E1120	Stn - Post-Installation Acceptance Tests, 9th St East	2	09-Nov-17	10-Nov-17
C016E1050	Stn - Install Glazing, 9th St East	5	17-Nov-17	29-Nov-17
C016E1100	Stn - Construct Option 3 (Amenities), 9th St East	5	30-Nov-17	08-Dec-17
C016E1110	Stn - Systems Acceptance Test, 9th St East	10	11-Dec-17	29-Dec-17
C016E2030	Stn - Install Landscape, 9th St East	5	11-Dec-17	18-Dec-17
C016E2010	Finish Milestone, 9th St East	0		29-Dec-17
12th St East		**250**	**26-Aug-16**	**15-Dec-17**
C019E2020	Stn - Relocate Existing Utilities, 12th St East	10	26-Aug-16	15-Sep-16
C019E2000	Start Milestone, 12th St East	0	30-Aug-17	
C019E1000	Stn - Construct Foundation, 12th St East	12	31-Aug-17	22-Sep-17
C019E1020	Stn - Install Station Canopy , 12th St East	3	25-Sep-17	27-Sep-17
C019E1010	Stn - Construct Knee Wall / Hand Rail, 12th St East	7	29-Sep-17	11-Oct-17
C019E1030	Stn - Construct Sign Structure, 12th St East	2	29-Sep-17	02-Oct-17
C019E1090	Stn - Construct Option 1 (Full Brick), 12th St East	3	13-Oct-17	17-Oct-17
C019E1070	Stn - Install Lighting, 12th St East	4	19-Oct-17	24-Oct-17
C019E1080	Stn - Install Security System & Ticket Machine, 12th St East	4	25-Oct-17	30-Oct-17
C019E1060	Stn - Install Finishes, 12th St East	5	31-Oct-17	06-Nov-17
C019E1120	Stn - Post-Installation Acceptance Tests, 12th St East	2	31-Oct-17	01-Nov-17
C019E1050	Stn - Install Glazing, 12th St East	5	08-Nov-17	14-Nov-17
C019E1100	Stn - Construct Option 3 (Amenities), 12th St East	5	16-Nov-17	27-Nov-17
C019E1110	Stn - Systems Acceptance Test, 12th St East	10	29-Nov-17	15-Dec-17
C019E2030	Stn - Install Landscape, 12th St East	5	29-Nov-17	06-Dec-17
C019E2010	Finish Milestone, 12th St East	0		15-Dec-17
Group 5 - Curb Stations		**218**	**26-Aug-16**	**19-Oct-17**
Willow Lawn East		**125**	**26-Aug-16**	**21-Apr-17**
C001E2020	Stn - Relocate Existing Utilities, Willow Lawn East	5	26-Aug-16	07-Sep-16
C001E2000	Start Milestone, Willow Lawn East	0	08-Sep-16	
C001E3000	Stn - Signal Testing, Willow Lawn East	5	08-Sep-16	15-Sep-16
C001E3010	Stn - Install MOT / E&S Control, Willow Lawn East	5	08-Sep-16	15-Sep-16
C001E3020	Stn - Demo Existing Roadway / Curb / Median, Willow Law	5	16-Sep-16	23-Sep-16
C001E1000	Stn - Construct Foundation, Willow Lawn East	12	31-Oct-16	16-Nov-16
C001E1020	Stn - Install Station Canopy , Willow Lawn East	3	25-Jan-17	30-Jan-17
C001E1010	Stn - Construct Knee Wall / Hand Rail, Willow Lawn East	7	31-Jan-17	10-Feb-17
C001E1030	Stn - Construct Sign Structure, Willow Lawn East	2	31-Jan-17	01-Feb-17
C001E3030	Stn - Construct Conc Paving & Flatwork, Willow Lawn East	5	31-Jan-17	07-Feb-17
C001E1070	Stn - Construct Option 1 (Full Brick), Willow Lawn East	3	13-Feb-17	15-Feb-17
C001E1100	Stn - Install Lighting, Willow Lawn East	4	17-Feb-17	24-Feb-17
C001E1110	Stn - Install Security System & Ticket Machine, Willow Law	4	27-Feb-17	02-Mar-17
C001E1060	Stn - Install Finishes, Willow Lawn East	5	03-Mar-17	13-Mar-17
C001E1120	Stn - Post-Installation Acceptance Tests, Willow Lawn East	2	03-Mar-17	07-Mar-17
C001E1050	Stn - Install Glazing, Willow Lawn East	5	14-Mar-17	23-Mar-17
C001E1080	Stn - Construct Option 3 (Amenities), Willow Lawn East	5	24-Mar-17	31-Mar-17
C001E1090	Stn - Systems Acceptance Test, Willow Lawn East	10	03-Apr-17	21-Apr-17
C019E2040	Stn - Install Landscape, Willow Lawn East	5	03-Apr-17	12-Apr-17
C001E2010	Finish Milestone, Willow Lawn East	0		21-Apr-17
Staples Mill East		**68**	**18-Mar-17**	**01-Aug-17**
C002E2000	Start Milestone, Staples Mill East	0	18-Mar-17	



Remaining Level of Effort | Remaining Work | ◆ Milestone
Actual Work | Critical Remaining Work

LANE

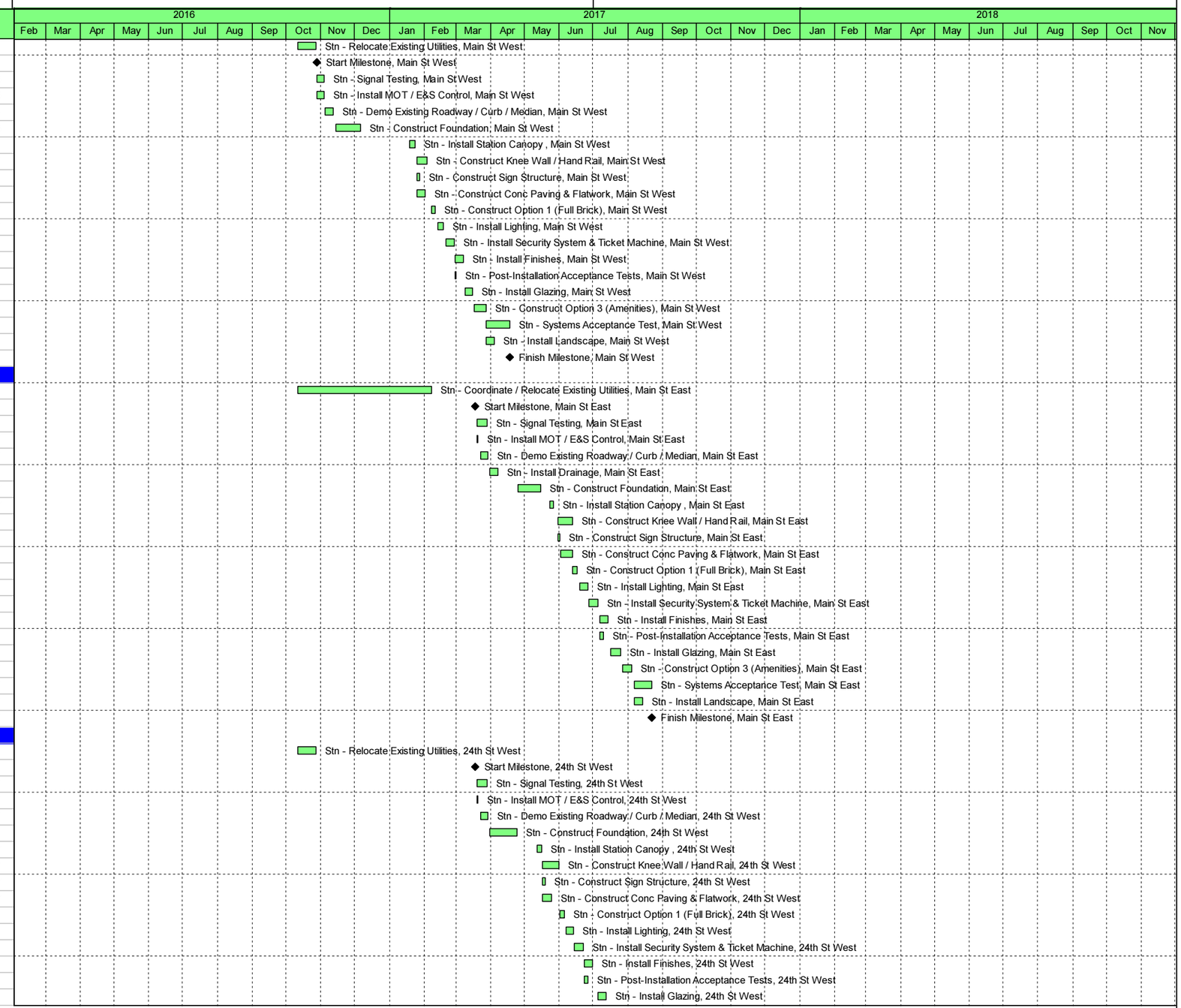
Activity ID	Activity Name	Original Duration	Start	Finish
C002E3000	Stn - Signal Testing, Staples Mill East	5	20-Mar-17	28-Mar-17
C002E3010	Stn - Install MOT / E&S Control, Staples Mill East	5	20-Mar-17	28-Mar-17
C002E3020	Stn - Demo Existing Roadway / Curb / Median, Staples Mill	5	29-Mar-17	06-Apr-17
C002E1000	Stn - Construct Foundation, Staples Mill East	12	07-Apr-17	01-May-17
C002E1020	Stn - Install Station Canopy , Staples Mill East	3	02-May-17	05-May-17
C002E1010	Stn - Construct Knee Wall / Hand Rail, Staples Mill East	7	08-May-17	17-May-17
C002E1030	Stn - Construct Sign Structure, Staples Mill East	2	08-May-17	10-May-17
C002E3030	Stn - Construct Conc Paving & Flatwork, Staples Mill East	5	08-May-17	15-May-17
C002E1090	Stn - Construct Option 1 (Full Brick), Staples Mill East	3	19-May-17	23-May-17
C002E1070	Stn - Install Lighting, Staples Mill East	4	25-May-17	01-Jun-17
C002E1080	Stn - Install Security System & Ticket Machine, Staples Mill	4	02-Jun-17	09-Jun-17
C002E1060	Stn - Install Finishes, Staples Mill East	5	12-Jun-17	19-Jun-17
C002E1120	Stn - Post-Installation Acceptance Tests, Staples Mill East	2	12-Jun-17	13-Jun-17
C002E1050	Stn - Install Glazing, Staples Mill East	5	22-Jun-17	28-Jun-17
C002E1100	Stn - Construct Option 3 (Amenities), Staples Mill East	5	30-Jun-17	11-Jul-17
C002E1110	Stn - Systems Acceptance Test, Staples Mill East	10	12-Jul-17	01-Aug-17
C002E3040	Stn - Install Landscape, Staples Mill East	5	12-Jul-17	21-Jul-17
C002E2010	Finish Milestone, Staples Mill East	0		01-Aug-17
Staples Mill West		71	18-Mar-17	07-Aug-17
C003W2000	Start Milestone, Staples Mill West	0	18-Mar-17	
C003W3000	Stn - Signal Testing, Staples Mill West	5	20-Mar-17	28-Mar-17
C003W3010	Stn - Install MOT / E&S Control, Staples Mill West	5	20-Mar-17	28-Mar-17
C003W3020	Stn - Demo Existing Roadway / Curb / Median, Staples Mill	5	29-Mar-17	06-Apr-17
C003W1000	Stn - Construct Foundation, Staples Mill West	12	07-Apr-17	01-May-17
C003W1020	Stn - Install Station Canopy , Staples Mill West	3	08-May-17	11-May-17
C003W1010	Stn - Construct Knee Wall / Hand Rail, Staples Mill West	7	12-May-17	23-May-17
C003W1030	Stn - Construct Sign Structure, Staples Mill West	2	12-May-17	15-May-17
C003W3030	Stn - Construct Conc Paving & Flatwork, Staples Mill West	5	12-May-17	19-May-17
C003W1090	Stn - Construct Option 1 (Full Brick), Staples Mill West	3	25-May-17	31-May-17
C003W1070	Stn - Install Lighting, Staples Mill West	4	01-Jun-17	07-Jun-17
C003W1080	Stn - Install Security System & Ticket Machine, Staples Mill	4	09-Jun-17	14-Jun-17
C003W1060	Stn - Install Finishes, Staples Mill West	5	16-Jun-17	26-Jun-17
C003W1120	Stn - Post-Installation Acceptance Tests, Staples Mill West	2	16-Jun-17	19-Jun-17
C003W1050	Stn - Install Glazing, Staples Mill West	5	27-Jun-17	07-Jul-17
C003W1100	Stn - Construct Option 3 (Amenities), Staples Mill West	5	10-Jul-17	17-Jul-17
C003W1110	Stn - Systems Acceptance Test, Staples Mill West	10	19-Jul-17	07-Aug-17
C003W3040	Stn - Install Landscape, Staples Mill West	5	19-Jul-17	27-Jul-17
C003W2010	Finish Milestone, Staples Mill West	0		07-Aug-17
Station - 3rd/4th St West		131	26-Aug-16	02-May-17
C014W2000	Start Milestone, 3rd/4th St West	0	26-Aug-16	
C014W2020	Stn - Signal Testing, 3rd/4th West	5	26-Aug-16	07-Sep-16
C014W2030	Stn - Install MOT / E&S Control, 3rd/4th West	5	26-Aug-16	07-Sep-16
C014W2040	Stn - Demo Existing Roadway / Curb / Median, 3rd/4th We	5	08-Sep-16	15-Sep-16
C014W1000	Stn - Construct Foundation, 3rd/4th St West	12	16-Sep-16	05-Oct-16
C014W1020	Stn - Install Station Canopy , 3rd/4th St West	3	03-Feb-17	09-Feb-17
C014W1010	Stn - Construct Knee Wall / Hand Rail, 3rd/4th St West	7	10-Feb-17	23-Feb-17
C014W1030	Stn - Construct Sign Structure, 3rd/4th St West	2	10-Feb-17	13-Feb-17
C014W2050	Stn - Construct Conc Paving & Flatwork, 3rd/4th West	5	10-Feb-17	17-Feb-17
C014W1090	Stn - Construct Option 1 (Full Brick), 3rd/4th St West	3	24-Feb-17	28-Feb-17
C014W1070	Stn - Install Lighting, 3rd/4th St West	4	01-Mar-17	07-Mar-17
C014W1080	Stn - Install Security System & Ticket Machine, 3rd/4th St W	4	09-Mar-17	14-Mar-17
C014W1060	Stn - Install Finishes, 3rd/4th St West	5	15-Mar-17	24-Mar-17
C014W1120	Stn - Post-Installation Acceptance Tests, 3rd/4th St West	2	15-Mar-17	17-Mar-17
C014W1050	Stn - Install Glazing, 3rd/4th St West	5	27-Mar-17	03-Apr-17
C014W1100	Stn - Construct Option 3 (Amenities), 3rd/4th St West	5	04-Apr-17	13-Apr-17
C014W1110	Stn - Systems Acceptance Test, 3rd/4th St West	10	17-Apr-17	02-May-17
C014W2060	Stn - Install Landscape, 3rd/4th St West	5	17-Apr-17	24-Apr-17
C014W2010	Finish Milestone, 3rd/4th St West	0		02-May-17
Main St West		98	11-Oct-16	17-Apr-17



Remaining Level of Effort | Remaining Work | ◆ Milestone
Actual Work | Critical Remaining Work

LANE

Activity ID	Activity Name	Original Duration	Start	Finish
C020W2020	Stn - Relocate Existing Utilities, Main St West	10	11-Oct-16	27-Oct-16
C020W2000	Start Milestone, Main St West	0	28-Oct-16	
C020W3000	Stn - Signal Testing, Main St West	5	28-Oct-16	03-Nov-16
C020W3010	Stn - Install MOT / E&S Control, Main St West	5	28-Oct-16	03-Nov-16
C020W3020	Stn - Demo Existing Roadway / Curb / Median, Main St We	5	04-Nov-16	11-Nov-16
C020W1000	Stn - Construct Foundation, Main St West	12	14-Nov-16	06-Dec-16
C020W1020	Stn - Install Station Canopy , Main St West	3	19-Jan-17	23-Jan-17
C020W1010	Stn - Construct Knee Wall / Hand Rail, Main St West	7	25-Jan-17	03-Feb-17
C020W1030	Stn - Construct Sign Structure, Main St West	2	25-Jan-17	27-Jan-17
C020W3030	Stn - Construct Conc Paving & Flatwork, Main St West	5	25-Jan-17	01-Feb-17
C020W1090	Stn - Construct Option 1 (Full Brick), Main St West	3	07-Feb-17	10-Feb-17
C020W1070	Stn - Install Lighting, Main St West	4	13-Feb-17	17-Feb-17
C020W1080	Stn - Install Security System & Ticket Machine, Main St We	4	20-Feb-17	27-Feb-17
C020W1060	Stn - Install Finishes, Main St West	5	28-Feb-17	07-Mar-17
C020W1120	Stn - Post-Installation Acceptance Tests, Main St West	2	28-Feb-17	01-Mar-17
C020W1050	Stn - Install Glazing, Main St West	5	09-Mar-17	15-Mar-17
C020W1100	Stn - Construct Option 3 (Amenities), Main St West	5	17-Mar-17	27-Mar-17
C020W1110	Stn - Systems Acceptance Test, Main St West	10	28-Mar-17	17-Apr-17
C020W3040	Stn - Install Landscape, Main St West	5	28-Mar-17	04-Apr-17
C020W2010	Finish Milestone, Main St West	0		17-Apr-17
Main St East		**164**	**11-Oct-16**	**22-Aug-17**
C021E3050	Stn - Coordinate / Relocate Existing Utilities, Main St East	120	11-Oct-16	07-Feb-17
C021E2000	Start Milestone, Main St East	0	18-Mar-17	
C021E3000	Stn - Signal Testing, Main St East	5	20-Mar-17	28-Mar-17
C021E3010	Stn - Install MOT / E&S Control, Main St East	1	20-Mar-17	20-Mar-17
C021E3020	Stn - Demo Existing Roadway / Curb / Median, Main St Eas	5	23-Mar-17	29-Mar-17
C021E3040	Stn - Install Drainage, Main St East	5	31-Mar-17	07-Apr-17
C021E1000	Stn - Construct Foundation, Main St East	12	25-Apr-17	15-May-17
C021E1020	Stn - Install Station Canopy , Main St East	3	23-May-17	26-May-17
C021E1010	Stn - Construct Knee Wall / Hand Rail, Main St East	7	31-May-17	12-Jun-17
C021E1030	Stn - Construct Sign Structure, Main St East	2	31-May-17	01-Jun-17
C021E3030	Stn - Construct Conc Paving & Flatwork, Main St East	5	02-Jun-17	12-Jun-17
C021E1090	Stn - Construct Option 1 (Full Brick), Main St East	3	13-Jun-17	16-Jun-17
C021E1070	Stn - Install Lighting, Main St East	4	19-Jun-17	26-Jun-17
C021E1080	Stn - Install Security System & Ticket Machine, Main St Eas	4	27-Jun-17	05-Jul-17
C021E1060	Stn - Install Finishes, Main St East	5	07-Jul-17	14-Jul-17
C021E1120	Stn - Post-Installation Acceptance Tests, Main St East	2	07-Jul-17	10-Jul-17
C021E1050	Stn - Install Glazing, Main St East	5	17-Jul-17	25-Jul-17
C021E1100	Stn - Construct Option 3 (Amenities), Main St East	5	27-Jul-17	04-Aug-17
C021E1110	Stn - Systems Acceptance Test, Main St East	10	07-Aug-17	22-Aug-17
C021E3060	Stn - Install Landscape, Main St East	5	07-Aug-17	14-Aug-17
C021E2010	Finish Milestone, Main St East	0		22-Aug-17
24th St West		**158**	**11-Oct-16**	**11-Aug-17**
C022W3040	Stn - Relocate Existing Utilities, 24th St West	10	11-Oct-16	27-Oct-16
C022W2000	Start Milestone, 24th St West	0	18-Mar-17	
C022W3000	Stn - Signal Testing, 24th St West	5	20-Mar-17	28-Mar-17
C022W3010	Stn - Install MOT / E&S Control, 24th St West	1	20-Mar-17	20-Mar-17
C022W3020	Stn - Demo Existing Roadway / Curb / Median, 24th St We	5	23-Mar-17	29-Mar-17
C022W1000	Stn - Construct Foundation, 24th St West	12	31-Mar-17	24-Apr-17
C022W1020	Stn - Install Station Canopy , 24th St West	3	12-May-17	16-May-17
C022W1010	Stn - Construct Knee Wall / Hand Rail, 24th St West	7	17-May-17	31-May-17
C022W1030	Stn - Construct Sign Structure, 24th St West	2	17-May-17	19-May-17
C022W3030	Stn - Construct Conc Paving & Flatwork, 24th St West	5	17-May-17	25-May-17
C022W1090	Stn - Construct Option 1 (Full Brick), 24th St West	3	01-Jun-17	05-Jun-17
C022W1070	Stn - Install Lighting, 24th St West	4	07-Jun-17	13-Jun-17
C022W1080	Stn - Install Security System & Ticket Machine, 24th St We	4	14-Jun-17	22-Jun-17
C022W1060	Stn - Install Finishes, 24th St West	5	23-Jun-17	30-Jun-17
C022W1120	Stn - Post-Installation Acceptance Tests, 24th St West	2	23-Jun-17	26-Jun-17
C022W1050	Stn - Install Glazing, 24th St West	5	05-Jul-17	12-Jul-17



Remaining Level of Effort | Remaining Work | ◆ Milestone
Actual Work | Critical Remaining Work

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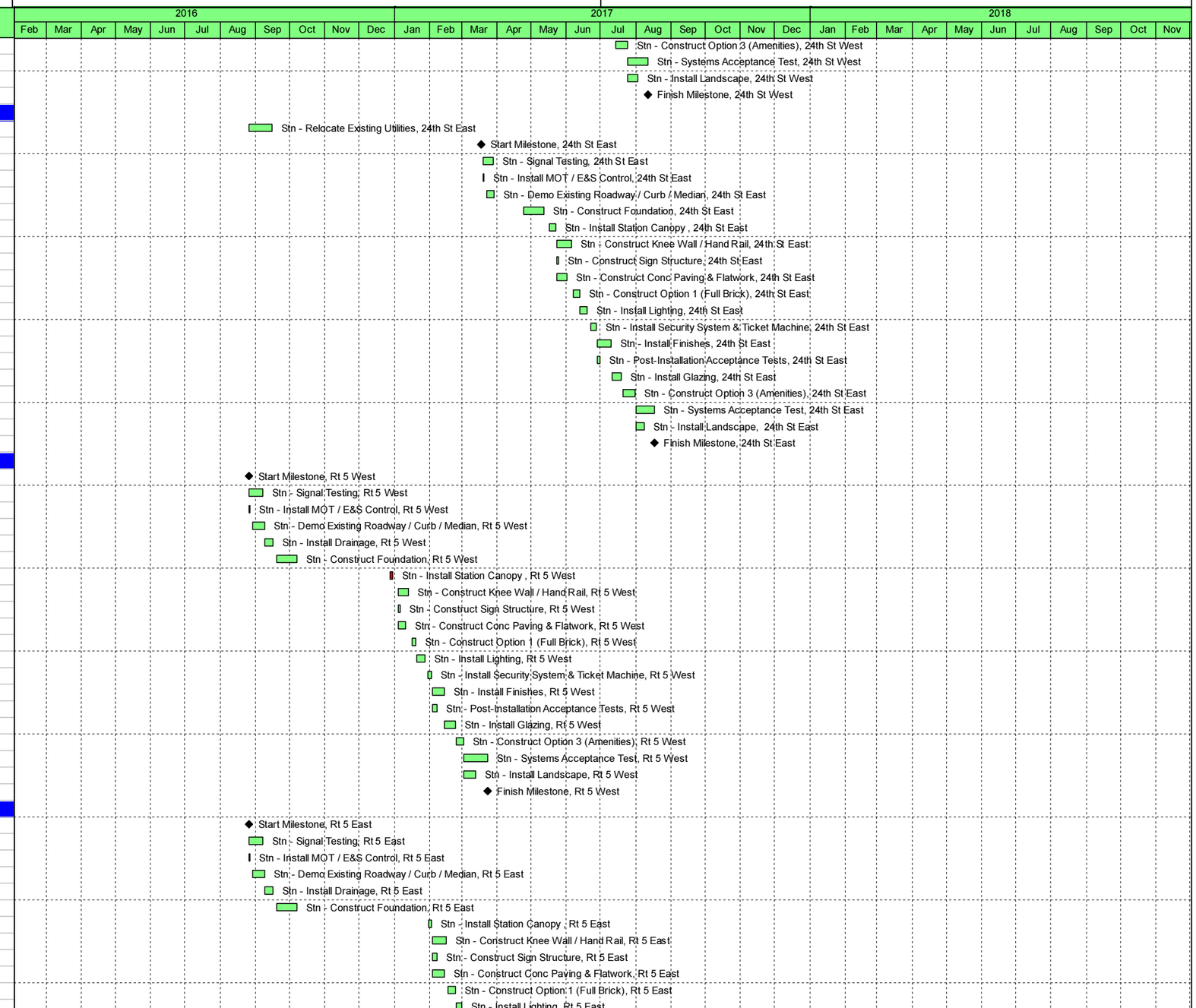
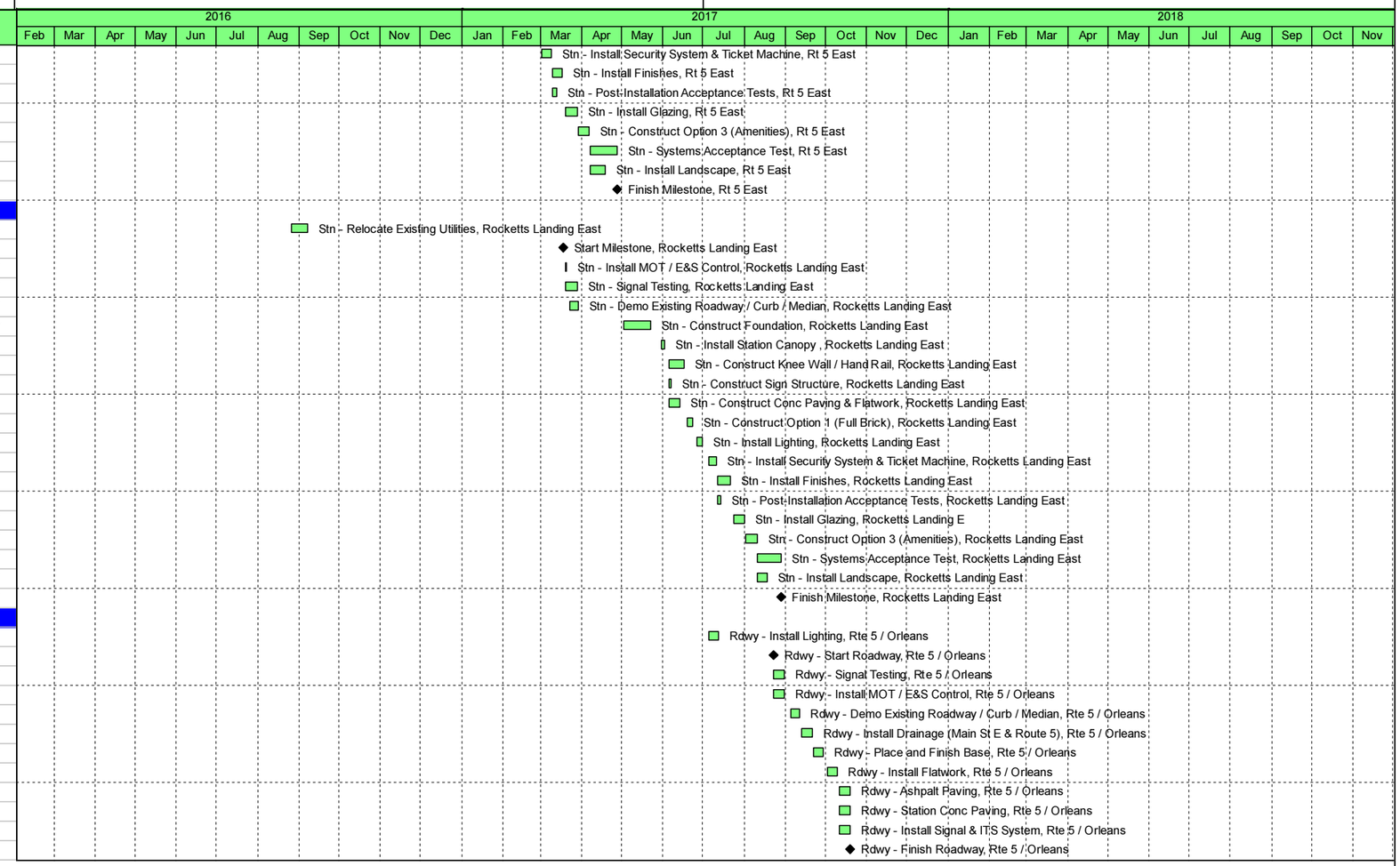
Activity ID	Activity Name	Original Duration	Start	Finish
C022W1100	Stn - Construct Option 3 (Amenities), 24th St West	5	14-Jul-17	24-Jul-17
C022W1110	Stn - Systems Acceptance Test, 24th St West	10	25-Jul-17	11-Aug-17
C022W3050	Stn - Install Landscape, 24th St West	5	25-Jul-17	02-Aug-17
C022W2010	Finish Milestone, 24th St West	0		11-Aug-17
24th St East		**185**	**26-Aug-16**	**17-Aug-17**
C023E3040	Stn - Relocate Existing Utilities, 24th St East	10	26-Aug-16	15-Sep-16
C023E2000	Start Milestone, 24th St East	0	18-Mar-17	
C023E3000	Stn - Signal Testing, 24th St East	5	20-Mar-17	28-Mar-17
C023E3010	Stn - Install MOT / E&S Control, 24th St East	1	20-Mar-17	20-Mar-17
C023E3020	Stn - Demo Existing Roadway / Curb / Median, 24th St East	5	23-Mar-17	29-Mar-17
C023E1000	Stn - Construct Foundation, 24th St East	12	24-Apr-17	12-May-17
C023E1020	Stn - Install Station Canopy , 24th St East	3	17-May-17	22-May-17
C023E1010	Stn - Construct Knee Wall / Hand Rail, 24th St East	7	23-May-17	05-Jun-17
C023E1030	Stn - Construct Sign Structure, 24th St East	2	23-May-17	25-May-17
C023E3030	Stn - Construct Conc Paving & Flatwork, 24th St East	5	23-May-17	01-Jun-17
C023E1090	Stn - Construct Option 1 (Full Brick), 24th St East	3	07-Jun-17	12-Jun-17
C023E1070	Stn - Install Lighting, 24th St East	4	13-Jun-17	19-Jun-17
C023E1080	Stn - Install Security System & Ticket Machine, 24th St East	4	22-Jun-17	27-Jun-17
C023E1060	Stn - Install Finishes, 24th St East	5	28-Jun-17	10-Jul-17
C023E1120	Stn - Post-Installation Acceptance Tests, 24th St East	2	28-Jun-17	30-Jun-17
C023E1050	Stn - Install Glazing, 24th St East	5	11-Jul-17	19-Jul-17
C023E1100	Stn - Construct Option 3 (Amenities), 24th St East	5	21-Jul-17	31-Jul-17
C023E1110	Stn - Systems Acceptance Test, 24th St East	10	01-Aug-17	17-Aug-17
C023E3050	Stn - Install Landscape, 24th St East	5	01-Aug-17	08-Aug-17
C023E2010	Finish Milestone, 24th St East	0		17-Aug-17
Rt 5 West		**110**	**26-Aug-16**	**23-Mar-17**
C025W2000	Start Milestone, Rt 5 West	0	26-Aug-16	
C025W3000	Stn - Signal Testing, Rt 5 West	5	26-Aug-16	07-Sep-16
C025W3010	Stn - Install MOT / E&S Control, Rt 5 West	1	26-Aug-16	26-Aug-16
C025W3020	Stn - Demo Existing Roadway / Curb / Median, Rt 5 West	5	29-Aug-16	08-Sep-16
C025W3040	Stn - Install Drainage, Rt 5 West	5	09-Sep-16	16-Sep-16
C025W1000	Stn - Construct Foundation, Rt 5 West	12	19-Sep-16	07-Oct-16
C025W1020	Stn - Install Station Canopy , Rt 5 West	3	28-Dec-16	30-Dec-16
C025W1010	Stn - Construct Knee Wall / Hand Rail, Rt 5 West	7	04-Jan-17	13-Jan-17
C025W1030	Stn - Construct Sign Structure, Rt 5 West	2	04-Jan-17	05-Jan-17
C025W3030	Stn - Construct Conc Paving & Flatwork, Rt 5 West	5	04-Jan-17	10-Jan-17
C025W1090	Stn - Construct Option 1 (Full Brick), Rt 5 West	3	16-Jan-17	19-Jan-17
C025W1070	Stn - Install Lighting, Rt 5 West	4	20-Jan-17	27-Jan-17
C025W1080	Stn - Install Security System & Ticket Machine, Rt 5 West	4	30-Jan-17	02-Feb-17
C025W1060	Stn - Install Finishes, Rt 5 West	5	03-Feb-17	13-Feb-17
C025W1120	Stn - Post-Installation Acceptance Tests, Rt 5 West	2	03-Feb-17	07-Feb-17
C025W1050	Stn - Install Glazing, Rt 5 West	5	14-Feb-17	23-Feb-17
C025W1100	Stn - Construct Option 3 (Amenities), Rt 5 West	5	24-Feb-17	02-Mar-17
C025W1110	Stn - Systems Acceptance Test, Rt 5 West	10	03-Mar-17	23-Mar-17
C025W3050	Stn - Install Landscape, Rt 5 West	5	03-Mar-17	13-Mar-17
C025W2010	Finish Milestone, Rt 5 West	0		23-Mar-17
Rt 5 East		**128**	**26-Aug-16**	**27-Apr-17**
C026E2000	Start Milestone, Rt 5 East	0	26-Aug-16	
C026E3000	Stn - Signal Testing, Rt 5 East	5	26-Aug-16	07-Sep-16
C026E3010	Stn - Install MOT / E&S Control, Rt 5 East	1	26-Aug-16	26-Aug-16
C026E3020	Stn - Demo Existing Roadway / Curb / Median, Rt 5 East	5	29-Aug-16	08-Sep-16
C025E1000	Stn - Install Drainage, Rt 5 East	5	09-Sep-16	16-Sep-16
C026E1000	Stn - Construct Foundation, Rt 5 East	12	19-Sep-16	07-Oct-16
C026E1020	Stn - Install Station Canopy , Rt 5 East	3	31-Jan-17	02-Feb-17
C026E1010	Stn - Construct Knee Wall / Hand Rail, Rt 5 East	7	03-Feb-17	15-Feb-17
C026E1030	Stn - Construct Sign Structure, Rt 5 East	2	03-Feb-17	07-Feb-17
C026E3030	Stn - Construct Conc Paving & Flatwork, Rt 5 East	5	03-Feb-17	13-Feb-17
C026E1090	Stn - Construct Option 1 (Full Brick), Rt 5 East	3	17-Feb-17	23-Feb-17
C026E1070	Stn - Install Lighting, Rt 5 East	4	24-Feb-17	01-Mar-17



Remaining Level of Effort | Remaining Work | ◆ Milestone
Actual Work | Critical Remaining Work

LANE

Activity ID	Activity Name	Original Duration	Start	Finish
C026E1080	Stn - Install Security System & Ticket Machine, Rt 5 East	4	02-Mar-17	09-Mar-17
C026E1060	Stn - Install Finishes, Rt 5 East	5	10-Mar-17	17-Mar-17
C026E1120	Stn - Post-Installation Acceptance Tests, Rt 5 East	2	10-Mar-17	13-Mar-17
C026E1050	Stn - Install Glazing, Rt 5 East	5	20-Mar-17	28-Mar-17
C026E1100	Stn - Construct Option 3 (Amenities), Rt 5 East	5	29-Mar-17	06-Apr-17
C026E1110	Stn - Systems Acceptance Test, Rt 5 East	10	07-Apr-17	27-Apr-17
C026E3040	Stn - Install Landscape, Rt 5 East	5	07-Apr-17	18-Apr-17
C026E2010	Finish Milestone, Rt 5 East	0		27-Apr-17
Rocketts Landing East		**191**	**26-Aug-16**	**28-Aug-17**
C024E2060	Stn - Relocate Existing Utilities, Rocketts Landing East	5	26-Aug-16	07-Sep-16
C024E2000	Start Milestone, Rocketts Landing East	0	18-Mar-17	
C024E2020	Stn - Install MOT / E&S Control, Rocketts Landing East	1	20-Mar-17	20-Mar-17
C024E2040	Stn - Signal Testing, Rocketts Landing East	5	20-Mar-17	28-Mar-17
C024E2030	Stn - Demo Existing Roadway / Curb / Median, Rocketts La	5	23-Mar-17	29-Mar-17
C024E1000	Stn - Construct Foundation, Rocketts Landing East	12	02-May-17	22-May-17
C024E1020	Stn - Install Station Canopy , Rocketts Landing East	3	31-May-17	02-Jun-17
C024E1010	Stn - Construct Knee Wall / Hand Rail, Rocketts Landing E	7	05-Jun-17	16-Jun-17
C024E1030	Stn - Construct Sign Structure, Rocketts Landing East	2	05-Jun-17	07-Jun-17
C024E2050	Stn - Construct Conc Paving & Flatwork, Rocketts Landing	5	05-Jun-17	13-Jun-17
C024E1090	Stn - Construct Option 1 (Full Brick), Rocketts Landing East	3	19-Jun-17	23-Jun-17
C024E1070	Stn - Install Lighting, Rocketts Landing East	4	26-Jun-17	30-Jun-17
C024E1080	Stn - Install Security System & Ticket Machine, Rocketts La	4	05-Jul-17	11-Jul-17
C024E1060	Stn - Install Finishes, Rocketts Landing East	5	12-Jul-17	21-Jul-17
C024E1120	Stn - Post-Installation Acceptance Tests, Rocketts Landing	2	12-Jul-17	14-Jul-17
C024E1050	Stn - Install Glazing, Rocketts Landing E	5	24-Jul-17	01-Aug-17
C024E1100	Stn - Construct Option 3 (Amenities), Rocketts Landing Ea	5	02-Aug-17	10-Aug-17
C024E1110	Stn - Systems Acceptance Test, Rocketts Landing East	10	11-Aug-17	28-Aug-17
C024E2070	Stn - Install Landscape, Rocketts Landing East	5	11-Aug-17	18-Aug-17
C024E2010	Finish Milestone, Rocketts Landing East	0		28-Aug-17
Route 5 / Orleans St. Roadway Work		**56**	**05-Jul-17**	**19-Oct-17**
C500R1110	Rdwy - Install Lighting, Rte 5 / Orleans	5	05-Jul-17	12-Jul-17
C500R1000	Rdwy - Start Roadway, Rte 5 / Orleans	0	23-Aug-17	
C500R1010	Rdwy - Signal Testing, Rte 5 / Orleans	5	23-Aug-17	31-Aug-17
C500R1020	Rdwy - Install MOT / E&S Control, Rte 5 / Orleans	5	23-Aug-17	31-Aug-17
C500R1030	Rdwy - Demo Existing Roadway / Curb / Median, Rte 5 / O	5	05-Sep-17	11-Sep-17
C500R1040	Rdwy - Install Drainage (Main St E & Route 5), Rte 5 / Orle	5	13-Sep-17	21-Sep-17
C500R1050	Rdwy - Place and Finish Base, Rte 5 / Orleans	5	22-Sep-17	29-Sep-17
C500R1060	Rdwy - Install Flatwork, Rte 5 / Orleans	5	02-Oct-17	09-Oct-17
C500R1070	Rdwy - Ashpalt Paving, Rte 5 / Orleans	5	11-Oct-17	19-Oct-17
C500R1080	Rdwy - Station Conc Paving, Rte 5 / Orleans	5	11-Oct-17	19-Oct-17
C500R1100	Rdwy - Install Signal & ITS System, Rte 5 / Orleans	5	11-Oct-17	19-Oct-17
C500R1120	Rdwy - Finish Roadway, Rte 5 / Orleans	0		19-Oct-17



Remaining Level of Effort | Remaining Work | ◆ Milestone
Actual Work | Critical Remaining Work

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