20 COMMUNITY MITIGATION FUND

APPENDIX H

Transportation Construction Project(s) ("TCP")
BD-20-1068-1068C-1068L-46130

Please complete the entire Application.

	City of Chelsea, MA
1.	**NAME OF MUNICIPALITY/GOVERNMENT ENTITY/DISTRICT**
	Beacham/Williams Transportation Corridor Project
2.	**PROJECT NAME (LIMIT 10 WORDS)**
	The City proposes the comprehensive reconstruction of Beacham and Williams Streets, from Spruce Street to the City's boundary with Everett. This project consists of roadway and utility reconstruction, intersection upgrades, and the installation of pedestrian and bicycle facilities. The project will mitigate adverse transportation impacts attributable to casino activities.
3.	**BRIEF PROJECT DESCRIPTION (LIMIT 50 WORDS)**
	Thomas G. Ambrosino, City Manager
4.	**NAME AND TITLE OF INDIVIDUAL AUTHORIZED TO COMMIT FUNDS ON BEHALF OF MUNICIPALITY/GOVERNMENTAL ENTITY**
	500 Broadway, Chelsea, MA 02150
5.	**ADDRESS OF INDIVIDUAL AUTHORIZED TO COMMIT FUNDS ON BEHALF OF MUNICIPALITY/ GOVERNMENTAL ENTITY**
	617-466-4100; tambrosino@chelseama.gov
6.	**PHONE # AND EMAIL ADDRESS OF INDIVIDUAL AUTHORIZED TO COMMIT FUNDS ON BEHALF OF MUNICIPALITY/GOVERNMENTAL ENTITY**
	John DePriest, Director; Alex Train, AICP, Assistant Director – Department of Planning + Development
7.	**NAME AND TITLE OF CONTRACT MANAGER RESPONSIBLE FOR HANDLING OF FUNDS ON BEHALF OF MUNICIPALITY/GOVERNMENTAL ENTITY**
	500 Broadway, Room 101, Chelsea, MA 02150
8.	**ADDRESS OF CONTRACT MANAGER RESPONSIBLE FOR HANDLING OF FUNDS ON BEHALF OF MUNICIPALITY/GOVERNMENTAL ENTITY**
	617-466-4180; jdepriest@chelseama.gov; atrain@chelseama.gov;
9.	**PHONE # AND EMAIL ADDRESS OF CONTRACT MANAGER ON BEHALF OF MUNICIPALITY/ GOVERNMENTAL ENTITY**
	Encore Boston Harbor

10. NAME OF GAMING LICENSEE

1. IMPACT DESCRIPTION

Please describe in detail the impact or potential impact that is attributed to the operation of a gaming facility that may be remediated by the proposed Transportation Construction Project (TCP). Please provide support for the determination that the operation of the gaming facility caused, is causing or otherwise may cause the impact.

Situated in close proximity to the City of Chelsea, the Encore Casino has resulted in adverse impacts to the Beacham and Williams Corridor. Traffic volumes and infrastructural deterioration, stressing a chronically overburdened roadway network, have grown noticeably since the casino opened. These conditions have exacerbated congestion, increased air emissions, delayed emergency response times, and degraded physical conditions along this corridor.

The Beacham and Williams Corridor is a gateway artery serving the casino. Spanning east to west through Chelsea, the corridor facilitates multi-modal travel between East Boston (Logan Airport), Chelsea, Everett, and points northward in the region. The land use composition includes significant industrial, commercial, and mixed uses. Notably, the New England Produce Center, the country's second largest produce terminal and a key regional employment anchor, is located on Beacham Street.

The corridor thoroughfare for employees and guests of the casino traveling via personal vehicles and shuttles. As one of the most direct routes where drivers can eschew highly congested, unreliable arterials, such as Route 1 and Route 16, the corridor has functioned as a "back entryway" to the casino. Additionally, it's the preferred route of Transportation Network Company (i.e. Uber, Lyft) vehicles, as well as other drivers wishing to circumvent the tolls present on Route 1 and the Boston Harbor Tunnels. The corridor also provides the sole bicycle connection between East Boston, Chelsea, and Everett

A designated freight route, the corridor is relied upon by vendors, contractors, and delivery drivers destined for the casino, as well as freight associated with the surrounding industrial and commercial uses. Because of continuous heavy truck traffic, this gateway corridor is unsafe and in disrepair. However, the deterioration of the surface and drainage infrastructure has been accelerated by the growth of traffic attributable to casino operations.

Prior to the opening of the Encore Casino, the City suspected that casino operations may yield adverse impacts. In order to measure these impacts, the City of Chelsea developed a robust traffic monitoring program. Through this program, the City collected traffic data on Beacham Street, slightly west of Market Street, in order to capture traffic activity in the corridor. By using this location, traffic flows from northbound and southbound Route 1 exits were also captured. This location also picked up the cumulative traffic from other minor routes circulating through the City.

First, the City collected baseline data during one week in June, prior to the casino's opening date of June 23rd, 2019, for comparative assessment purposes. Then, the City gathered data for five weeks

following the opening data. Reasonably, there were expectations that a sharp uptick of casino related traffic would occur during this opening month, after which conditions would normalize. To account for this, the City again collected data during the month of October. The October data was comparatively analyzed against the June baseline data. The results of this study, as well as graphics visualizing the noted patterns, are attached to this application.

Strikingly, this independent study found that daily traffic volumes, measured as Average Daily Traffic, climbed by approximately 19%, from approximately 11,747 vehicle trips on an average day to 14,021 vehicle trips following the casino's opening. This upward trend was most pronounced during the casino's "peak hours," defined as Friday PM and Saturday PM. During Friday PM and Saturday PM, traffic volumes in the westbound direction towards the casino increased by 29% and 94% respectively. Overall, the findings reveal an impact far larger than those outlined within the Environmental Impact Reports submitted to the Executive Office of Energy and Environmental Affairs by the Wynn, MA LLC.

These trends have accelerated the deterioration of the corridor's physical condition. Furthermore, the documented increase in traffic volume stress an already heavily traveled and congested roadway while generating higher concentrations of polluting air emissions and cause major logistical disruptions to adjacent industrial and distribution businesses throughout the roadway. Operations and safety at key intersections, such as Spruce Street/Williams Street and Beacham Street/Market Street have also been negatively affected.

Overall, the physical decline of the corridor has outpaced the City's ability to extend the useful life of this asset through routine maintenance. Congestion impacts continue to degrade the surrounding industrial and commercial areas, while hampering the ability of employees of the broader region, especially those employed at the casino, to utilize the roadway in a safe and effective manner. Furthermore, these conditions have presented considerable safety issues that endanger all classes of users, while slowing emergency response time.

2. PROPOSED USE OF TRANSPORTATION CONSTRUCTION PROJECT(S) FUNDS (Please attach additional sheets/supplemental materials if necessary.)

a) Please describe how you propose to use the Transportation Construction Project(s) for transportation projects related to the gaming facility.

The City seeks $1,000,000 in Transportation Construction Project grant funds and $500,000 in Specific Impact Project grant funds to comprehensively reconstruct surface and subsurface infrastructure along Beacham and Williams Streets, from Spruce Street to the City's boundary with Everett. Previously, the City of Chelsea secured a Mass Gaming Commission grant to conduct a planning study of the Beacham/Williams corridor in 2018. The recommendations concluded within the study, such as improving the roadway for multi-modal users and addressing the impacts of surrounding developments, such as the Encore Casino, will come to fruition through the City's proposed reconstruction efforts along Beacham and Williams Street.

This project consists of full depth roadway reconstruction; the rehabilitation of the Spruce Street/Williams Street intersection, including the addition of intelligent signal systems and reconfigured approaches; the installation of sidewalks, wheelchair ramps, a multi-use path, and crossings; improvements to corridor lighting systems; the reconstruction of the corridor drainage, including drain lines, outfalls, and catch-basins; the rehabilitation of sewer and water systems (locally funded), the installation of compliant signage, pavement markings, and other traffic control devices; and the installation of street trees. For reference, an itemized scope of work and cost estimated is attached to this application, accompanied by a master plan of improvements.

The project, once constructed, will result in a rebuilt roadway designed in accordance with contemporary standards. Upon completion, the corridor will be equipped to safely and efficiently manage traffic volumes, pedestrian and bicyclist traffic, and freight activity. Furthermore, comprehensive reconstruction of the roadway, drainage system, and Spruce/Williams intersection will optimize travel, while ensuring the corridor can sustainably manage traffic associated with the Encore Boston Harbor facility.

Despite working diligently to modernize local infrastructure, the City of Chelsea possesses limited economic resources to undertake this project. As detailed in the project's budget, a funding gap of approximately $1.5 million remains. To execute this project, the City respectfully requests $1 million from the Transportation Construction Grant Program and $500,000 from the Specific Impact Grant Program. These funds will supplement a $3 million grant from the Department of Commerce's Economic Development Administration and approximately $7.3 million in local capital financing. Representing a small share of the total project cost, the funds sought from the Massachusetts Gaming Commission will be used to finance a construction contract and cover the costs associated with construction engineering services.

b) Please describe how the mitigation request will address the impact indicated.

The corridor, following reconstruction, will result in upgraded roadway and intersection infrastructure. Through a thoughtfully designed construction program, the City seeks to directly mitigate the operational, safety, and reliability impacts of the casino. By employing "complete streets" principles, the City aspires to do this in a balanced manner that serves all roadway users.

Through the proposed construction program, the corridor will be equipped to safely and efficiently manage the recent growth of traffic. New roadway surfacing will optimize travel time, reduce delays, and decrease potential damage incurred to vehicles, due to adverse roadway conditions. Once built, the new roadway will include defined lane architecture and pedestrian facilities that will improve operations and safely accommodate various roadway users. Safety deficiencies and conflicts will be addressed through the installation of pavement markings and signage. Traffic control devices will delineate traveling lanes, channelize traffic, and communicate roadway safety protocol. Streetscape enhancements, including the addition of sidewalks, a multi-use asphalt path, and street trees, will safely accommodate bicycle and pedestrian traffic and improve air quality. Furthermore, upgraded lighting will enhance roadway safety during evening hours, including the casino's peak hours, which have experienced a rise in traffic.

Congestion will be efficiently managed through the introduction of intelligent traffic signal systems at the intersection of Spruce Street/Williams Street. These systems will optimize the safe flow of traffic by responding to changes in traffic patterns. Traffic signal upgrades will be accompanied by the reconfiguration of the layout of this intersection and all approaches. Simultaneously, the intersection of Beacham Street/Market Street will be modestly upgraded. Intentionally designed to accommodate a variety of traffic, the updated intersections will ameliorate congestion and safety deficiencies. By managing congestion, as well as providing complete streets infrastructure, the adverse effects to air quality caused by traffic and idling vehicles will be mitigated in a designated environmental justice community.

Underground, the reconstruction of utilities will result in a variety of benefits. The reconstruction of the corridor's drainage will enlarge capacity of the system. The new system will allay localized flooding and maintain operations along the corridor during different weather events, thus reducing the chance of traffic delays throughout the corridor. Selective water system rehabilitation, consisting of the replacement of valves and hydrants, will enable the City's effective response to emergencies, such as vehicular crashes.

3. CONNECTION TO GAMING FACILITY

Please provide specificity/evidence that the requested funds will be used to address issues or impacts directly related to the gaming facility.

The City of Chelsea possesses the professional expertise, capacity, and professionalized administrative systems to assure the Massachusetts Gaming Commission that the funds sought will be utilized solely to address the impacts outlined in this grant application. The City has been a recipient of federal and state grants, including a Massachusetts Gaming Commission grant. It has compliantly administered these grants in conformance with all terms, conditions, and regulations.

The requested funds will be solely used to fund the reconstruction of Beacham Street and Williams Street within the specified project boundaries. The Department of Planning and Development has assembled a project management team to carry out effort. The City's assigned project management team, comprised of the Assistant Director of Planning and Development, Director of Public Works, City Engineer, and Planner/Project Manager, will implement the project on behalf of the City. The project management team is responsible for the oversight of engineering and construction activities, the management of all consultants and contractors, the management of project budgets, the enforcement of labor standards, grant administration, and engagement with all stakeholders. This project shall be carried out in compliance with all local, state, and federal regulations, including, but not limited to, all terms and conditions set forth by the Commission.

The Department of Planning and Development has commissioned the preparation of construction documents and specifications for bidding, using Weston & Sampson Engineers, following a design/engineering phase and robust stakeholder engagement activities. The City maintains various on-call and project-based professional services contracts with Weston & Sampson Engineers, a firm with deep experience in the engineering and execution of complex infrastructure projects. The City will enter into a professional services contract for construction administration and resident engineering services with Weston & Sampson Engineers. Through this contract, the firm will be tasked with the day-to-day management of the construction project, licensed site professional activities, resident engineering, and permitting compliance responsibilities, under the oversight of the City's project management team.

The construction documents and specifications will form the foundation of an Invitation for Bid to procure a construction contractor. All procurement activities shall be administered by the City's Chief Procurement Officer, through the Purchasing Department, and be conducted in accordance with M.G.L. 30B and all local, state, and federal laws. All procurement and preconstruction documentation will be transmitted to the Commission.

Throughout the project, the consulting resident engineer shall maintain a full-time presence on-site, while the consulting construction administration group shall manage construction, overseen by the City's project management team. Weekly project management meetings with all parties will be convened to track progress, ensure contractor accountability, and coordinate matters of logistics and public affairs. The contractor shall submit payment requisitions in an AIA standard template, portraying the scope and value of work complete to date. All work will be diligently overseen, tracked, and documented for Commission review. Payment invoices and narrative progress updates will be shared with the Commission on a quarterly basis.

4. BUDGET & TIMELINE

a) Please identify the amount of funding requested. Please provide a detailed scope and budget for the use of funds.

The City of Chelsea respectfully requests $1,000,000 in Transportation Construction Project funds and $500,000 in Specific Impact Project Funds. A detailed scope and budget for the use of these funds is attached to this application.

b) Please provide documentation (e.g. - invoices, proposals, estimates, etc.) adequate for the Commission to ensure that the funds will be used for the cost of the Transportation Construction Project.

The City commits that all funds will be used solely for costs associated with mitigating the adverse impacts detailed above. Specifically, the City will use funds to cover the costs of a construction contract, police details, and construction engineering services. For the Commission's review and reference, the City has attached the following documents, illustrating the specific use of the funds:

1. Draft Construction Documents
2. Draft Construction Administration/Resident Engineering Scope of Services
3. Project Timeline

c) Please provide the estimate and percentage of the costs projected to be funded from other federal, state, local, private contributions or unspent CMF Reserves. (Applicants may include contributions from gaming licensees and private contributions.) Please provide a detailed itemized estimate for each type of funding.

Please find attached:

1. Project Sources & Uses

d) Please indicate, through a commitment letter or otherwise, how such other funding will be available for the project. In the absence of a final commitment to such funding, please provide detail on any process needed to secure any non-CMF funding.

Please find appended as a cover sheet the City's commitment letter related to project financing. As described in this letter, the City has proposed the use of over $7.3 million in local capital funds in the FY'21 period, subject to City Council appropriation. Furthermore, the City has secured a $3 million construction grant from the U.S. Department of Commerce's Economic Development Administration. The City anticipates availability of all funds in FY'21.

e) Please include a detailed timetable for the TCP, including but not limited to, the timetable for planning, for securing additional funds and the timetable to implement the TCP. Construction of the TCP must commence by June 30, 2021.

Please see the attached timetable for the Transportation Construction Project. This timetable includes detailed timeframes for all project elements.

5. MEASUREMENT OF IMPACT

Please describe how you propose to measure the impact of your TCP including indicators proposed to measure results.

The City of Chelsea will employ engineering consultants to perform and analyze traffic counts after construction has concluded along Beacham and Williams Street. Furthermore, the City will comparatively evaluate pre-project and post-project crash statistics. Data generated through these efforts will be analyzed against existing data related to pre-project conditions. This analysis will allow the City to examine the efficacy of the proposed mitigation project. The physical condition and operational characteristics of the roadway and subsurface utilities will be monitored through the City's asset management program and assessed annually.

6. INTERNAL CONTROLS/ADMINISTRATION OF FUNDS

Please provide detail regarding the internal controls that will be used to ensure that funds will only be used to address the impact. If non-governmental entities will receive any funds, please describe what reporting will be required and how the applicant will remedy any misuse of funds.

The City, through its Department of Planning and Development, will utilize the funds to commission a qualified contractor to undertake the reconstruction of Beacham Street and Williams Street. The City will be aided by the Department of Public Works. In addition to a project management team that specializes in capital infrastructure planning, design, and construction, the City maintains the internal controls, expertise, and staffing necessary to attain compliance with all grant terms and applicable laws.

This project will include the procurement of a construction contract and a construction engineering contract. All procurement activities shall occur under the oversight of the City's Chief Procurement Officer subject to M.G.L. c. 30B. Under M.G.L. Ch. 30B, the City of Chelsea shall abide by the established uniform procedures of procurement when contracting for supplies, services, and real property. All contracting procedures for this project have been established adhere to all federal and state mandated internal financial and administrative controls.

This construction effort will be managed by a team of project managers, engineers, and consultants who are employed directly or externally by the City of Chelsea's Department of Planning & Development, in conjunction with the Department of Public Works. The City's consulting engineer will provide construction management services, overseen by the City. In this role, the consulting engineer providing construction administration services will manage day-to-day construction operations, address design and engineering related matters, oversee work zone layout, and assure compliance with permit conditions and contract specifications. The resident engineer assigned to the project will provide a full time presence on-site to ensure all work performed by the contractor conforms to contract drawings.

Financially, the City's organizational structure is rooted in a system of checks and balances. No one employee, nor single department, may unilaterally authorized the issuance of payment or disbursement of funds. Under City policy, approvals of invoices and disbursements of funds must be collectively approved by the Department, the Chief Procurement Officer, and the City's Auditor, to ensure conformance with professional financial practices. Copies of all procurement and preconstruction documents will be submitted to the Commission. Copies of all construction and engineering invoices will be transmitted to the Commission for verification when the City submits to the Commission its quarterly progress reports.

The City reserves the right to remedy the misuse of funds by any of its contractors through a comprehensive process of legal recourse specified in its standard contract terms and conditions. These terms and conditions will be provided to the Commission.

7. CONSULTATION WITH MASSDOT / REGIONAL TRANSIT AGENCY (RTA) / REGIONAL PLANNING AGENCY (RPA) AND NEARBY COMMUNITIES

Please provide details about the Applicant's consultation with MassDOT, the Regional Transit Agency/MBTA and the Regional Planning Agency serving the community, and nearby communities to determine the potential for cooperative regional efforts regarding transportation construction activities.

The City of Chelsea sought and received support for this project from multiple local, state-wide, and federal entities.

The Economic Development Agency awarded the City of Chelsea $3,000,000 in construction financing for this project, due to the economic development opportunities the project will unlock, in conjunction with the casino. The City has worked closely with the Metropolitan Area Planning Commission (MAPC) on this endeavor. The MAPC unequivocally supports the City in its pursuit to improve this important multi-modal corridor. With support from the MAPC, the City sought and obtained construction financing from the Department of Commerce's Economic Development Administration.

Additionally, a segment of Beacham St. traverses through the City of Everett. The City of Chelsea and the City of Everett have collaborated closely on this corridor. Everett also aims to rehabilitate their portion of Beacham St.. They are currently undertaking a 25% design process. Both cities have recently submitted a request for Transportation Improvement Program funding to the Boston MPO, potentially as a joint construction project.

The City has also coordinated with the Boston Metropolitan Planning Organization (MPO), MassDOT, and the MBTA. This project appeared as a focal point of the City's MassDOT funded Complete Streets Prioritization Plan. Additionally, the City engaged the Boston MPO Coordination with the Boston MPO to gauge the availability of funding and technical expertise to further the project. Because the Route 112 traverses a short segment of the project area, the MBTA is involved as a stakeholder in this project. Direct coordination between the City and the MBTA's bus operations and transit planning divisions occurs regularly, as the MBTA is a member of the Chelsea Transit Task Force.

8. RELEVANT EXCERPTS FROM HOST OR SURROUNDING COMMUNITY AGREEMENTS

Please describe and include excerpts from any relevant sections of any Host or Surrounding Community Agreement. Please explain how this impact was either anticipated or not anticipated in that Agreement.

The "Surrounding Community Arbitration Between Wynn, MA LLC and The City of Chelsea" filed with the Massachusetts Gaming Commission provides information on Wynn LLC's studies of five specific intersections listed in the Chelsea "Best and Final Offer". The arbitration concluded that "studies conducted by Ms. Pyke and her firm (Howard Stein Hudson) of the five specific intersections listed in the Chelsea BAFO were conducted in accordance with MEPA and accepted engineering practices, and establish that the impact posed by the Wynn casino on traffic at those intersections will, at worst, be limited. The findings of this study state that only eleven additional vehicles at Williams Street and Broadway and twelve additional vehicles at Williams Street and Spruce Street were to be expected as generated by the opening of the Encore Casino. The findings of the City of Chelsea's traffic consultants however, show significantly higher traffic volumes. Traffic counts collected in June of 2019 before the opening of the casino compared against those collected in October of 2019 after the opening of the casino show an additional 130 vehicles along Beacham Street towards the casino during Friday PM peak hours and an additional 222 vehicles towards the casino during Saturday PM Peak hours.

The findings of the City's traffic consultants conflict with the projected traffic impacts proposed by the Wynn, MA LLC's traffic consultants and calls to question the conclusion within the Chelsea-Wynn arbitration that "with regard to the three intersections as to which the impact posed is de minimis (i.e., Marginal Street/Pearl Street, Williams Street/Broadway, Williams Street/Spruce Street), it is fair and reasonable that no mitigation payment be required, as opposed to the total of $1,050,000 requested by Chelsea."

The initial funds requested by the City of Chelsea, at the time, represented a fair request from the Wynn, MA LLC in order to adequately mitigate the impacts of the opening of the casino. Given the inflation of construction, labor, engineering, and incidental costs, the actual expense of undertaking the full breadth of improvements outlined in the City's initial request are far higher today.

Funds committed under this initial arbitration have been insufficient to mitigate the impacts caused by the casino. Therefore, the City respectfully petitions the Commission for $1 million in Transportation Construction Grant Program funds and $500,000 in Specific Impact Grant Program funds to perform the reconstruction of the Beacham/Williams Corridor. Without support from the Commission in this amount, the City will be unable to effectuate the project to mitigate casino related impacts.

CERTIFICATION BY MUNICIPALITY/GOVERNMENTAL ENTITY

On behalf of the aforementioned municipality/governmental entity I hereby certify that the funds that are requested in this application will be used solely for the purposes articulated in this Application.

Thomas A. Cuffaro

1/28/20

Signature of Responsible Municipal Official/Governmental Entity | **Date**

146 Dascomb Road
Andover, MA 01810
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

TEC
The Engineering Corp

TECHNICAL MEMORANDUM

TO: Alex Train
City of Chelsea
500 Broadway
Chelsea, MA 02150

DATE: December 20, 2019

FROM: Elizabeth Oltman, PE

PROJECT NO.: T0910

RE: Traffic Volume Monitoring Phase 2
Beacham Street, Chelsea, MA

INTRODUCTION

The City of Chelsea has retained TEC, Inc. (TEC) to provide traffic engineering services to conduct traffic volume counts at a strategic location within the City of Chelsea to determine the impact of the opening of the Encore Boston Harbor Casino in neighboring City of Everett on the City of Chelsea street system.

The location determined to best capture vehicles accessing the Casino using City of Chelsea streets was Beacham Street, west of Market Street. Beacham Street to the west of Market Street captures vehicles traveling toward the Casino from Route 1, both northbound via a direct exit and southbound via Carter Street and Spruce Street. Beacham Street also captures the cumulative traffic from other minor routes circulating through the City. For the purposes of this report, the westbound (WB) direction, toward the Casino, was specifically examined as well as the total volume at each location.

TEC conducted traffic volume counts at this location for six weeks within June and July of 2019 to determine baseline traffic volumes and early traffic impacts of the Casino opening. Week 1 (June 17-23, 2019) is considered the "baseline" for the roadway traffic volumes, as these volumes were recorded prior to the Casino opening on Sunday, June 23, 2019, at the end of Week 1.

Within the initial analyses, summarized in TEC's memorandum dated August 16, 2019, TEC found that, overall, the traffic volumes Monday through Saturday increased significantly during Week 2 (immediately after the grand opening), significantly decreased during Week 3 (4th of July week), and then plateaued at levels above the Week 1 (June 17-23, 2019) volumes but below the Week 2 (June 24-30, 2019) volumes.

October Weeks 7-10 were recorded between Monday, September 30, 2019 and Sunday, October 27, 2019. To ensure that daily fluxuations over the month of October were taken into consideration, the average daily and peak hour volumes were calculated for October. These average October volumes were then compared with the Baseline Week 1 (June) volumes to determine the increase in traffic volumes along Beacham Street subsequent to the opening of the Casino. The recorded volumes are shown in the tables attached to this memorandum.

TEC notes that in accordance with MassDOT standards, traffic volumes are typically adjusted to average-month conditions. To evaluate the potential for seasonal fluctuation of traffic volumes on

roadways near the study area intersection, TEC reviewed historic traffic volume counts collected by MassDOT at permanent counts stations along the Tobin Bridge in Boston and Lee Burbank Highway in Revere. These published values indicated that weekday traffic volumes in June are 5 percent higher than average-month conditions and weekday traffic volumes in October are 4 percent higher than average-month conditions. Therefore, a June to October comparison is reasonable without seasonally adjusting either month.

It was determined that the Casino is anticipated to have the greatest impact during the weekend peak hour and daily time periods, as it is primarily a recreational land use. Therefore, the Friday and Saturday evening peak hours and daily volumes were specifically analyzed to determine any increase in traffic volumes between Baseline Week 1 (June) and the Weeks 7-10 (October) average volumes. To provide an overall analysis of the week, the overall Average Daily Traffic (ADT) for the week was also compared between June and October. Graphics illustrating the overall volume trends for the Friday daily, Saturday daily and ADT are attached.

Beacham Street Summary

The Beacham Street location is close to the Encore Boston Harbor Casino and was therefore determined to be the most likely to have a significant change in traffic volumes upon its opening. Beacham Street captures the culmination of vehicles traveling toward the Casino from Route 1, Carter Street, Spruce Street, Williams Street and other minor routes circulating through the City. Table 1 details the peak hour and daily volume comparison between the Baseline June Week 1 volumes and the October Weeks 7-10 average volumes at Beacham Street.

Table 1 – Beacham Street June to October Comparison

Time Period	June Baseline Volumes		October Average Volumes		Difference	
	WB	Total (EB+WB)	WB	Total (EB+WB)	WB	Total (EB+WB)
Friday PM Peak Hour	443	1,116	573	1,191	+29%	+7%
Friday Daily	7,194	13,760	8,796	16,100	+22%	+17%
Saturday PM Peak Hour	237	495	459	934	+94%	+89%
Saturday Daily	4,562	10,054	7,408	13,611	+62%	+35%
Average Daily Traffic	**6,476**	**11,747**	**7,675**	**14,021**	**+19%**	**+19%**

A review of Table 1 indicates that in all time periods studied, the October volumes are significantly higher than recorded in June. The Saturday evening peak hour shows a 94% increase in the westbound direction (toward the Casino) and 89% increase overall. The total Friday daily and Saturday daily volumes increased by 17% and 35%, respectively. Overall, the ADT at the Beacham Street location increased by 19% from June to October.

Conclusion

Beacham Street is significantly impacted by the addition of new Casino traffic, with an ADT increase of 19% from June to October. This may indicate that visitors to the Casino are using multiple different routes to reach the Casino through the City of Chelsea street system. Beacham Street may also be a primary employee route toward the Casino, since employees would be more familiar with local circuitous routes to access the Casino rather than using Route 99 (Alford Street / Broadway in the City of Everett). TEC therefore concludes that the 19% increase in traffic volume recorded along Beacham Street at the study location may represent a cumulation of smaller traffic volume increases throughout the City of Chelsea street system at the final vehicular approach to the Casino.

Comparison of October Volumes to Baseline Week 1

Beacham Street Westbound

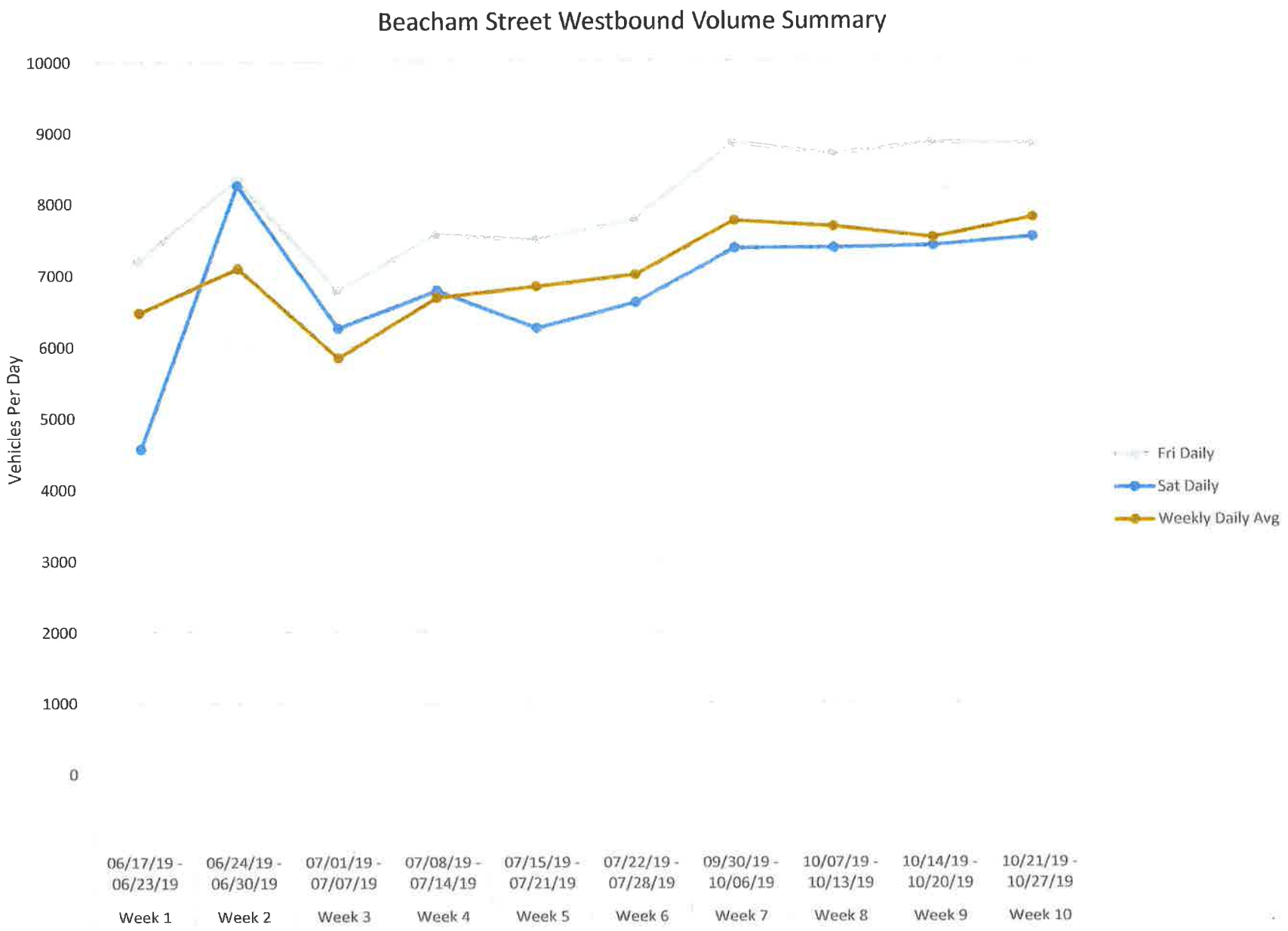
	Week 1 06/17/19 - 06/23/19	Week 7 09/30/19 - 10/06/19	Week 8 10/07/19 - 10/13/19	Week 9 10/14/19 - 10/20/19	Week 10 10/21/19 - 10/27/19	
	Site A WB	Site A WB	Site A WB	Site A WB	Site A WB	Average % Difference
Mon-Wed PM Peak	428	538	503	519	562	23.95%
Mon-Wed Daily Avg	6899	8090	7907	7585	8143	14.97%
Thurs PM Peak	443	582	563	520	608	28.27%
Thurs Daily	6710	8302	8200	7979	8522	22.96%
Fri PM Peak	443	565	581	582	564	29.35%
Fri Daily	7194	8842	8683	8838	8822	22.27%
Sat PM Peak	237	455	462	436	483	93.67%
Sat Daily	4562	7365	7364	7394	7508	62.38%
Sun PM Peak	522	387	423	374	368	-25.67%
Sun Daily	6167	5448	5681	5575	5207	-11.18%
Weekly Daily Avg	6476	7747	7664	7506	7784	18.52%

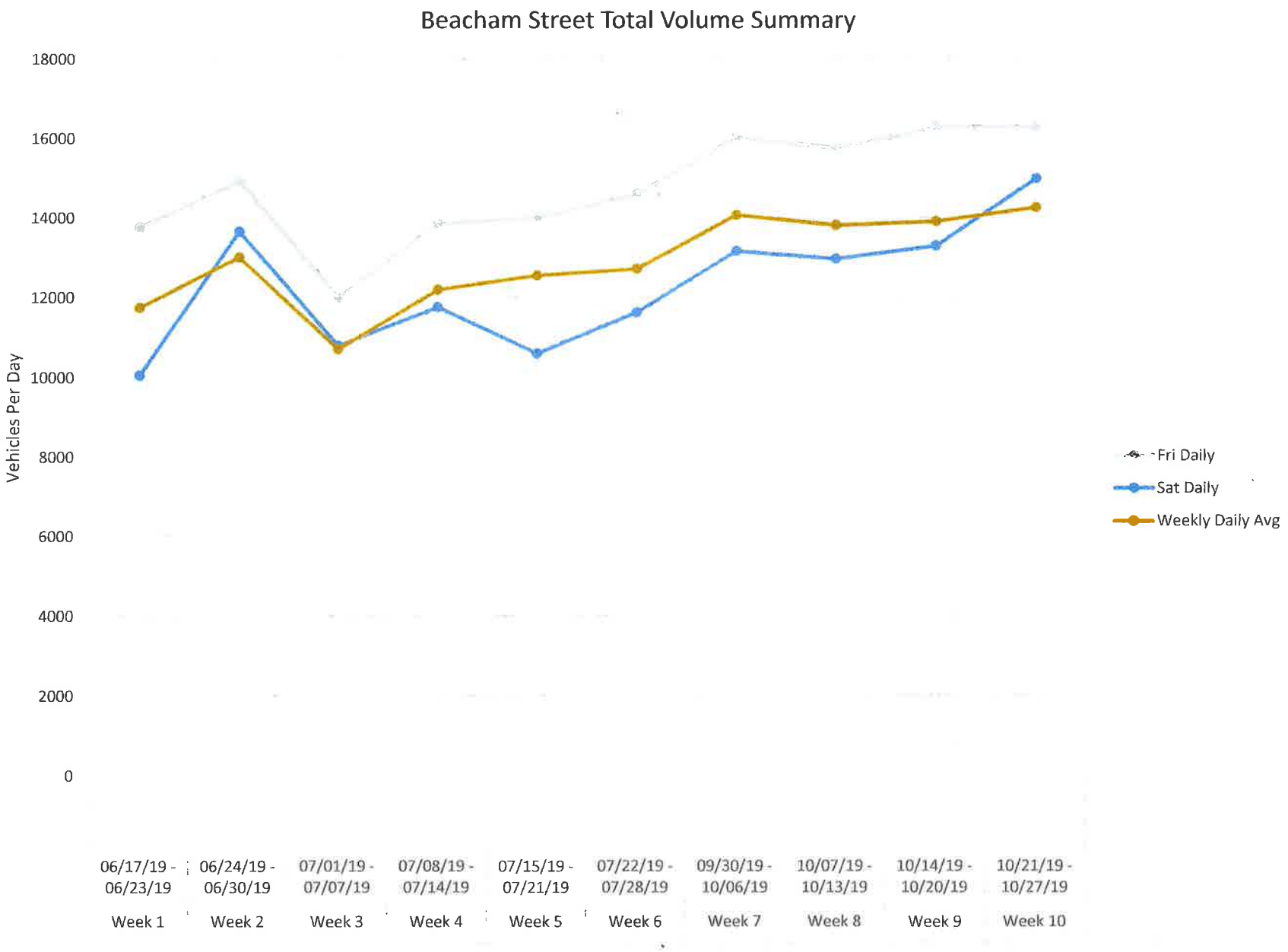
Site A: Beacham St
west of Market St
Site B: Williams St
west of Pearl St

Beacham Street Total

	Week 1 06/17/19 - 06/23/19	Week 7 09/30/19 - 10/06/19	Week 8 10/07/19 - 10/13/19	Week 9 10/14/19 - 10/20/19	Week 10 10/21/19 - 10/27/19	
	Site A Total	Site A Total	Site A Total	Site A Total	Site A Total	Average % Difference
Mon-Wed PM Peak	982	1167	1125	1163	1193	18.37%
Mon-Wed Daily Avg	12816	14878	14218	14266	15029	13.91%
Thurs PM Peak	1041	1188	1223	1180	1316	17.84%
Thurs Daily	12426	15122	15229	15089	15990	23.59%
Fri PM Peak	1116	1163	1182	1242	1178	6.74%
Fri Daily	13760	16035	15756	16298	16311	17.01%
Sat PM Peak	495	920	846	874	1097	88.74%
Sat Daily	10054	13168	12972	13307	14997	35.38%
Sun PM Peak	796	680	838	739	685	-7.60%
Sun Daily	9952	9548	10121	9927	9251	-2.41%
Weekly Daily Avg	11747	14073	13819	13917	14273	19.35%

Site A: Beacham St
west of Market St
Site B: Williams St
west of Pearl St


Beacham Street Westbound Volume Summary
Vehicles Per Day
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
06/17/19 - 06/23/19
06/24/19 - 06/30/19
07/01/19 - 07/07/19
07/08/19 - 07/14/19
07/15/19 - 07/21/19
07/22/19 - 07/28/19
09/30/19 - 10/06/19
10/07/19 - 10/13/19
10/14/19 - 10/20/19
10/21/19 - 10/27/19
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Fri Daily
Sat Daily
Weekly Daily Avg


Beacham Street Total Volume Summary
Vehicles Per Day
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
06/17/19 - 06/23/19
Week 1
06/24/19 - 06/30/19
Week 2
07/01/19 - 07/07/19
Week 3
07/08/19 - 07/14/19
Week 4
07/15/19 - 07/21/19
Week 5
07/22/19 - 07/28/19
Week 6
09/30/19 - 10/06/19
Week 7
10/07/19 - 10/13/19
Week 8
10/14/19 - 10/20/19
Week 9
10/21/19 - 10/27/19
Week 10
Fri Daily
Sat Daily
Weekly Daily Avg

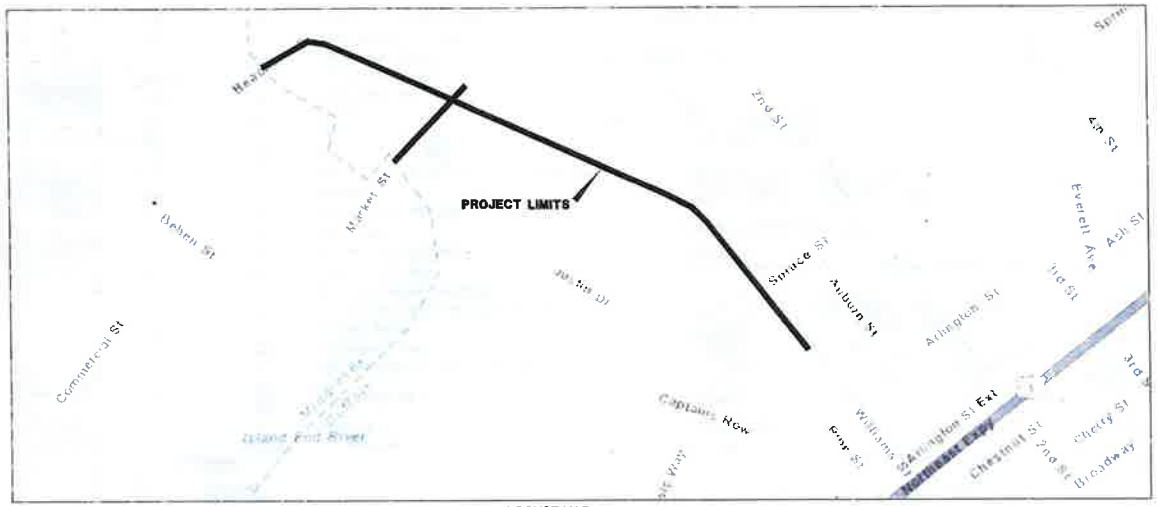
CITY OF CHELSEA, MASSACHUSETTS

BEACHAM STREET AND WILLIAMS STREET UTILITY & ROADWAY IMPROVEMENTS

DEPARTMENT OF PLANNING AND DEVELOPMENT, 500 BROADWAY, CHELSEA MA 02150

N

NAD 83



LOCUST MAP
NOT SCALE

DRAWING INDEX	
SHEET	TITLE
[illegible]	[illegible]

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

THOMAS G. AMBROSINO
CITY MANAGER

ALEXANDER TRAIN, AICP
ASSISTANT DIRECTOR OF
PLANNING AND DEVELOPMENT

JOHN DePRIEST
DIRECTOR OF PLANNING
AND DEVELOPMENT
CONTRACT NO. 2020-201
EDA AWARD NUMBER
01-01-14797

Issued Date

JANUARY 2020

EDA

COMMONWEALTH OF MASSACHUSETTS
BRUCE W. ADAMS
CIVIL
No. 35752
REGISTERED PROFESSIONAL ENGINEER

01/10/2020

Draft Print
01/17/2020 4:14:04 PM

811
Know what's below.
Call before you dig.

Issued For

DRAFT DESIGN

COPYRIGHT © 2019 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OR UTILIZATION OF THE DRAWING CONTENT BY OTHER CLIENTS, FIRMS AND ON OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

COPYRIGHT 2019 WESTON & SAMPSON

LEGEND

DESCRIPTION	EXISTING	PROPOSED
SANITARY SEWER	9"RCP	8"S PVC
FORCE MAIN	4"DI	6"W DI
WATER MAIN	16"	6"W DI
TEMPORARY WATER		4"TW
STORM DRAIN	12"CMP	15"D RCP
GAS	G	G
ELECTRIC	E	E
TELEPHONE	T	T
CIPP LINING		
SANITARY SEWER MANHOLE	S	SMH
STORM DRAIN MANHOLE	D	DMH
ELECTRICAL MANHOLE	E	EMH
TELEPHONE MANHOLE	T	TMH
AIR RELEASE VALVE MANHOLE		ARMH
FORCE MAIN CLEANOUT MANHOLE		FMCO
CLEANOUT		CO
CATCH BASIN (WITH OR WITHOUT CURB INLET)		CB
GUTTER INLET, DI PIPE, & SUMP	GICB	DMH GI
HYDRANT		
TEMPORARY HYDRANT		
GATE VALVE		
CHECK VALVE		
CURB STOP		
BUTTERFLY VALVE		
BALL VALVE		
REDUCER		
CAP OR PLUG		
GAS GATE VALVE		
UTILITY POLE		
GUY POLE		
LIGHT POST		
EDGE OF PAVEMENT		
EDGE OF TRAVELED WAY		
CONCRETE CURB		
GRANITE CURB		
SIDEWALK		
STONE WALL		
RETAINING WALL	RET WALL	RET WALL
FENCE	X X	X X
INDIVIDUAL DECIDUOUS TREE		
INDIVIDUAL EVERGREEN TREE		
TREE LINE		
SURVEY MARKER		
PROPERTY LINE		
EASEMENT LINE		
LIMIT OF WORK		
APPROX. LIMIT OF REFUSE		
SPOT ELEVATIONS	×141.5	×141.5
CONTOUR LINES	56	56
DEPRESSION CONTOUR LINES		
HOUSE NUMBER	89	
FLOOR ELEVATION	FLOOR	
SILL ELEVATION	SILL	
WETLAND		
WETLAND FLAGS		1 2
RIP RAP		
STATE HIGHWAY STATION		
SURFACE MOUNTED DELINEATOR		
GUARD POST		
BOLLARD	B	B
SIGN		
BENCH MARK		
AUGER	A-1	A-1
PERCOLATION TEST	1	PT-1
TEST PIT	1	TP-1
BORING	B-10	B-11
PROBE	P-10	P-11
GROUNDWATER MONITORING WELL	WS-1	WS-1
GAS MONITORING WELL	GMW-10	GMW-10
GAS VENT	GV	GV
HAY BALES		
ROCK OUTCROP		
DRAINAGE DITCH / SWALE		
FIRE CALL BOX	F	
MEAN LOW / HIGH TIDE		
TOP OF BANK		
WETLAND BOUNDARY		
100-FOOT BUFFER ZONE		

NOTE: ITEMS SHOWN IN THE LEGEND MAY NOT BE PRESENT IN THESE PLANS

ABBREVIATIONS

UTILITIES

ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
CB	CATCH BASIN
CIPP	CURED IN PLACE PIPE
DI	DUCTILE IRON PIPE
DMH	DRAIN MANHOLE
DS	DOWN SPOUT
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN	FOUNDATION
GND	GROUND
HH	HANDHOLE
HYD	HYDRANT
INV. ELEV.	INVERT ELEVATION
MWRA	MASSACHUSETTS WATER RESOURCES AUTHORITY
PB	PULLBOX
PE	POLYETHYLENE PIPE
PVC	POLYVINYL CHLORIDE PIPE
RC	REINFORCED CONCRETE PIPE
SMH	SEWER MANHOLE
TMH	TELEPHONE MANHOLE
UP	UTILITY POLE
WG	WATER GATE

ALIGNMENT/GRADING

CC	CENTER OF CURVE
ELEV.(OR EL)	ELEVATION
H.P.	HIGH POINT
L.P.	LOW POINT
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
PCC	POINT OF COMPOUND CURVATURE
PGL	PROFILE GRADE LINE
PRC	POINT OF REVERSE CURVATURE
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
R	RADIUS OF CURVATURE
RCP	REINFORCED CONCRETE PIPE
S.S.L.	STOPPING SIGHT DISTANCE
STA	STATION
VC	VERTICAL CURVE
WM	WATER METER

GENERAL

ABAN.	ABANDON
ADJ.	ADJUST
APPROX	APPROXIMATE
B L	BASELINE
BIT CONC	BITUMINOUS CONCRETE
BLDG	BUILDING
B M.	BENCH MARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
CC	GRANITE CURB CORNER
CEM CONC	CEMENT CONCRETE
CI	GRANITE CURB INLET
CLF	CHAIN LINK FENCE
CW	CROSSWALK
DWY	DRIVEWAY
EXIST. (OR EX.)	EXISTING
PROP.	PROPOSED
N.T.S.	NOT TO SCALE
MB	MAIL BOX
GRAN CURB	GRANITE CURB
GI	GUTTER INLET
LP	ORNAMENTAL LIGHT POLE
HMA	HOT MIX ASPHALT
PL	PROPERTY LINE
PVMT	PAVEMENT
REM	REMOVE
RET.	RETAIN
ROW	RIGHT-OF-WAY
RR	RAILROAD
R&D	REMOVE & DISCARD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
SB	STONE BOUND
SCH	SCHEDULE
SHLD	SHOULDER
TOS	TOP OF SLOPE
TYP	TYPICAL
VERT	VERTICAL
WCR	WHEELCHAIR RAMP
WALK	SIDEWALK

TRAFFIC SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
1	1	CONTROLLER PHASE ACTUATED
		TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
		WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED)
		VIDEO DETECTION CAMERA
		MICROWAVE DETECTOR
		PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE
		EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD
		VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED
		FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)
RRSG	RRSG	RAILROAD SIGNAL
GV D		SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
	20'	MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
		HIGH MAST POLE OR TOWER
		SIGN AND POST
TS		TRAFFIC SIGNAL POST
		SIGN AND POST (2 POSTS)
	30'	MAST ARM WITH LUMINAIRE
		OPTICAL PRE-EMPTION DETECTOR
		CONTROL CABINET, GROUND MOUNTED
		CONTROL CABINET, POLE MOUNTED
		FLASHING BEACON CONTROL AND METER PEDESTAL
		LOAD CENTER ASSEMBLY
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

TEMPORARY BENCHMARK CHART:

T.B.M. #	DESCRIPTION	ELEVATION
3	LEFT OUTSIDE CORNER LOWEST CONCRETE STEP. 0.5' A.G.	10.16
4	RIGHT OUTSIDE CORNER LOWEST CONCRETE STEP. 0.5' A.G. +-CUT TOP BOLT	9.58
5	NORTHWEST CORNER OF WARNING SIGN. 0.4' A.G.	10.08
6	SQUARE CUT NORTHEAST CORNER OF TRANSFORMER CONCRETE PAD. 0.3' A.G.	8.41

GENERAL NOTES

1. THE TOPOGRAPHY, SITE DETAIL & SURFACE IMPROVEMENTS DEPICTED HEREON WERE OBTAINED FROM AN INSTRUMENT SURVEY CONDUCTED ON THE GROUND BY MERIDIAN ASSOCIATES, INC. BETWEEN APRIL 25 & JUNE 22, 2017.
2. THE ELEVATIONS DEPICTED HEREON WERE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
3. THIS PLAN DOES NOT SHOW ANY UNRECORDED OR UNWRITTEN EASEMENTS WHICH MAY EXIST. THIS DOES NOT CONSTITUTE A GUARANTEE THAT NO SUCH EASEMENTS EXIST.
4. THE CONTRACTOR SHALL CALL DIGSAFE AT 1-888-344-7233 AT LEAST 72 HOURS, SATURDAYS, SUNDAYS, AND HOLIDAYS EXCLUDED, PRIOR TO EXCAVATING AT ANY LOCATION. A COPY OF THE DIGSAFE PROJECT REFERENCE NUMBER(S) SHALL BE GIVEN TO THE OWNER PRIOR TO EXCAVATION
5. THE CONTRACTOR SHALL CALL CHELSEA WATER & SEWER AT 1-617-466-4310 AT LEAST 72 HOURS, SATURDAYS, SUNDAYS, AND HOLIDAYS EXCLUDED, PRIOR TO ANY SHUTDOWN OF THE WATER MAINS. THE CONTRACTOR SHALL NOTIFY ALL AFFECTED RESIDENTS, CHELSEA DPW, AND THE CITY TREASURER'S OFFICE BY FLYER OR EMAIL AT LEAST 48 HOURS PRIOR TO SHUTDOWN. FLYERS DISTRIBUTED TO CUSTOMERS SHALL BE SUBMITTED TO THE OWNER AND THE ENGINEER FOR APPROVAL PRIOR TO DISTRIBUTION.
6. THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. EXISTING UTILITY SERVICES (WATER, SEWER, GAS, ELECTRIC, TELEPHONE) ARE SHOWN WITH INFORMATION PROVIDED TO WESTON & SAMPSON BY THE CITY OR PRIVATE UTILITY COMPANIES AND MAY NOT BE EXACTLY AS SHOWN ON THE PLANS. ALL SERVICES MAY NOT BE SHOWN.
7. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
8. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY OWNER.
9. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
10. JOINTS BETWEEN NEW HOT MIX ASPHALT ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH HOT POURED RUBBERIZED ASPHALT JOINT SEALANT AND BACK SANDED.
11. ALL EXISTING STATE, COUNTY AND CITY LOCATION LINES (ROW) HAVE BEEN ESTABLISHED BASED ON ACTUAL RECORD INFORMATION AND ON THE GROUND SURVEY MONUMENTATION. PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED BASED ON AVAILABLE INFORMATION AND THEIR EXACT LOCATION IS NOT GUARANTEED.
12. TREES AND SHRUBS WITHIN THE LIMITS OF WORK SHALL BE REMOVED ONLY UPON THE APPROVAL OF THE ENGINEER OR AS NOTED ON THE PLANS.
13. ALL EXCESS MATERIAL FROM THE EXCAVATION PROCESS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LEGAL AND PROPER MANNER.
14. THE CONTRACTOR SHALL BE RESPONSIBLE TO HIRE A LAND SURVEYOR REGISTERED IN THE STATE OF MASSACHUSETTS TO ESTABLISH ALL CONSTRUCTION BASELINES INCLUDING, BUT NOT LIMITED TO MAG NAILS AT EVERY 50-FOOT INTERVALS, POINTS OF CURVATURE (PC), POINTS OF TANGENT (PT), AND AT THE BEGINNING AND END OF THE BASELINES. ALL STATIONS, PC'S, PT'S, ETC. SHALL BE MARKED WITH SURVEYOR'S PAINT. ANY RE-ESTABLISHMENT OF ANY OF THE CONSTRUCTION BASELINES DEEMED NECESSARY BY THE CONTRACTOR OR ENGINEER SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR WITH THE ABOVE MENTIONED REQUIREMENTS. ALL WORK ASSOCIATED WITH HIRING THE LAND SURVEYOR TO PERFORM ALL OF THE SURVEY WORK AND THE TOOLS, EQUIPMENT, ETC. REQUIRED TO COMPLETE THE BASELINE LAYOUTS SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT. ANY RE-ESTABLISHMENT OF THE BASELINES SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.
15. UNLESS OTHERWISE INDICATED, CONCRETE USED FOR PIPE ANCHOR BLOCKS, BACKING, PIPE CRADLES, ARCHES, AND FILL SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS.
16. THE CONTRACTOR SHALL NOT STORE ANY APPARATUS, MATERIALS, SUPPLIES, OR EQUIPMENT ON DRAINAGE STRUCTURES
17. TRENCHES MAY BE EXCAVATED WIDER THAN THE 'LIMIT OF EXCAVATION AND PAYMENT FOR EARTH EXCAVATION' ABOVE THE 'LINE OF NARROW TRENCH LIMIT.' ANY SUCH ADDITIONAL EXCAVATION AND DISPOSAL OF MATERIAL SHALL BE AT THE CONTRACTOR'S EXPENSE AND SHALL NOT BE MEASURED FOR PAYMENT.
18. FOUR FOOT INSIDE DIAMETER MANHOLES SHALL BE USED WITH SEWER AND DRAIN PIPES 24 INCHES AND LESS IN DIAMETER.
19. OPENINGS FOR PIPE IN PRECAST MANHOLE BASES SHALL BE CAST IN THE REQUIRED LOCATIONS DURING MANHOLE MANUFACTURE. FIELD CUT OPENINGS WILL NOT BE PERMITTED UNLESS APPROVED BY THE ENGINEER AND IF APPROVED SHALL BE CORED.
20. FORM BRICK INVERTS IN MANHOLES WITH BRICK ON EDGE TO A DEPTH OF 0.8 INSIDE DIAMETER OF PIPE AND FORM A 1 INCH SLOPED BENCH WITH BRICK FLAT. INVERT SHALL BE SLOPED UNIFORMLY BETWEEN INLET AND OUTLET PIPE AND SHALL BE FORMED AND FILLED AS REQUIRED TO DIRECT THE FLOW AS INDICATED AND TO PREVENT DEPOSITION OF SOLIDS.
21. ALL HYDRANTS, FRAMES, GRATES, AND COVERS REMOVED SHALL BE SALVAGED AND DELIVERED TO A LOCATION TO BE DETERMINED BY THE OWNER.
22. ANY HYDRANT WHICH IS NOT IN SERVICE SHALL BE COVERED WITH A SECURELY FASTENED BURLAP BAG.
23. ALL SEWERS AND DRAINS IN THE WORK SITE SHALL BE BAITED AND ANY NECESSARY MEASURES TAKEN FOR RODENT CONTROL PRIOR TO START-UP OF CONSTRUCTION.
24. ALL STREET EXCAVATIONS SHALL BE COMPLETELY CLOSED AT THE END OF EACH WORKING DAY BY BACKFILLING, COVERING WITH STEEL PLATES MAY BE ALLOWED IF APPROVED BY THE ENGINEER.
25. THE CONTRACTOR SHALL NOT OPEN OR CLOSE ANY VALVES WHICH HOLD WATER IN THE SYSTEM. CHELSEA WATER & SEWER WILL, ON 24 HOURS NOTICE FROM THE CONTRACTOR, OPEN AND/OR CLOSE ANY VALVES REQUIRED FOR DRAINING OR ADMITTING WATER TO THE VARIOUS SECTIONS OF THE WATER MAINS.
26. ELEVATIONS REFERENCED ARE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 HORIZONTAL DATUM IS IN MASSACHUSETTS STATE PLANE COORDINATES SYSTEM, NAD83, MAINLAND ZONE.
27. SURFACE ELEVATIONS SHOWN IN UTILITY PROFILES ARE REPRESENTATIVE OF ELEVATION AT THE PROJECT STATION LINE. STRUCTURES OFFSET FROM THE PROJECT STATION LINE IN THE ROADWAY, GUTTERS, AND SIDEWALKS WILL HAVE RIMS OF HIGHER AND LOWER ELEVATION, AS SHOWN IN PROFILES. CASTINGS SHALL BE SET FLUSH WITH ACTUAL FINISHED GRADE.
28. CALCULATION OF PIPE SLOPES IS BASED ON ELEVATION CHANGES DIVIDED BY THE DISTANCE BETWEEN THE CENTER OF THE MANHOLE WALLS. 'IN' INDICATES UPSTREAM PIPE, AND 'OUT' INDICATES DOWNSTREAM PIPE.
29. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING FLOWS IN THE SEWER, DRAIN, AND COMBINED SYSTEMS, BYPASSING AS NECESSARY TO PREVENT SURCHARGING, AS APPROVED OR REQUIRED BY THE ENGINEER.
30. SERVICES CONNECTED TO THE SEWER SCHEDULED FOR REHABILITATION SHALL BE CURED IN PLACE TO THE PROPERTY LINE AND ONLY REPLACED WITH PVC IF IDENTIFIED BY THE ENGINEER AS DEFECTIVE. SERVICES CONNECTED TO THE SEWER SCHEDULED FOR REPLACEMENT SHALL BE REPLACED IN THE SAME LOCATION AS THE EXISTING SERVICE WITH NEW PVC PIPE FROM THE SEWER TO THE PROPERTY LINE. NEW SEWER SERVICES SHALL BE OF PVC AND 6-INCHES IN DIAMETER (OR LARGER, AS REQUIRED).
31. THE CONTRACTOR SHALL ADJUST ALL COVERS, GRATES, ETC, WITHIN THE LIMITS OF WORK AS REQUIRED.
32. WHERE EXISTING PAVEMENT SURFACES ARE REMOVED, THE CONTRACTOR SHALL SAWCUT PAVEMENT AT THE LIMIT OF REMOVAL TO ENSURE A CLEAN, STRAIGHT LINE FOR ABUTTING PROPOSED SURFACE PAVEMENT.
33. THE CONTRACTOR SHALL COMMUNICATE WORK PLAN AND SCHEDULE UPDATES TO THE OWNER AND THE ENGINEER. THIS SHALL INCLUDE A DAY-AHEAD WORK AND WORK ZONE MANAGEMENT PLAN COMMUNICATED TO THE ENGINEER WITHIN AN HOUR OF FINISHING WORK EACH DAY, A WEEK-AHEAD WORK PLAN PROJECTION EACH FRIDAY, AND REFRESHING OF THE OVERALL PROGRAM SCHEDULE MONTHLY OR AS REQUIRED BY THE ENGINEER. CHANGES IN WORK ZONE MANAGEMENT PLAN SHALL BE COMMUNICATED TO THE OWNER AND ENGINEER AS SOON AS POSSIBLE AND NO LATER THAN AN HOUR OF IMPLEMENTATION.
34. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FOLLOWING THE REQUIREMENTS STATED IN THE "SCOPE AND SEQUENCE" SECTION OF THE CONTRACT DOCUMENTS.
35. ALL PROPOSED DUCTILE IRON PIPE SHALL BE POLYETHYLENE ENCASED.
36. STRATIGRAPHIC PROFILES DEPICTED AT BORING, GEOPROBE, AND TEST PIT LOCATIONS ARE FOR INFORMATIONAL PURPOSES AND INTENDED TO CONVEY TRENDS IN SUBSURFACE CONDITIONS. THE BOUNDARIES BETWEEN STRATA ARE APPROXIMATE AND IDEALIZED, AND HAVE BEEN DEVELOPED BY INTERPRETATIONS OF WIDELY SPACED SAMPLES. ACTUAL TRANSITIONS MAY BE GRADUAL. VARIATIONS MAY OCCUR AND SHOULD BE EXPECTED BETWEEN EXPLORATION LOCATIONS. IN ALL CASES, ATTACHED LOGS IN SPECIFICATION APPENDIX A SHALL GOVERN.
37. GROUNDWATER LEVELS DEPICTED ON THE PROFILE INDICATE THE APPROXIMATE OBSERVED GROUNDWATER LEVEL IN THE BOREHOLE AT THE TIME OF DRILLING AND MAY NOT REPRESENT STABILIZED GROUNDWATER CONDITIONS. GROUNDWATER LEVELS WILL FLUCTUATE WITH SEASON, VARIATIONS IN PRECIPITATION, CONSTRUCTION IN THE AREA, AND OTHER FACTORS. PERCHED GROUNDWATER CONDITIONS COULD EXIST CLOSE TO THE GROUND SURFACE, ESPECIALLY DURING AND AFTER EXTENDED PERIODS OF WET WEATHER.
38. ALL CATCH BASIN DRAIN LATERALS INSTALLED WITH LESS THAN 2 FEET OF COVER SHALL BE DUCTILE IRON (PRESSURE CLASS 350). CATCH BASIN DRAIN LATERALS INSTALLED WITH GREATER THAN 2 FEET OF COVER SHALL BE HDPE.

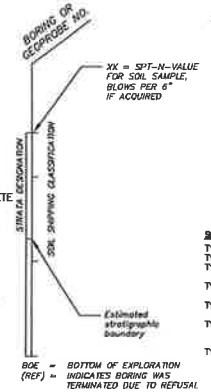
BORING PROFILE LEGEND

(MW) INDICATES A GROUNDWATER WELL WAS INSTALLED IN THE BORING UPON COMPLETION.

OBSERVED GROUNDWATER DEPTH DURING DRILLING

MEASURED DEPTH TO GROUNDWATER IN MONITORING WELL

TOPSOIL	CONCRETE
CLAY	ASPHALTIC CONCRETE
SAND	ASH
FILL	SILT AND SAND
SILT	SAND AND GRAVEL
ORGANICS	SILT AND CLAY
COBBLES	BRICK



BOE = BOTTOM OF EXPLORATION
(REF) = INDICATES BORING WAS TERMINATED DUE TO REFUSAL

SOIL CLASSIFICATIONS

TYPE A-1 CONTAMINATION CONCENTRATION<RCS-1, MEETING DEP WSC13-500
TYPE A-2 CONTAMINATION CONCENTRATION<RCS-1, GREATER THAN DEP WCS-13-500
TYPE B-1 CONTAMINATION CONCENTRATION≥RCS-1, MEETS COMM-97 FOR REUSE AT IN-STATE UNLINED LANDFILL
TYPE B-2 CONTAMINATION CONCENTRATION≥RCS-1, MEETS COMM-97 FOR REUSE AT IN-STATE LINED LANDFILL
TYPE B-3 CONTAMINATION CONCENTRATION≥RCS-1, MEETS DEP'S WSC-94-400 FOR REUSE AT ASPHALT BATCHING
TYPE C CONTAMINATION CONCENTRATION≥RCS-1, DOES NOT MEET COMM-97 IN-STATE LINED OR UNLINED, REQUIRING DISPOSAL AT OUT OF STATE LANDFILL OR THERMAL RECYCLING FACILITY
TYPE D CONTAMINATION CONCENTRATION≥RCS-1 STANDARDS REQUIRING DISPOSAL AT HAZARDOUS WASTE LANDFILL

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

No.	Date	Description

Seal

COMMONWEALTH OF MASSACHUSETTS BRUCE W. ADAMS CIVIL No. 35752 REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2019 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT NAMED IN CHARGE LISTED ON THIS DRAWING.

REPRODUCTION, TRANSFER OF UTILIZATION OF THE DRAWING CONTRARY BY OTHER CLIENTS OR PERSONS NOT ON CLIENT CONTRACTS IS PROHIBITED BY LAW

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN

Issued for

DRAFT DESIGN

Scale AS NOTED

Date

Drawn By MRD

Reviewed By RPM

Approved By LFK

W&S Project No. 219003

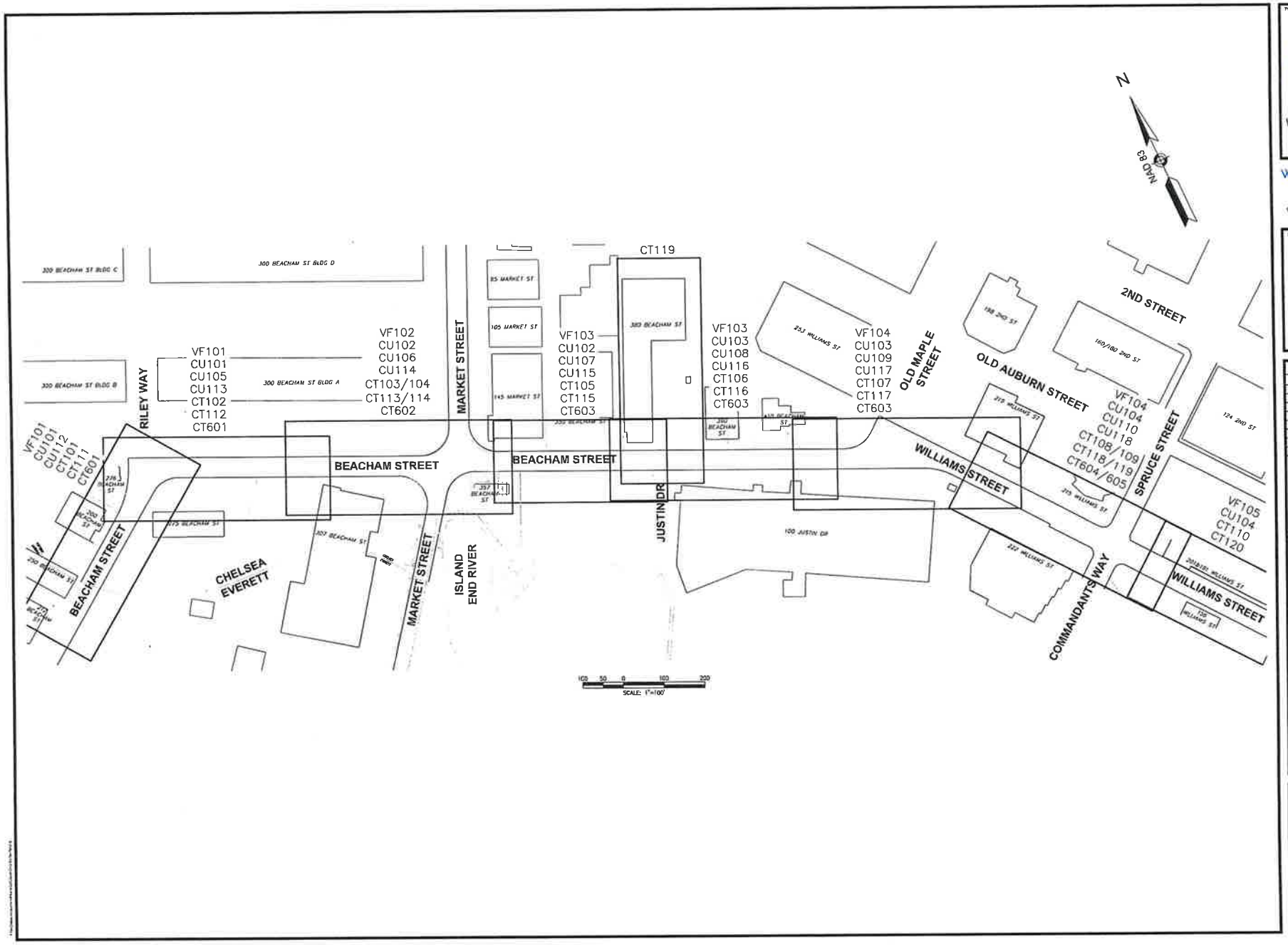
W&S File No.

Drawing Title

ABBREVIATIONS, NOTES, AND LEGEND

Sheet Number

GG101



Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultant

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 35752 REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2019 BY WESTON & SAMPSON. THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTAINED BY OTHER CLIENTS OR FOR ANY OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	JANUARY 2020
Drawn By	CFW
Reviewed By	JPC
Approved By	BWA
W&S Project No.:	21 90031
W&S File No.	

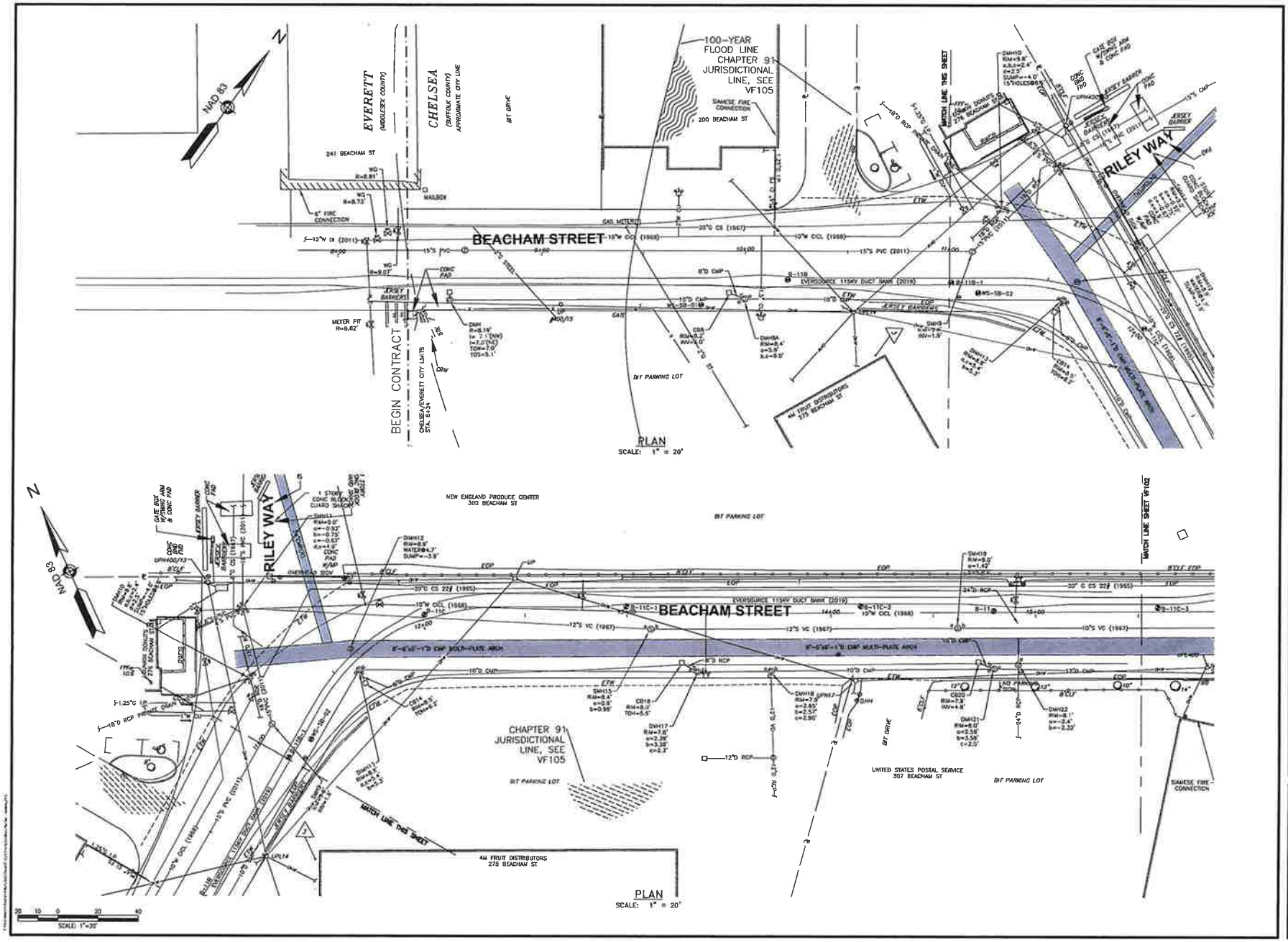
Drawing Title

SITE OVERVIEW

Sheet Number

VF100

COPYRIGHT 2019 WESTON & SAMPSON



BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No. 35752
COMMONWEALTH OF MASSACHUSETTS
REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2019 WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CITY OF CHELSEA PROJECT AND USED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OR UTILIZATION OF THE DRAWING CONTAINED OTHER CLIENTS, FIRMS AND ON OTHER PROJECTS IS PROHIBITED BY LAW.
WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	JBM
Reviewed By	TPC
Approved By	BWA
W&S Project No.	2190031
W&S File No.	

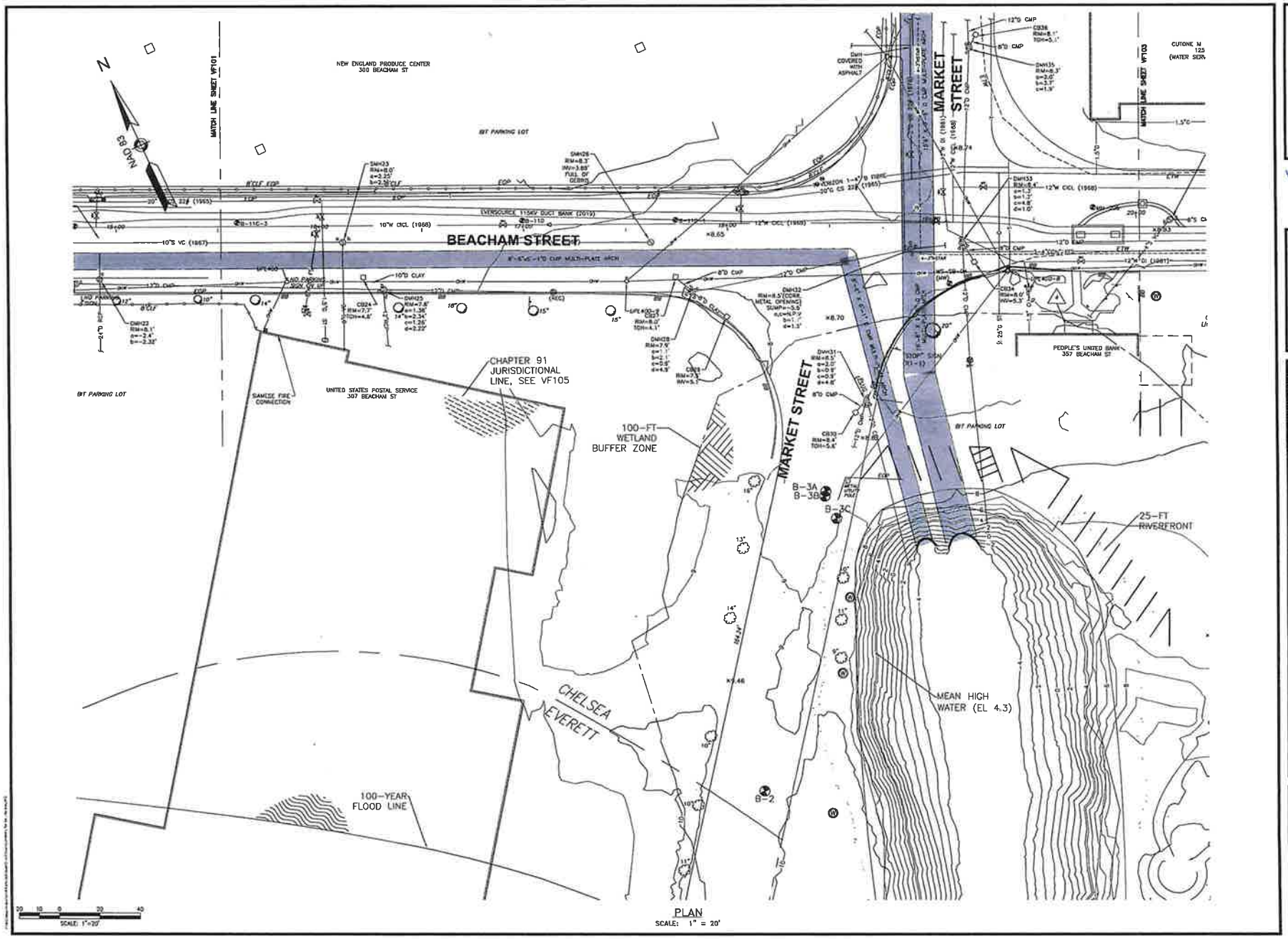
Drawing Title

EXISTING SITE PLAN
1 OF 5

Sheet Number

VF101

COPYRIGHT © 2019 WESTON & SAMPSON



PLAN
SCALE: 1" = 20'

Project

BEACHAM ST AND
WILLIAMS ST UTILITY
& ROADWAY
IMPROVEMENTS

Weston & Sampson

Consultants

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No. 35752
COMMONWEALTH OF MASSACHUSETTS
REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2019 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTENT BY OTHER CLIENTS / FIRMS AND ON OTHER PROJECTS IS PROHIBITED FULLY.
WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN

Issued For

DRAFT DESIGN

Scale:	AS NOTED
Date	
Drawn By	JBM
Reviewed By	TPC
Approved By	BWA
W&S Project No.:	3190031
W&S File No	

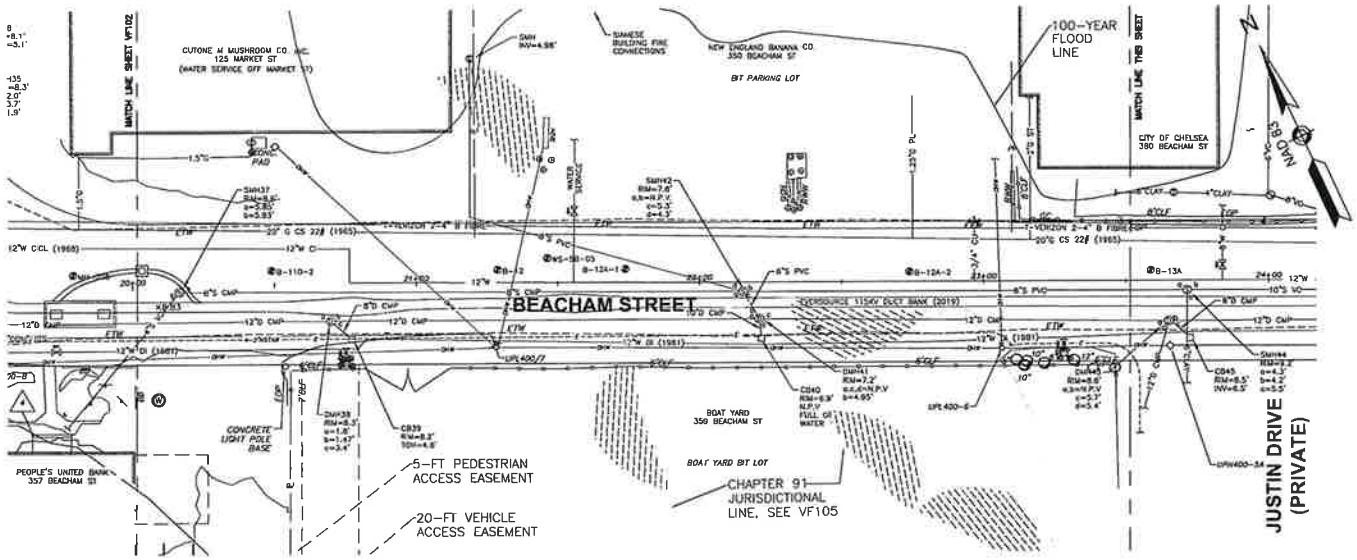
Drawing Title

EXISTING SITE PLAN
2 OF 5

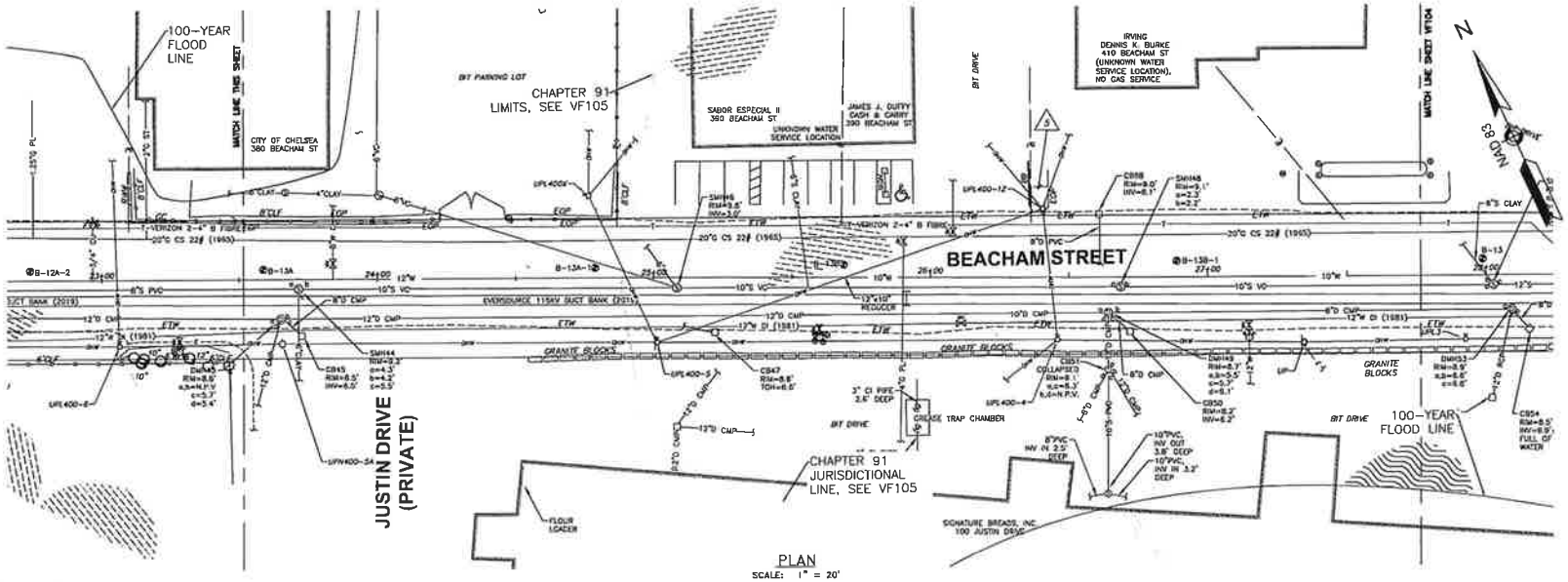
Sheet Number

VF102

COPYRIGHT © 2019 WESTON & SAMPSON



PLAN
SCALE: 1" = 20'



PLAN
SCALE: 1" = 20'

SCALE: 1"=20'

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultant

Revision

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 35752 REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF MASSACHUSETTS

COPYRIGHT © 2019 BY WESTON & SAMPSON
THIS DRAWING WAS REPRODUCED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OF UTILIZATION OF THIS DRAWING CONTENTS TO OTHERS IN WHOLE OR IN PART AND ON OTHER PROJECTS IS PROHIBITED BY LAW.
WESTON & SAMPSON ENGINEERS, INC. HAS THE EXCLUSIVE LEGAL RIGHT TO THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	JBW
Reviewed By	TPC
Approved By	BWA
W&S Project No.	2190031
W&S File No.	

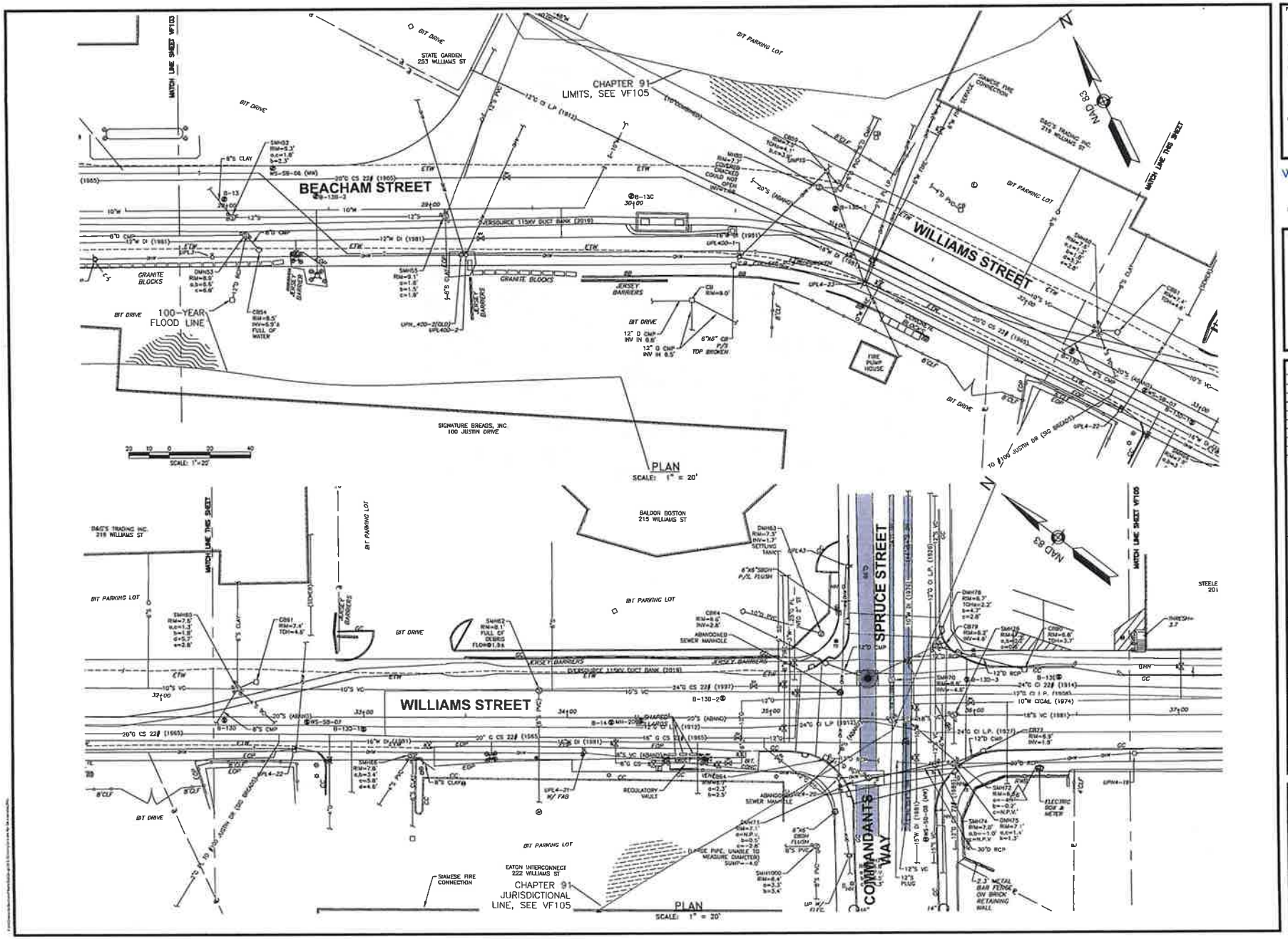
Drawing Title

EXISTING SITE PLAN
3 OF 5

Sheet Number

VF103

COPYRIGHT 2019 WESTON & SAMPSON



Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Com. Date

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 35752 COMMONWEALTH OF MASSACHUSETTS PROFESSIONAL ENGINEER

COPYRIGHT © 2019 BY WESTON & SAMPSON. THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OR UNAUTHORIZED USE OF THE DRAWING CONTAINED BY OTHER CLIENTS, FIRMS AND ON OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued for

DRAFT DESIGN

Scale: AS NOTED

Drawn By: JBJ

Reviewed By: TPC

Approved By: BWA

W&S Project No. 2190031

W&S File No.

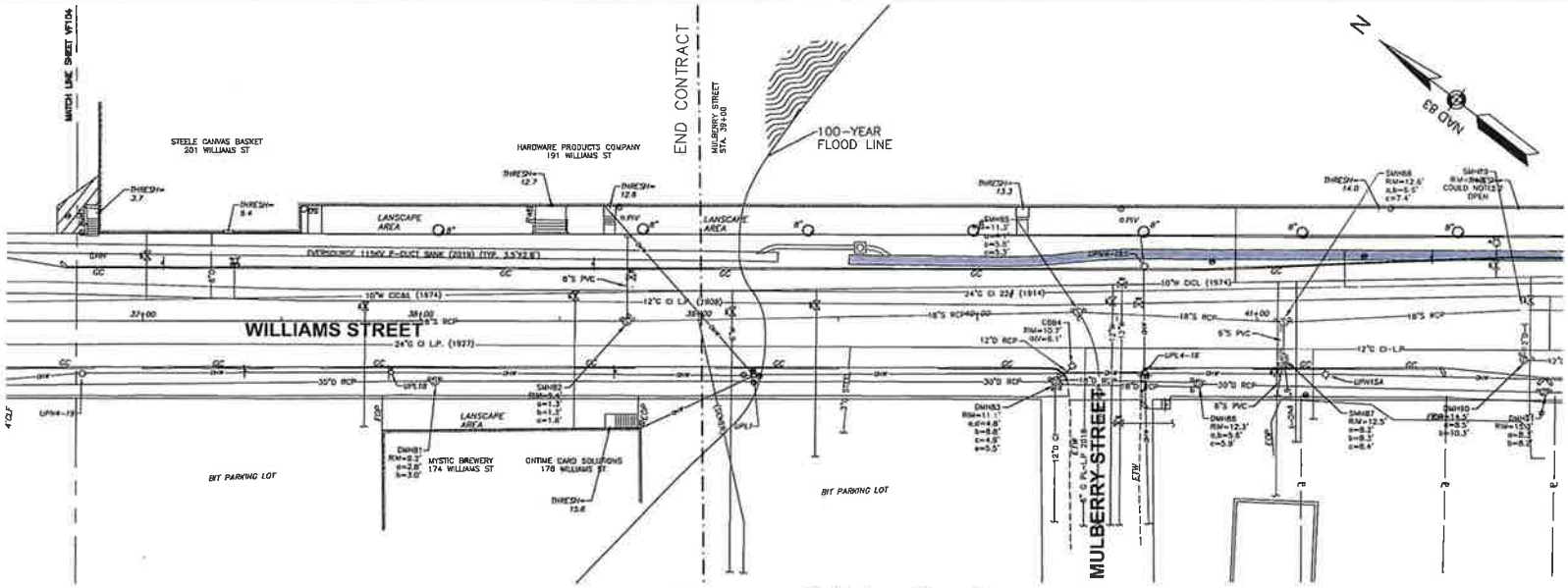
Drawing Title

EXISTING SITE PLAN 4 OF 5

Sheet Number

VF104

COPYRIGHT 2019 WESTON & SAMPSON



PLAN
SCALE: 1" = 20'

SCALE: 1"=20'

PLAN
SCALE: 1" = 500'

SCALE: 1"=500'

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions:

No.	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No. 35752
REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS

COPYRIGHT © 2018 BY WESTON & SAMPSON. THIS DRAWING WAS REPRODUCED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT VALUE LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTAINED BY OTHER CLIENTS AND ON OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HERIN.

Issued For

DRAFT DESIGN

Scale: AS NOTED

Date:

Drawn By: JRM

Reviewed By: TPC

Approved By: BWA

W&S Project No.: 2190031

W&S File No.:

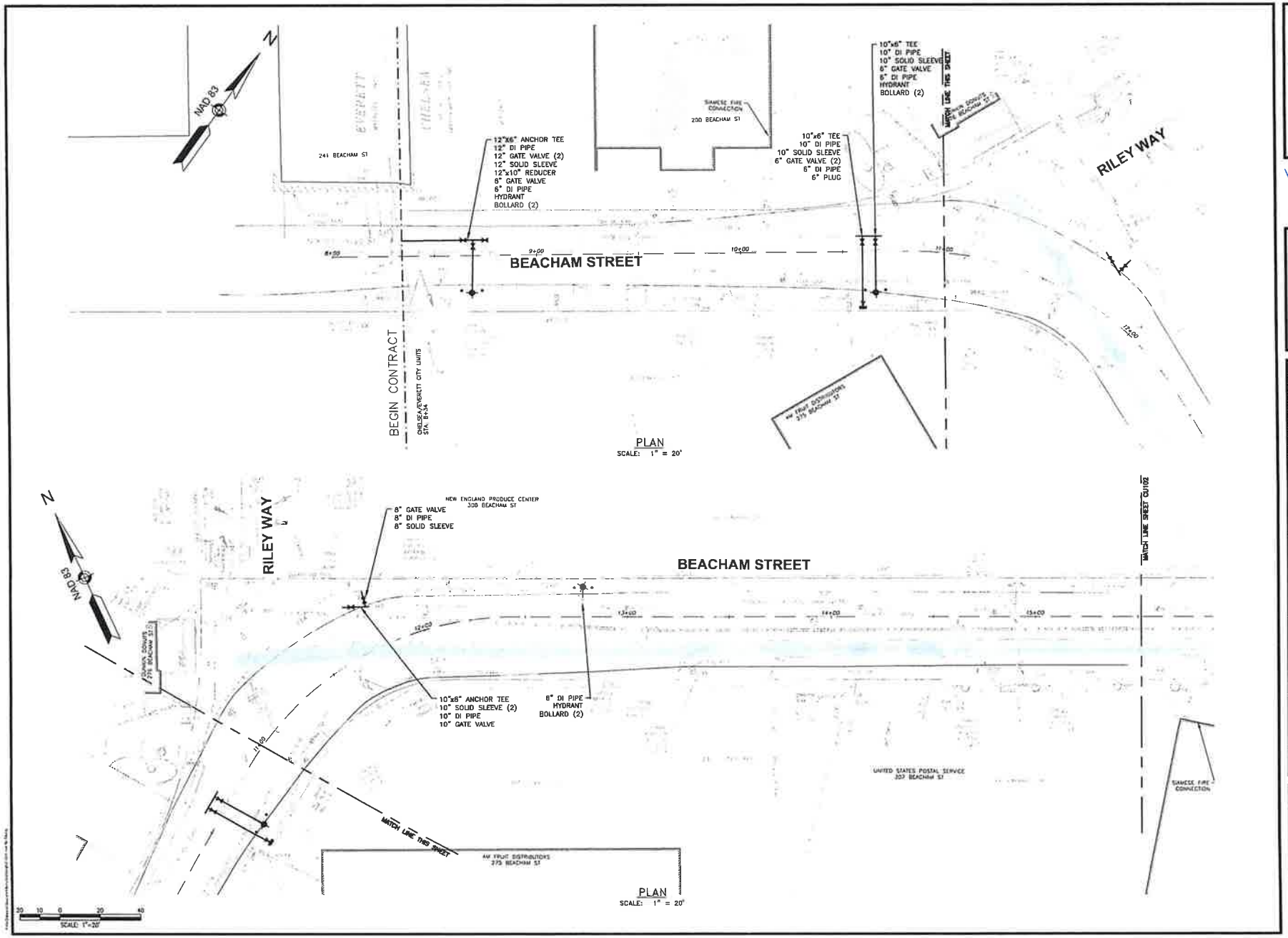
Drawing Title

EXISTING SITE PLAN
5 OF 5

Sheet Number

VF105

COPYRIGHT 2018 WESTON & SAMPSON



BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1800 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions		
No.	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No. 35752
COMMONWEALTH OF MASSACHUSETTS
PROFESSIONAL ENGINEER

COPYRIGHT © 2019 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OR UTILIZATION OF THIS DRAWING CONTRARY TO THE CLIENT & PROJECT STATED ABOVE IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE COPYRIGHT & OTHER INTELLECTUAL PROPERTY CONTAINED HEREIN

Issued For

DRAFT DESIGN

Scale AS NOTED

Date

Drawn By BW

Reviewed By MC

Approved By BWA

W&S Project No. 219003

W&S File No.

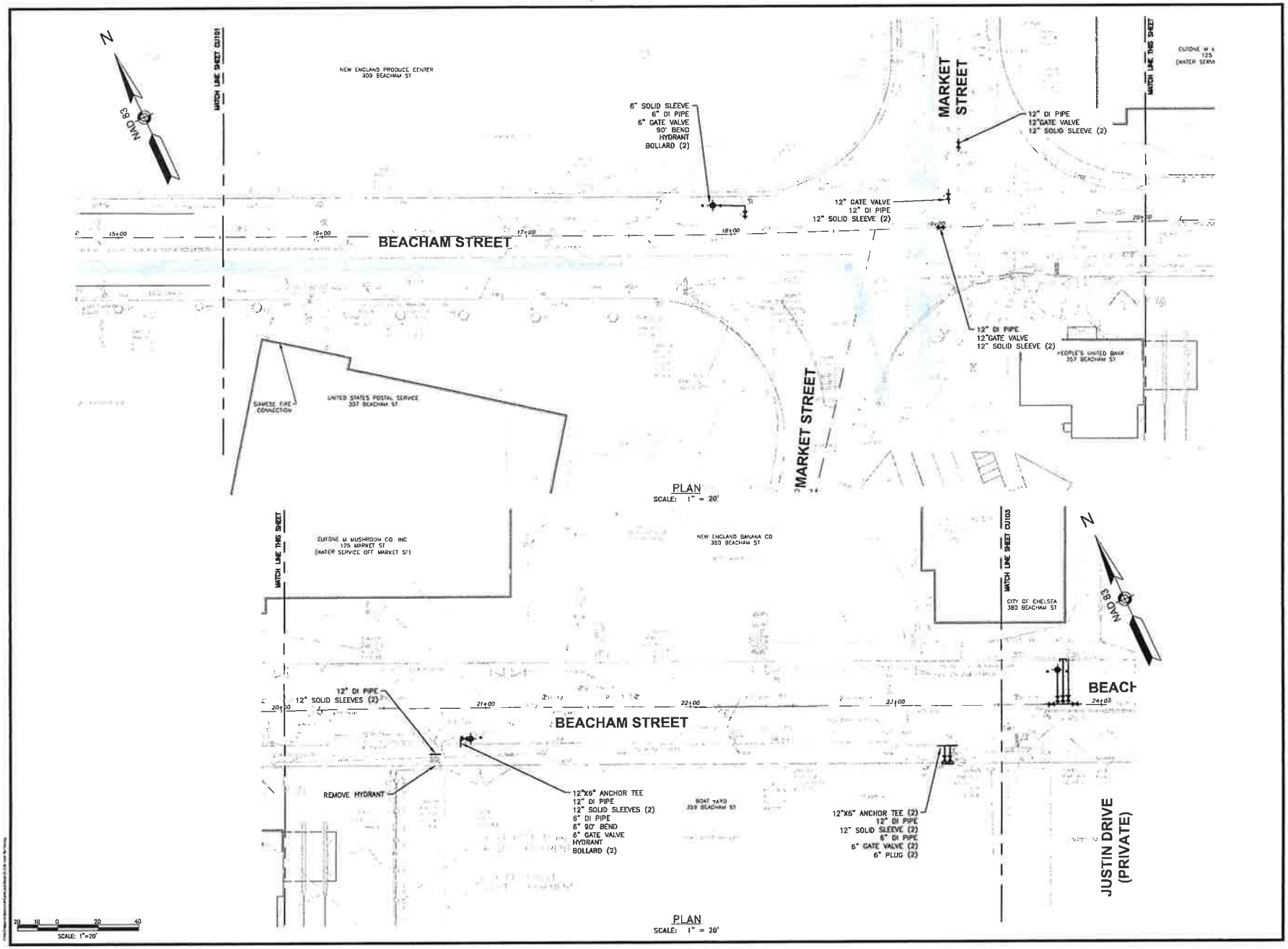
Drawing Title

WATER IMPROVEMENTS PLAN 1 OF 4

Sheet Number

CU101

COPYRIGHT 2019 WESTON & SAMPSON



Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive Suite 100
Reading MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

COMMONWEALTH OF MASSACHUSETTS
BRUCE W. ADAMS
CIVIL
No. 35152
REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2019 BY WESTON & SAMPSON
THIS DRAWING WAS PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME DESIGNATED ON THIS DRAWING ONLY.

REPRODUCTION, REUSE OF UTILIZATION OF THE DRAWING CONTAINED BY OTHER CLIENTS, HIRE AND ON OTHER PROJECTS IS PROHIBITED BY LAW

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN

Issued For

DRAFT DESIGN

Scale: AS NOTED

Date:

Drawn By: JBM

Reviewed By: TPC

Approved By: BWA

W&S Project No.: 2190031

W&S File No.:

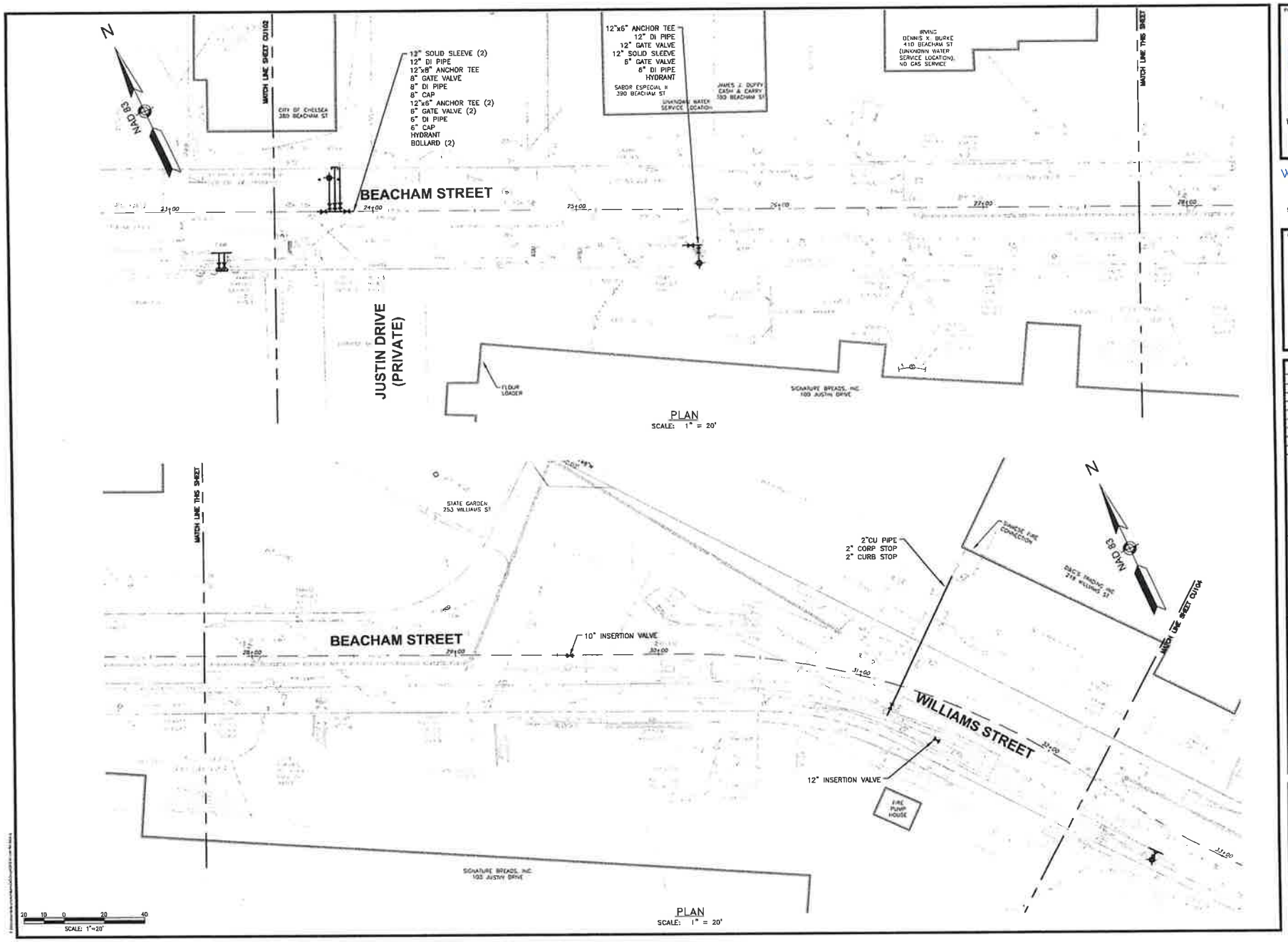
Drawing Title

WATER IMPROVEMENTS PLAN 2 OF 4

Sheet Number

CU102

COPYRIGHT 2019 WESTON & SAMPSON



Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON

Consultants

Revisions

No	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No. 35752
COMMONWEALTH OF MASSACHUSETTS
PROFESSIONAL ENGINEER

COA
COPYRIGHT © 2018 WESTON & SAMPSON. THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT WITH LISTED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OF INFORMATION OF THE DRAWING CONTAINED BY OTHERS, OR ITS USE ON OTHER PROJECTS IS PROHIBITED BY LAW.
WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale: AS NOTED

Date:

Drawn By: JBM

Reviewed By: TPC

Approved By: BWA

W&S Project No. 21 90011

W&S File No.

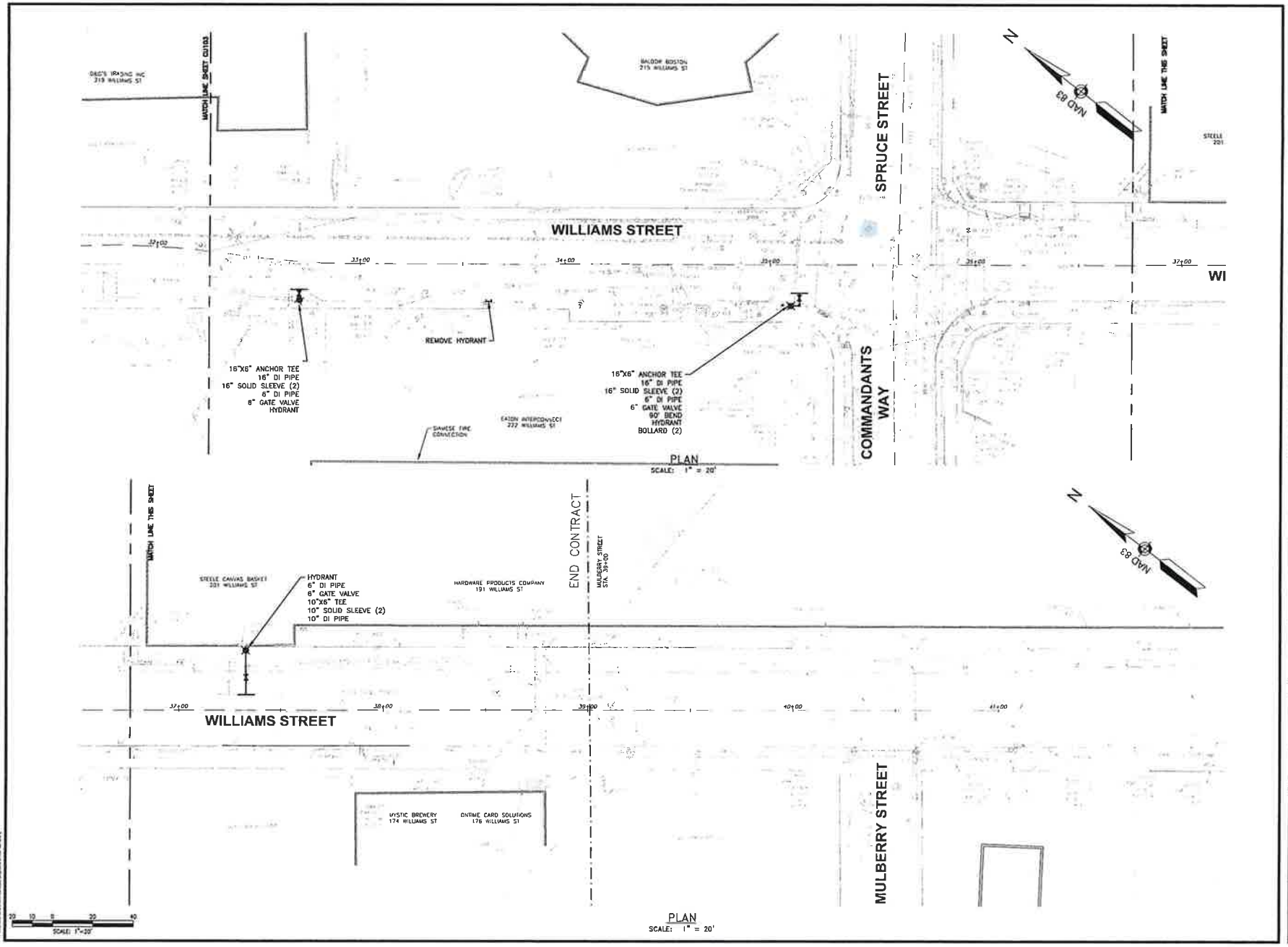
Drawing Title

WATER IMPROVEMENTS PLAN 3 OF 4

Sheet Number

CU103

COPYRIGHT 2018 WESTON & SAMPSON



Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No	Date	Description

Seal

COMMONWEALTH OF MASSACHUSETTS
BRUCE W. ADAMS
CIVIL
No. 35752
REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2019 WESTON & SAMPSON
THE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF WESTON & SAMPSON. THEY ARE INTENDED FOR USE ON THE CLIENT'S PROJECT WHICH IS DESCRIBED IN THIS DRAWING ONLY.
REPRODUCTION, RELEASE OR OTHER USE OF THE DRAWING OR OTHER DOCUMENTS, IN WHOLE OR IN PART, WITHOUT THE WRITTEN CONSENT OF WESTON & SAMPSON IS PROHIBITED.
WESTON & SAMPSON RETAINS THE STATUTORY RIGHTS OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For:

DRAFT DESIGN

Scale: AS NOTED

Date:

Drawn By: JBM
Reviewed By: TPC
Approved By: BWA

W&S Project No: 2190011
W&S File No:

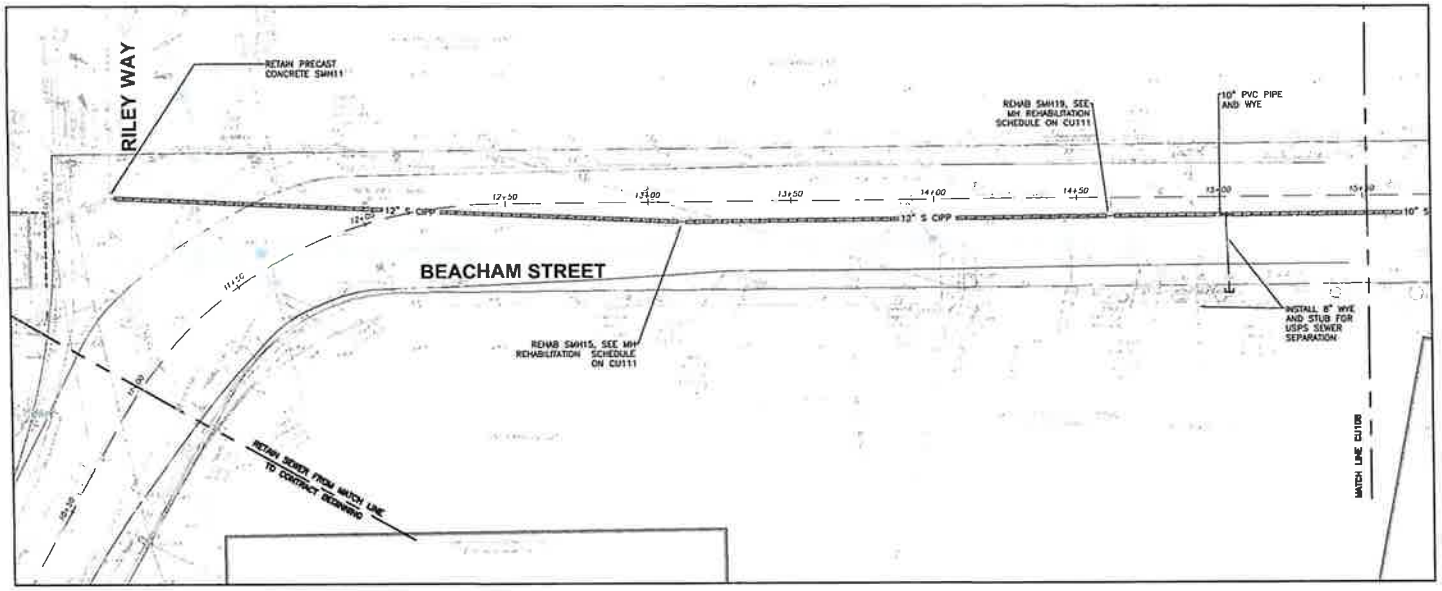
Drawing Title

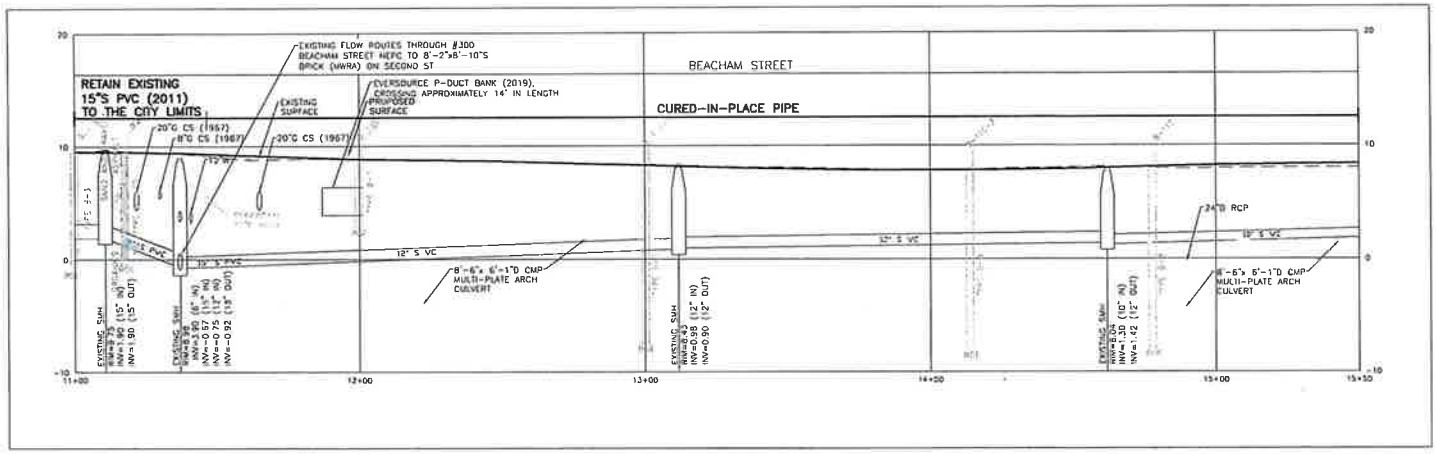
WATER IMPROVEMENTS PLAN
4 OF 4

Sheet Number

CU104

COPYRIGHT 2019 WESTON & SAMPSON





PROFILE
SCALE: 1"=20' HORIZ
1"=4' VERT

20 10 0 20 40
SCALE: 1"=20'

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

COPYRIGHT © 2021 WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, REUSE OR UTILIZATION OF THE DRAWING CONTENT BY OTHER CLIENTS, FIRMS AND ON OTHER PROJECTS IS PROHIBITED BY LAW.
WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

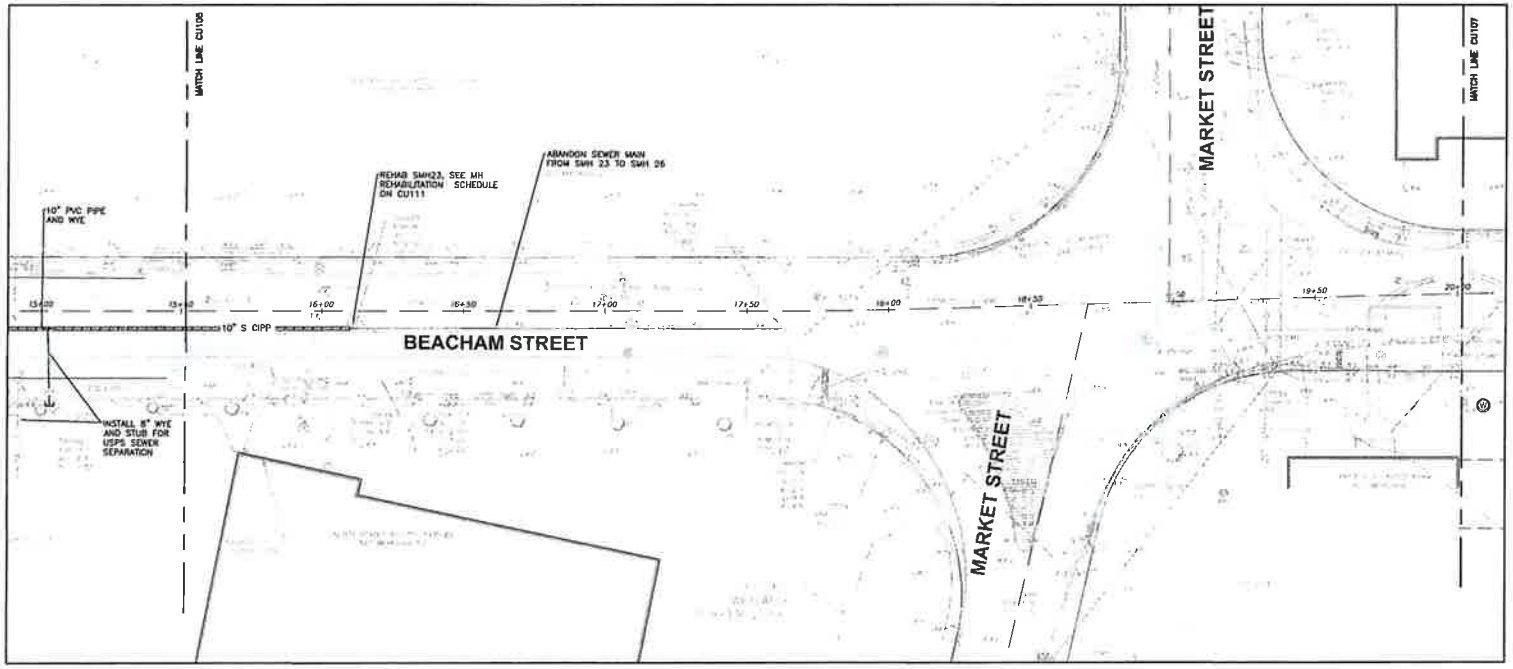
Scale	AS NOTED
Date	
Drawn By	CFW
Reviewed By	TPC
Approved By	BWA
W&S Project No.	210231
W&S File No.	

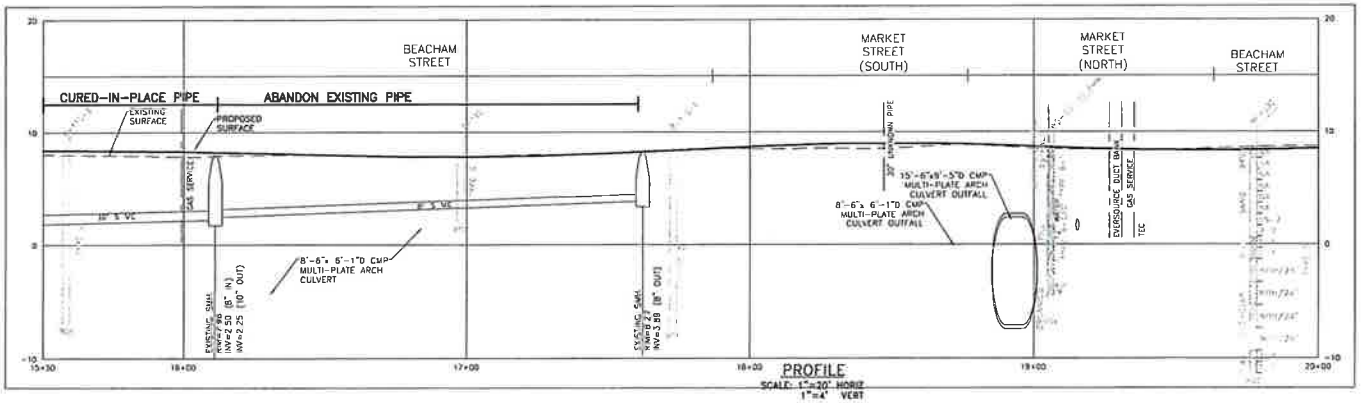
Drawing Title

SEWER IMPROVEMENTS PLAN AND PROFILE 1 OF 6

Sheet Number

CU105





20 10 0 20 40
SCALE: 1"=20'

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No. 35752
COMMONWEALTH OF MASSACHUSETTS
PROFESSIONAL ENGINEER

COPYRIGHT © 2019 WESTON & SAMPSON
THIS DRAWING WAS SEALED PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTAINED BY OTHER CLIENTS OR FOR ANY OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale:	AS NOTED
Date	
Drawn By	CPW
Reviewed By	TPC
Approved By	BWA
W&S Project No.	2180031
W&S File No.	

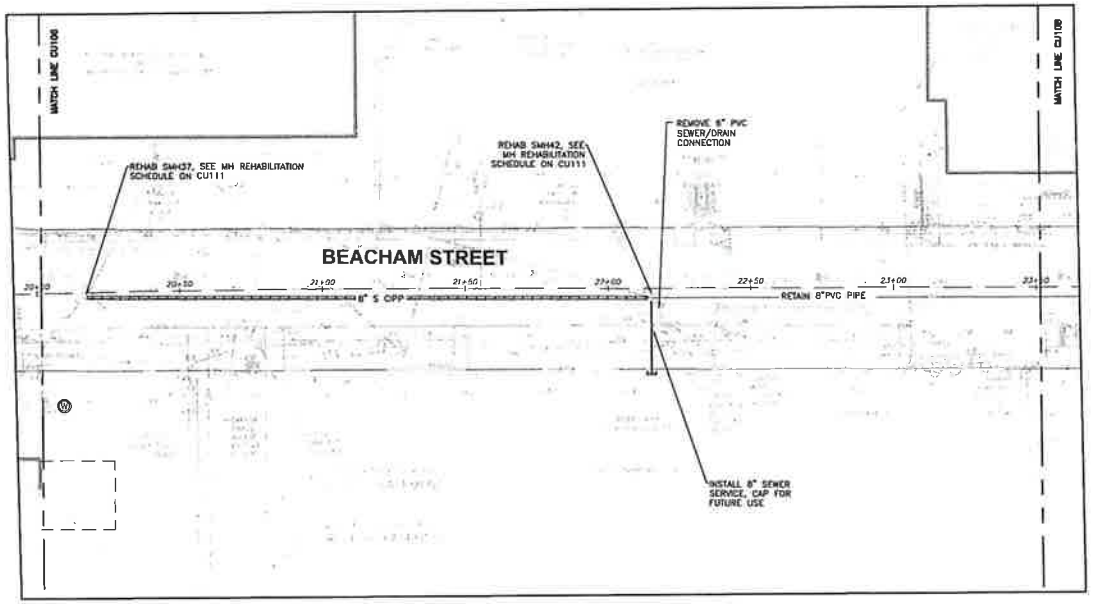
Drawing Title

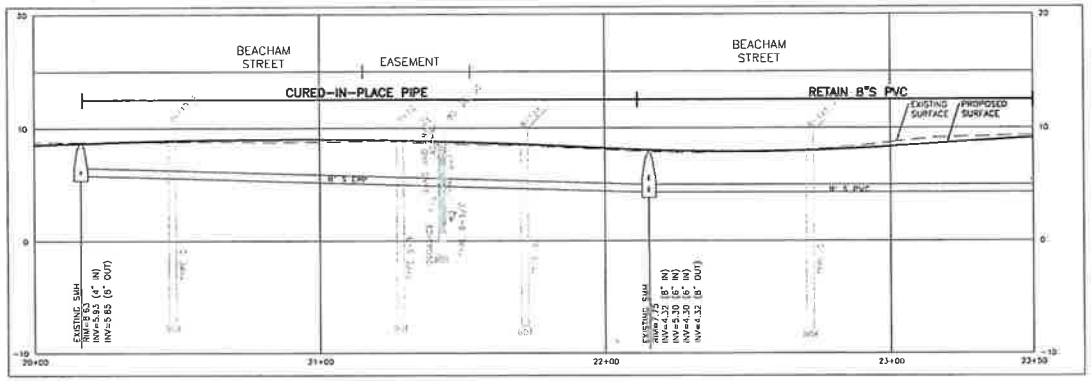
SEWER IMPROVEMENTS PLAN AND PROFILE 2 OF 6

Sheet Number

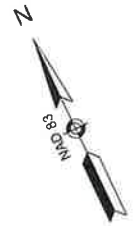
CU106

COPYRIGHT 2019 WESTON & SAMPSON





PROFILE
SCALE: 1"=20' HORIZ
1"=4' VERT



20 10 0 20 40
SCALE: 1"=20'

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1810 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No	Date	Description

Seal

COMMONWEALTH OF MASSACHUSETTS
BRUCE W. ADAMS
CIVIL
No. 35757
REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2018 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTAINED BY OTHER CLIENTS IMPLIES NO OWNERSHIP OR PROPERTY RIGHTS BY WS

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HERIN.

Issued For

DRAFT DESIGN

Scale AS NOTED

Date

Drawn By CPW

Reviewed By TPC

Approved By BWA

W&S Project No. 2190031

W&S File No

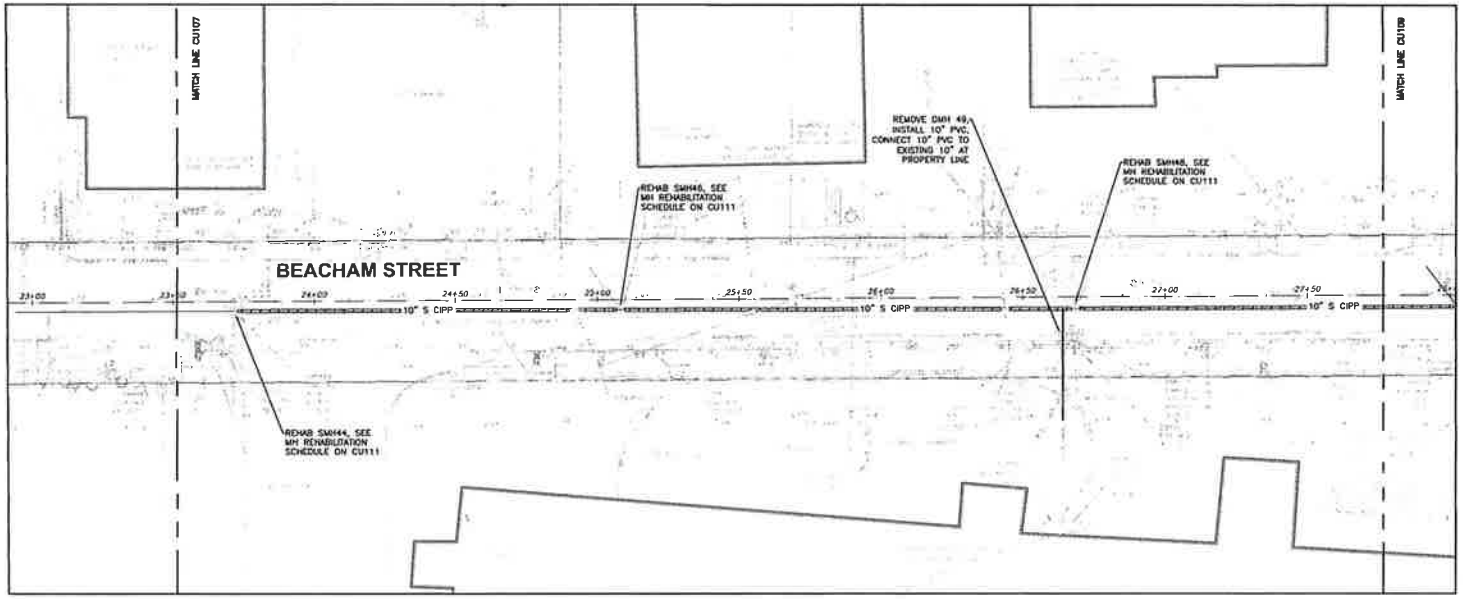
Drawing Title

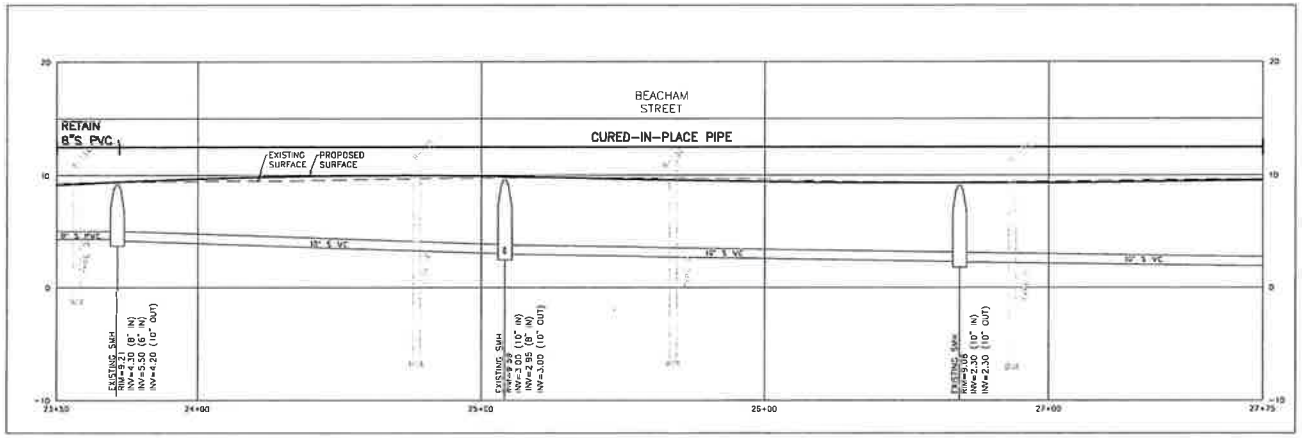
SEWER IMPROVEMENTS PLAN AND PROFILE 3 OF 6

Sheet Number

CU107

COPYRIGHT 2018 WESTON & SAMPSON





PROFILE
SCALE: 1"=20' HORIZ
1"=4' VERT

20 10 0 20 40
SCALE: 1"=20'

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants

Revisions

No	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 35752

COPYRIGHT © 2018 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTENT BY OTHERS OR FOR USE ON OTHER PROJECTS IS PROHIBITED BY LAW.
WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	CPV
Reviewed By	TPC
Approved By	BWA
W&S Project No.	2190031
W&S File No.	

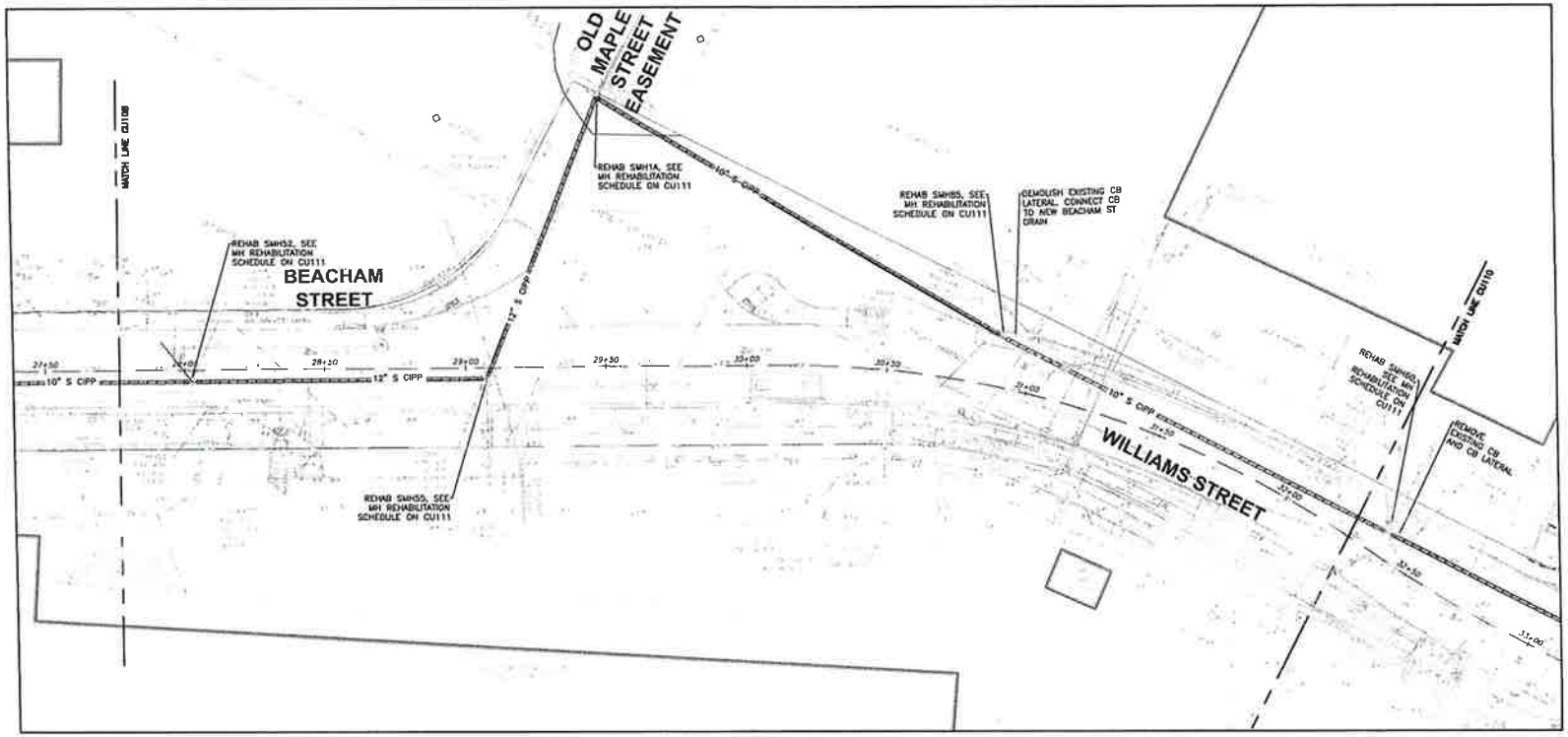
Drawing Title

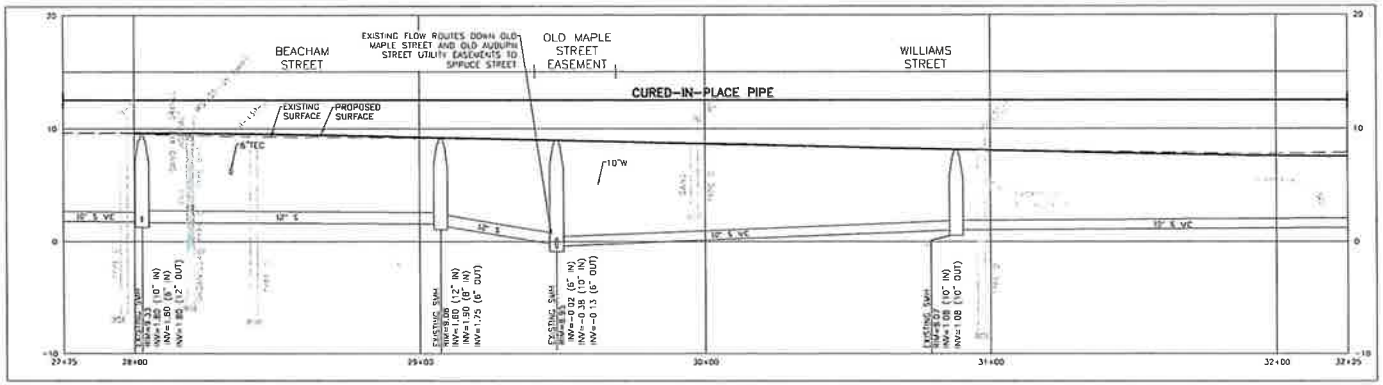
SEWER IMPROVEMENTS PLAN AND PROFILE 4 OF 6

Sheet Number

CU108

COPYRIGHT 2018 WESTON & SAMPSON





PROFILE
SCALE: 1"=20' HORIZ
1"=4' VERT

20 10 0 20 40
SCALE: 1"=20'

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No. 35752
REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2018 BY WESTON & SAMPSON. THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT. IMPROPER USE OF THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTRIBUTION HAS NO OTHER PURPOSES IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HERIN.

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	CFW
Reviewed By	TPC
Approved By	BWA
W&S Project No.	2180031
W&S File No.	

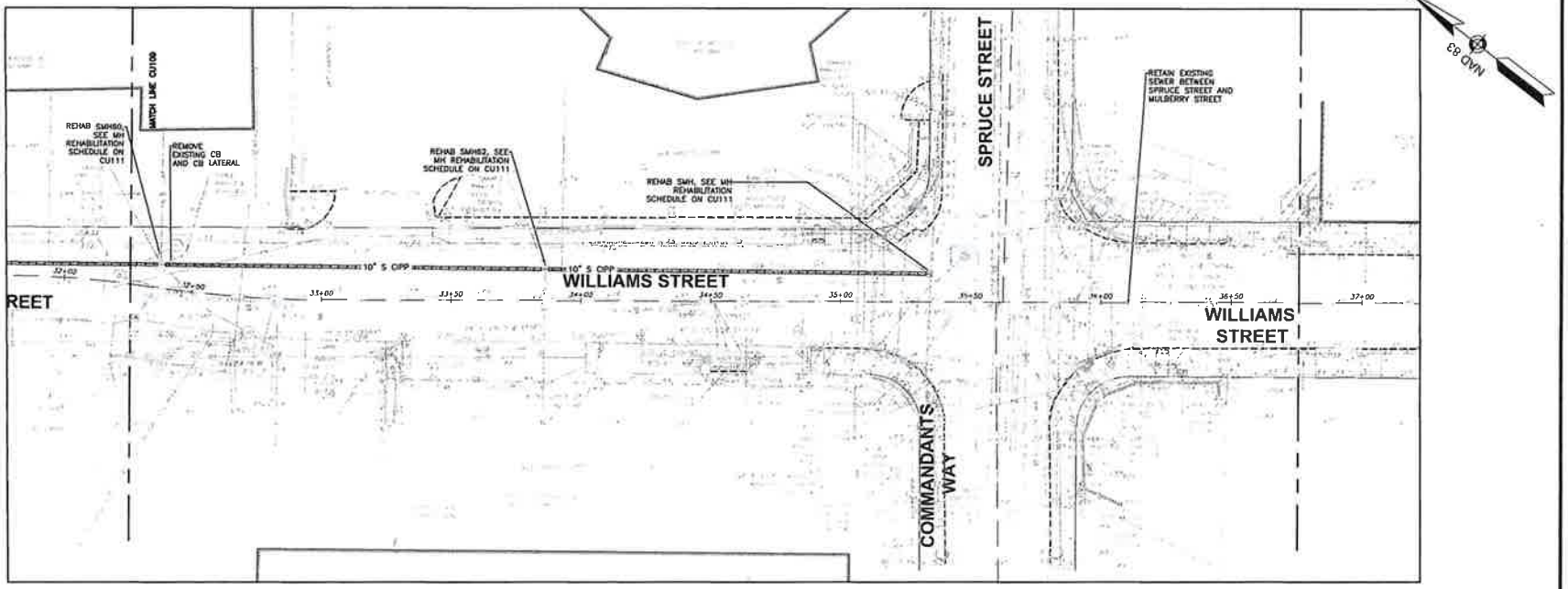
Drawing Title

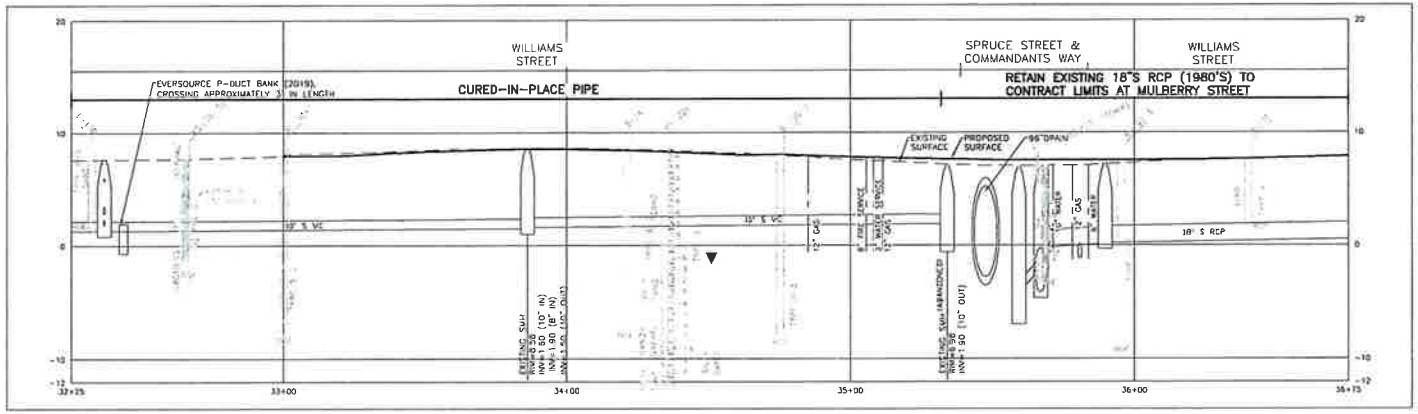
SEWER IMPROVEMENTS PLAN AND PROFILE 5 OF 6

Sheet Number

CU109

COPYRIGHT 2018 WESTON & SAMPSON





PROFILE
SCALE: 1"=20' HORIZ
1"=4' VERT

20 10 0 20 40
SCALE: 1"=20'

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No	Date	Description

Seal

COPYRIGHT © 2018 WESTON & SAMPSON
THIS DRAWING AND SUPPORTING DATA IS THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OF OR REFERENCE OF THIS DRAWING OR DATA IN OTHER CLIENT'S SERVICES AND ON OTHER PROJECTS IS PROHIBITED BY LAW.
WESTON & SAMPSON RETAINS THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale AS NOTED

Date

Drawn By CPW

Reviewed By TPC

Approved By BWA

W&S Project No. 3190518

W&S File No.

Drawing Title

SEWER IMPROVEMENTS PLAN AND PROFILE 6 OF 6

Sheet Number

CU110

COPYRIGHT 2018 WESTON & SAMPSON

Manhole Rehabilitation Schedule

No.	Station	Material	Approximate Depth (ft)	Replace Frame & Cover	Cementitious Lining	Sheet No.
SMH 15	13+10	BLOCK	7.5	X	X	CU105
SMH 19	14+60	BLOCK	6.6	X	X	CU105
SMH 23	16+10	BLOCK	5.8	X	X	CU106
SMH 37	20+15	BLOCK	2.8	X	X	CU107
SMH 42	22+11	BLOCK	3.5	X	X	CU107
SMH 44	23+70	BLOCK/BRICK	5	X	X	CU108
SMH 46	25+07	UNK	6.6	X	X	CU108
SMH 48	26+67	BLOCK	6.9	X	X	CU109
SMH 52	29+00	BLOCK	7.5	X	X	CU109
SMH 55	29+05	BLOCK	7.6	X	X	CU109
SMH 85	30+88	UNK	6.62	X	X	CU109
SMH 60	32+39	UNK	6.3	X	X	CU110
SMH 62	33+85	UNK	6.2	X	X	CU110
ABANDONED SMH	35+34	UNK	UNK	X	X	CU110

Cured In Place Pipe Schedule

Start Manhole	End Manhole	Pipe Diameter (in)	Pipe Material	Pipe Length (ft)	Sheet No.
SMH 11	SMH 15	12	RCP	200	CU105
SMH 15	SMH 19	12	VC	150	CU105
SMH 19	SMH 23	10	VC	150	CU106
SMH 37	SMH 42	8	CMP	200	CU109
SMH 44	SMH 46	10	VC	137	CU108
SMH 46	SMH 48	10	VC	160	CU108
SMH 48	SMH 52	10	VC	135	CU108
SMH 52	SMH 55	12	CONFIRM IN FIELD	105	CU109
SMH 55	SMH 1A	12	CONFIRM IN FIELD, PVC AT OLD MAPLE ST	110	CU109
SMH 1A	SMH 85	10	CONFIRM IN THE FIELD	170	CU109
SMH 85	SMH 60	10	VC	155	CU109
SMH 60	SMH 62	10	VC	150	CU110
SMH 62	ABANDONED SMH	10	VC	145	CU110
			TOTAL	1967	

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No. 35732
COMMONWEALTH OF MASSACHUSETTS
PROFESSIONAL ENGINEER

©CA

COPYRIGHT © 2018 WESTON & SAMPSON
THE DRAWINGS AND SPECIFICATIONS CONTAINED HEREIN ARE THE PROPERTY OF WESTON & SAMPSON AND SHALL NOT BE REPRODUCED IN WHOLE OR IN PART WITHOUT WRITTEN PERMISSION OF WESTON & SAMPSON.

REPRODUCTION, RE-USE OR DISTRIBUTION OF THE DRAWINGS CONTAINED HEREIN IN ANY OTHER PROJECT IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale AS NOTED

Date

Drawn By CPW

Reviewed By TPC

Approved By BWA

WBS Project No. 2190031

WBS File No

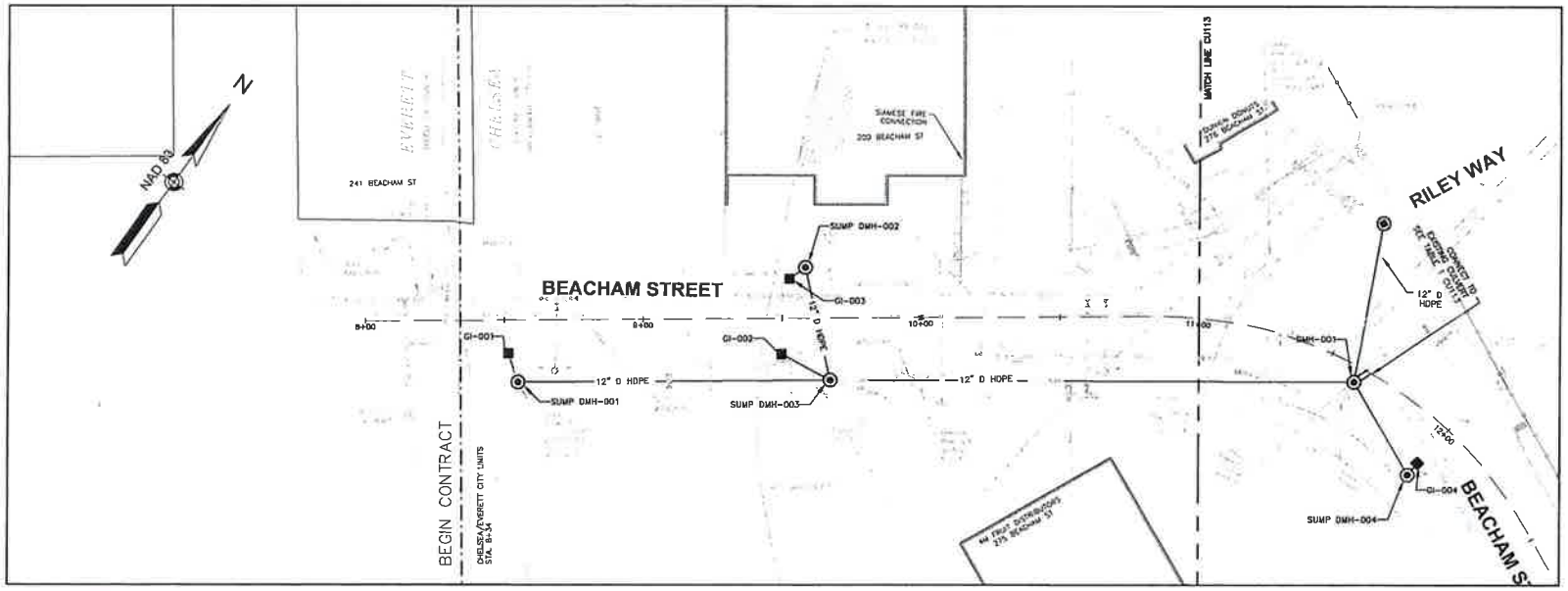
Drawing Title

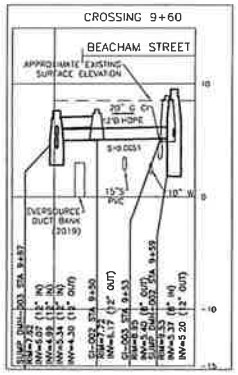
SEWER IMPROVEMENTS SUMMARY TABLE 1 OF 1

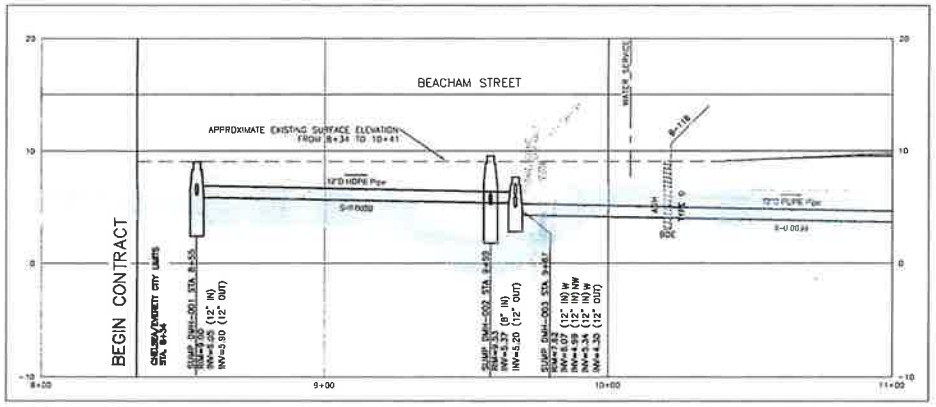
Sheet Number

CU111

COPYRIGHT 2018 WESTON & SAMPSON







PROFILE
SCALE: 1"=20' HORIZ
1"=4' VERT

20 10 0 20 40
SCALE: 1"=20'

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No. 35752
COMMONWEALTH OF MASSACHUSETTS
PROFESSIONAL ENGINEER

COPYRIGHT © 2019 BY WESTON & SAMPSON THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTAINED HEREIN FOR ANY PURPOSE NOT ON OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale: AS NOTED

Date

Drawn By: UDC/WJM
Reviewed By: RP
Approved By: LFK

W&S Project No.: 2190039
W&S File No.:

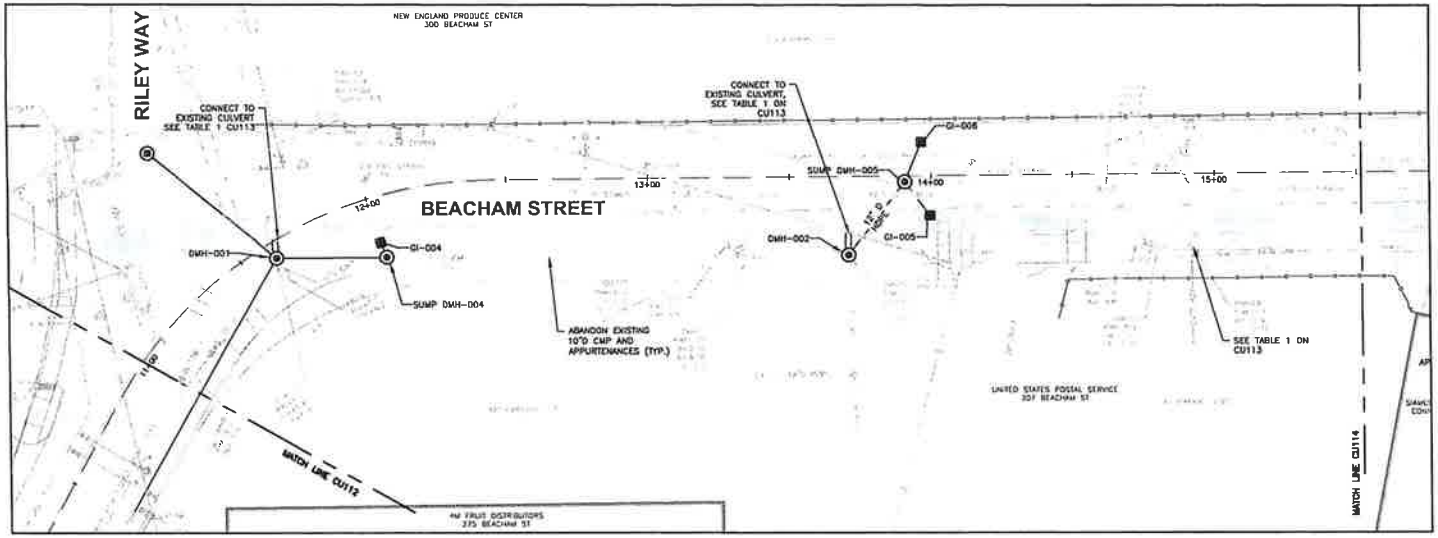
Drawing Title

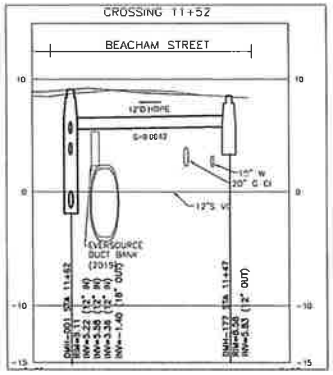
DRAIN IMPROVEMENTS PLAN AND PROFILE 1 OF 8

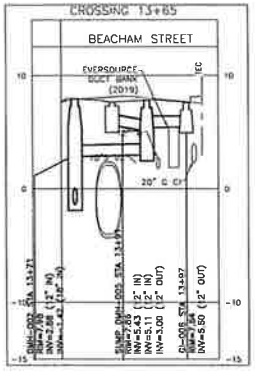
Sheet Number

CU112

COPYRIGHT 2019 WESTON & SAMPSON







PROFILE
SCALE: 1"=20' HORIZ
1"=4' VERT

TABLE 1 PROPOSED TRENCH CATCH BASINS

LOCATION	MH ID	SIZE	CONNECTION TYPE
DMH-001	CU113	18-INCH	UPSTREAM CLAMP
DMH-172	CU113	24-INCH	UPSTREAM CLAMP
SUMP DMH-004	CU113	12-INCH	UPSTREAM CLAMP
DMH-002	CU113	18-INCH	UPSTREAM CLAMP
SUMP DMH-005	CU113	24-INCH	UPSTREAM CLAMP
CI-006	CU113	24-INCH	UPSTREAM CLAMP

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants

Revisions

No	Date	Description

Seal

BRUCE W. ADAMS CIVIL No 35752 COMMONWEALTH OF MASSACHUSETTS

COPYRIGHT © 2019 WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTENTS OTHER CLIENTS / PROJECTS AND OTHER PURPOSES IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued for

DRAFT DESIGN

Scale AS NOTED

Date

Drawn By W.DREW/JM

Reviewed By RP

Approved By LFK

W&S Project No. 2190031

W&S File No

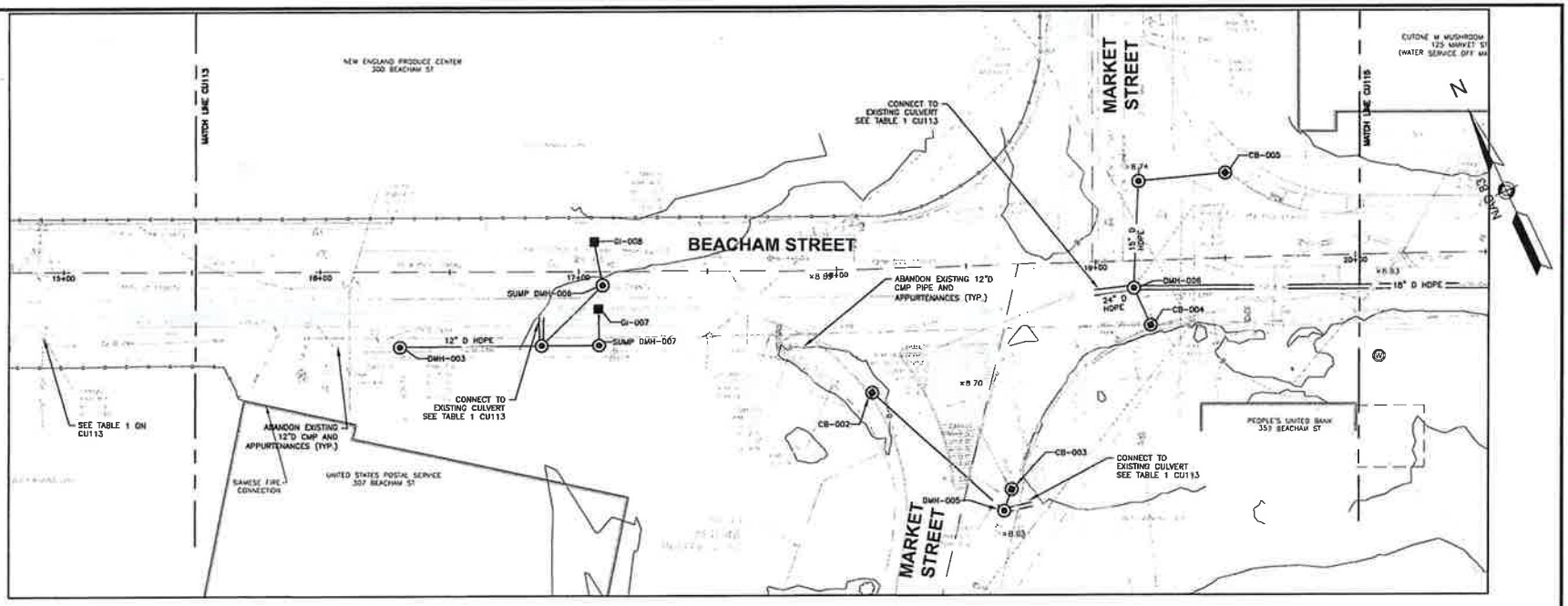
Drawing Title

DRAIN IMPROVEMENTS PLAN AND PROFILE 2 OF 8

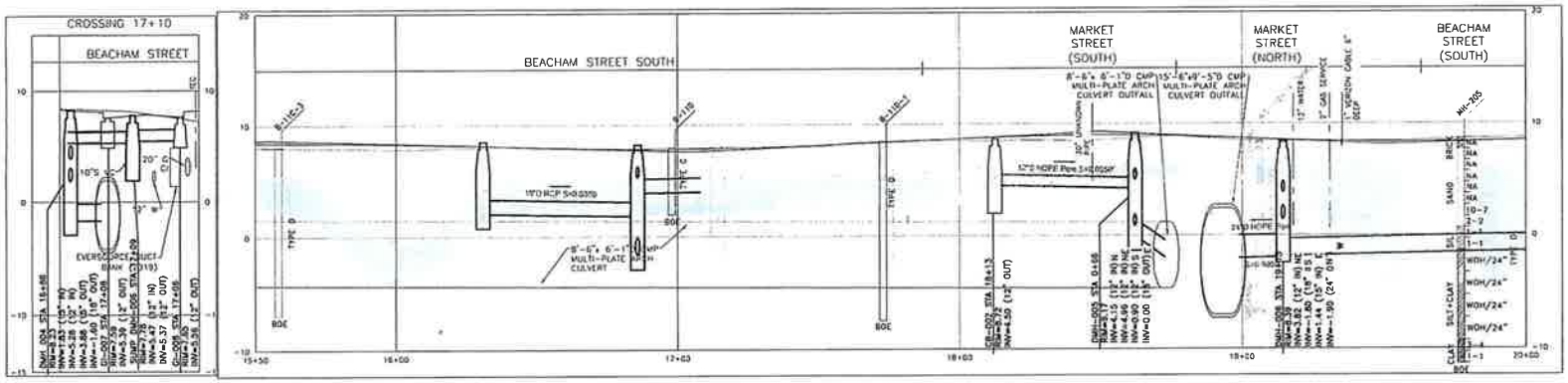
Sheet Number

CU113

COPYRIGHT 2019 WESTON & SAMPSON



SCALE: 1"=20'



PROFILE
SCALE: 1"=20' HORIZ
1"=4' VERT

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No. 35752
COMMONWEALTH OF MASSACHUSETTS

COA
COPYRIGHT © 2018 BY WESTON & SAMPSON
"AS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CITY & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, PLEASE OF UTILIZATION OF THE DRAWING CONTAINED BY OTHER CLIENTS PERSONS OR OTHER PROJECTS IS PROHIBITED BY LAW
WITH OWNERSHIP RIGHTS THE DISCLOSURE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale: AS NOTED

Date:

Drawn By: MCCOWAN

Reviewed By: BP

Approved By: LFK

W&S Project No.: 2190031

W&S File No.:

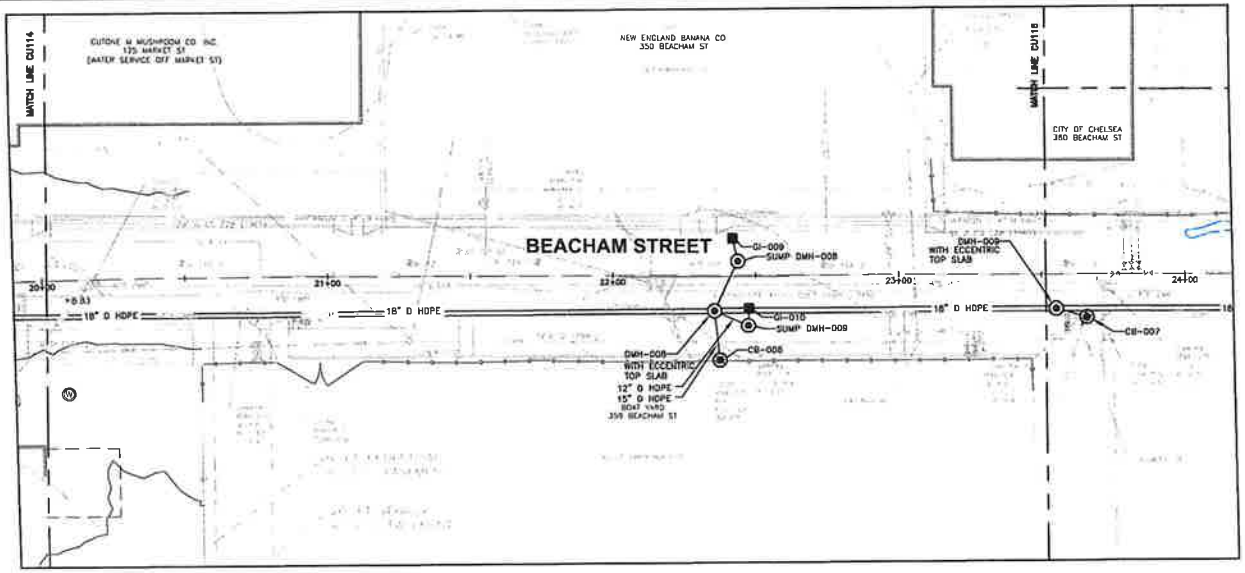
Drawing Title

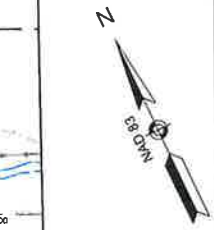
DRAIN IMPROVEMENTS PLAN AND PROFILE 3 OF 8

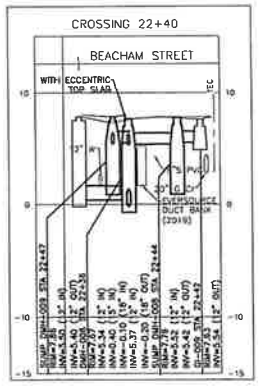
Sheet Number

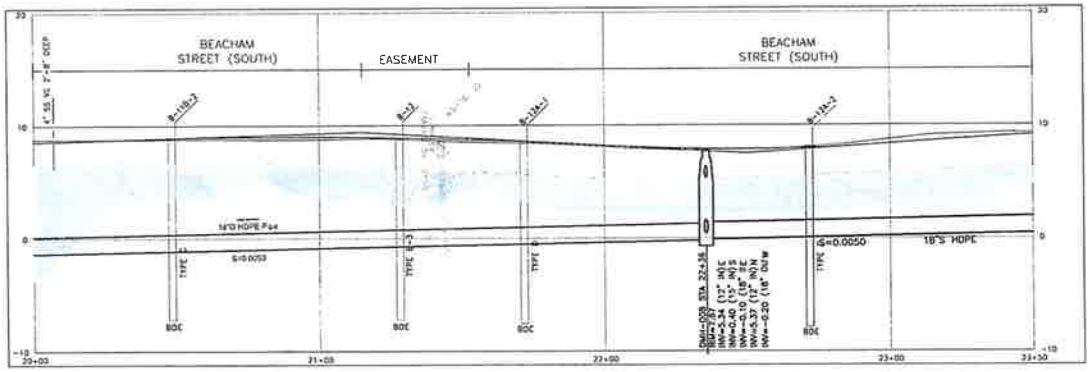
CU114

COPYRIGHT 2019 BY CITY & SAMPSON









PROFILE
SCALE: 1"=20' HORIZ
1"=4' VERT

20 10 0 20 40
SCALE: 1"=20'

Project

BEACHAM ST AND
WILLIAMS ST UTILITY
& ROADWAY
IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No. 35752
COMMONWEALTH OF MASSACHUSETTS
PROFESSIONAL ENGINEER

COPYRIGHT © 2019 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THE DRAWING(S).

REPRODUCTION, RELEASE OR DISTRIBUTION OF THE DRAWING CONTAINED HEREIN, EXCEPT FOR USE ON OTHER PROJECTS, IS PROHIBITED.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	W DROWJM
Reviewed By	RP
Approved By	UFK
W&S Project No	2190031
W&S File No	

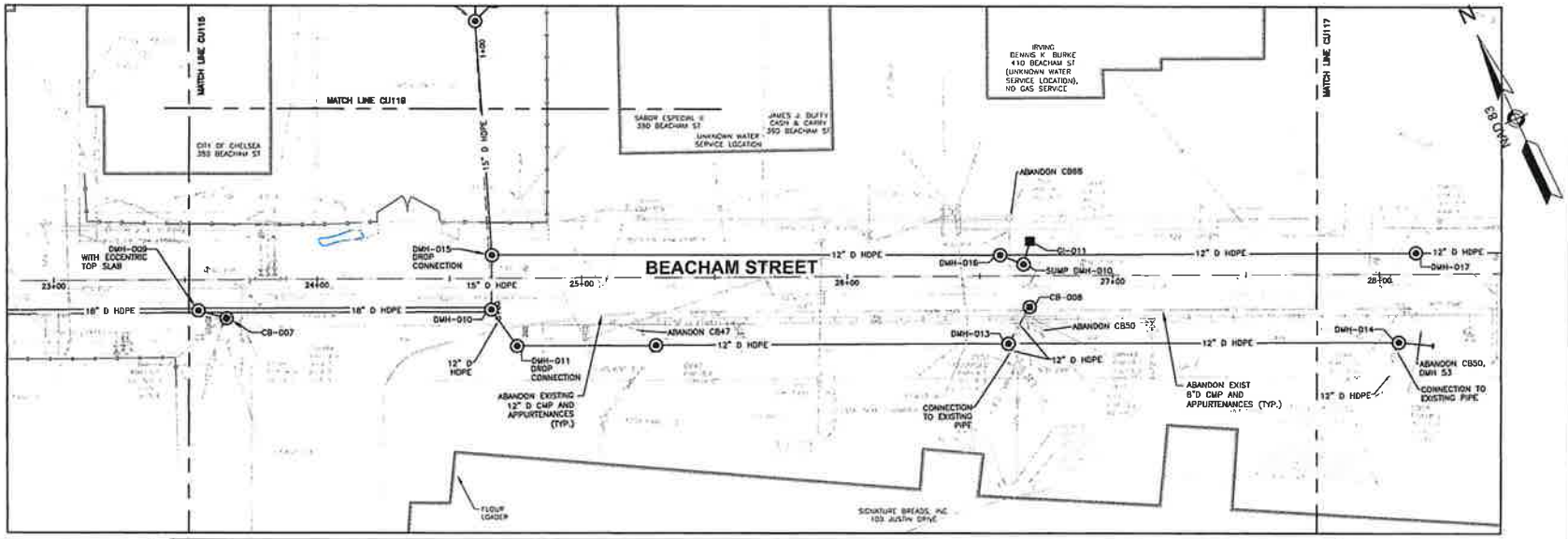
Drawing Title

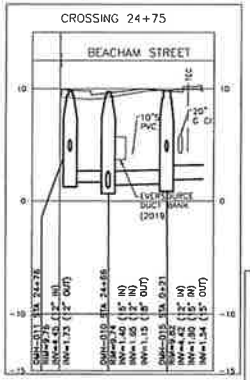
DRAIN
IMPROVEMENTS
PLAN AND
PROFILE 4 OF 8

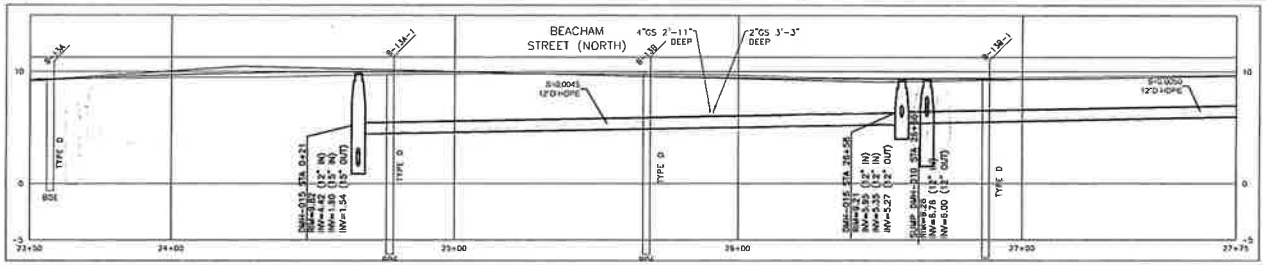
Sheet Number

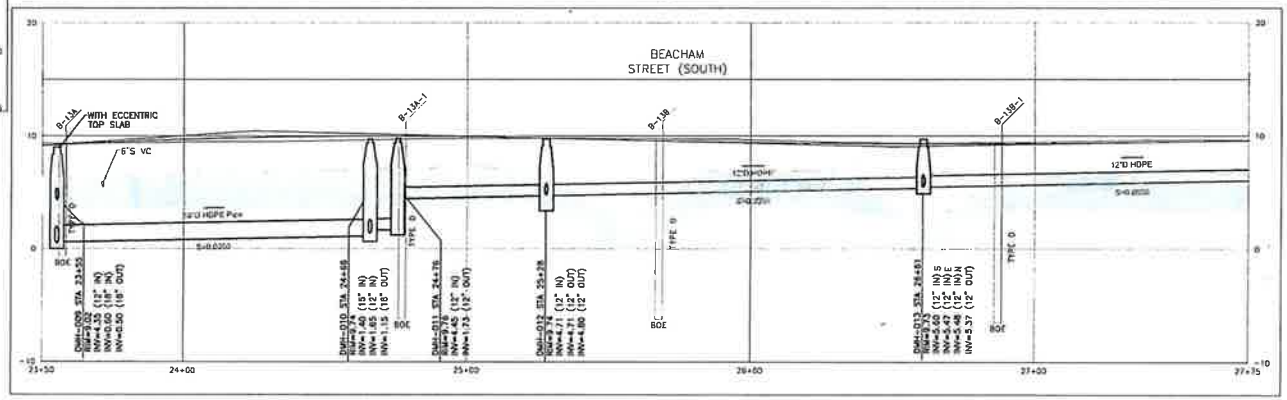
CU115

COPYRIGHT 2019 WESTON & SAMPSON









PROFILE
SCALE: 1"=20' HORIZ
1"=4' VERT

SCALE: 1"=20'

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultant:

Revisions:

No	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No 35752
COMMONWEALTH OF MASSACHUSETTS
PROFESSIONAL ENGINEER

COPYRIGHT © 2019 BY WESTON & SAMPSON THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTAINED HEREIN IS STRICTLY NOT ON OTHER PROJECTS IS PROHIBITED BY LAW

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	BIDDCYALJR
Reviewed By	RP
Approved By	LFR
W&S Project No.	2190031
W&S File No.	

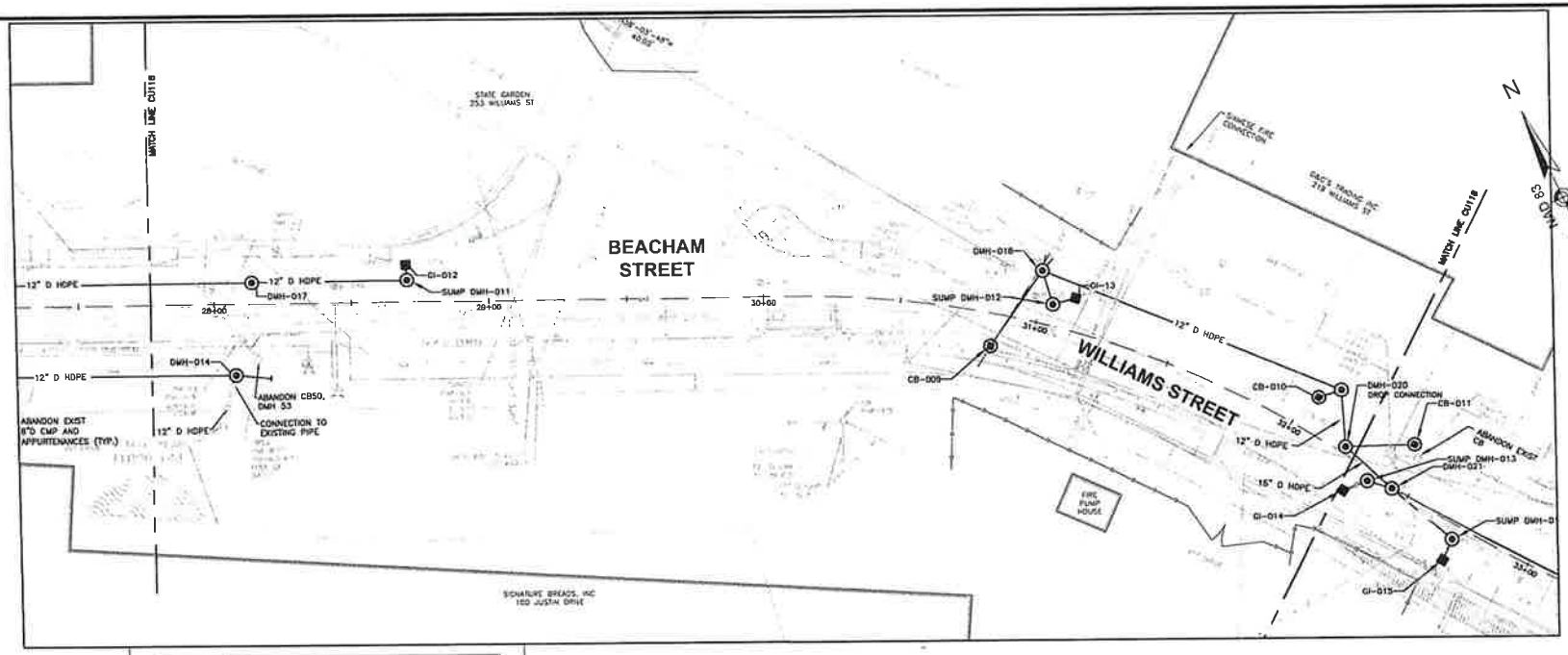
Drawing Title

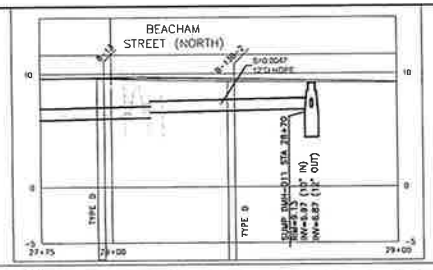
DRAIN IMPROVEMENTS PLAN AND PROFILE 5 OF 8

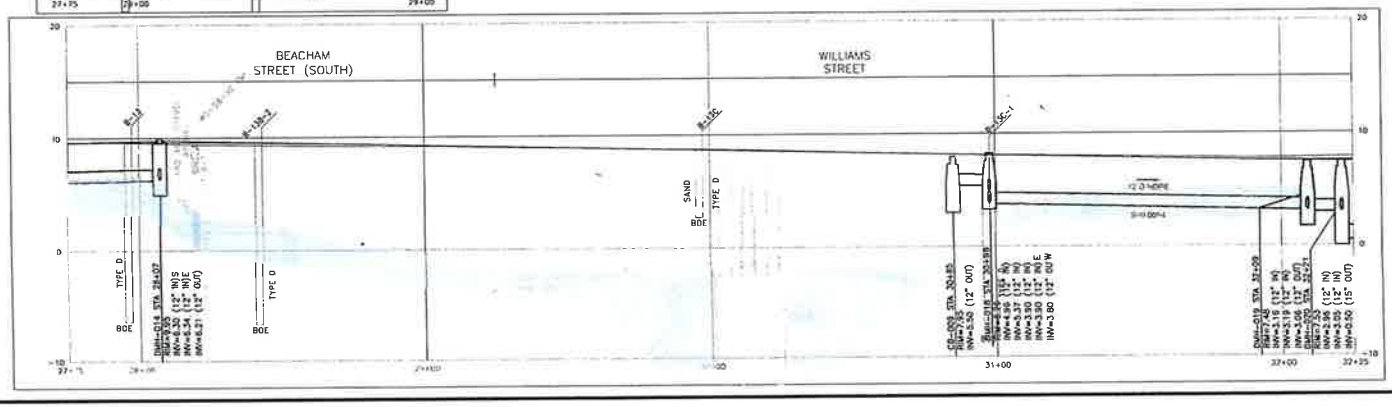
Sheet Number

CU116

COPYRIGHT 2019 WESTON & SAMPSON







PROFILE
SCALE: 1"=20' HORIZ
1"=4' VERT

SCALE: 1"=20

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800 SAMPSON
www.westonandsampson.com

Consultants

Revisions

No	Date	Description

Seal

BRUCE W. ADAMS CIVIL No 35752 MASSACHUSETTS, U.S.A.

COA

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	MMCW/JM
Reviewed By	RP
Approved By	LFK
W&S Project No.	2190031
W&S File No	

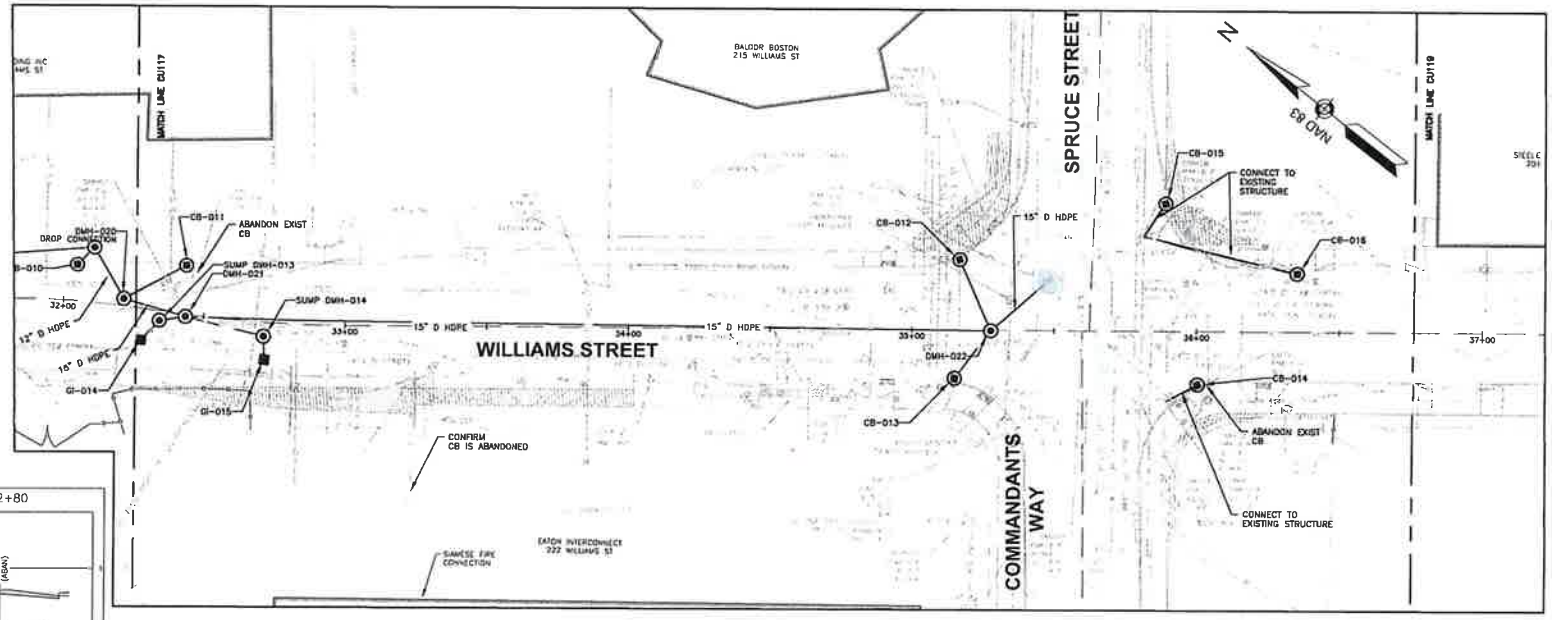
Drawing Title

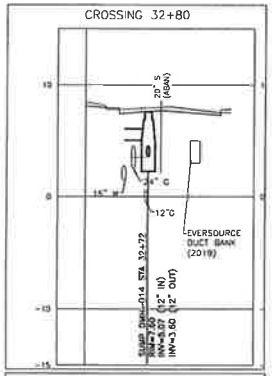
DRAIN IMPROVEMENTS PLAN AND PROFILE 6 OF 8

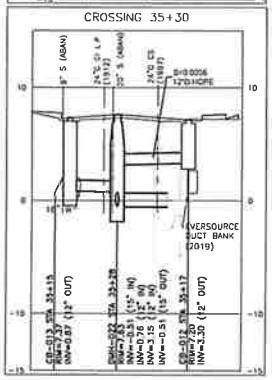
Sheet Number

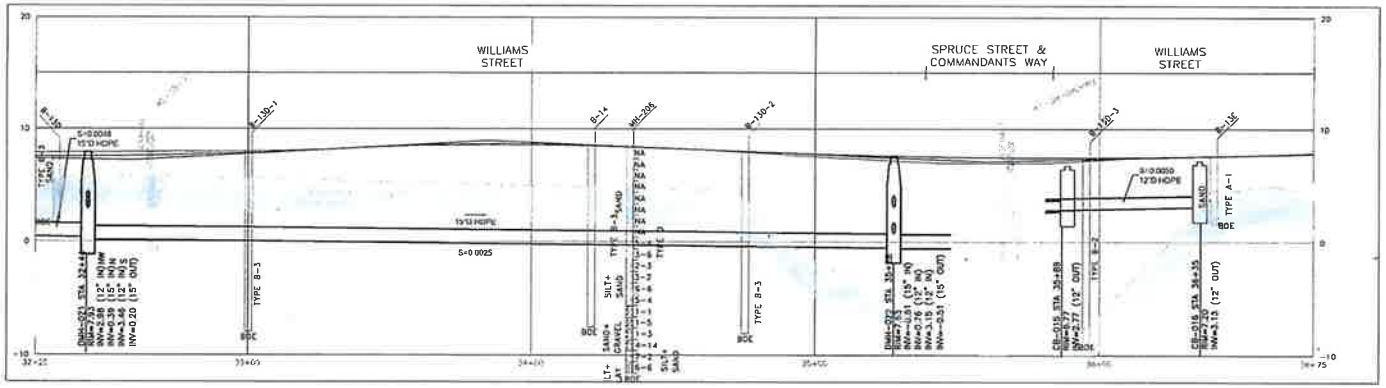
CU117

COPYRIGHT 2019 WESTON & SAMPSON









PROFILE
SCALE: 1"=20' HORIZ
1"=4' VERT

20 10 0 20 40
SCALE: 1"=20'

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions:

No.	Date	Description

Seal

BRUCE W. ADAMS
Civil
No. 35752
COMMONWEALTH OF MASSACHUSETTS
PROFESSIONAL ENGINEER

COPYRIGHT © 2019 WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE LEGITIMATE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OR UTILIZATION OF THE DRAWING CONTENT OUTSIDE OF THE CLIENT'S PROJECT AND OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale: AS NOTED

Date:

Drawn By: MD/CW/JM

Reviewed By: RP

Approved By: LFK

W&S Project No. 2190031

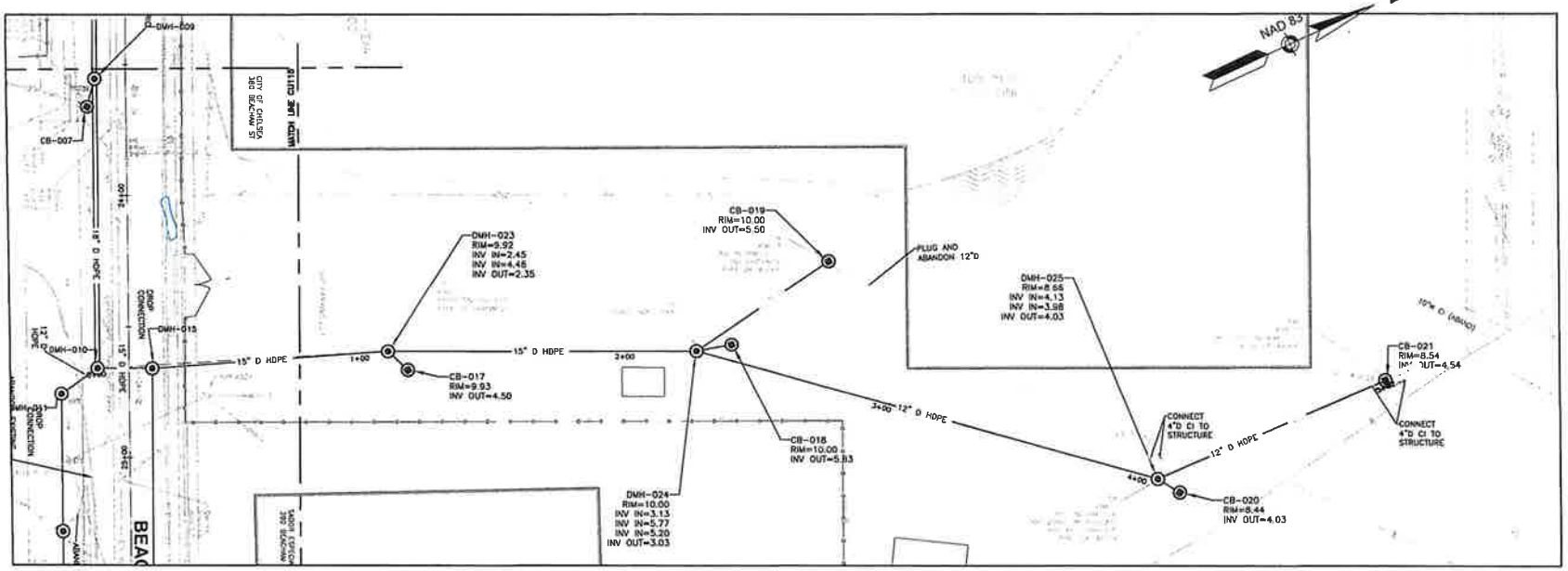
W&S File No.

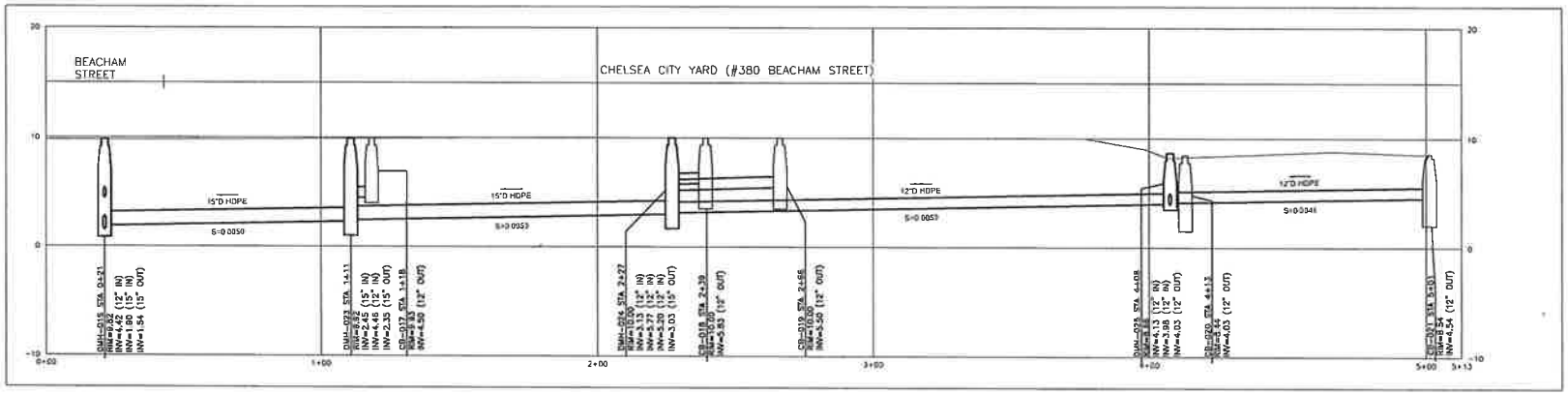
Drawing Title

DRAIN IMPROVEMENTS PLAN AND PROFILE 7 OF 8

Sheet Number

CU118





PROFILE

SCALE: 1"=20' HORIZ
1"=4' VERT

20 10 0 20 40
SCALE: 1"=20'

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

COMMONWEALTH OF MASSACHUSETTS
BRUCE W. ADAMS
CIVIL
No. 35752
REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2019 BY WESTON & SAMPSON
THE DRAWING(S) AND SPECIFICATIONS ARE PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF, UTILIZATION OF THE DRAWING CONTAINED IN OTHER PROJECTS, REPORTS AND ON OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	UD/CW/JM
Reviewed By	RP
Approved By	LFK
W&S Project No.	2150031
W&S File No.	

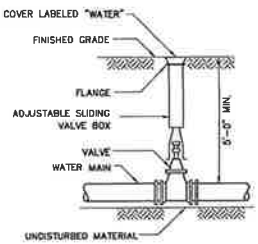
Drawing Title

DRAIN IMPROVEMENTS PLAN AND PROFILE 8 OF 8

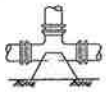
Sheet Number

CU119

COPYRIGHT 2019 WESTON & SAMPSON



VALVE AND BOX DETAIL
N.T.S.



TEE DETAIL
(PLAN VIEW)

CAP DETAIL
(PLUG SIMILAR)
(SECTION VIEW)

BEND DETAIL
(PLAN VIEW)

TABLE OF CONCRETE THRUST RESTRAINT MINIMUM BEARING AREAS IN SQUARE FEET AGAINST UNDISTURBED MATERIAL FOR WATER MAIN FITTINGS

SIZE OF MAIN	90° BENDS, TEES, CAPS AND PLUGS	45° BENDS AND WYES	22-1/2° BENDS	11-1/4° BENDS
6", 8"	5	4	2	2
10", 12"	12	9	5	2

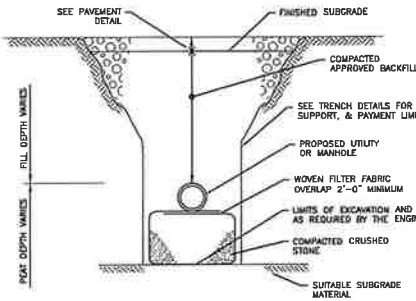
NOTES:
1. CONCRETE THRUST RESTRAINT SHALL ONLY BE USED WHERE OTHER MEANS OF RESTRAINT ARE NOT FEASIBLE.
2. CONTRACTOR SHALL USE CARE TO AVOID PLACEMENT OF CONCRETE ON THE FITTING JOINTS

CONCRETE THRUST RESTRAINT FOR FITTINGS
N.T.S.

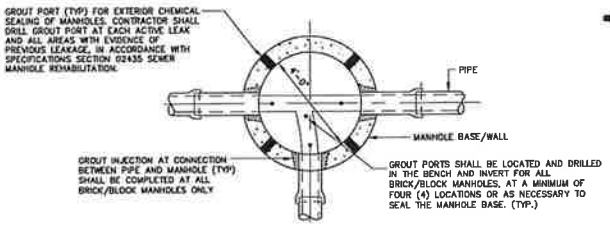
TABLE 1
REQUIRED LENGTH OF RESTRAINED JOINTS FROM FITTINGS IN FEET

PIPE SIZE	90° BEND	45° BEND OR WYE BRANCH	22 1/2° BEND	11 1/4° BEND	PLUG, CAP OR IN-LINE VALVE	TEE (BRANCH)
6"	25 (30.5)	10.5 (12.5)	5 (6)	2.5 (3)	43 (64)	34 (51)
8"	33 (40)	13.5 (16.5)	6.5 (8)	3 (4)	55 (82)	47 (70)
10"	40 (48.5)	16.5 (20)	8 (9.5)	4 (5)	67 (100)	58 (87)
12"	47 (56.5)	19.5 (23.5)	9.5 (11.5)	4.5 (5.5)	79 (118)	70 (105)
16"	58.5 (72)	24.5 (30)	12 (14.5)	6 (7)	101 (152)	92 (139)
20"	72 (86.5)	30 (36)	14.5 (17)	7 (8.5)	123 (184)	114 (171)
24"	84 (100)	35 (41)	16.5 (20)	8 (10)	144 (216)	134 (202)
30"	100 (120)	41 (50)	20 (24)	10 (12)	174 (261)	165 (247)

NOTES:
1. RESTRAINED LENGTHS LISTED IN PARENTHESES ARE FOR PIPE WRAPPED IN POLYETHYLENE. THE OTHER ASSOCIATED LENGTHS ARE FOR PLAIN UNWRAPPED DUCTILE IRON PIPE.
2. THE CONTRACTOR SHALL USE THIS TABLE IN CONJUNCTION WITH THE APPROPRIATE PIPE SPECIFICATION SECTION.



OVER-EXCAVATION UTILITY INSTALLATION DETAIL
N.T.S.



4'-0" DIA. MANHOLE SEALING PLAN
N.T.S.

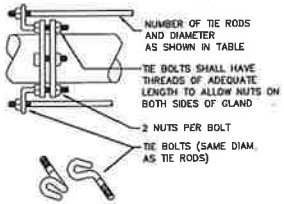
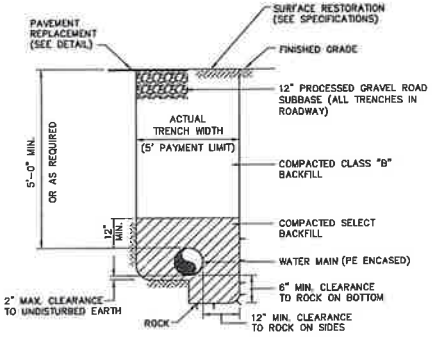


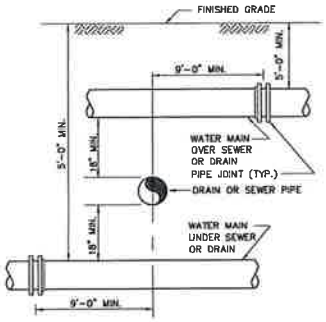
TABLE OF TIE RODS		
PIPE SIZE	TIE ROD NO.	TIE ROD DIA.
6"	2	1/2"
8"	2	5/8"
10"	2	3/4"
12"	4	3/4"

NOTE:
TIE ROD JOINT RESTRAINT SHALL ONLY BE USED WHERE OTHER MEANS OF RESTRAINT ARE NOT FEASIBLE.

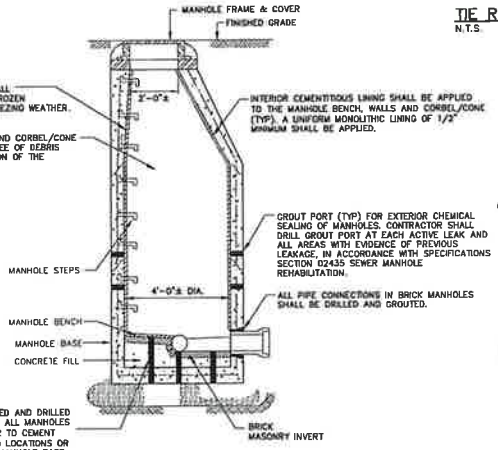
TIE ROD JOINT RESTRAINT DETAIL
N.T.S.



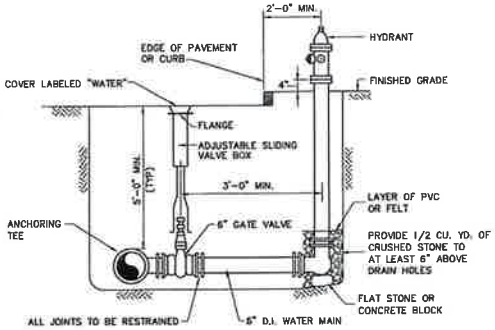
WATER MAIN TRENCH DETAIL
N.T.S.



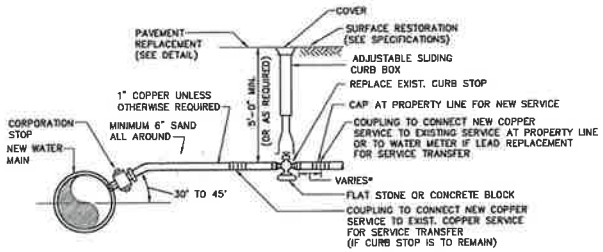
SEWER OR DRAIN CROSSING DETAIL
N.T.S.



4'-0"± DIA. MANHOLE CEMENTITIOUS LINING DETAIL
N.T.S.



HYDRANT AND VALVE DETAIL
N.T.S.



NOTE: PROVIDE SADDLE FOR ALL AC AND PVC MAINS AND ALL 2" OR LARGER STOPS

*1' FOR CONNECTION TO NON LEAD SERVICE
*VARIES BASED ON DISTANCE FROM CURB STOP

WATER SERVICE DETAIL
N.T.S.

Project:

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 ROB.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No. 35752
COMMONWEALTH OF MASSACHUSETTS
PROFESSIONAL ENGINEER

COPYRIGHT © 2019 WESTON & SAMPSON
THE DRAWINGS, SPECIFICATIONS, PLANS, REPORTS, PAPERS AND OTHER DOCUMENTS PREPARED BY WESTON & SAMPSON FOR THE CLIENT & PROJECT NAMED ARE THE PROPERTY OF WESTON & SAMPSON. THE REPRODUCTION, ALTERATION OR REPUBLICATION OF THESE DRAWINGS, SPECIFICATIONS, PLANS, REPORTS, PAPERS AND OTHER DOCUMENTS PREPARED BY WESTON & SAMPSON FOR OTHER PROJECTS IS PROHIBITED. WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For:

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	CFW
Reviewed By	TPC
Approved By	BWA
W&S Project No.	2190031
W&S File No.	

Drawing Title

UTILITY DETAILS 1 OF 3

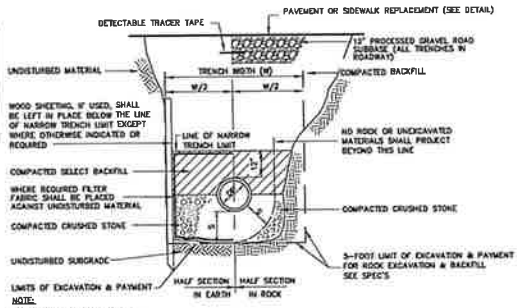
Sheet Number

CU501

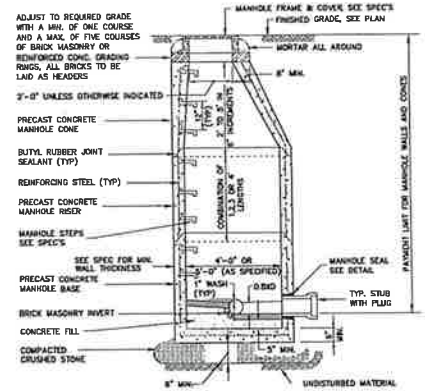
© COPYRIGHT 2019 WESTON & SAMPSON

DEPTH TO INVERT	DIAMETER OF PIPE (DP)	MAXIMUM TRENCH WIDTH BELOW LINE OF NARROW TRENCH LIMIT (SHEETED OR UNSHEETED) (W)	MINIMUM CLEARANCE (S)
0-12'	TO 18"	5'	6"
0-12'	21"-24"	5'	7-1/2"
0-12'	27"-36"	6'	9"
OVER 12'	TO 18"	7'	6"
OVER 12'	21"-24"	7'	7-1/2"

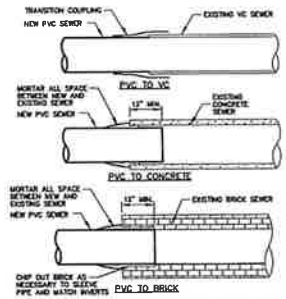
TABLE A



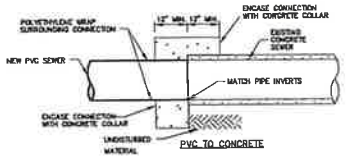
TRENCH DETAIL
(SEWER OR DRAIN)
N.T.S.

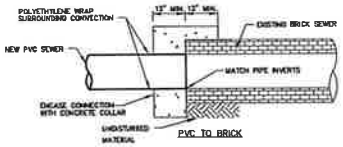


PRECAST
CONCRETE MANHOLE DETAIL
N.T.S.

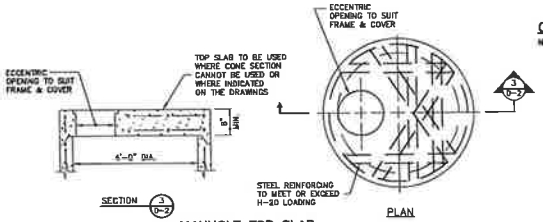


SEWER TRANSITION DETAILS – DOWNSTREAM CONNECTION
N.T.S.



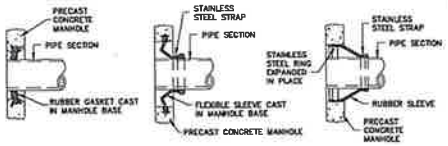


SEWER TRANSITION DETAILS – UPSTREAM CONNECTIONS
N.T.S.

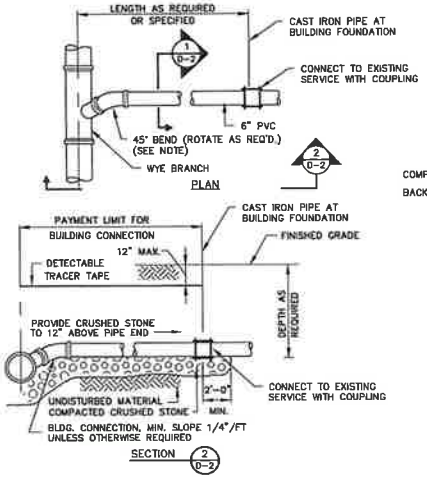


MANHOLE TOP SLAB
N.T.S.

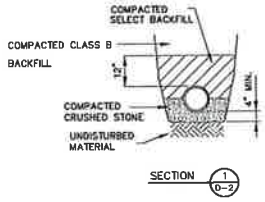
NOTE:
THE "DROP OVER" SECTION SHALL BE INDEPENDENTLY SUPPORTED TO ALLOW FOR PROPER CURING OF THE BASE SLAB



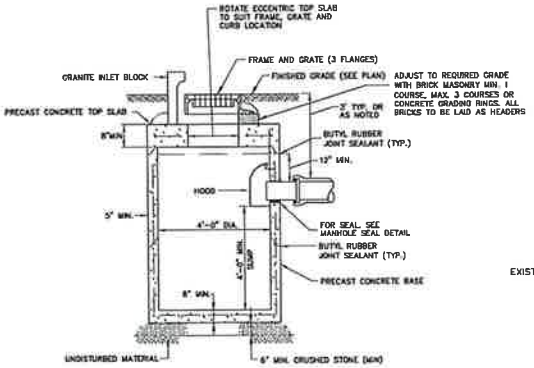
MANHOLE SEAL DETAILS
N.T.S.



TYPICAL BUILDING CONNECTION DETAIL
N.T.S

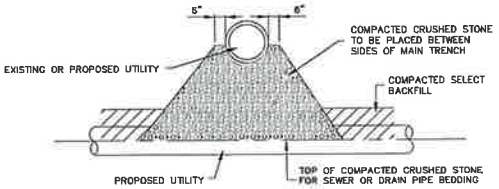


NOTE:
BE SURE THAT END OF BELL ON WYE BRANCH DOES NOT RUB ON UNDERSIDE OF 45° BEND.



NOTE:
1. STEEL REINFORCING TO MEET OR EXCEED H20 LOADING.
2. REFER TO GENERAL NOTE 38 ON SHEET CG101 FOR REQUIREMENTS ON DRAIN LATERAL PIPE MATERIAL.

PRECAST CATCH BASIN DETAIL
N.T.S.



UTILITY CROSSING DETAIL
N.T.S.

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No	Date	Description

Seal

COMMONWEALTH OF MASSACHUSETTS
BRUCE W. ADAMS
CIVIL
No. 35752
PROFESSIONAL ENGINEER

COPYRIGHT © 2018 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTAINED BY OTHER CLIENTS, FIRMS AND ON OTHER PROJECTS IS PROHIBITED BY LAW

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	CRW
Reviewed By	TPC
Approved By	SWA
W&S Project No.	3130031
W&S File No.	

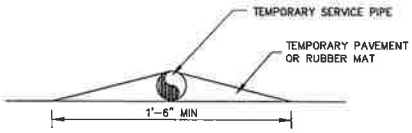
Drawing Title

UTILITIES DETAILS 2 OF 3

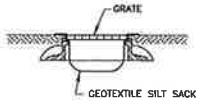
Sheet Number

CU502

COPYRIGHT 2018 WESTON & SAMPSON



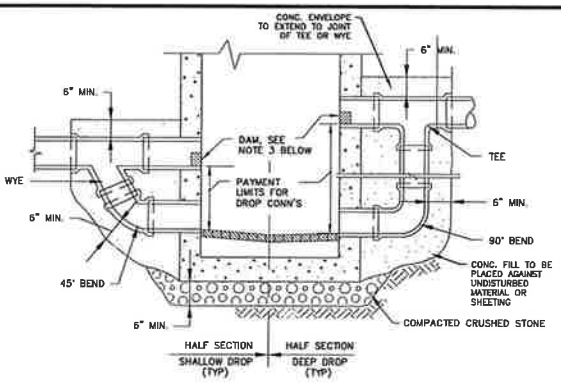
2" TEMPORARY SERVICE PIPE DRIVEWAY CROSSING DETAIL
N.T.S.



NOTES:

1. SILT SACK SHALL BE AN APPROVED PROPRIETARY GEOTEXTILE UNIT. SILT FENCING CAN NOT BE UTILIZED.
2. CONTRACTOR TO CLEAN AND INSPECT SILT SACK REGULARY AND AFTER EVERY MAJOR WEATHER EVENT.
3. SILT SACK SHALL BE SECURED AS DIRECTED BY THE MANUFACTURER TO PREVENT UNIT FROM FALLING INTO THE CATCH BASIN WHEN GRATE IS REMOVED.
4. CONTRACTOR SHALL INSTALL ALL CATCH BASIN PROTECTION WITHIN PROJECT LIMITS PRIOR TO COMMENCEMENT OF WORK.

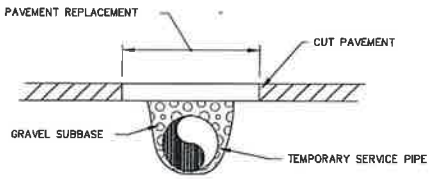
CATCH BASIN PROTECTION DETAIL
N.T.S.



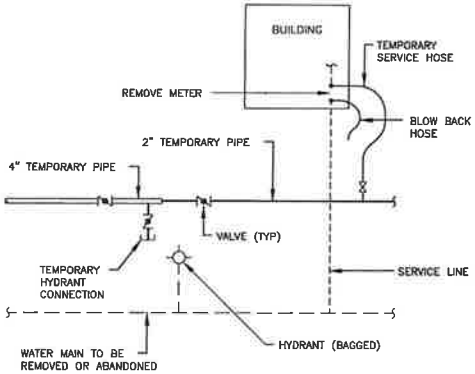
NOTES:

1. DROP PIPE TO BE SAME DIAMETER AS DRAIN DISCHARGE INTO MANHOLE UNLESS OTHERWISE SHOWN ON DRAWINGS.
2. DIMENSIONS & CONSTRUCTION OF DROP MANHOLE TO BE SIMILAR TO TYPICAL MANHOLE EXCEPT AS SHOWN.
3. FOR HDPE PIPE, EPOXY HALF PLUG TO PIPE.

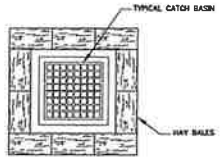
DROP CONNECTION DETAIL
N.T.S.



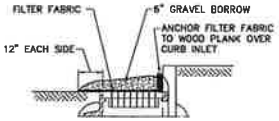
TEMPORARY SERVICE PIPE ROADWAY CROSSING DETAIL
N.T.S.



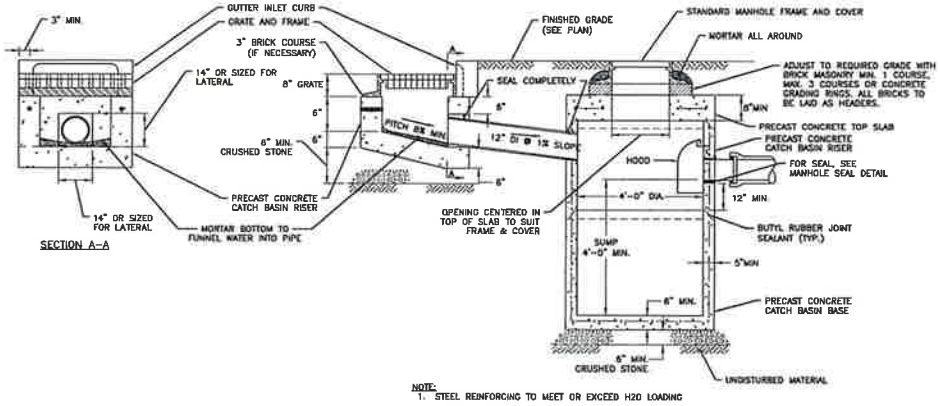
TEMPORARY WATER SERVICE DETAIL
N.T.S.



CATCH BASIN PROTECTION DETAIL
N.T.S.



CATCH BASIN INLET PROTECTION DETAIL
N.T.S.



NOTE:
1. STEEL REINFORCING TO MEET OR EXCEED H20 LOADING

GUTTER INLET AND SUMP MANHOLE DETAIL
N.T.S.

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultant

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 35752

COPYRIGHT © 2019 BY WESTON & SAMPSON THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION OR RELEASE OF DISTRIBUTION OF THE DRAWINGS CONTAINED BY OTHER PARTIES TO OTHER PROJECTS IS PROHIBITED WITHOUT

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued for

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	CFW
Reviewed By	TPC
Approved By	BWA
W&S Project No.	2190035
W&S File No.	

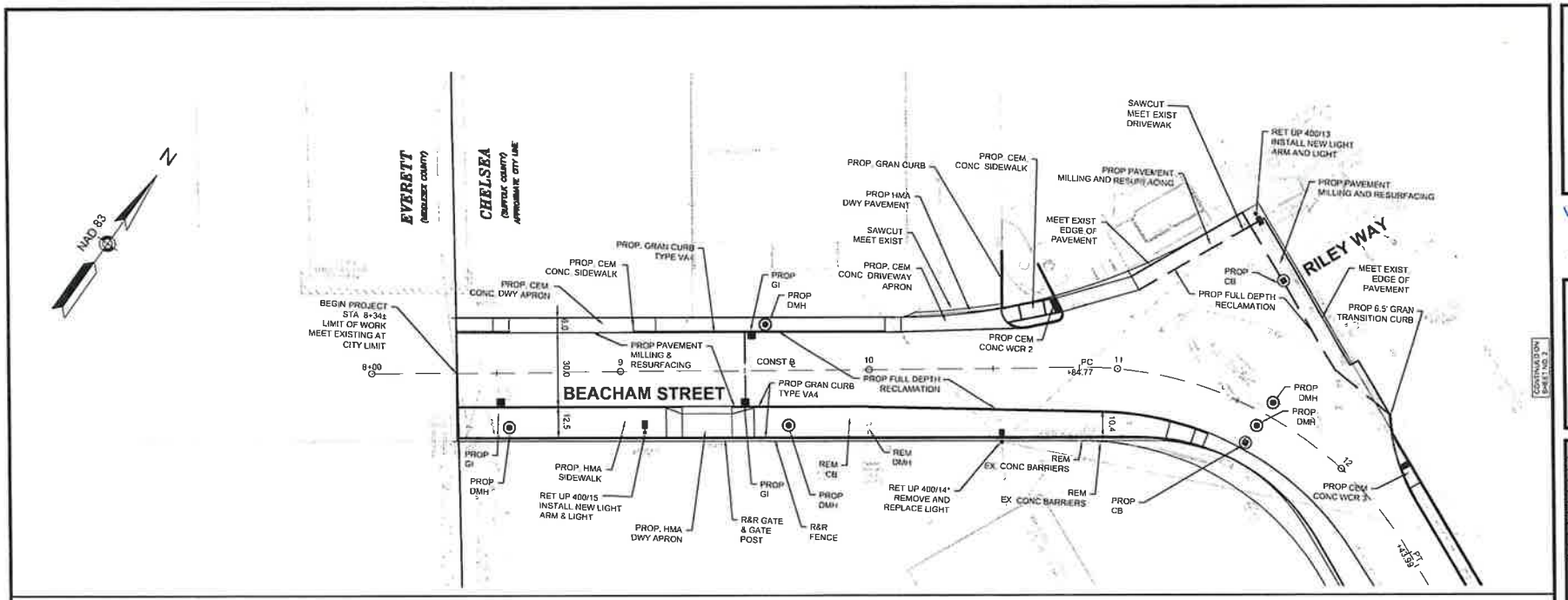
Drawing Title

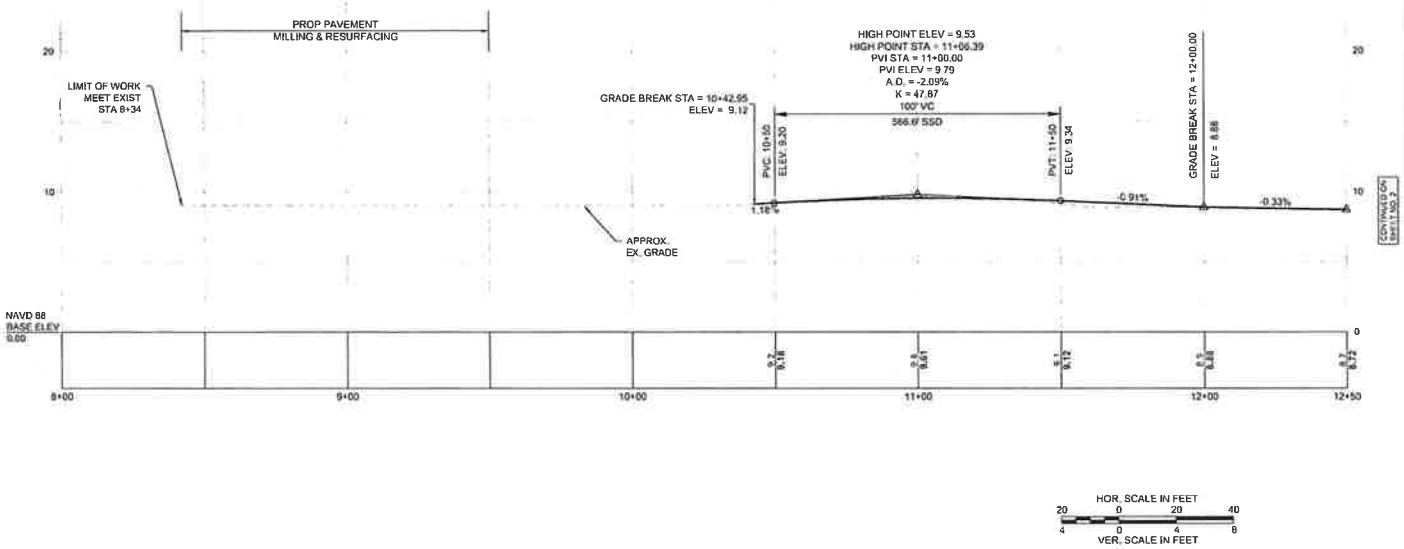
UTILITY DETAILS 3 OF 3

Sheet Number

CU503

COPYRIGHT 2019 WESTON & SAMPSON





Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No. 35752
REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS

COA
COPYRIGHT © 2019 BY WESTON & SAMPSON
THE DRAWINGS AND JOB SPECIFICATIONS ARE THE EXCLUSIVE USE OF THIS CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWINGS CONTAINED BY OTHER PARTIES TO THIS AND ON OTHER PROJECTS IS PROHIBITED BY LAW

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED WITHIN

Issued for

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	MRD
Reviewed By	RKP
Approved By	LPK
W&S Project No.	[illegible]
W&S File No.	

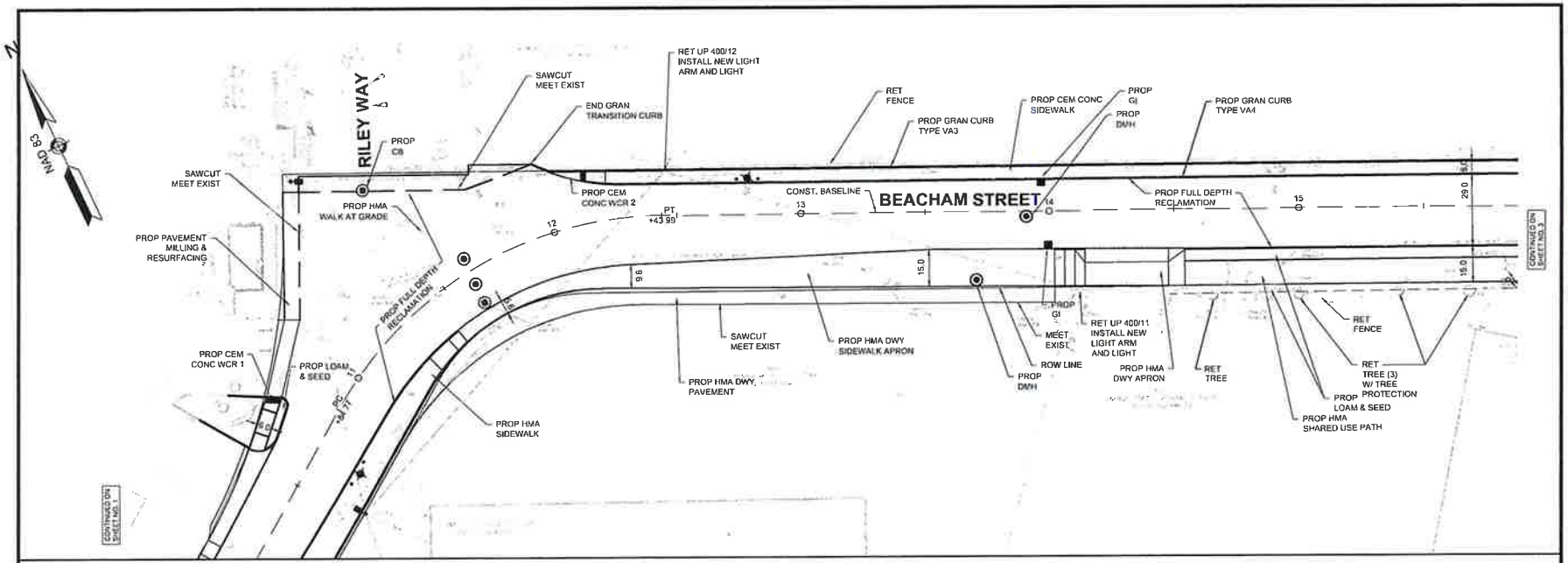
Drawing Title

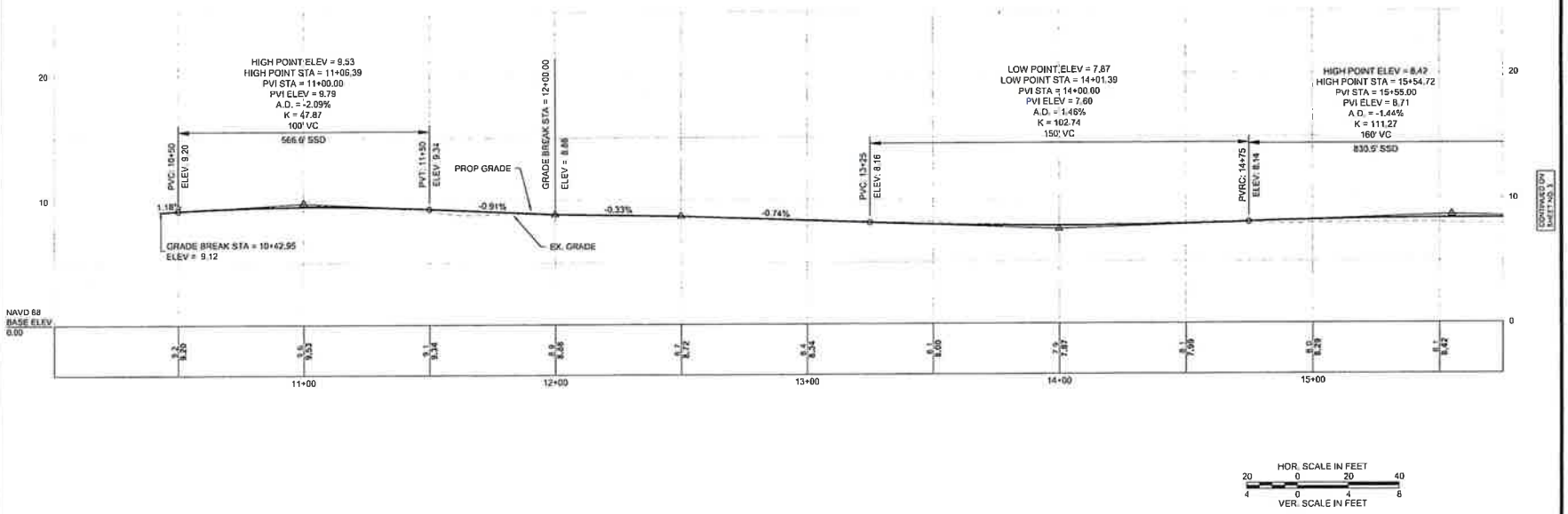
ROADWAY CONSTRUCTION PLAN AND PROFILE 1 OF 10

Sheet Number

CT101

COPYRIGHT 2019 WESTON & SAMPSON





Project:

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants:

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 35352 COMMONWEALTH OF MASSACHUSETTS PROFESSIONAL ENGINEER

COA
COPYRIGHT © 2018 BY WESTON & SAMPSON THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OR UTILIZATION OF THE DRAWING CONTENT BY OTHER CLIENTS, PERSONS AND ENGINEERS PROJECTS IS PROHIBITED BY LAW.
WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For:

DRAFT DESIGN

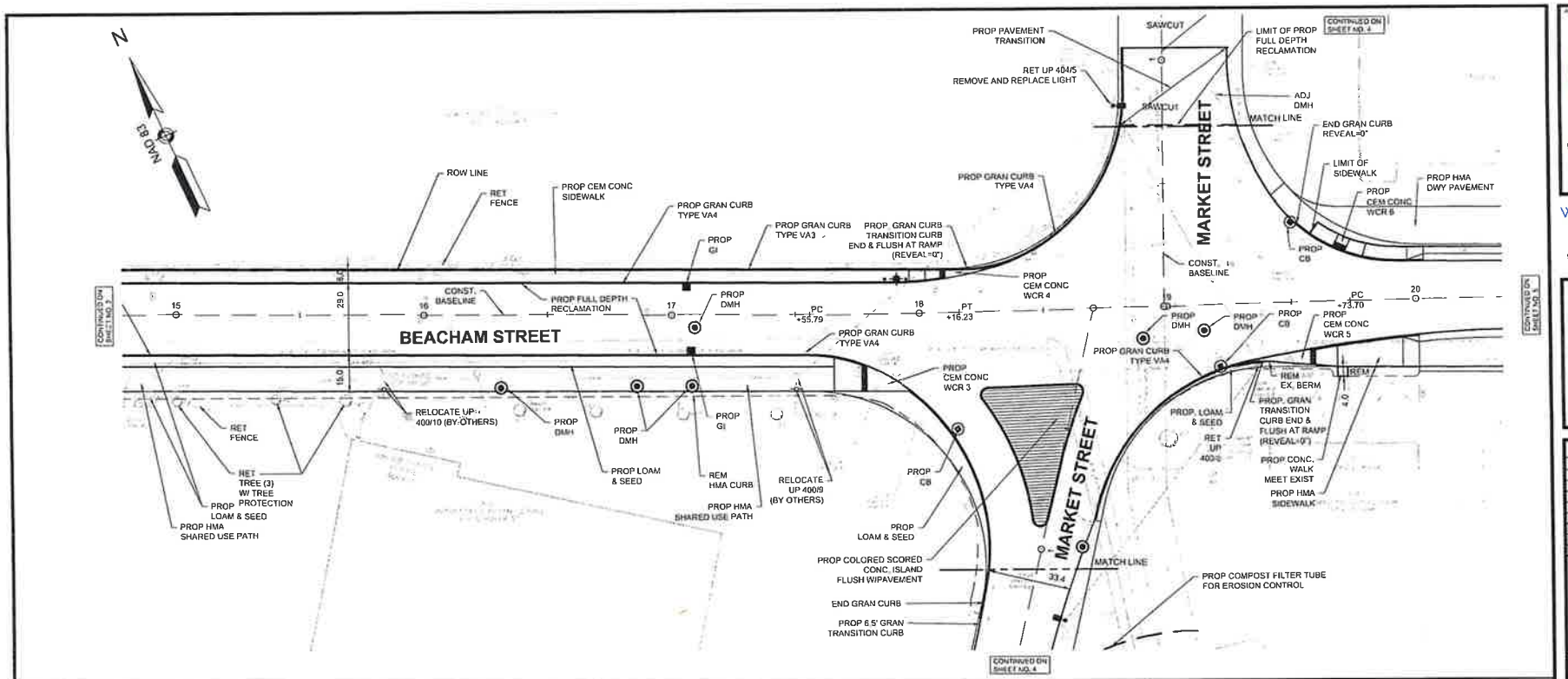
Scale	AS NOTED
Date	
Drawn By	MRD
Reviewed By	RKP
Approved By	LFK
W&S Project No.	2180CH
WAS File No	

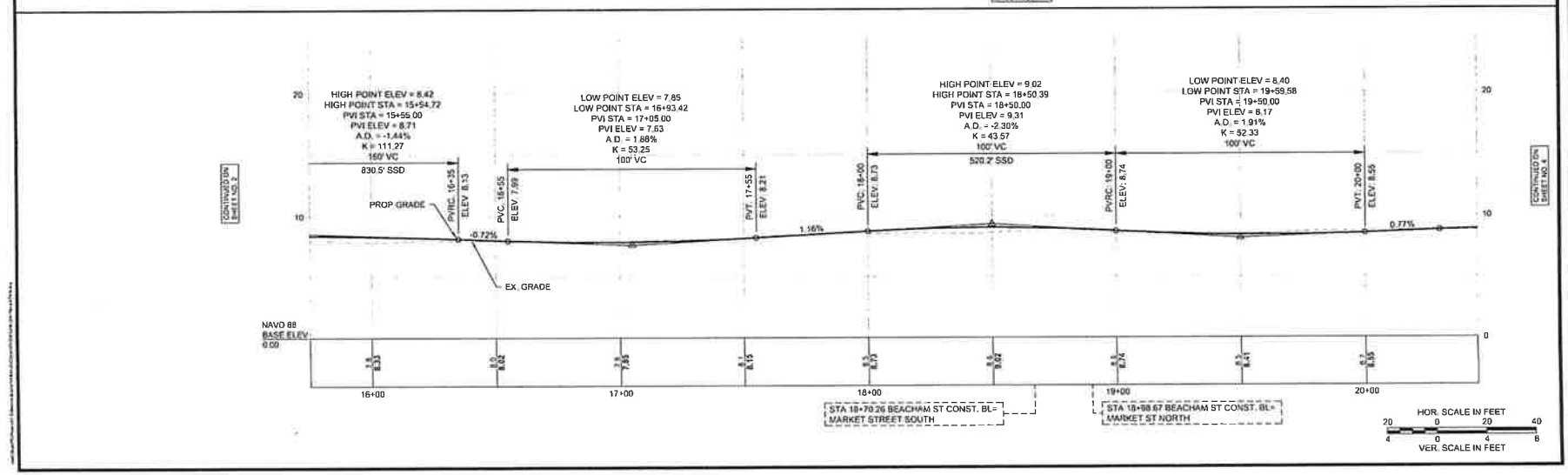
Drawing Title

ROADWAY CONSTRUCTION PLAN AND PROFILE 2 OF 10

Sheet Number

CT102





BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

COMMONWEALTH OF MASSACHUSETTS BRUCE W. ADAMS CIVIL No. 35752 REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2019 WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF OR ALTERATION OF THE DRAWING CONTAINED BY OTHER CLIENTS OR FOR ANY OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE RIGHTS OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued for

DRAFT DESIGN

Scale AS NOTED

Date

Drawn By MRD

Reviewed By TKP

Approved By LPK

W&S Project No. [illegible]

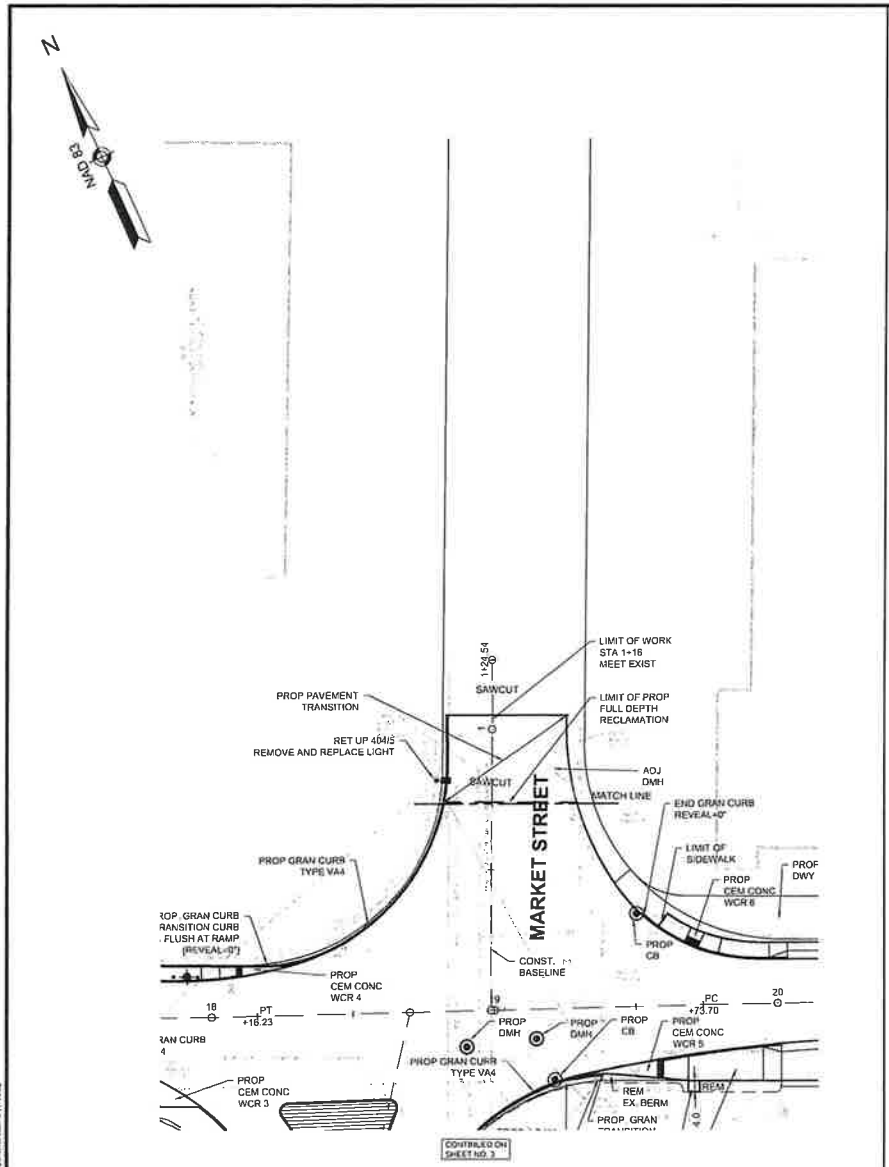
W&S File No.

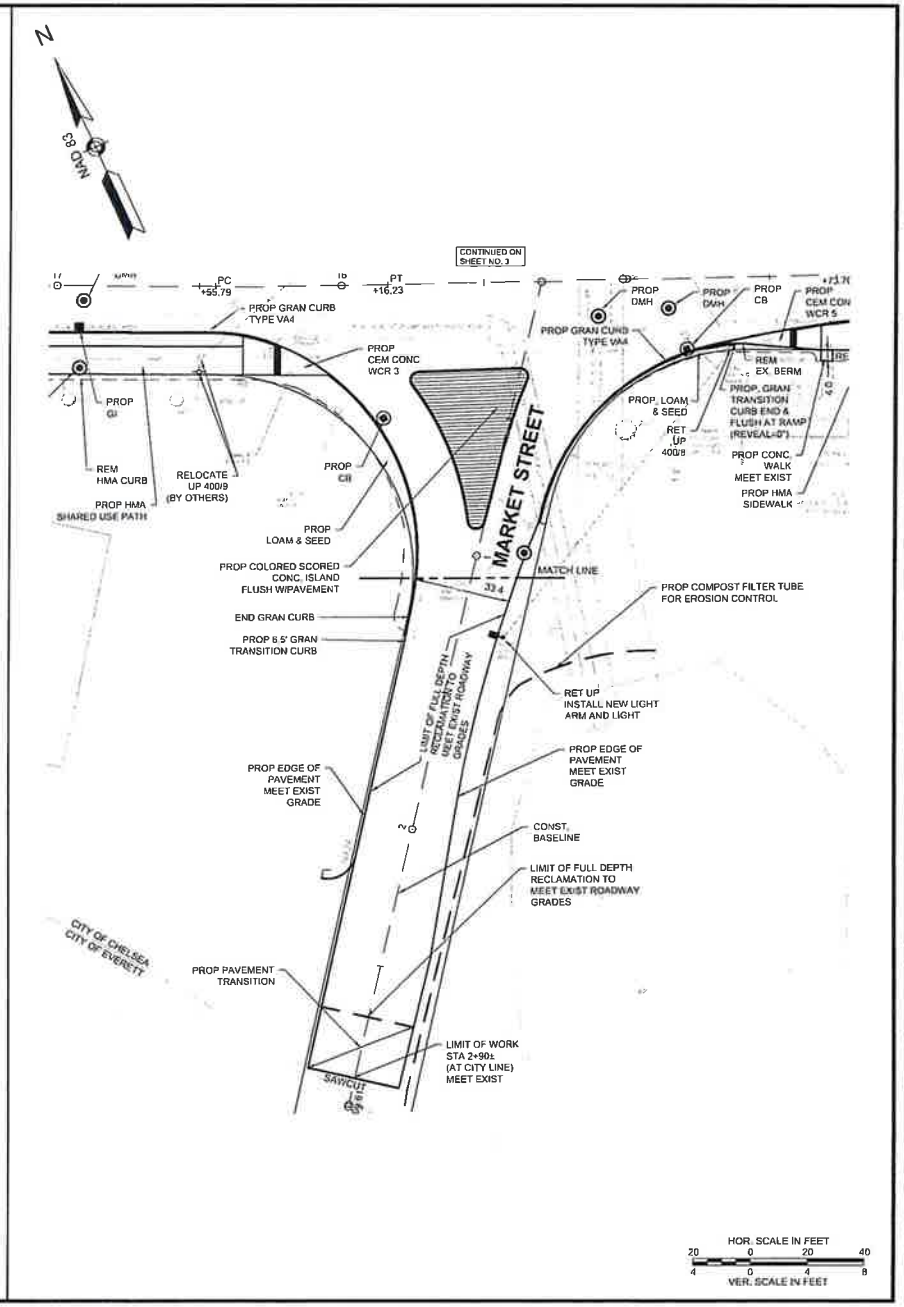
Drawing Title

ROADWAY CONSTRUCTION PLAN AND PROFILE SHEET 3 OF 10

Sheet Number

CT103





Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 WESTON & SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

COMMONWEALTH OF MASSACHUSETTS
BRUCE W. ADAMS
CIVIL
No. 35752
REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2019 BY WESTON & SAMPSON
THIS DRAWING WAS SOLELY PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF INFORMATION OF THE DRAWING CONTAINS OPINIONS, ESTIMATES AND ON OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	MRD
Reviewed By	RKP
Approved By	LFK
W&S Project No.	15190081
W&S File No.	

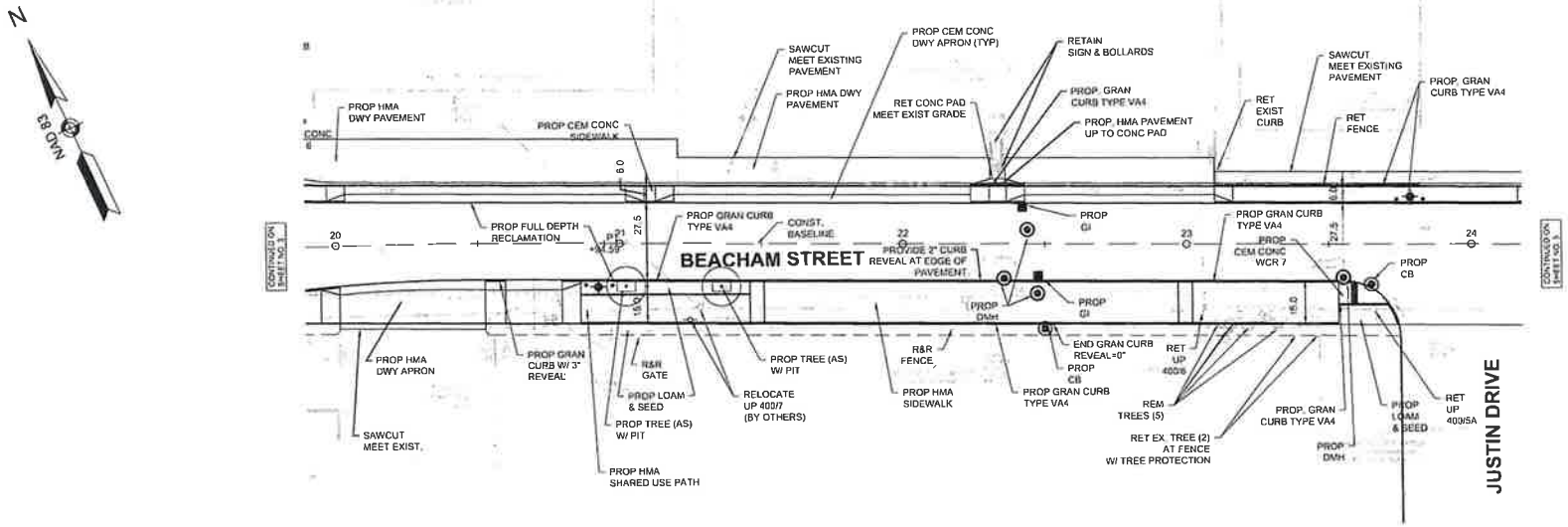
Drawing Title

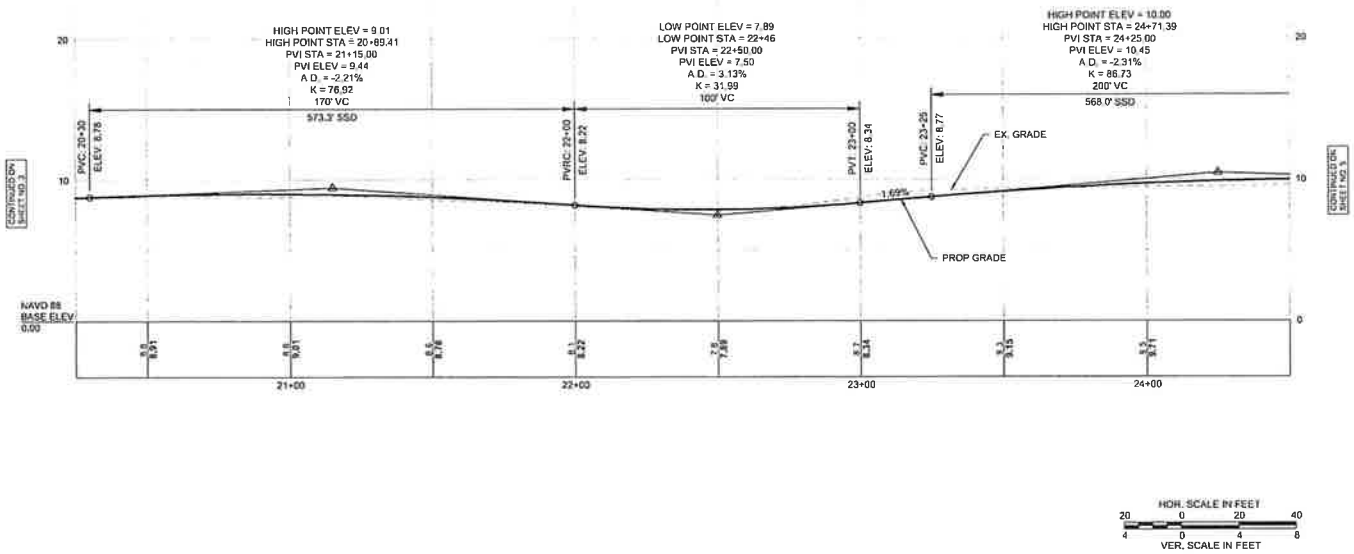
ROADWAY CONSTRUCTION PLAN AND PROFILE SHEET 4 OF 10

Sheet Number

CT104

COPYRIGHT 2019 WESTON & SAMPSON





Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON

Consultants

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS CO. No. 35752 REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2019 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTAINED IN THIS DOCUMENT AND ON OTHER PROJECTS IS PROHIBITED BY LAW.
WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale: AS NOTED

Date

Drawn By: MAD

Reviewed By: RKP

Approved By: LFK

W&S Project No. 21 00031

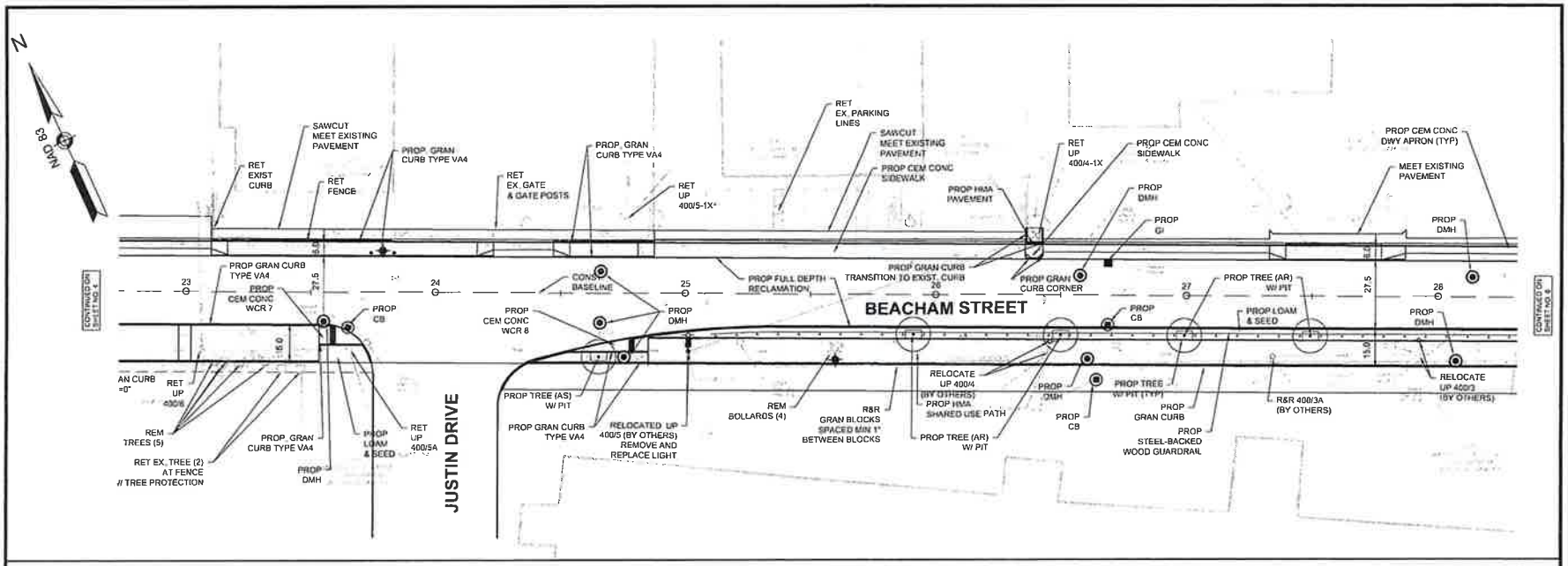
W&S File No.

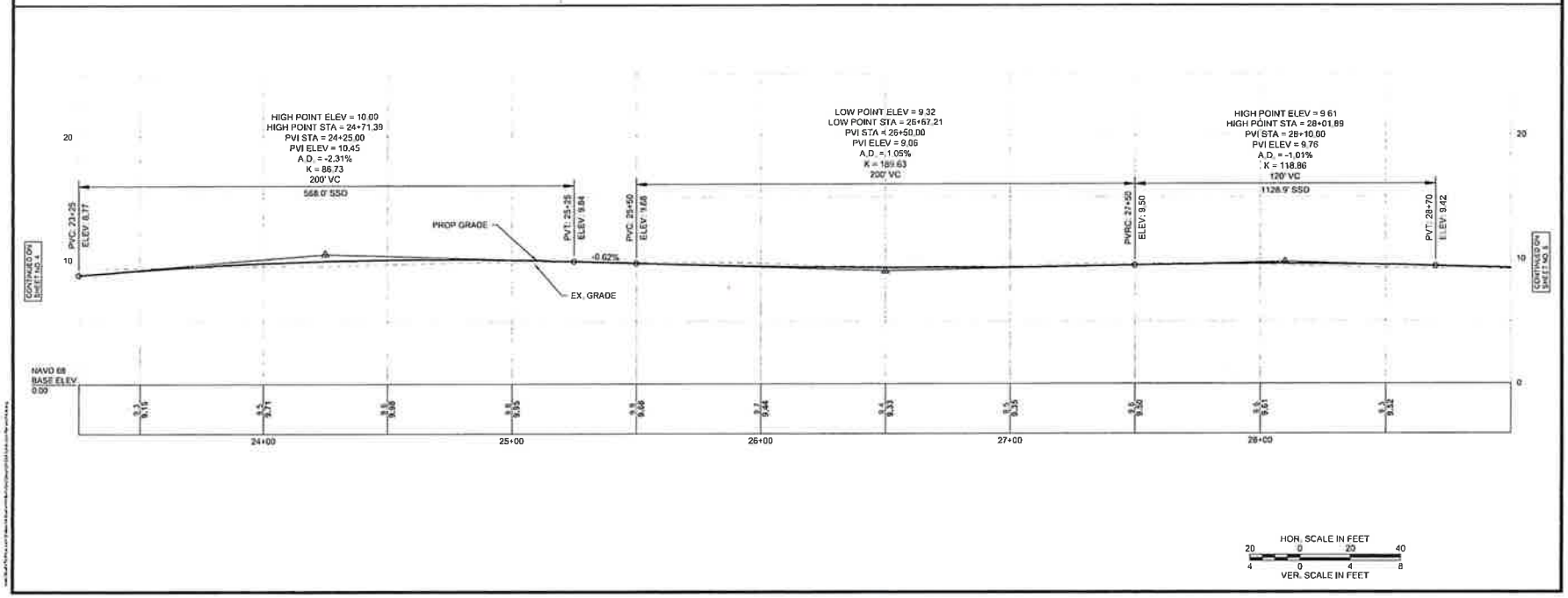
Drawing Title

ROADWAY CONSTRUCTION PLAN AND PROFILE 5 OF 10

Sheet Number

CT105





Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No. 35752
COMMONWEALTH OF MASSACHUSETTS
PROFESSIONAL ENGINEER

COPYRIGHT © 2018 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THIS DRAWING CONTAINS PROPRIETARY TERMS AND CONDITIONS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN

Issued for

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	MRD
Reviewed By	RKP
Approved By	LFK
WBS Project No.	2150031
WBS File No.	

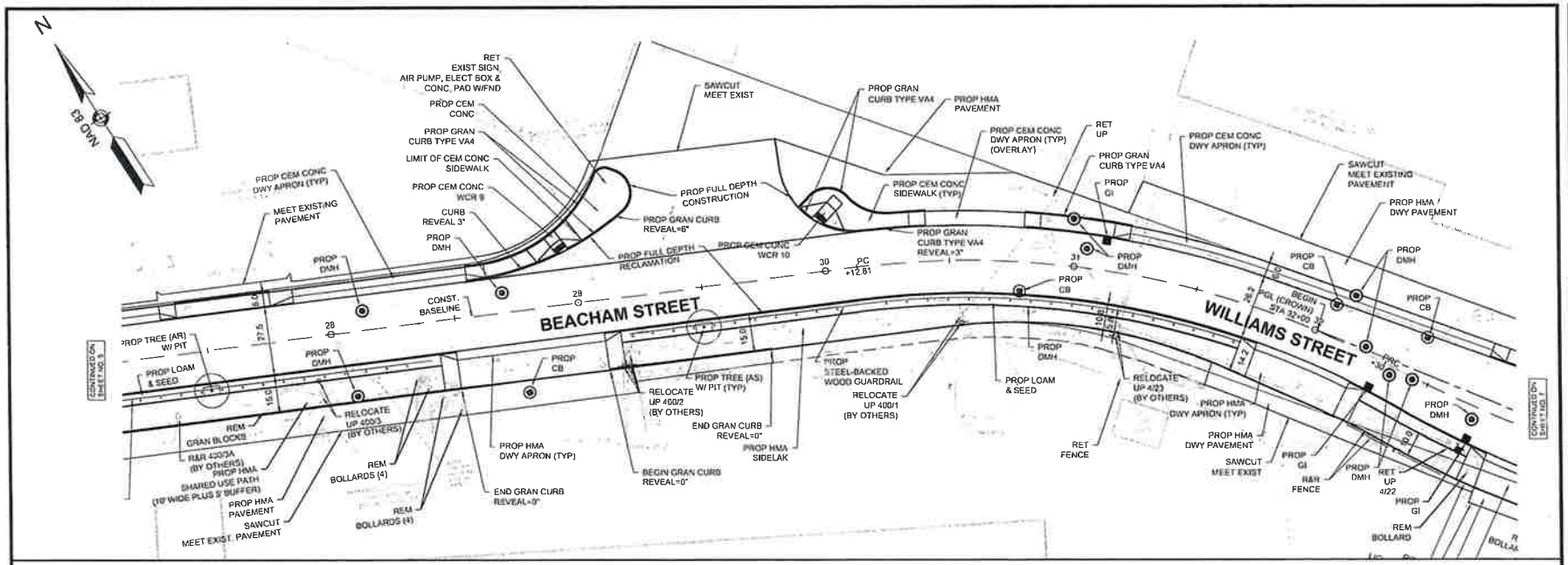
Drawing Title

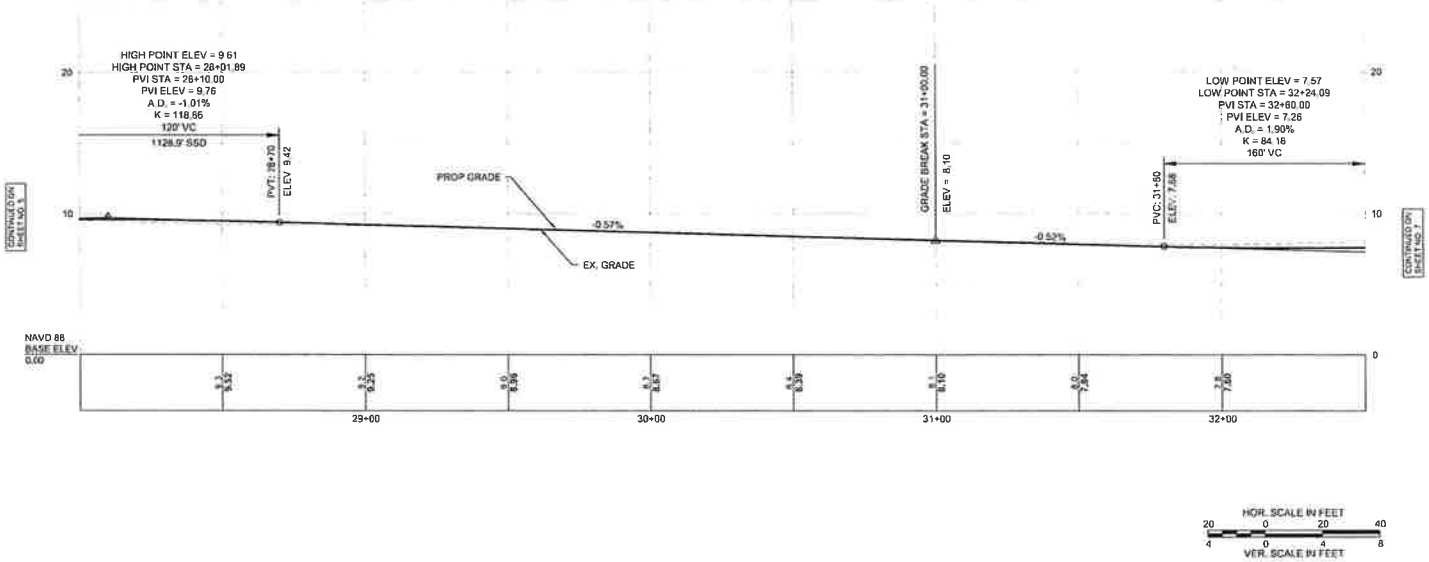
ROADWAY CONSTRUCTION PLAN AND PROFILE 6 OF 10

Sheet Number

CT106

COPYRIGHT 2018 WESTON & SAMPSON





Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions		
No.	Date	Description

Seal

BRUCE W. ADAMS
CIVIL
No. 35752
REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS

COPYRIGHT © 2019 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTAINED BY OTHERS THAN THE CLIENT FOR THE PROJECT IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN

Issued For

DRAFT DESIGN

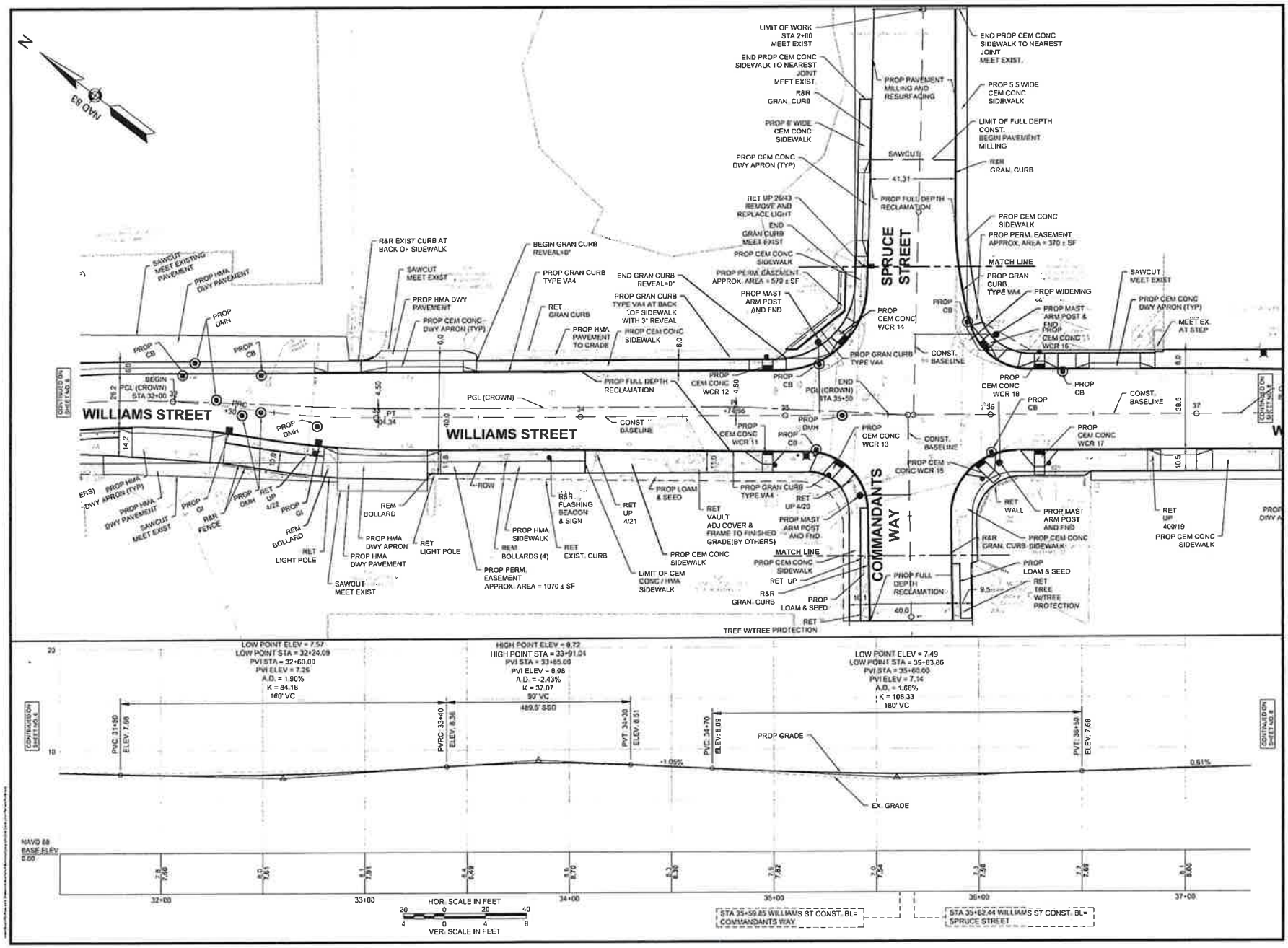
Scale	AS NOTED
Date	
Drawn By	MRD
Reviewed By	RKP
Approved By	LFK
W&S Project No.	2190031
W&S File No.	

Drawing Title

ROADWAY CONSTRUCTION PLAN AND PROFILE
7 OF 10

Sheet Number

CT107



BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900
800.SAMPSON

Consultants

Revisions

No.	Date	Description

Seal

COPYRIGHT © 2019 WESTON & SAMPSON

Issued For

DRAFT DESIGN

Scale AS NOTED

Date

Drawn By MRD

Reviewed By RKP

Approved By LFK

W&S Project No. 2190031

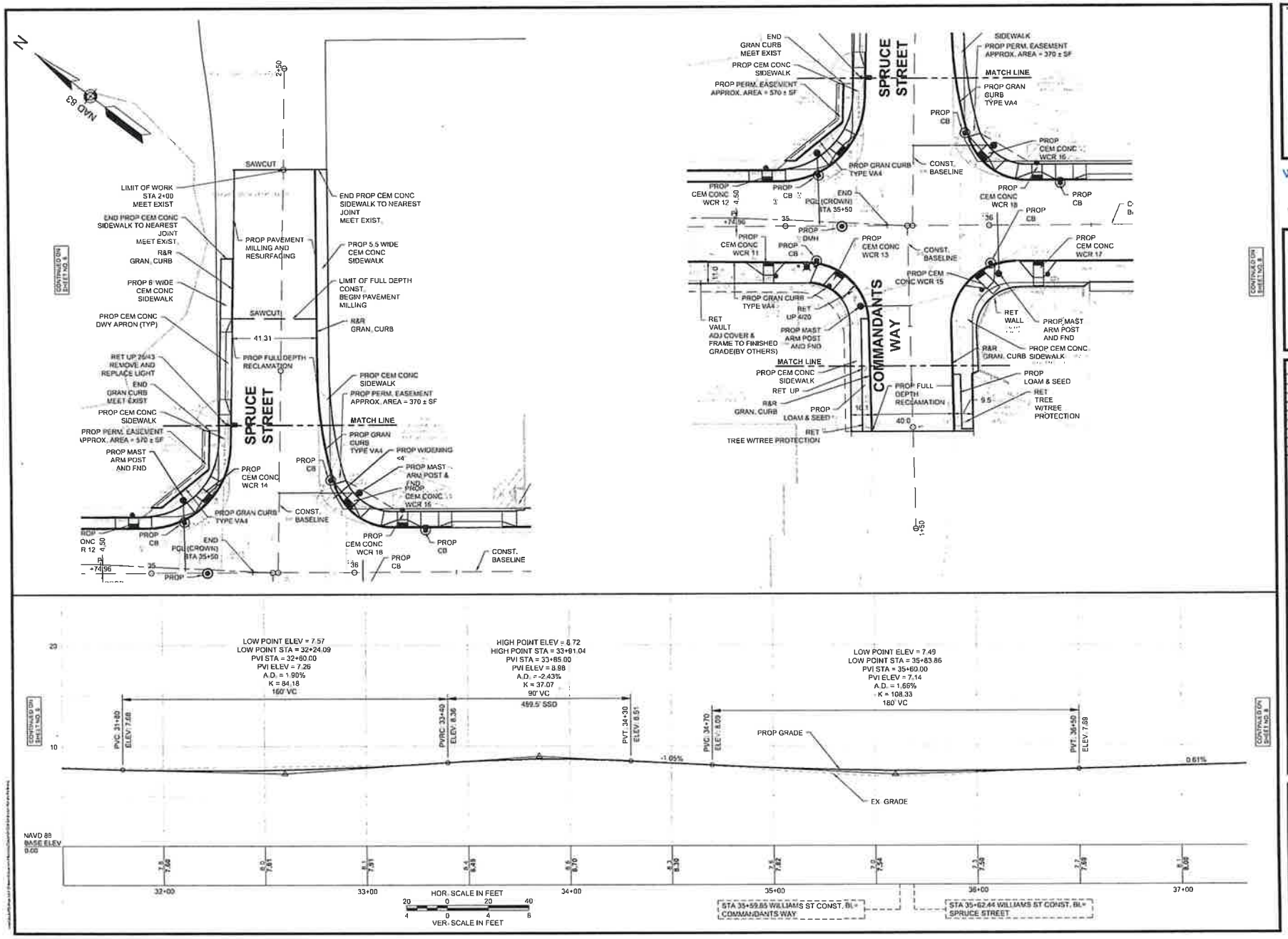
W&S File No.

Drawing Title

ROADWAY CONSTRUCTION PLAN AND PROFILE 8 OF 10

Sheet number

CT108



Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 35752 COMMONWEALTH OF MASSACHUSETTS REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2018 BY WESTON & SAMPSON. THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & FOR SCALES NOT LISTED ON THE DRAWING ONLY.

REPRODUCTION, RELEASE OR UTILIZATION OF THE DRAWING CONTRARY BY CITY OF CHELSEA'S RULES AND CITY OF CHELSEA'S PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale: AS NOTED

Date

Drawn By: MRD

Reviewed By: RKP

Approved By: LFK

W&S Project No.: 2190031

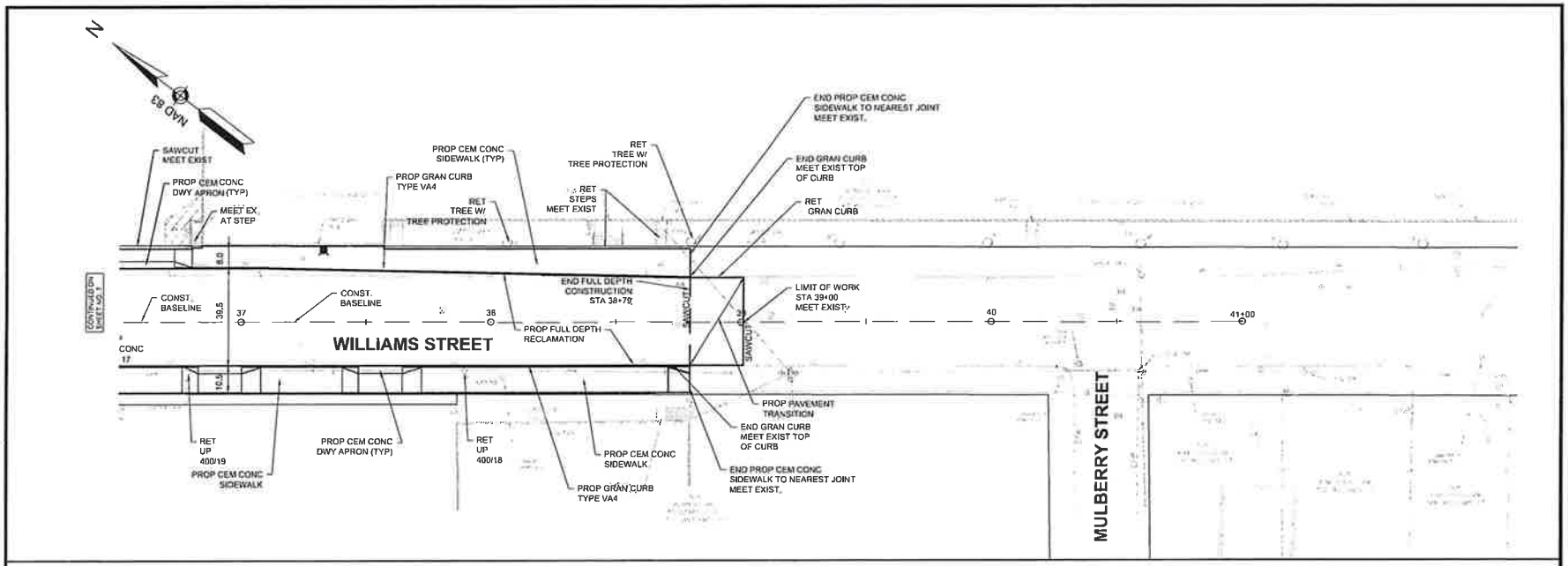
W&S File No.:

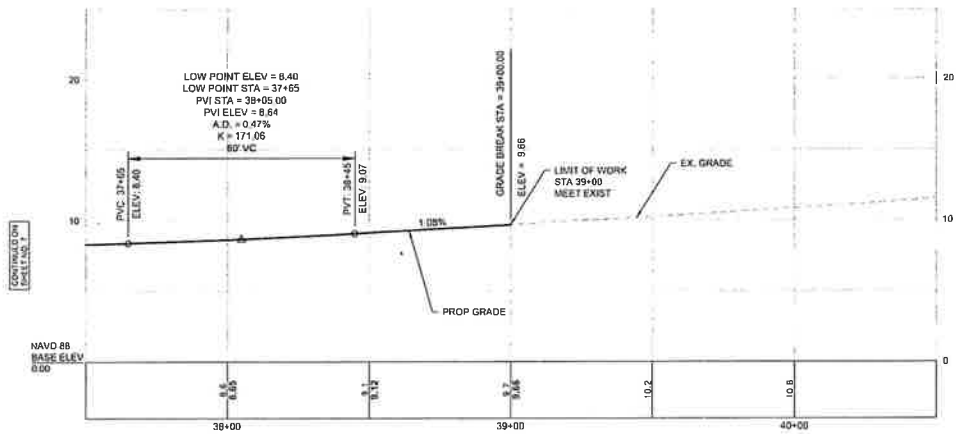
Drawing Title

ROADWAY CONSTRUCTION PLAN AND PROFILE 9 OF 10

Sheet Number

CT109





HOR. SCALE IN FEET
20 0 20 40
4 0 4 8
VER. SCALE IN FEET

Project:

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants:

Revisions:

No.	Date	Description

Seal:

BRUCE W. ADAMS CIVIL No. 35752 COMMONWEALTH OF MASSACHUSETTS PROFESSIONAL ENGINEER

COPYRIGHT © 2019 WESTON & SAMPSON

THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWINGS CONTAINED BY OTHER CLIENTS, AGENCIES AND OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued for:

DRAFT DESIGN

Scale: AS NOTED

Date:

Drawn By: MRD

Reviewed By: RPK

Approved By: LFK

W&S Project No.: 2190251

W&S File No.:

Drawing Title:

ROADWAY CONSTRUCTION PLAN AND PROFILE 10 OF 10

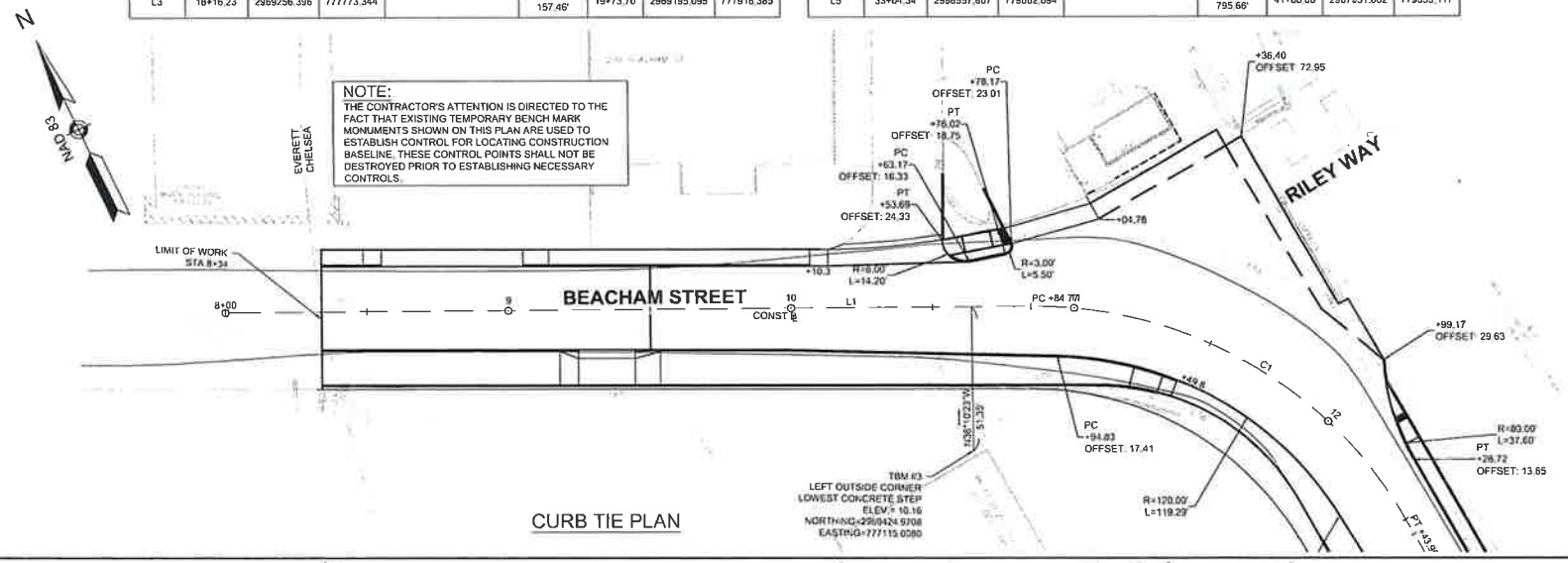
Sheet Number:

CT110

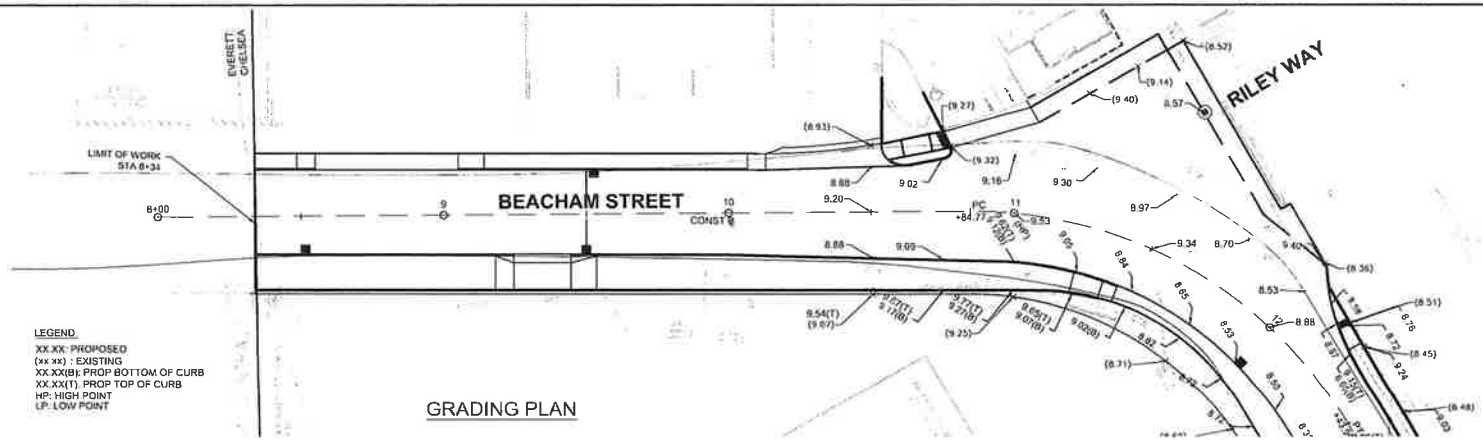
BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	8+00.00	2969310.831	776871.866		N53°49'37"E 284.77'	10+84.77	2969478.911	777101.764
C1	10+84.77	2969478.911	777101.764	R=150.00' Δ=60°48'57" L=159.22' T=88.03'		12+43.99	2969494.164	777252.842
L2	12+43.99	2969494.164	777252.842		S65°21'26"E 511.80'	17+55.79	2969280.766	777718.029
C2	17+55.79	2969280.766	777718.029	R=2000.00' Δ=1°43'54" L=60.45' T=30.23'		18+16.23	2969256.396	777773.344
L3	18+16.23	2969256.396	777773.344		S67°05'21"E 157.46'	19+73.70	2969195.095	777918.385

BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C3	19+73.70	2969195.095	777918.385	R=4000.00' Δ=1°43'54" L=120.90' T=60.45'		20+94.59	2969146.355	778029.015
L4	20+94.59	2969146.355	778029.015		S65°21'26"E 918.22'	30+12.81	2968763.496	778863.609
C4	30+12.81	2968763.496	778863.609	R=350.00' Δ=35°42'47" L=218.16' T=112.75'		32+30.97	2968618.487	779021.864
C5	32+30.97	2968618.487	779021.864	R=500.00 Δ=8°24'27" L=73.37' T=36.75'		33+04.34	2968557.607	779062.694
L5	33+04.34	2968557.607	779062.694		S38°03'05"E 795.66'	41+00.00	2967931.062	779553.117

NOTE:
THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT EXISTING TEMPORARY BENCH MARK MONUMENTS SHOWN ON THIS PLAN ARE USED TO ESTABLISH CONTROL FOR LOCATING CONSTRUCTION BASELINE. THESE CONTROL POINTS SHALL NOT BE DESTROYED PRIOR TO ESTABLISHING NECESSARY CONTROLS.



CURB TIE PLAN



GRADING PLAN

20 10 0 20 40
SCALE: 1"=20'

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 35752 REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT 2019 WESTON & SAMPSON

REPRODUCTION, RELEASE OR UTILIZATION OF THE DRAWING CONTAINED BY OTHER OLDER SERVICES AND ON OTHER PROJECTS IS PROHIBITED BY LAW

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	MRD
Reviewed By	RPK
Approved By	LFK
W&S Project No.	2190031
W&S File No.	

Drawing Title

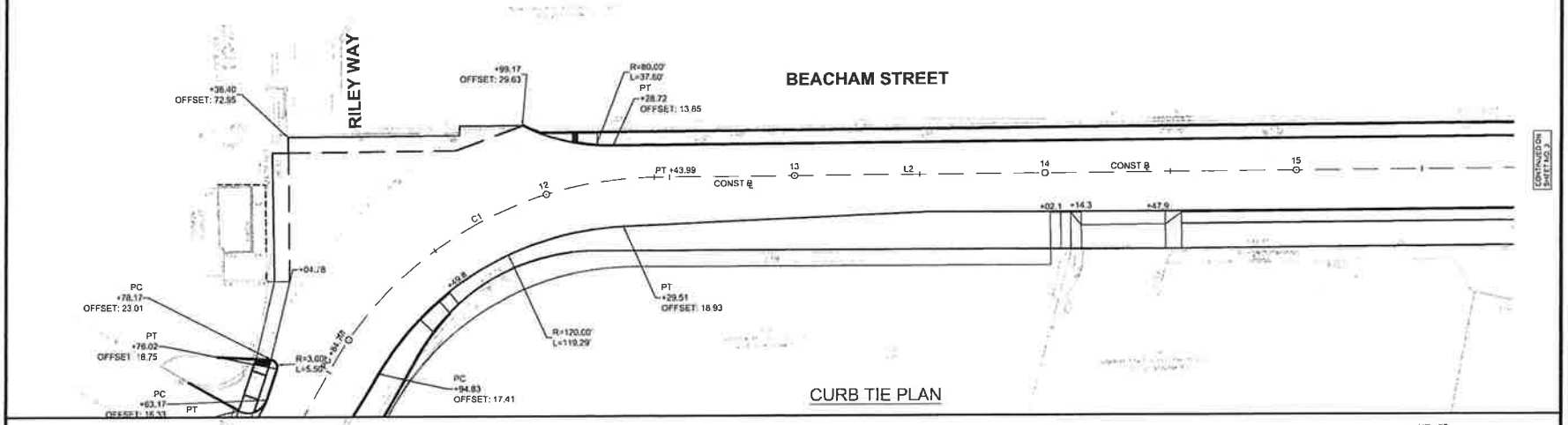
ROADWAY CURB TIE AND GRADING PLAN 1 OF 10

Sheet Number

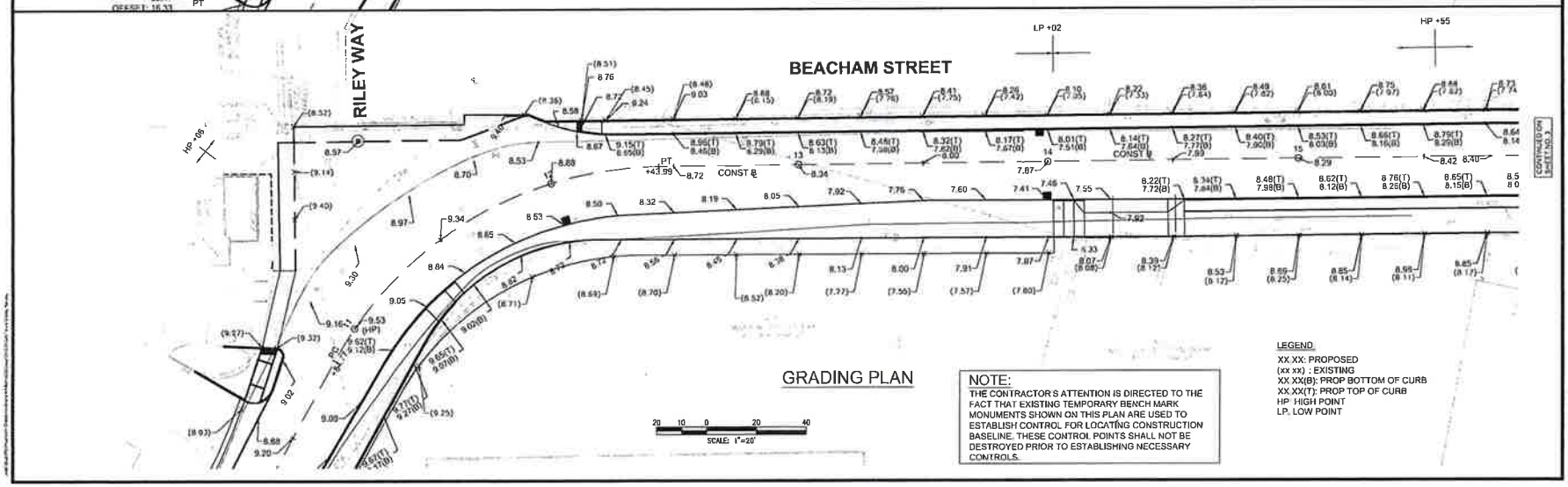
CT111

BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	6+00.00	2969310.831	776871.886		N53°49'37"E 284.77'	10+84.77	2969478.911	777101.764
C1	10+84.77	2969478.911	777101.764	R = 150.00 Δ= 60°48'57" L=159.22' T=88.03'		12+43.99	2969494.164	777252.842
L2	12+43.99	2969494.164	777252.842		S65°21'26"E 511.80'	17+55.79	2969280.766	777718.029
C2	17+55.79	2969280.766	777718.029	R = 2000.00 Δ= 1°43'54" L=60.45' T=30.23'		18+16.23	2969256.396	777773.344
L3	18+16.23	2969256.396	777773.344		S67°05'21"E 157.46'	19+73.70	2969195.095	777918.385

BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C3	19+73.70	2969195.095	777918.385	R 4000.00 Δ= 1°43'54" L=120.90' T=60.45'		20+94.59	2969146.355	778029.015
L4	20+94.59	2969146.355	778029.015		S65°21'26"E 918.22'	30+12.81	2968763.496	778863.609
C4	30+12.81	2968763.496	778863.609	R 350.00 Δ= 35°42'47" L=218.16' T=112.75'		32+30.97	2968618.487	779021.864
C5	32+30.97	2968618.487	779021.864	R = 500.00' Δ= 8°24'27" L=73.37' T=36.75'		33+04.34	2968557.607	779062.694
L5	33+04.34	2968557.607	779062.694		S38°03'06"E 795.66'	41+00.00	2967931.062	779553.117



CURB TIE PLAN



GRADING PLAN

SCALE: 1"=20'

NOTE:
THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT EXISTING TEMPORARY BENCH MARK MONUMENTS SHOWN ON THIS PLAN ARE USED TO ESTABLISH CONTROL FOR LOCATING CONSTRUCTION BASELINE. THESE CONTROL POINTS SHALL NOT BE DESTROYED PRIOR TO ESTABLISHING NECESSARY CONTROLS.

LEGEND:
XX.XX: PROPOSED
(xx.xx) : EXISTING
XX.XX(B): PROP BOTTOM OF CURB
XX.XX(T): PROP TOP OF CURB
HP: HIGH POINT
LP: LOW POINT

Project
BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.weston&sampson.com

Consultants

Revisions

No.	Date	Description

Seal

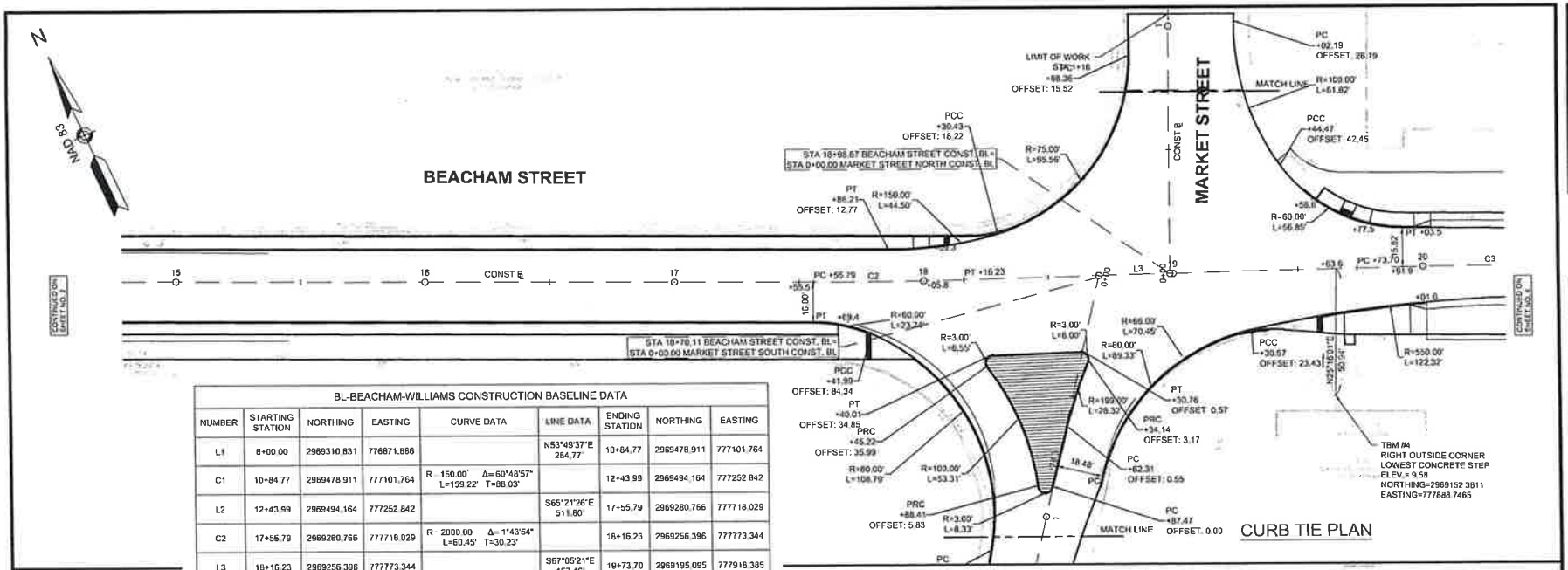
COPYRIGHT © 2019 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OF INFORMATION OF THE DRAWING CONTAINS BY OTHER CLIENTS, VENDORS AND OTHER PARTIES IS PROHIBITED BY LAW.
WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued for
DRAFT DESIGN

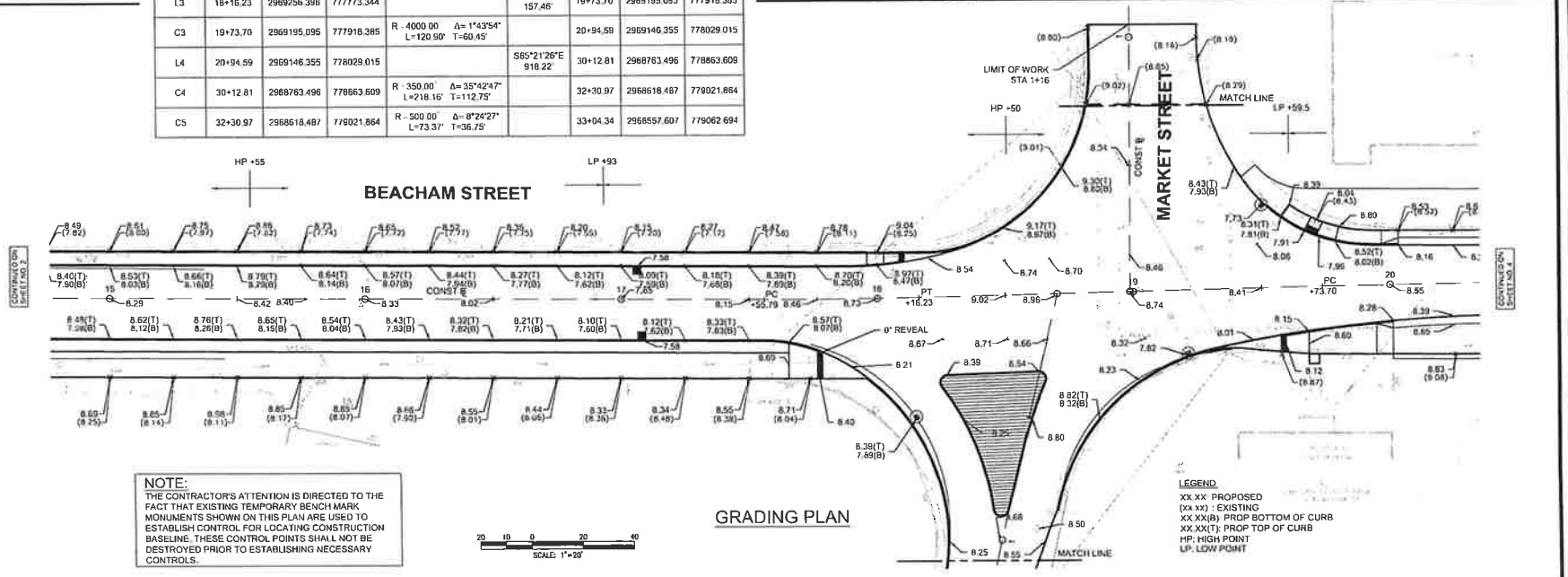
Scale	AS NOTED
Date:	
Drawn By	MRD
Reviewed By	RPK
Approved By	LPK
W&S Project No.	2190031
W&S File No	

Drawing Title
ROADWAY CURB TIE AND GRADING PLAN 2 OF 10

Sheet Number:
CT112



BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	8+00.00	2969310.831	776871.886		N53°49'37"E 284.77'	10+84.77	2969478.911	777101.764
C1	10+84.77	2969478.911	777101.764	R - 150.00' Δ= 60°48'57" L=159.22' T=88.03'		12+43.99	2969494.164	777252.842
L2	12+43.99	2969494.164	777252.842		S65°21'26"E 511.80'	17+55.79	2969280.766	777718.029
C2	17+55.79	2969280.766	777718.029	R - 2000.00 Δ= 1°43'54" L=60.45' T=30.23'		18+16.23	2969256.396	777773.344
L3	18+16.23	2969256.396	777773.344		S67°05'21"E 157.46'	19+73.70	2969195.095	777918.385
C3	19+73.70	2969195.095	777918.385	R - 4000.00 Δ= 1°43'54" L=120.90' T=60.45'		20+94.59	2969146.355	778029.015
L4	20+94.59	2969146.355	778029.015		S65°21'26"E 918.22'	30+12.81	2968763.496	778863.609
C4	30+12.81	2968763.496	778863.609	R - 350.00' Δ= 35°42'47" L=218.16' T=112.75'		32+30.97	2968618.487	779021.864
C5	32+30.97	2968618.487	779021.864	R - 500.00' Δ= 8°24'27" L=73.37' T=36.75'		33+04.34	2968557.607	779062.694



NOTE:
THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT EXISTING TEMPORARY BENCH MARK MONUMENTS SHOWN ON THIS PLAN ARE USED TO ESTABLISH CONTROL FOR LOCATING CONSTRUCTION BASELINE. THESE CONTROL POINTS SHALL NOT BE DESTROYED PRIOR TO ESTABLISHING NECESSARY CONTROLS.

LEGEND
XX.XX PROPOSED
(xx.xx) : EXISTING
XX.XX(B) PROP BOTTOM OF CURB
XX.XX(T): PROP TOP OF CURB
HP: HIGH POINT
LP: LOW POINT

Project
BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson
Weston & Sampson Engineers Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No	Date	Description

Seal
COMMONWEALTH OF MASSACHUSETTS
BRUCE W. ADAMS
CIVIL
No. 35352
REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2018 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTENT BY OTHER CLIENTS PROJECTS AND ON OTHER PROJECTS IS PROHIBITED BY LAW.
WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For
DRAFT DESIGN

Scale AS NOTED
Date
Drawn By MRD
Reviewed By RPK
Approved By LPK
W&S Project No. 2180031
W&S File No.

Drawing Title
ROADWAY CURB TIE AND GRADING PLAN 3 OF 10

Sheet Number
CT113

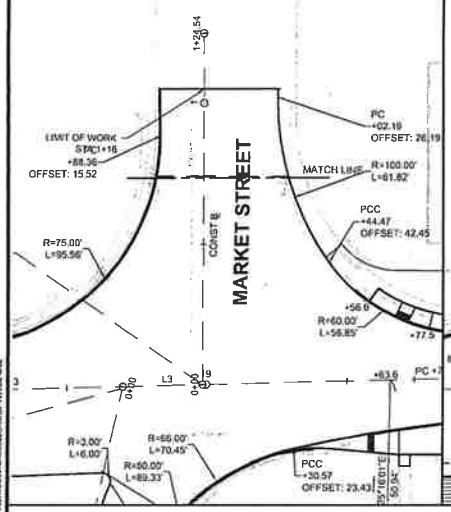
N

MAG 63

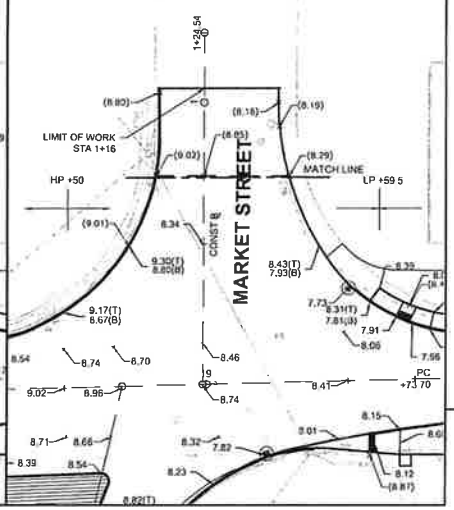
BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	8+00.00	2969310.831	776871.886		N53°49'37"E 284.77'	10+84.77	2969478.911	777101.764
C1	10+84.77	2969478.911	777101.764	R 150.00 Δ= 60°48'57" L=159.22' T=88.03'		12+43.99	2969494.164	777252.842
L2	12+43.99	2969494.164	777252.842		S65°21'26"E 511.80'	17+55.79	2969280.766	777718.029
C2	17+55.79	2969280.768	777718.029	R - 2000.00' Δ= 1°43'54" L=60.45' T=30.23'		18+16.23	2969258.396	777773.344
L3	18+16.23	2969258.395	777773.344		S67°05'21"E 157.46'	19+73.70	2969195.095	777918.385

BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C3	19+73.70	2969195.095	777918.385	R = 4000.00' Δ= 1°43'54" L=120.90' T=60.45'		20+94.59	2969146.355	778029.015
L4	20+94.59	2969146.355	778029.015		S65°21'26"E 918.22'	30+12.81	2968763.496	778863.609
C4	30+12.81	2968763.496	778863.609	R 350.00 Δ= 35°42'47" L=218.16' T=112.75'		32+30.97	2968618.487	779021.864
C5	32+30.97	2968618.487	779021.864	R 500.00 Δ= 8°24'27" L=73.37' T=36.75'		33+04.34	2968557.607	779062.694
L5	33+04.34	2968557.607	779062.694		S38°03'06"E 795.66'	41+00.00	2967931.062	779553.117

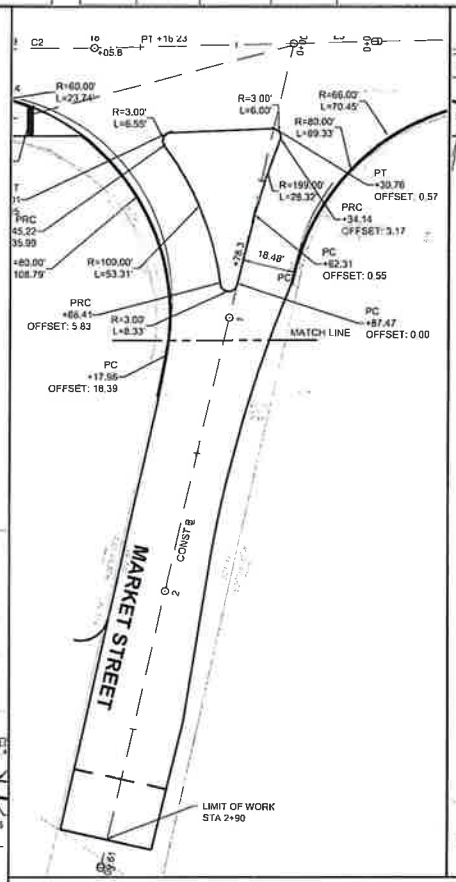
NOTE:
THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT EXISTING TEMPORARY BENCH MARK MONUMENTS SHOWN ON THIS PLAN ARE USED TO ESTABLISH CONTROL FOR LOCATING CONSTRUCTION BASELINE. THESE CONTROL POINTS SHALL NOT BE DESTROYED PRIOR TO ESTABLISHING NECESSARY CONTROLS.



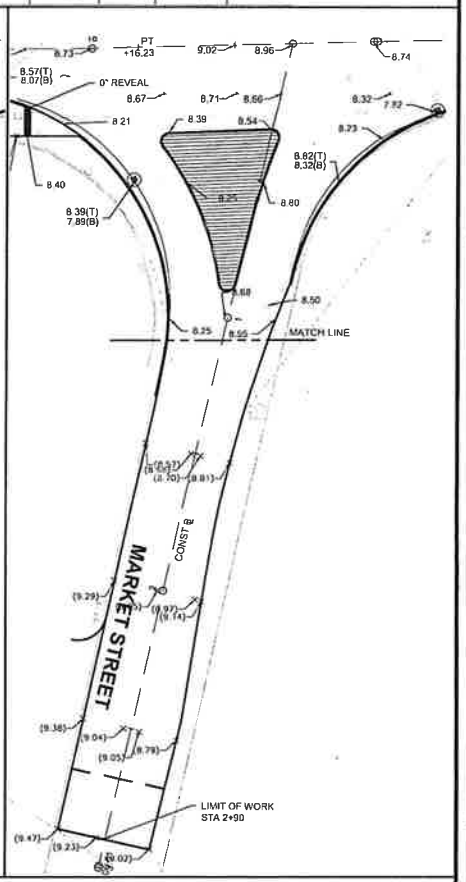
CURB TIE PLAN



GRADING PLAN



CURB TIE PLAN



GRADING PLAN

LEGEND:
XX.XX PROPOSED
(xx.xx) : EXISTING
XX.XX(B): PROP BOTTOM OF CURB
XX.XX(T): PROP TOP OF CURB
HP: HIGH POINT
LP: LOW POINT

SCALE: 1"=20'

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants

Revisions

No.	Date	Description

Seal

COPYRIGHT

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	MRD
Reviewed By	RPK
Approved By	LFK
W&S Project No.	15003
W&S File No.	

Drawing Title

ROADWAY CURB TIE AND GRADING PLAN 4 OF 10

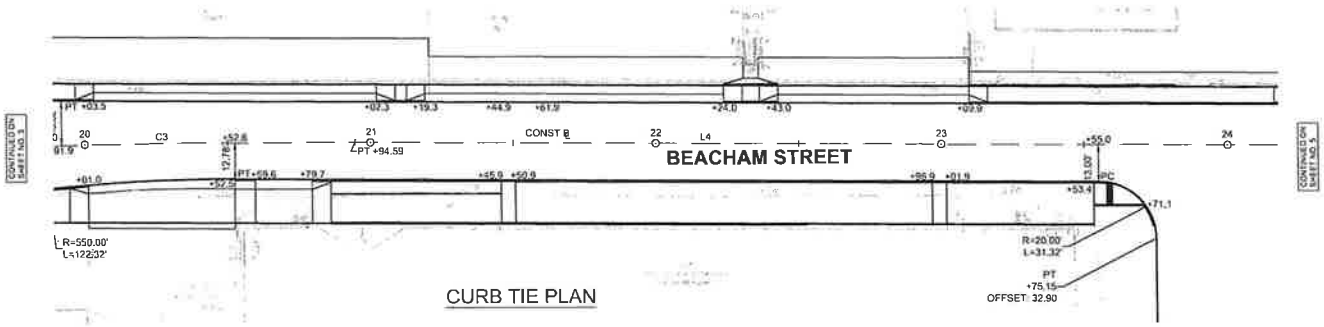
Sheet Number

CT114

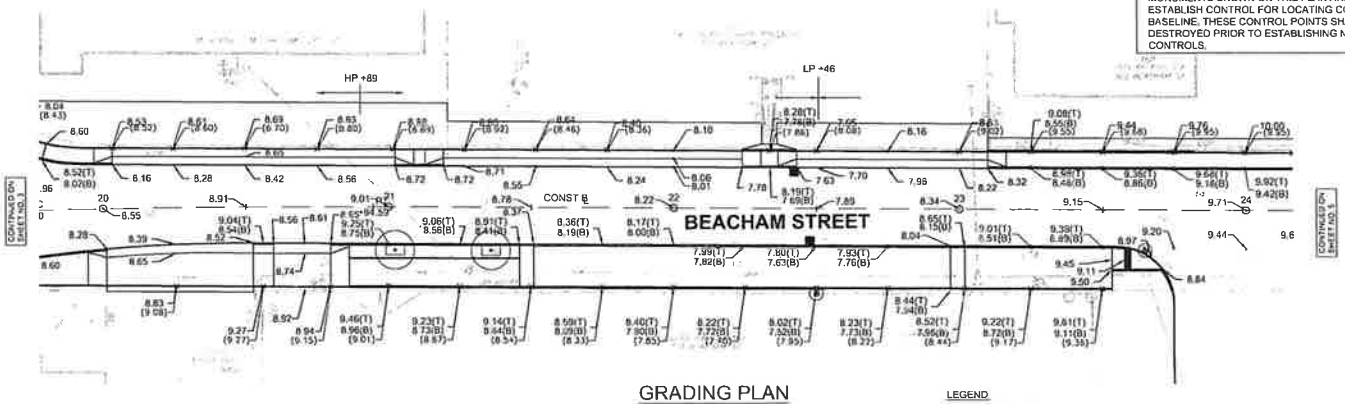
COPYRIGHT 2016 WESTON & SAMPSON

BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	8+00.00	2969310.831	776871.886		N53°49'37"E 284.77'	10+84.77	2969478.911	777101.764
C1	10+84.77	2969478.911	777101.764	R 150.00 Δ= 60°48'57" L=159.22' T=88.03'		12+43.99	2969494.164	777252.842
L2	12+43.99	2969494.164	777252.842		S65°21'26"E 511.80'	17+55.79	2969280.766	777718.029
C2	17+55.79	2969280.766	777718.029	R = 2000.00' Δ= 1°43'54" L=60.45' T=30.23'		18+16.23	2969256.396	777773.344
L3	18+16.23	2969256.396	777773.344		S67°05'21"E 157.46'	19+73.70	2969195.095	777918.385

BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C3	19+73.70	2969195.095	777918.385	R = 4000.00' Δ= 1°43'54" L=120.90' T=60.45'		20+94.59	2969146.355	778029.015
L4	20+94.59	2969146.355	778029.015		S65°21'26"E 918.22'	30+12.81	2968763.496	778863.609
C4	30+12.81	2968763.496	778863.609	R = 350.00 Δ= 35°42'47" L=218.18' T=112.75'		32+30.97	2968618.487	779021.864
C5	32+30.97	2968618.487	779021.864	R = 500.00 Δ= 8°24'27" L=73.37' T=36.75'		33+04.34	2968557.607	779062.694
L5	33+04.34	2968557.607	779062.694		S38°03'06"E 795.66'	41+00.00	2967931.062	779553.117



NOTE:
THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT EXISTING TEMPORARY BENCH MARK MONUMENTS SHOWN ON THIS PLAN ARE USED TO ESTABLISH CONTROL FOR LOCATING CONSTRUCTION BASELINE. THESE CONTROL POINTS SHALL NOT BE DESTROYED PRIOR TO ESTABLISHING NECESSARY CONTROLS.



SCALE: 1"=20'

LEGEND
XX.XX: PROPOSED
(xx.xx) : EXISTING
XX.XX(B): PROP BOTTOM OF CURB
XX.XX(T): PROP TOP OF CURB
HP: HIGH POINT
LP: LOW POINT

Project:
BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Signature

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 35252 REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF MASSACHUSETTS

COA
COPYRIGHT © 2018 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTENT BY OTHER CLIENTS, PROJECTS AND ON OTHER PROJECTS IS PROHIBITED BY LAW.
WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN

Issued For: DRAFT DESIGN

Scale: AS NOTED

Date:

Drawn By: MRD
Reviewed By: RPK
Approved By: LFK

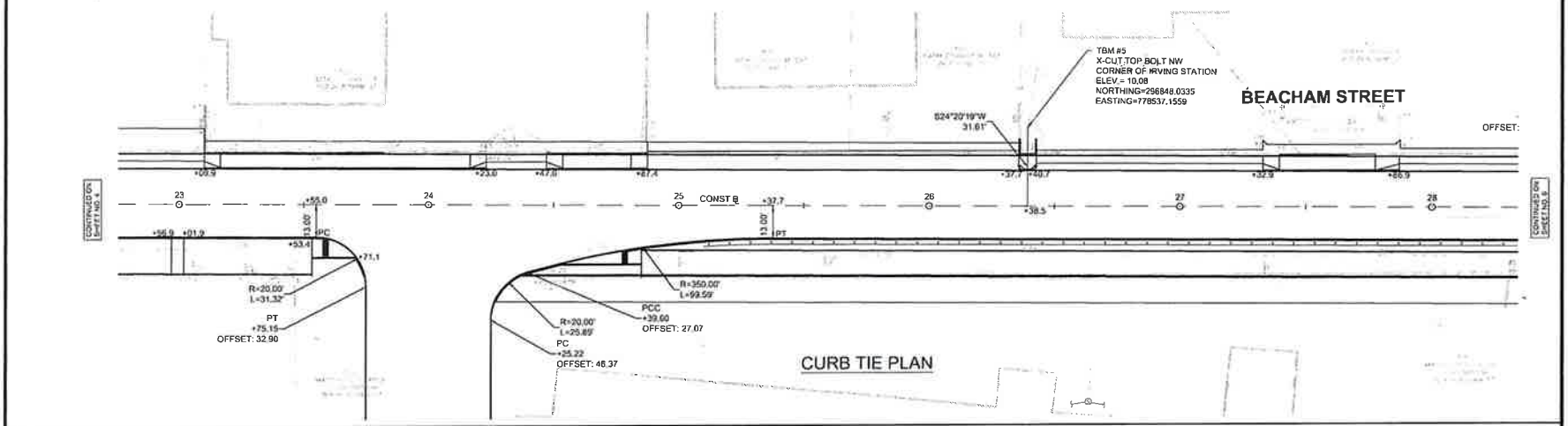
W&S Project No.: 2190031
W&S File No.:

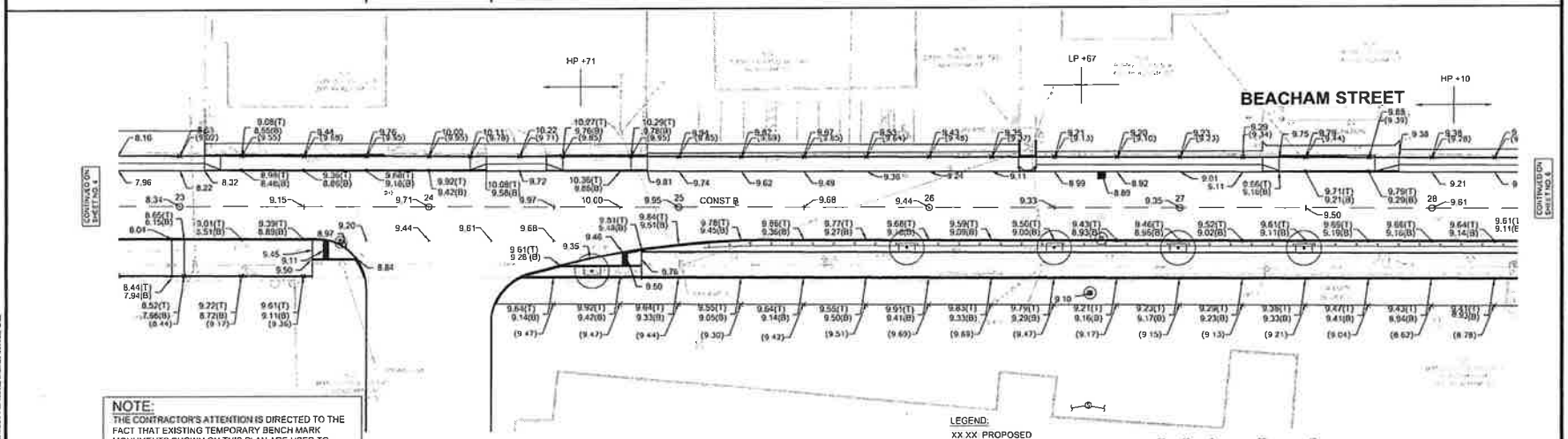
Drawing Title: ROADWAY CURB TIE AND GRADING PLAN 5 OF 10

Sheet Number: CT115

BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	8+00.00	2969310.631	776871.886		N53°49'37"E 284.77'	10+84.77	2969478.911	777101.764
C1	10+84.77	2969478.911	777101.764	R 150.00 Δ= 60°48'57" L=159.22' T=88.03'		12+43.99	2969494.164	777252.842
L2	12+43.99	2969494.164	777252.842		S65°21'26"E 511.80'	17+55.79	2969260.766	777718.029
C2	17+55.79	2969260.766	777718.029	R - 2000.00 Δ= 1°43'54" L=60.45' T=30.23'		18+16.23	2969256.396	777773.344
L3	18+16.23	2969256.396	777773.344		S67°05'21"E 157.46'	19+73.70	2969195.095	777918.385

BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C3	19+73.70	2969195.095	777918.385	R 4000.00 Δ= 1°43'54" L=120.90' T=60.45'		20+94.59	2969146.355	778029.015
L4	20+94.59	2969146.355	778029.015		S65°21'26"E 918.22'	30+12.81	2968763.496	778863.609
C4	30+12.81	2968763.496	778863.609	R - 350.00 Δ= 35°42'47" L=218.16' T=112.75'		32+30.97	2968618.487	779021.864
C5	32+30.97	2968618.487	779021.864	R - 500.00 Δ= 8°24'27" L=73.37' T=36.75'		33+04.34	2968557.607	779062.694
L5	33+04.34	2968557.607	779062.694		S38°03'06"E 795.66'	41+00.00	2967931.062	779553.117





NOTE:
THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT EXISTING TEMPORARY BENCH MARK MONUMENTS SHOWN ON THIS PLAN ARE USED TO ESTABLISH CONTROL FOR LOCATING CONSTRUCTION BASELINE. THESE CONTROL POINTS SHALL NOT BE DESTROYED PRIOR TO ESTABLISHING NECESSARY CONTROLS.

LEGEND:
XX.XX PROPOSED
(xx.xx) : EXISTING
XX.XX(B): PROP BOTTOM OF CURB
XX.XX(T): PROP TOP OF CURB
HP HIGH POINT
LP LOW POINT

SCALE: 1"=20'

Project
BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants

Revisions

Seal

DRAFT DESIGN

Scale AS NOTED
Date
Drawn By MRD
Reviewed By RPK
Approved By LPK
W&S Project No. 2190031
W&S File No

Drawing Title
ROADWAY CURB TIE AND GRADING PLAN 6 OF 10

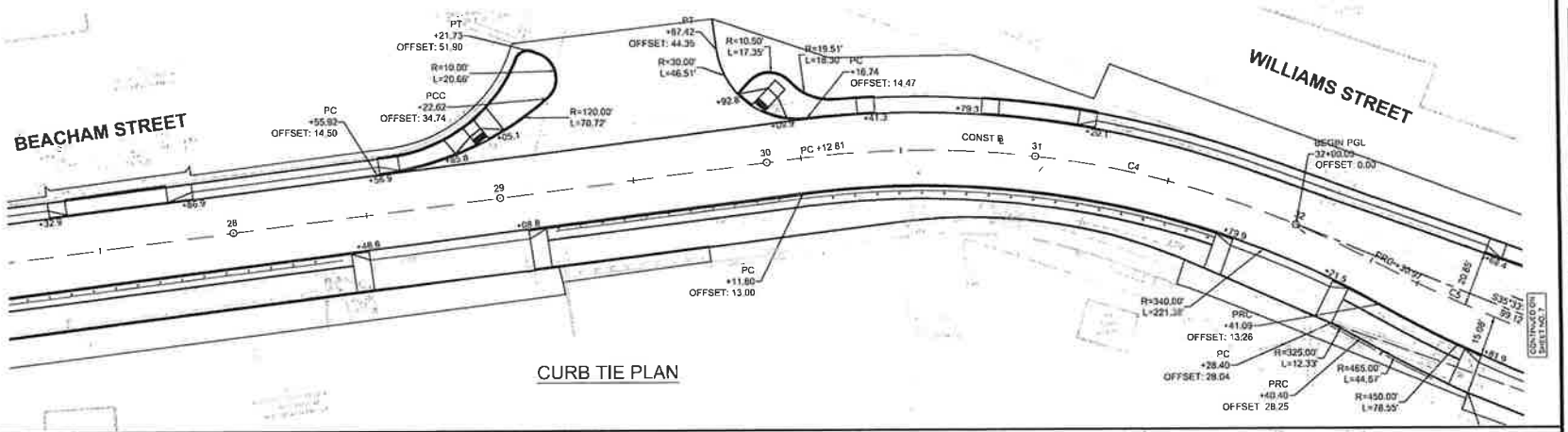
Sheet Number
CT116

BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	8+00.00	2969310.831	776871.886		N53°49'37"E 284.77'	10+84.77	2969478.911	777101.764
C1	10+84.77	2969478.911	777101.764	R = 150.00 Δ= 60°48'57" L=159.22' T=88.03'		12+43.99	2969494.164	777252.842
L2	12+43.99	2969494.164	777252.842		S65°21'26"E 511.80'	17+55.79	2969280.766	777718.029
C2	17+55.79	2969280.766	777718.029	R 2000.00 Δ= 1°43'54" L=60.45' T=30.23'		18+16.23	2969256.396	777773.344
L3	18+16.23	2969256.396	777773.344		S67°05'21"E 157.46'	19+73.70	2969195.095	777918.385

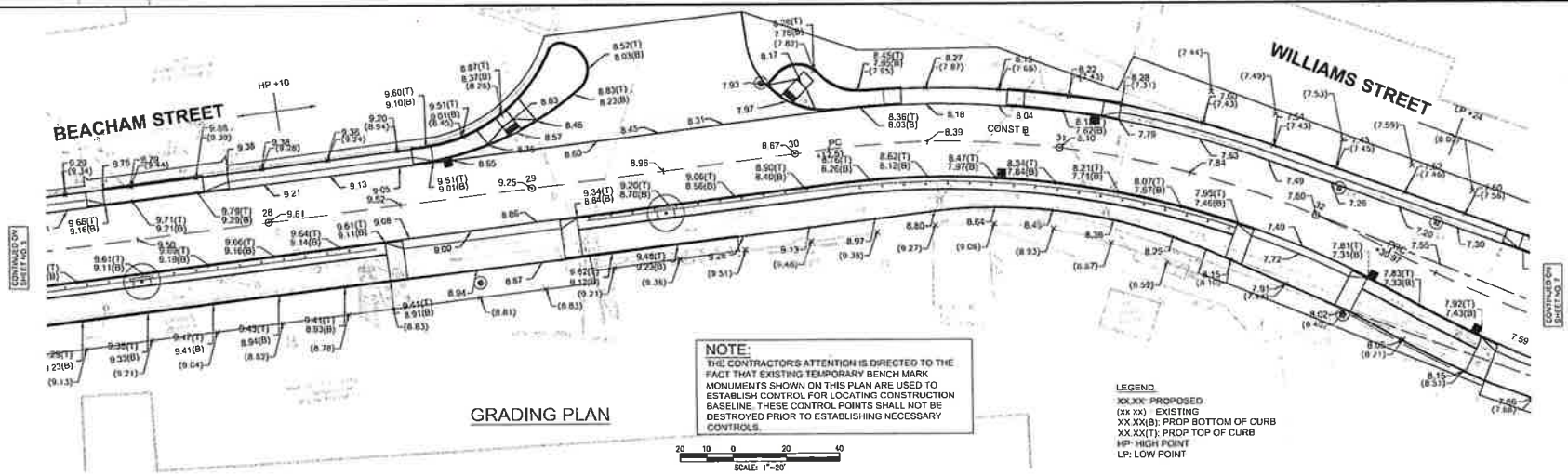
BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C3	19+73.70	2969195.095	777918.385	R 4000.00 Δ= 1°43'54" L=120.90' T=60.45'		20+94.59	2969146.355	778029.015
L4	20+94.59	2969146.355	778029.015		S65°21'26"E 918.22'	30+12.81	2968763.496	778863.609
C4	30+12.81	2968763.496	778863.609	R - 350.00 Δ= 35°42'47" L=218.16' T=112.75'		32+30.97	2968618.487	779021.864
C5	32+30.97	2968618.487	779021.864	R - 500.00' Δ= 8°24'27" L=73.37' T=36.75'		33+04.34	2968557.607	779062.694
L5	33+04.34	2968557.607	779062.694		S38°03'06"E 795.66'	41+00.00	2967931.062	779553.117

N

MAG 63



CURB TIE PLAN



GRADING PLAN

NOTE:
THE CONTRACTORS ATTENTION IS DIRECTED TO THE FACT THAT EXISTING TEMPORARY BENCH MARK MONUMENTS SHOWN ON THIS PLAN ARE USED TO ESTABLISH CONTROL FOR LOCATING CONSTRUCTION BASELINE. THESE CONTROL POINTS SHALL NOT BE DESTROYED PRIOR TO ESTABLISHING NECESSARY CONTROLS.

LEGEND
XX.XX: PROPOSED
(XX.XX) EXISTING
XX.XX(B): PROP BOTTOM OF CURB
XX.XX(T): PROP TOP OF CURB
HP: HIGH POINT
LP: LOW POINT

20 10 0 20 40
SCALE: 1"=20'

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

COMMONWEALTH OF MASSACHUSETTS BRUCE W. ADAMS CIVIL No. 35752 PROFESSIONAL ENGINEER

COA
COPYRIGHT © 2018 BY WESTON & SAMPSON. THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OR UTILIZATION OF THE DRAWING CONTAINED BY OTHERS CLIENTS OR THIRD AND OTHER PROJECTS IS PROHIBITED BY LAW.
WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale: AS NOTED
Date:
Drawn By: MRD
Reviewed By: RPK
Approved By: LFK
W&S Project No. 2190091
W&S File No.

Drawing Title

ROADWAY CURB TIE AND GRADING PLAN 7 OF 10

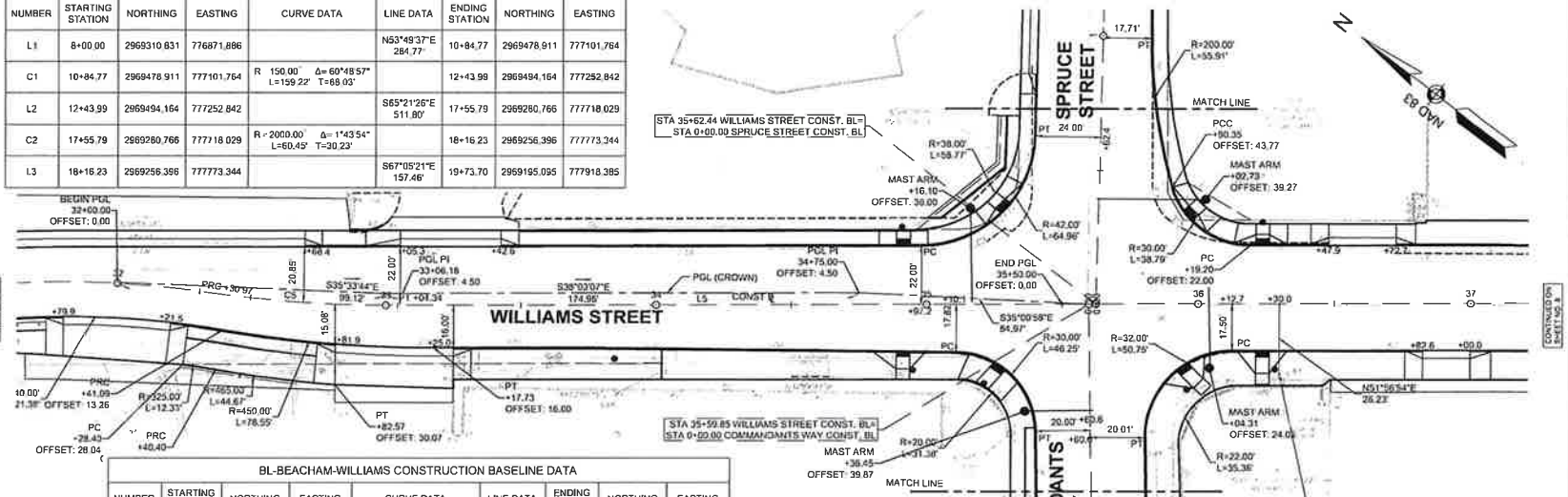
Sheet Number

CT117

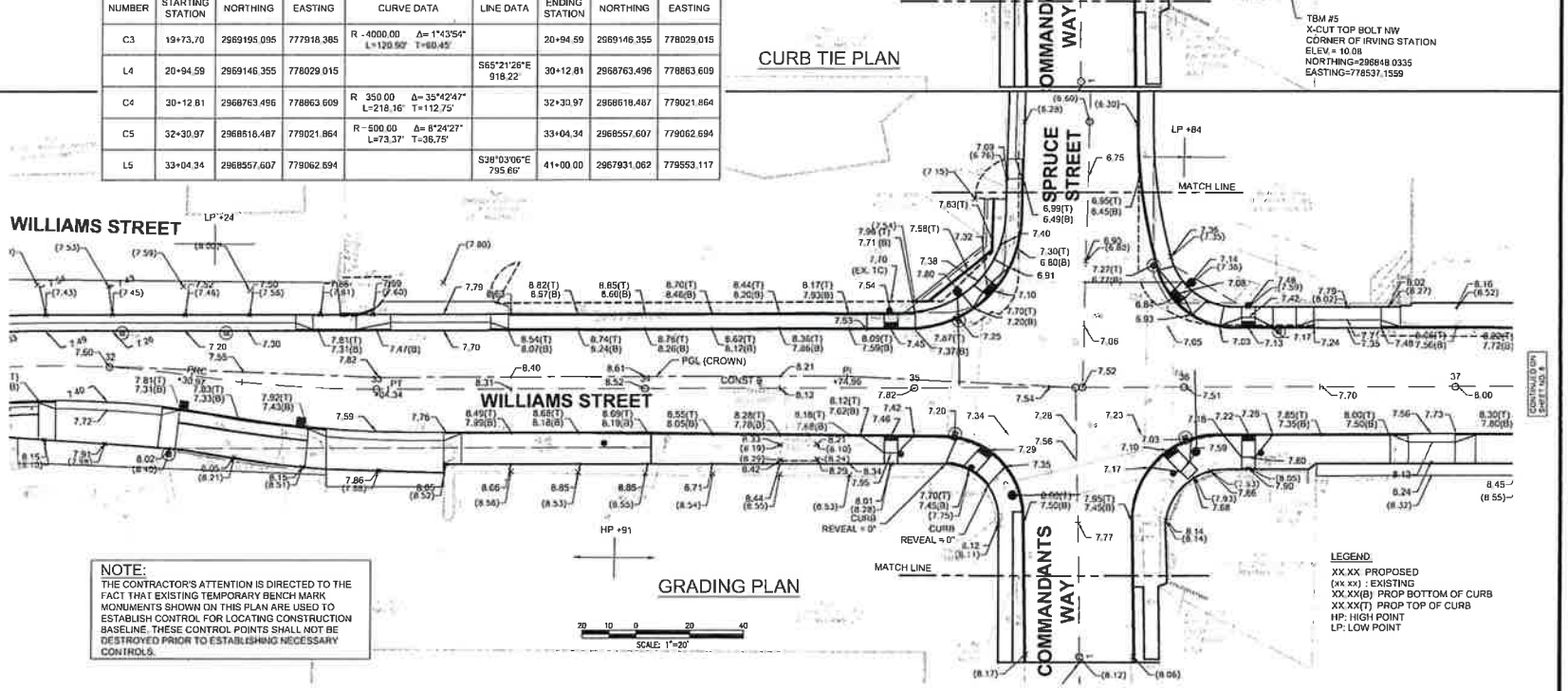
COPYRIGHT © 2018 WESTON & SAMPSON

BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	8+00.00	2969310.831	776871.886		N53°49'37"E 284.77'	10+84.77	2969478.911	777101.764
C1	10+84.77	2969478.911	777101.764	R 150.00' Δ= 60°48'57" L=159.22' T=88.03'		12+43.99	2969494.164	777252.842
L2	12+43.99	2969494.164	777252.842		S65°21'26"E 511.80'	17+55.79	2969280.766	777718.029
C2	17+55.79	2969280.766	777718.029	R = 2000.00' Δ= 1°43'54" L=60.45' T=30.23'		18+16.23	2969256.396	777773.344
L3	18+16.23	2969256.396	777773.344		S67°05'21"E 157.46'	19+73.70	2969195.095	777918.385

BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C3	19+73.70	2969195.095	777918.385	R - 4000.00 Δ= 1°43'54" L=120.92' T=60.45'		20+94.59	2969146.355	778029.015
L4	20+94.59	2969146.355	778029.015		S65°21'26"E 918.22'	30+12.81	2968763.496	778863.609
C4	30+12.81	2968763.496	778863.609	R 350.00 Δ= 35°42'47" L=218.16' T=112.75'		32+30.97	2968618.487	779021.864
C5	32+30.97	2968618.487	779021.864	R = 500.00 Δ= 8°24'27" L=73.37' T=36.75'		33+04.34	2968557.607	779062.694
L5	33+04.34	2968557.607	779062.694		S38°03'06"E 795.66'	41+00.00	2967931.062	779553.117



CURB TIE PLAN



GRADING PLAN

SCALE: 1"=20'

NOTE:
THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT EXISTING TEMPORARY BENCH MARK MONUMENTS SHOWN ON THIS PLAN ARE USED TO ESTABLISH CONTROL FOR LOCATING CONSTRUCTION BASELINE. THESE CONTROL POINTS SHALL NOT BE DESTROYED PRIOR TO ESTABLISHING NECESSARY CONTROLS.

LEGEND:
XX.XX PROPOSED
(xx.xx) : EXISTING
XX.XX(B) PROP BOTTOM OF CURB
XX.XX(T) PROP TOP OF CURB
HP: HIGH POINT
LP: LOW POINT

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 33752 COMMONWEALTH OF MASSACHUSETTS PROFESSIONAL ENGINEER

COPYRIGHT © 2019 WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OR UTILIZATION OF THE DRAWING CONTRARY TO THE CLIENT'S INTERESTS AND OTHER PROJECTS IS PROHIBITED BY LAW.
WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	MRD
Reviewed By	RPK
Approved By	LPK
W&S Project No.	2180031
W&S File No.	

Drawing Title

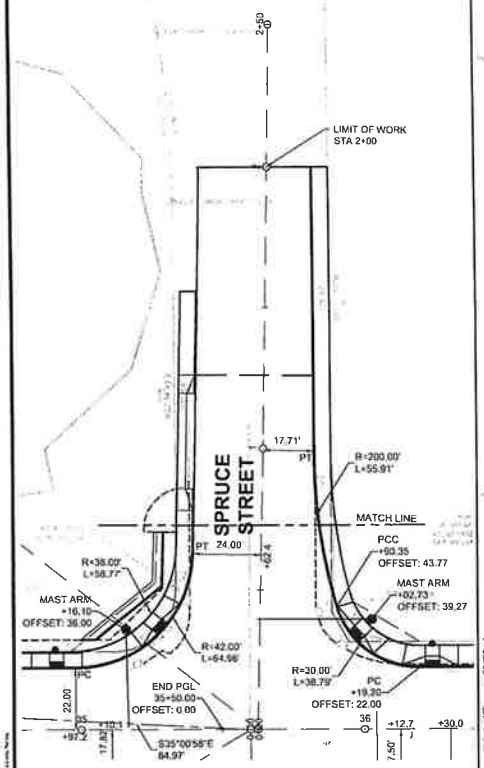
ROADWAY CURB TIE AND GRADING PLAN 8 OF 10

Sheet number

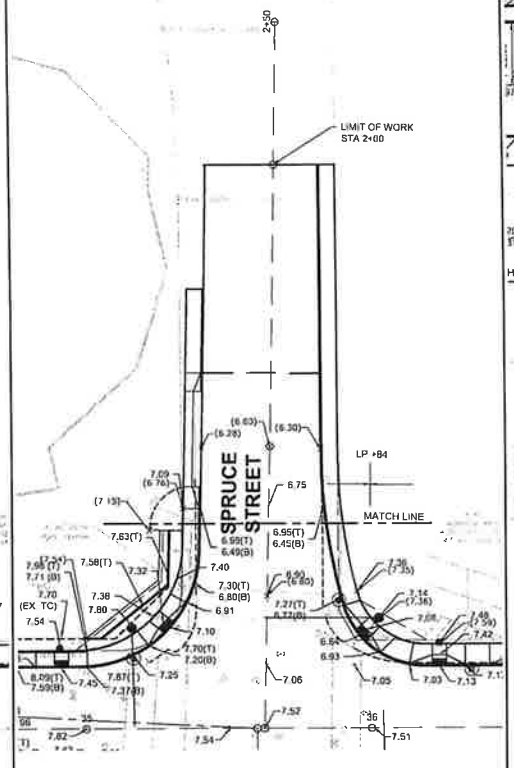
CT118

BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	8+00.00	2969310.831	776871.886		N53°49'37"E 284.77'	10+84.77	2969478.911	777101.764
C1	10+84.77	2969478.911	777101.764	R 150.00 Δ= 60°48'57" L=159.22' T=88.03'		12+43.99	2969494.164	777252.842
L2	12+43.99	2969494.164	777252.842		S65°21'26"E 511.80'	17+55.79	2969280.766	777718.029
C2	17+55.79	2969280.766	777718.029	R = 2000.00 Δ= 1°43'54" L=60.45' T=30.23'		18+16.23	2969256.396	777773.344
L3	18+16.23	2969256.396	777773.344		S67°05'21"E 157.46'	19+73.70	2969195.095	777918.385

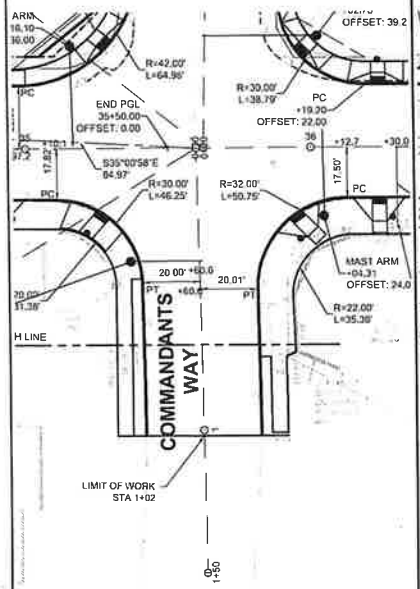
BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C3	19+73.70	2969195.095	777918.385	R 1000.00' Δ= 1°43'54" L=120.90' T=60.45'		20+94.59	2969146.355	778029.015
L4	20+94.59	2969146.355	778029.015		S65°21'26"E 918.22'	30+12.81	2968763.496	778863.609
C4	30+12.81	2968763.496	778863.609	R = 350.00 Δ= 35°42'47" L=218.16' T=112.75'		32+30.97	2968618.487	779021.864
C5	32+30.97	2968618.487	779021.864	R 500.00' Δ= 8°24'27" L=73.37' T=36.75'		33+04.34	2968557.607	779062.694
L5	33+04.34	2968557.607	779062.694		S38°03'08"E 795.66'	41+00.00	2967931.062	779553.117



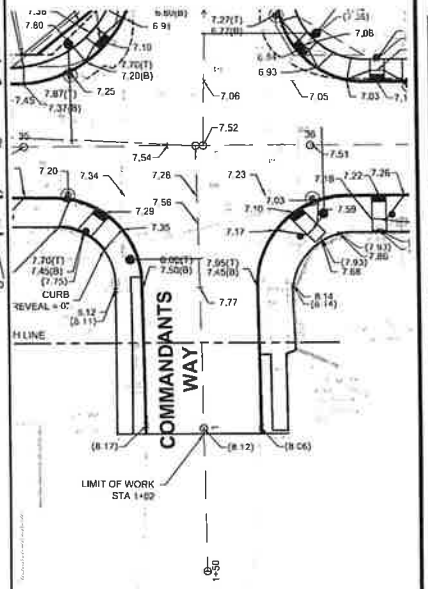
CURB TIE PLAN



GRADING PLAN



CURB TIE PLAN



GRADING PLAN

NOTE:
THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT EXISTING TEMPORARY BENCH MARK MONUMENTS SHOWN ON THIS PLAN ARE USED TO ESTABLISH CONTROL FOR LOCATING CONSTRUCTION BASELINE. THESE CONTROL POINTS SHALL NOT BE DESTROYED PRIOR TO ESTABLISHING NECESSARY CONTROLS.

LEGEND
XX.XX: PROPOSED
(xx.xx) : EXISTING
XX.XX(B) PROP BOTTOM OF CURB
XX.XX(T) PROP TOP OF CURB
HP HIGH POINT
LP LOW POINT

SCALE: 1"=20'

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
35 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAWPSON

Consultants

Revisions

No.	Date	Description

Seal

DRAFT DESIGN

Scale AS NOTED

Date

Drawn By MRD
Reviewed By RPK
Approved By LFK

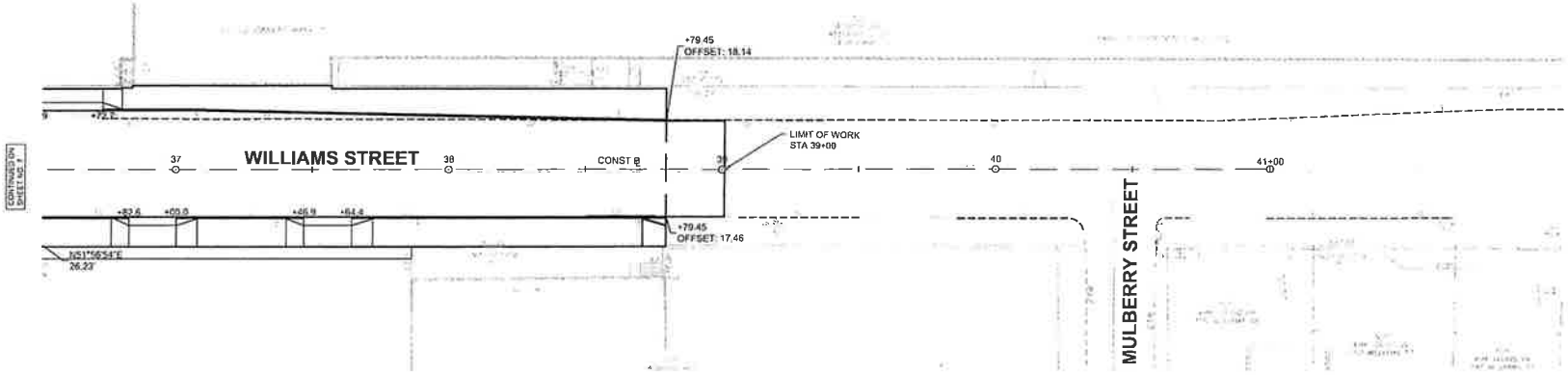
W&S Project No. 2-30231
W&S File No.

Drawing Title
ROADWAY CURB TIE AND GRADING PLAN 9 OF 10

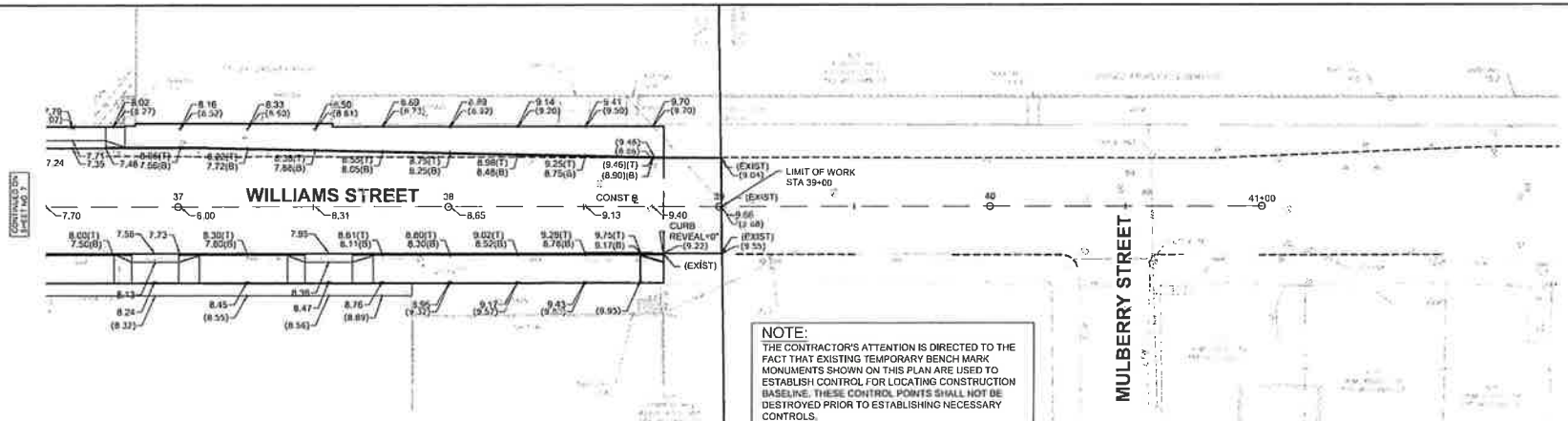
Sheet Number
CT119

BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	8+00.00	2969310.831	776871.886		N53°49'37"E 284.77'	10+84.77	2969478.911	777101.764
C1	10+84.77	2969478.911	777101.764	R 150.00 Δ= 60°48'57" L=159.22' T=88.03'		12+43.99	2969494.164	777252.842
L2	12+43.99	2969494.164	777252.842		S65°21'26"E 511.80'	17+55.79	2969280.766	777718.029
C2	17+55.79	2969280.766	777718.029	R - 2000.00' Δ= 1°43'54" L=60.45' T=30.23'		18+16.23	2969256.396	777773.344
L3	18+16.23	2969256.396	777773.344		S67°05'21"E 157.46'	19+73.70	2969195.095	777918.385

BL-BEACHAM-WILLIAMS CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C3	19+73.70	2969195.095	777918.385	R 4000.00' Δ= 1°43'54" L=120.90' T=60.45'		20+94.59	2969146.355	778029.015
L4	20+94.59	2969146.355	778029.015		S65°21'26"E 918.22'	30+12.81	2968763.496	778863.609
C4	30+12.81	2968763.496	778863.609	R - 350.00 Δ= 35°42'47" L=218.16' T=112.75'		32+30.97	2968618.487	779021.864
C5	32+30.97	2968618.487	779021.864	R - 500.00 Δ= 8°24'27" L=73.37' T=36.75'		33+04.34	2968557.607	779062.694
L5	33+04.34	2968557.607	779062.694		S38°03'06"E 795.66'	41+00.00	2967931.062	779553.117



CURB TIE PLAN



GRADING PLAN

NOTE:
THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT EXISTING TEMPORARY BENCH MARK MONUMENTS SHOWN ON THIS PLAN ARE USED TO ESTABLISH CONTROL FOR LOCATING CONSTRUCTION BASELINE. THESE CONTROL POINTS SHALL NOT BE DESTROYED PRIOR TO ESTABLISHING NECESSARY CONTROLS.

LEGEND:
XX.XX: PROPOSED
(xx.xx) : EXISTING
XX.XX(B): PROP BOTTOM OF CURB
XX.XX(T): PROP TOP OF CURB
HP: HIGH POINT
LP: LOW POINT

SCALE: 1"=20'

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants

Revisions

Seal

COPYRIGHT 2019 BY WESTON & SAMPSON THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTAINED ON THIS PLAN IS PROHIBITED ON OTHER PROJECTS WITHOUT BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN

Issued for: DRAFT DESIGN

Scale: AS NOTED

Date

Drawn By: MRD

Reviewed By: RPK

Approved By: LFK

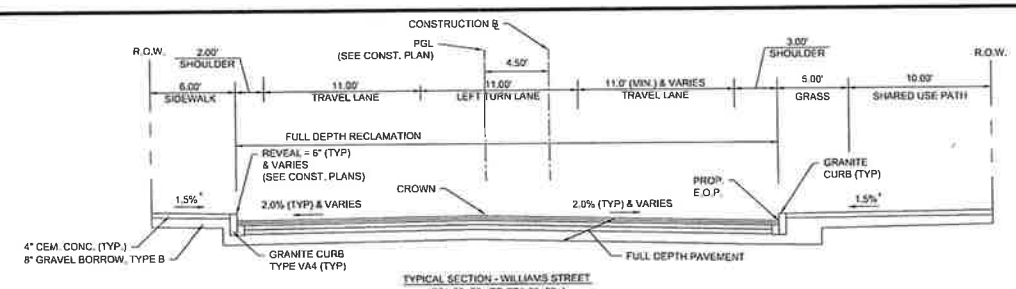
W&S Project No.: [illegible]

W&S File No.

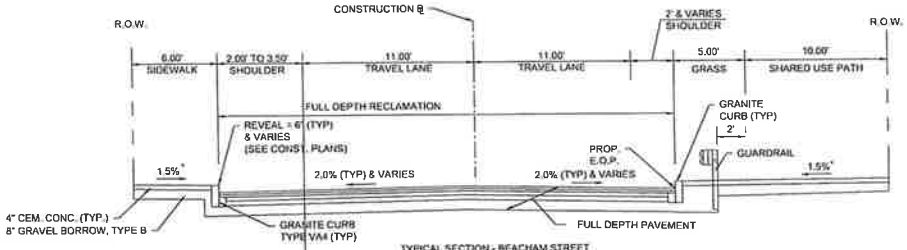
Drawing Title: ROADWAY CURB TIE AND GRADING PLAN 10 OF 10

Sheet Number: CT120

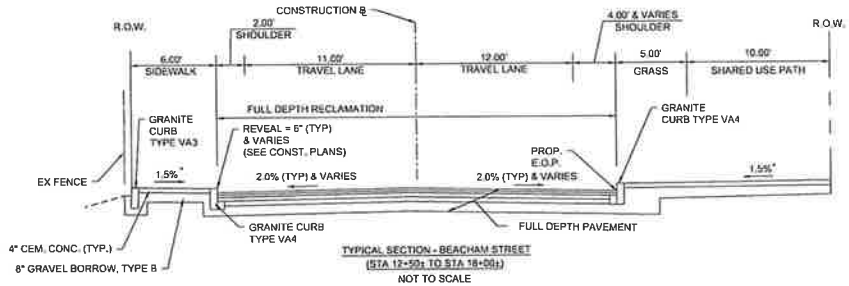
COPYRIGHT 2019 WESTON & SAMPSON



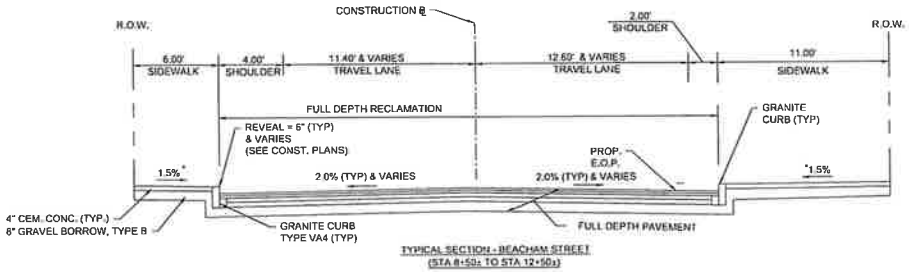
TYPICAL SECTION - WILLIAMS STREET
(STA 33+00± TO STA 35+00±)
NOT TO SCALE



TYPICAL SECTION - BEACHAM STREET
(STA 20+00± TO STA 32+00±)
NOT TO SCALE



TYPICAL SECTION - BEACHAM STREET
(STA 12+50± TO STA 18+00±)
NOT TO SCALE



TYPICAL SECTION - BEACHAM STREET
(STA 8+50± TO STA 12+50±)
NOT TO SCALE

* TOLERENCE FOR CONSTRUCTION ± 0.5%

PAVEMENT NOTES

PAVEMENT MILLING AND OVERLAY:

1.75" SUPERPAVE SURFACE COURSE 12.5 (SSC-12.5) OVER
1.75" PAVEMENT MICRO MILLING

FULL DEPTH RECLAMATION:

1.75" SUPERPAVE SURFACE COURSE 12.5 (SSC-12.5) OVER
2.25" SUPERPAVE INTERMEDIATE COURSE 19.0 (SIC-19.0) OVER
4" SUPERPAVE BASE COURSE 37.5 (SBC-37.5) OVER
12" RECLAIMED PAVEMENT WITH CRUSHED STONE FOR BLENDING
SUITABLE EXCAVATED MATERIAL OR ORDINARY BORROW AS REQUIRED

FULL DEPTH PAVEMENT FOR WIDENING (MORE THAN 4' WIDE):

1.75" SUPERPAVE SURFACE COURSE 12.5 (SSC-12.5) OVER
2.75" SUPERPAVE INTERMEDIATE COURSE 19.0 (SIC-19.0) OVER
4" SUPERPAVE BASE COURSE 37.5 (SBC-37.5) OVER
4" DENSE GRADED CRUSHED STONE OVER
8" RECLAIMED PAVEMENT WITH CRUSHED STONE FOR BLENDING
SUITABLE EXCAVATED MATERIAL OR ORDINARY BORROW AS REQUIRED

CEMENT CONCRETE DRIVEWAY & APRON:

8" CEMENT CONCRETE WITH #4 WIRE MESH OVER
8" GRAVEL BORROW, TYPE B

CEMENT CONCRETE SIDEWALK:

4" CEMENT CONCRETE OVER
8" GRAVEL BORROW, TYPE B

HOT MIX ASPHALT VARIABLE WIDTH SIDEWALK AND DRIVEWAY PAVEMENT:

1 1/2" SUPERPAVE SURFACE COURSE (SSC-12.5) OVER
2" SUPERPAVE INTERMEDIATE COURSE (SIC-12.5) OVER
8" GRAVEL BORROW, TYPE B

CEMENT CONCRETE WHEELCHAIR RAMP:

6" CEMENT CONCRETE WITH #4 WIRE MESH OVER
8" GRAVEL BORROW, TYPE B

TACK COAT:

TACK COAT SHALL BE APPLIED AT RATE OF 0.07 GALLON PER SQUARE YARD OVER MILLED SURFACES AND 0.05 GALLON PER SQUARE YARD OVER SMOOTH PAVED SURFACES

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 35752 REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF MASSACHUSETTS

COPYRIGHT © 2019 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OF UTILIZATION OF THIS DRAWING OTHER THAN FOR CLIENT'S FUTURE USE ON OTHER PROJECTS IS PROHIBITED BY LAW.
WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale AS NOTED

Date

Drawn By MRD

Reviewed By RPK

Approved By LPK

W&S Project No. 2190031

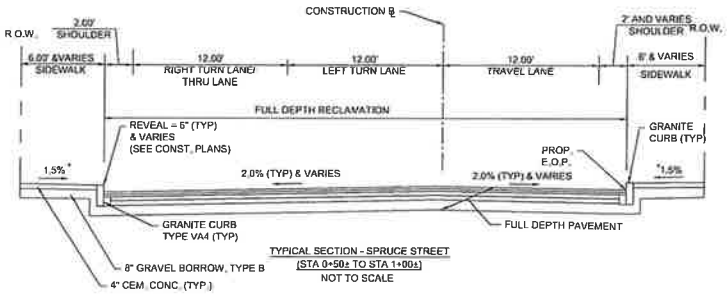
W&S File No.

Drawing Title

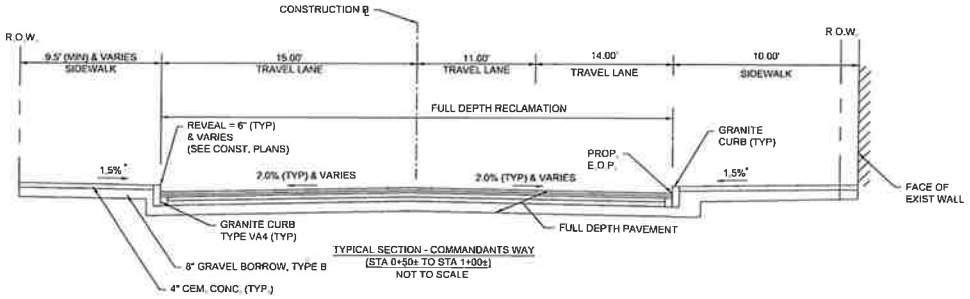
ROADWAY TYPICAL SECTIONS 1 OF 2

Sheet Number

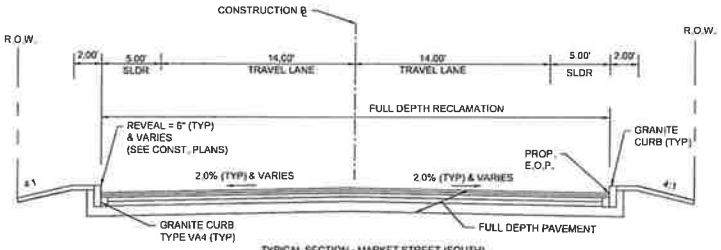
CT401



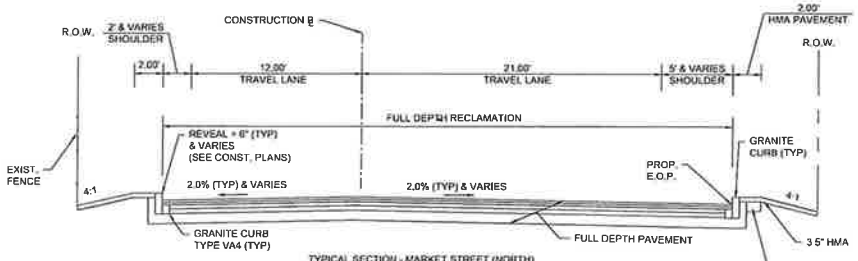
TYPICAL SECTION - SPRUCE STREET
(STA 0+50± TO STA 1+00±)
NOT TO SCALE



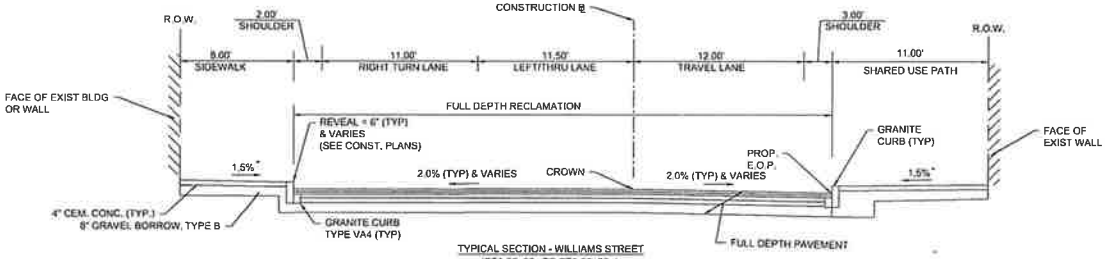
TYPICAL SECTION - COMMANDANTS WAY
(STA 0+50± TO STA 1+00±)
NOT TO SCALE



TYPICAL SECTION - MARKET STREET (SOUTH)
(STA 1+00± TO STA 1+50±)
NOT TO SCALE



TYPICAL SECTION - MARKET STREET (NORTH)
(STA 0+50± TO STA 1+50±)
NOT TO SCALE



TYPICAL SECTION - WILLIAMS STREET
(STA 35+00± TO STA 39+00±)
NOT TO SCALE

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Drake's Island Drive, Suite 100
Pembroke, MA 02359
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

COMMONWEALTH OF MASSACHUSETTS
BRUCE W. ADAMS
CIVIL
No. 35752
REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2018 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED ON THE EXCLUSIVE USE OF THE CITY & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OF UTILIZATION OF THIS DRAWING OR ITS OTHER CONTENTS THEREIN AND ON OTHER PROJECTS IS PROHIBITED BY LAW
WESTON & SAMPSON HERE HAS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN

Issued For

DRAFT DESIGN

Scale AS NOTED

Date

Drawn By MRD

Reviewed By RPK

Approved By LFK

W&S Project No. 2190031

W&S File No.

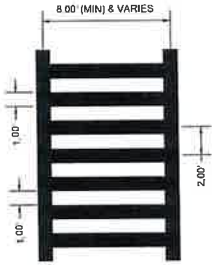
Drawing Title

ROADWAY TYPICAL SECTIONS 2 OF 2

Sheet Number

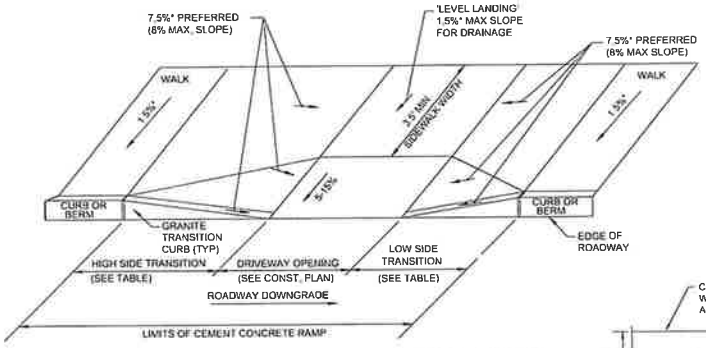
CT402

COPYRIGHT 2019 WESTON & SAMPSON

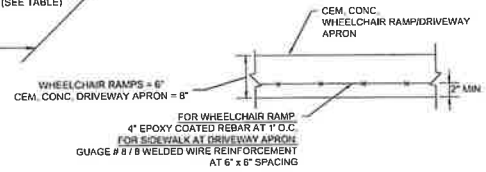


NOTES:
1. PAVEMENT MARKINGS SHALL BE THERMOPLASIC AND CONFORM TO MASSDOT STANDARDS
2. CROSSWALK LINES SHOULD BE BETWEEN ONE AND THREE FEET FROM THE CURB

CROSSWALK WITH STRIPING DETAIL
NOT TO SCALE

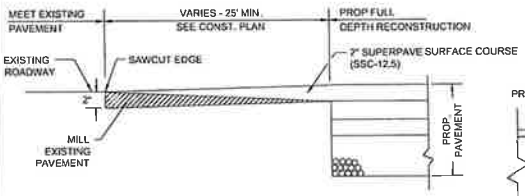


TYPICAL CEMENT CONCRETE DRIVEWAY ENTRANCE
NOT TO SCALE

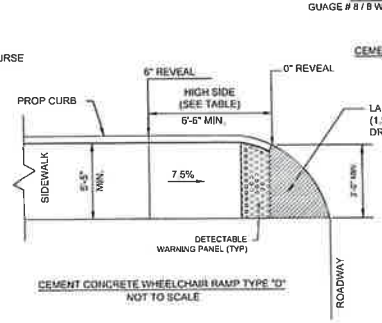


CEMENT CONCRETE WCR/ DRIVEWAY APRON WITH REINFORCEMENT
NOT TO SCALE

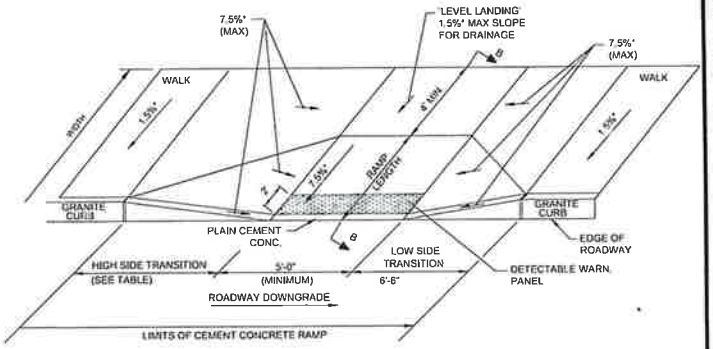
DWY REFERENCE POINT BASELINE		WIDTH OF SIDEWALK	PATH OF TRAVEL	ROADWAY GUTTER SLOPE	TRANSITION LENGTH	
STATION	OFFSET				LEFT	RIGHT
BEACHAM STREET AND WILLIAMS STREET						
13+00	RT	15.0	15.0	0.76%±	6.5	7.67
14+17	RT	15.0	15.0	0.68%±	7.67	6.5
20+15	RT	15.0	15.0	1.56%±	9.0	6.5
20+50	LT	6.0	6.0	0.88%±	6.5	7.67
20+75	RT	15.0	15.0	1.56%±	9.0	6.5
21+25	LT	6.0	6.0	0.52%±	6.5	7.67
22+75	LT	6.0	6.0	0.81%±	6.5	7.67
24+30	LT	6.0	6.0	0.45%±	6.5	7.67
25+50	LT	6.0	6.0	0.42%±	6.5	7.67
26+75	LT	6.0	6.0	0.52%±	7.67	7.67
28+25	LT	6.0	6.0	0.37%±	7.67	6.5
28+75	RT	15.0	15.0	0.39%±	6.5	7.67
32+00	LT	6.0	6.0	0.37%±	7.67	7.67
32+00	RT	15.0	15.0	0.60%±	7.67	6.5
33+00	RT	15.0	15.0	0.84%±	7.67	6.5
33+25	LT	6.0	6.0	1.00%±	6.5	7.67
36+50	LT	8.0	8.0	0.60%±	6.5	7.67
36+90	RT	11.0	11.0	0.81%±	7.67	6.5
37+55	RT	11.0	11.0	0.32%±	7.67	6.5



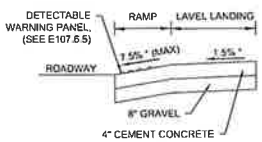
PROPOSED PAVEMENT TRANSITION
(LONGITUDINAL SECTION)
NOT TO SCALE



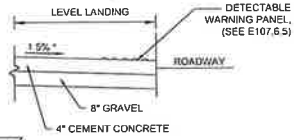
CEMENT CONCRETE WHEELCHAIR RAMP TYPE "D"
NOT TO SCALE



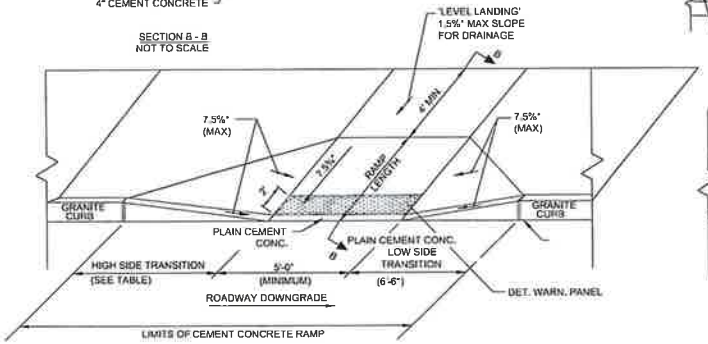
CEMENT CONCRETE WHEELCHAIR RAMP TYPE "A"
NOT TO SCALE



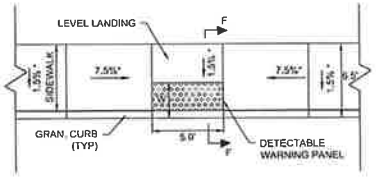
SECTION B - B
NOT TO SCALE



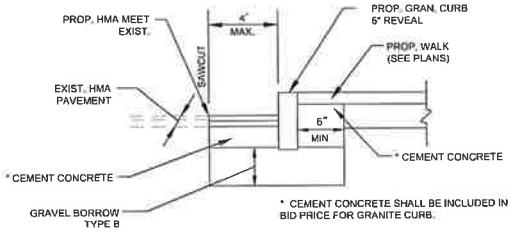
SECTION F - F
NOT TO SCALE



CEMENT CONCRETE WHEELCHAIR RAMP TYPE "B"
NOT TO SCALE



CEMENT CONCRETE WHEELCHAIR RAMP TYPE "C"
NOT TO SCALE



CURB INSTALLATION IN FULL DEPTH
PAVEMENT LESS THAN 4' WIDE
N.T.S.

* TOLERANCE FOR CONSTRUCTION ± 0.5%

Project:
BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal
COMMONWEALTH OF MASSACHUSETTS
BRUCE W. ADAMS
CIVIL
No. 35752
REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT 2019 WESTON & SAMPSON
THIS DRAWING WAS PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.
REPRODUCTION, RELEASE OR UTILIZATION OF THIS DRAWING EXCLUSIVE BY OTHER CLIENTS IS PROHIBITED ON OTHER PROJECTS WITHOUT WRITTEN CONSENT.
WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

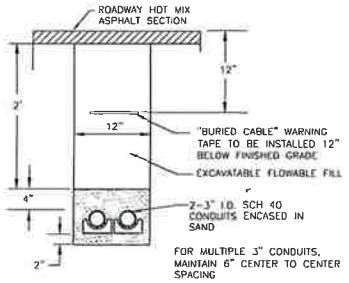
Issued For
DRAFT DESIGN

Scale AS NOTED
Date
Drawn By MRD
Reviewed By RPK
Approved By LFK
W&S Project No. 2190031
W&S File No.

Drawing Title
ROADWAY CONSTRUCTION DETAILS 1 OF 4

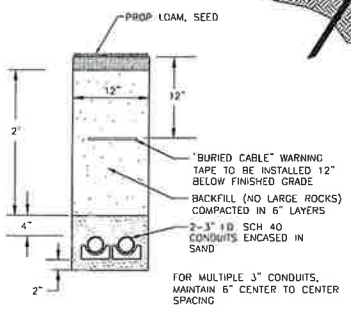
Sheet Number
CT501

COPYRIGHT 2019 WESTON & SAMPSON



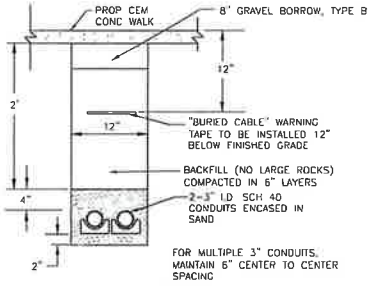
UTILITY TRENCH IN ROADWAY DETAIL

N.T.S



UTILITY TRENCH IN GRASS DETAIL

N.T.S

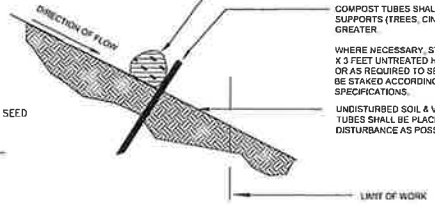


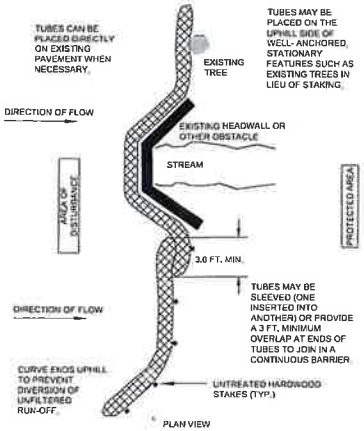
UTILITY TRENCH IN WALK DETAIL

N.T.S

GENERAL NOTES

1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES FOR SLOPES UP TO 50 FEET IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES
2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
3. TUBE LOCATION MAY BE SHIFTED TO ADJUST TO LANDSCAPE FEATURES, BUT SHALL PROTECT UNDISTURBED AREA AND VEGETATION TO MAXIMUM EXTENT POSSIBLE.
4. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
5. ADDITIONAL TUBES SHALL BE USED AT THE DIRECTION OF THE ENGINEER.
6. ADDITIONAL STAKING SHALL BE USED AT THE DIRECTION OF THE ENGINEER.



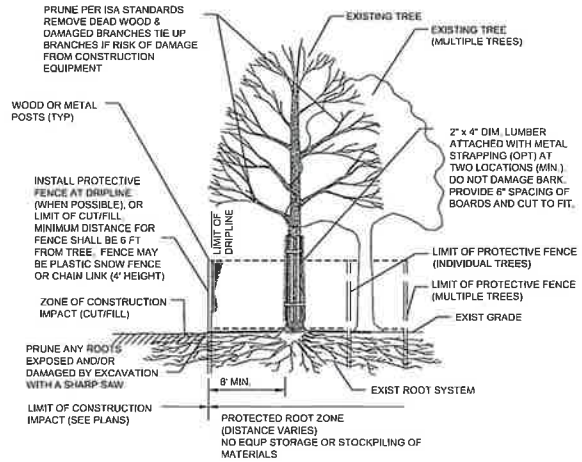


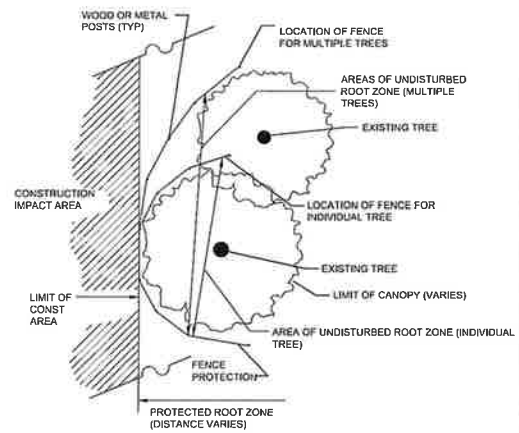
SINGLE COMPOST FILTER TUBE DETAIL

N.T.S.

NOTES

1. EROSION CONTROL MEASURES SHALL BE INCORPORATED IN THE SEQUENCE OF CONSTRUCTION TO PREVENT SEDIMENT LADEN WATER FROM LEAVING THE SITE.
2. AREAS SUBJECT TO EROSION SHALL BE MINIMIZED IN TERMS OF TIME AND AREA.
3. IN GENERAL, WORK REQUIRING EROSION CONTROL INCLUDES EXCAVATIONS, FILLS, DRAINAGE, SWALES AND DITCHES, ROUGH AND FINISH GRADING, AND STOCKPILING OF EARTH.
4. DO NOT DISTURB VEGETATION AND TOPSOIL BEYOND THE PROPOSED LIMIT OF SILT FENCE ACTIVITIES.
5. TEMPORARY SILT CONTROLS SHALL BE PLACED AS SHOWN ON THE PLAN, PERMANENTLY STABILIZE EACH COMPLETED SEGMENT OF CONSTRUCTION.
6. THE CONTRACTOR SHALL REMOVE TEMPORARY SILT CONTROLS AND ALL ACCUMULATED SILT AND DEBRIS AFTER COMPLETION OF CONSTRUCTION OPERATIONS.
7. SILT CONTROLS SHALL BE IN PLACE AT ALL TIMES DURING CONSTRUCTION.
8. THE CONTRACTOR SHALL REMOVE AND LEGALLY DISPOSE OF ALL SILT AND DEBRIS FROM EACH DRAINAGE STRUCTURE UPON COMPLETION OF THE PROJECT.
9. OBJECTS AND/OR AREAS DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.
10. ALL DISTURBED AREAS SHALL BE RESTORED TO EXISTING GRADE. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE AS NEEDED.
11. SILT CONTROLS SHALL BE REMOVED UPON THE SATISFACTORY COMPLETION OF ALL WORK SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
12. SITE PERIMETER SHALL HAVE STRAW WATTLES INSTALLED AT THE LIMIT OF WORK.





PLAN VIEW

EXISTING TREE PROTECTION

NOT TO SCALE

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 35750 COMMONWEALTH OF MASSACHUSETTS PROFESSIONAL ENGINEER

COPYRIGHT © 2018 BY WESTON & SAMPSON THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CHELSEA PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING FOR USE BY OTHERS OUTSIDE THIS AND ON OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For:

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	MRD
Reviewed By	BPK
Approved By	LFK
W&S Project No.	2190003
W&S File No.	

Drawing Title:

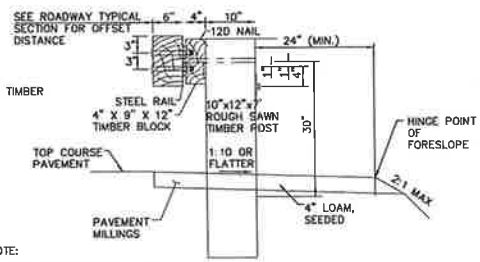
ROADWAY CONSTRUCTION DETAILS 2 OF 4

Sheet Number

CT502

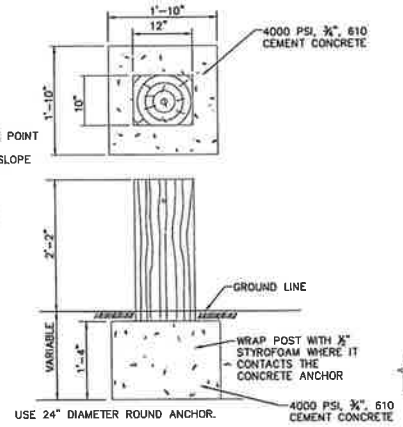
COPYRIGHT © 2018 WESTON & SAMPSON

STEEL RAIL DETAIL
NOT TO SCALE

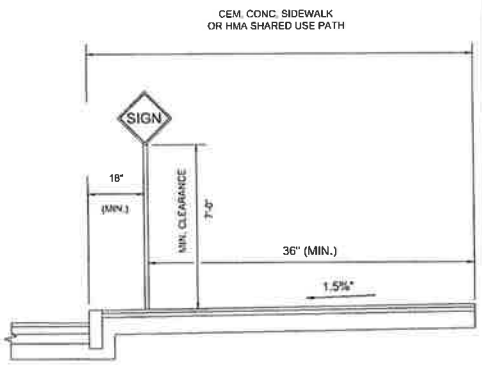


NOTE:
SEE CONSTRUCTION PLAN FOR STEEL BACKED TIMBER GUARDRAIL LOCATIONS.

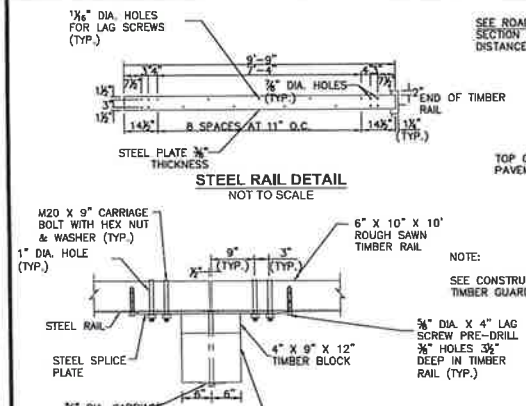
TYPICAL GUARDRAIL CROSS SECTION
NOT TO SCALE



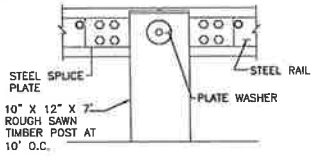
STEEL SPLICE PLATECONCRETE ANCHOR FOR SHORT GUARDRAIL POST
NOT TO SCALE



TRAAFFIC SIGN PLACEMENT DETAIL
NOT TO SCALE



PLAN VIEW
NOT TO SCALE

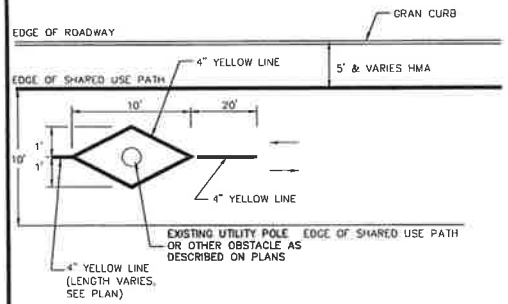


STEEL RAIL ELEVATION
NOT TO SCALE

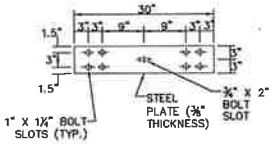
PLATE WASHER
NOT TO SCALE

NOTES:
1. ALL CONNECTION HARDWARE SHALL BE GALVANIZED ACCORDING TO ASTM A 123-78
2. SEE SPECIAL PROVISIONS FOR SPECIFIC REQUIREMENTS

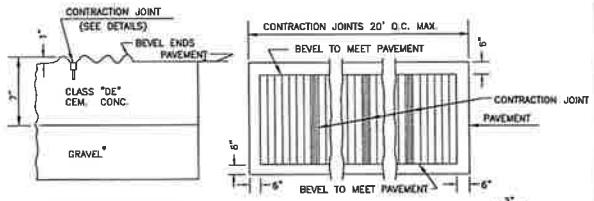
STEEL-BACKED WOOD GUARDRAIL
NOT TO SCALE



DETAIL FOR SHARED USE PATH PAVEMENT MARKINGS AT OBSTACLE
NOT TO SCALE

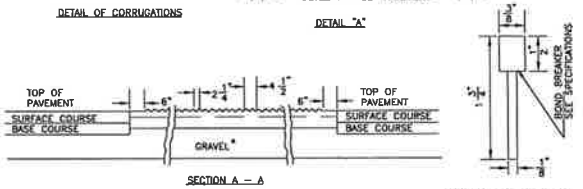


STEEL SPLICE PLATE
NOT TO SCALE



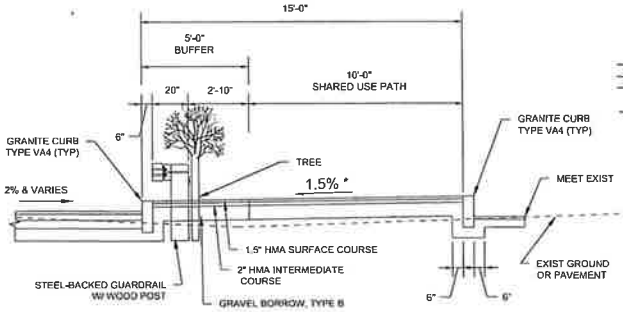
DETAIL OF CORRUGATIONS

DETAIL "A"



SECTION A – A

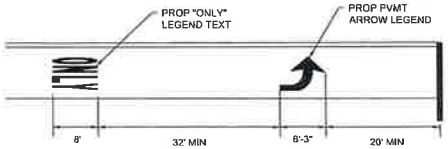
CONTRACTION JOINT DETAIL



STEEL-BACKED WOOD GUARDRAIL INSTALLATION DETAIL
NOT TO SCALE

SCORED CONCRETE PAVEMENT AT RAMPS
NOT TO SCALE

NOTES:
1. CONTRACTION JOINTS ARE TO BE SPACED AT A MAXIMUM OF 20 FEET APART.
2. THE JOINTS ARE TO BE SAWED AND LOCATED IN THE DEPRESSIONS OF THE CORRUGATIONS, SEE DETAIL OF CORRUGATIONS.
3. END OF CORRUGATED RIDGES TO BE BEVELED.
4. FOR DESCRIPTION OF MATERIAL AND CONSTRUCTION METHODS SEE STANDARD SPECIFICATION AND SPECIAL PROVISIONS.
*. THE DEPTH OF THE GRAVEL IS TO BE SUCH THAT ITS BOTTOM LINE MEETS THE BOTTOM OF THE GRAVEL LINE OF THE CONTIGUOUS PAVEMENT.



PAVEMENT ARROW AND LEGEND DETAIL
NOT TO SCALE

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 35752

COA

DRAFT DESIGN

Scale: AS NOTED

Date:

Drawn By: MRD
Reviewed By: RPK
Approved By: LFK

W&S Project No. 2190031
W&S File No.

Drawing Title

ROADWAY CONSTRUCTION DETAILS 3 OF 4

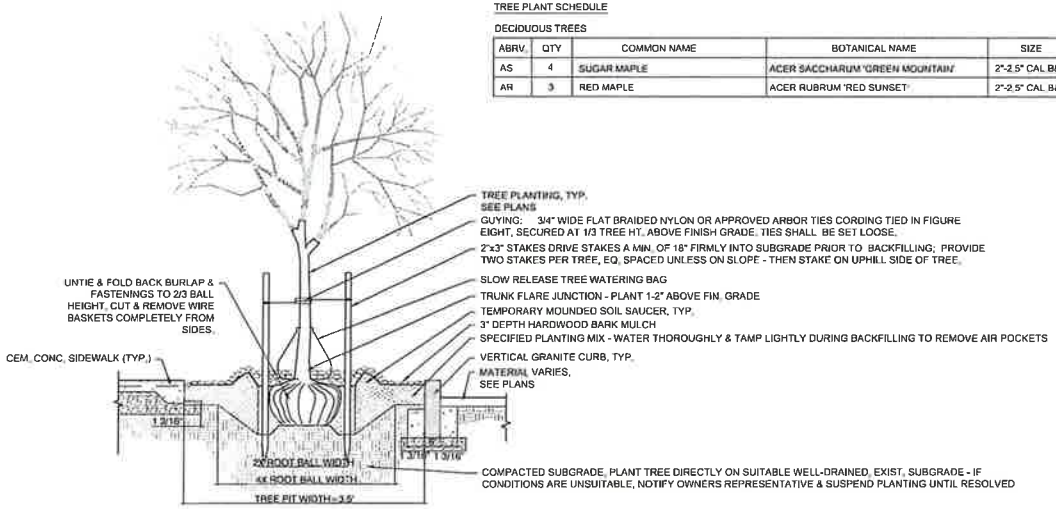
Sheet Number

CT503

TREE PLANT SCHEDULE

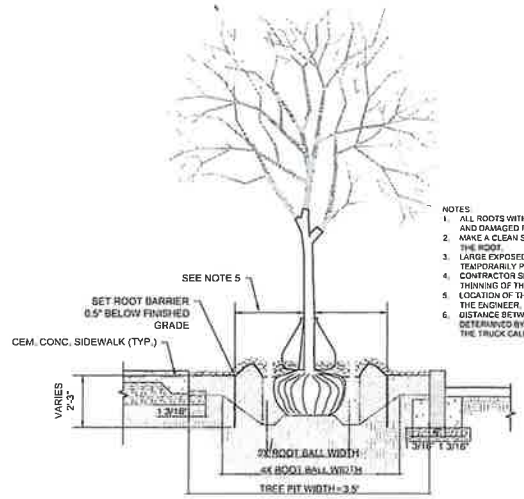
DECIDUOUS TREES

ABRV.	QTY	COMMON NAME	BOTANICAL NAME	SIZE	NOTES
AS	4	SUGAR MAPLE	ACER SACCHARUM 'GREEN MOUNTAIN'	2"-2.5" CAL B&B	WELL-BRANCHED
AR	3	RED MAPLE	ACER RUBRUM 'RED SUNSET'	2"-2.5" CAL B&B	WELL-BRANCHED



TREE STAKING DETAIL

N.T.S.



NOTES:

1. ALL ROOTS WITH MORE THAN 1" IN DIAMETER THAT HAVE BEEN EXPOSED AND DAMAGED FROM TRENCHING ACTIVITIES SHALL BE REMOVED.
2. MAKE A CLEAN STRAIGHT CUT TO EXPOSE THE DAMAGE PORTION OF THE ROOT.
3. LARGE EXPOSED ROOTS SHOULD BE COVERED IN DAMP BURLAP TO TEMPORARILY PREVENT DRYING AND DAMAGE.
4. CONTRACTOR SHOULD CONSULT A CERTIFIED ARBORIST REGARDING THINNING OF THE FOLIAGE CANOPY.
5. LOCATION OF THE ROOT BARRIER IS TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
6. DISTANCE BETWEEN THE TREE AND THE ROOT BARRIER TO BE DETERMINED BY THE ENGINEER. MINIMUM DISTANCE IS THREE TIMES THE TRUCK CALIPER

ROOT BARRIER DETAIL

N.T.S.

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Cons./Const.

Revisions:

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 35752 REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT 2019 WESTON & SAMPSON

REPRODUCTION, RELEASE OF INFORMATION OR USE OF THE DESIGN OR PROJECT DATA HEREIN FOR ANY PURPOSE OTHER THAN THE SPECIFIED PROJECT IS PROHIBITED WITHOUT THE WRITTEN CONSENT OF WESTON & SAMPSON.

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	MRD
Reviewed By	RPK
Approved By	LFK
W&S Project No.	21180031
W&S File No.	

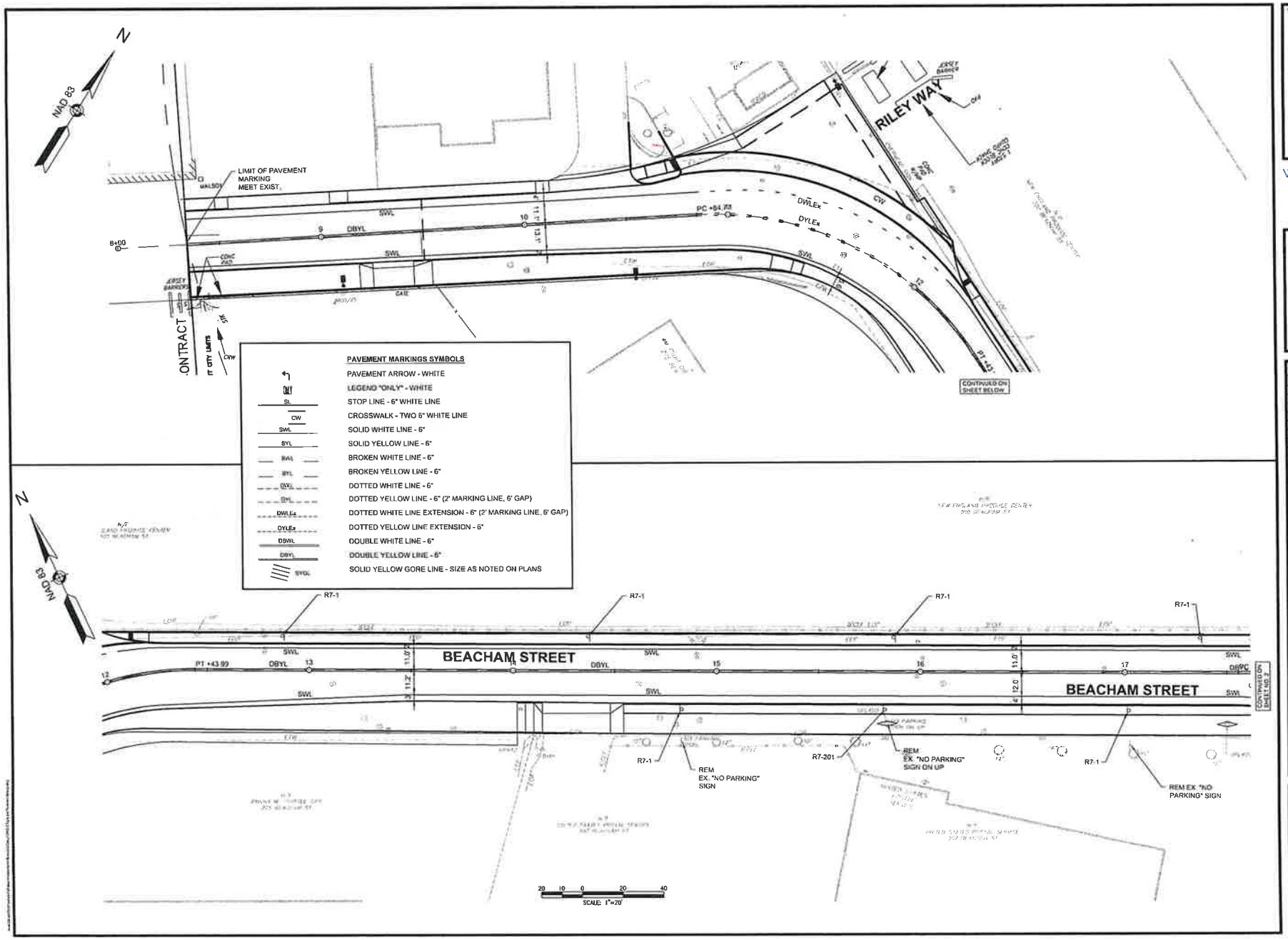
Drawing Title

ROADWAY CONSTRUCTION DETAILS 4 OF 4

Sheet Number

CT504

COPYRIGHT 2019 WESTON & SAMPSON



BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1820 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 35752 PROFESSIONAL ENGINEER

COA
COPYRIGHT © 2018 BY WESTON & SAMPSON ENGINEERS, INC. ALL RIGHTS RESERVED. THE DISCLOSURE OF THE CLIENT'S PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE, OR UTILIZATION OF THE DRAWING CONTENT BY OTHER CLIENTS OTHERS AND ON OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued for

DRAFT DESIGN

Scale AS NOTED

Date

Drawn By MRD

Reviewed By RWK

Approved By LFK

W&S Project No. 21-0003

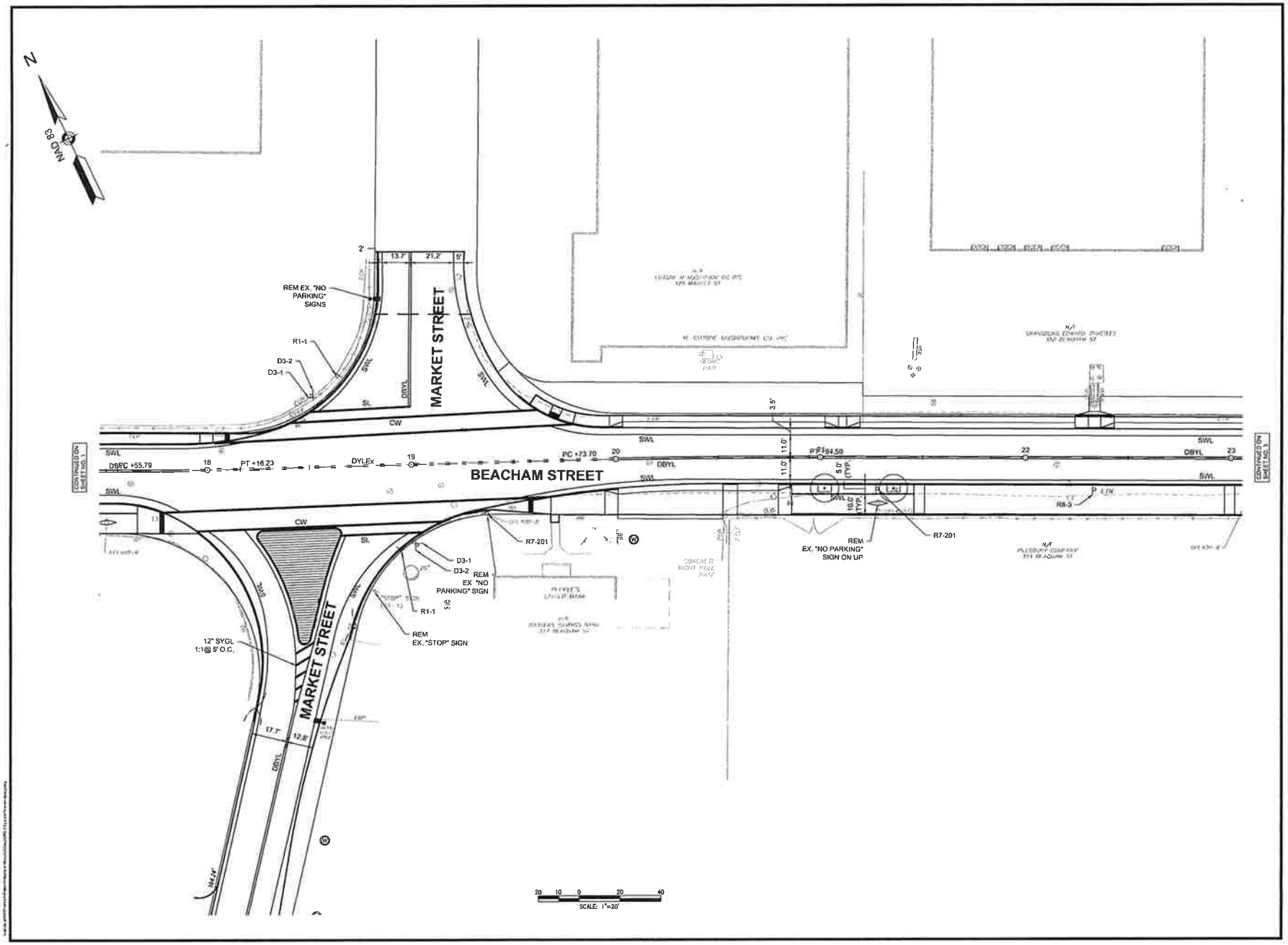
W&S File No.

Drawing Title

TRAFFIC SIGNS AND PAVEMENT MARKINGS PLAN 1 OF 4

Sheet Number

CT601



Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants

Revisions

No.	Date	Description

Seal

COA

COPYRIGHT © 2018 WESTON & SAMPSON

THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT SUBJECT AND LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OR UTILIZATION OF THIS DRAWING ON ANY OTHER CLIENT'S PROJECT AND ON OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale AS NOTED

Date

Drawn By: MRD

Reviewed By: RPK

Approved By: LFK

W&S Project No. 3190031

W&S File No.:

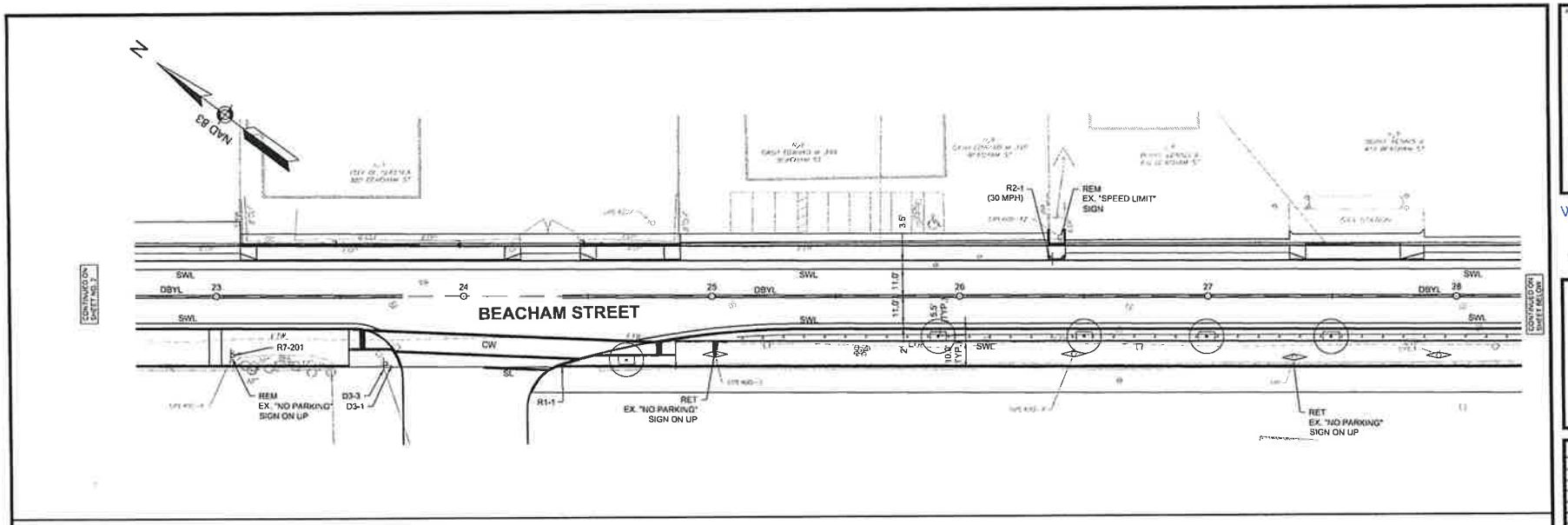
Drawing Title

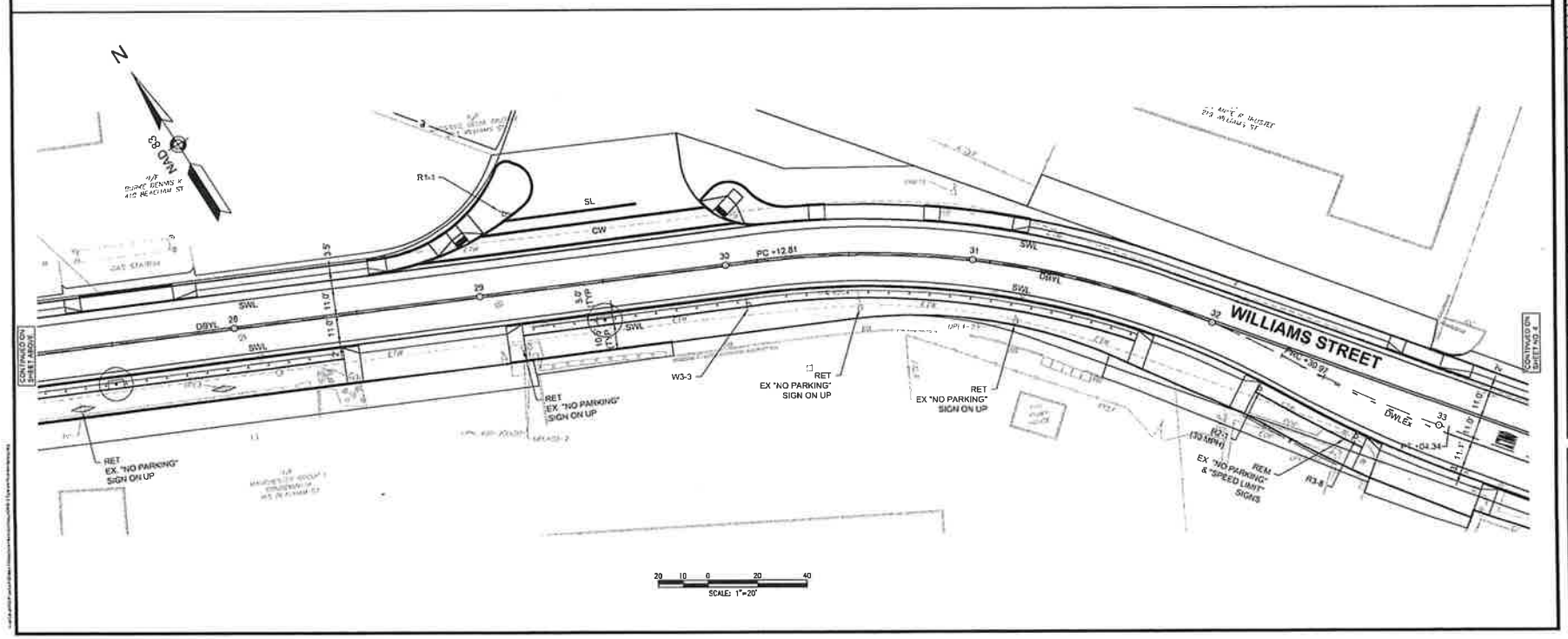
TRAFFIC SIGNS AND PAVEMENT MARKINGS PLAN 2 OF 4

Sheet Number

CT602

COPYRIGHT 2018 WESTON & SAMPSON





Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAWPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

COMMONWEALTH OF MASSACHUSETTS
BRUCE W. ADAMS
CIVIL
No. 35752
REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2019 WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT IN CONNECTION WITH THE PROJECT IT WAS ISSUED ON. THIS DRAWING ONLY.

REPRODUCTION, RELEASE OR UTILIZATION OF THE DRAWING CONTRARY TO THE FOREGOING STATEMENT AND ON ANY OTHER PROJECT IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued for

DRAFT DESIGN

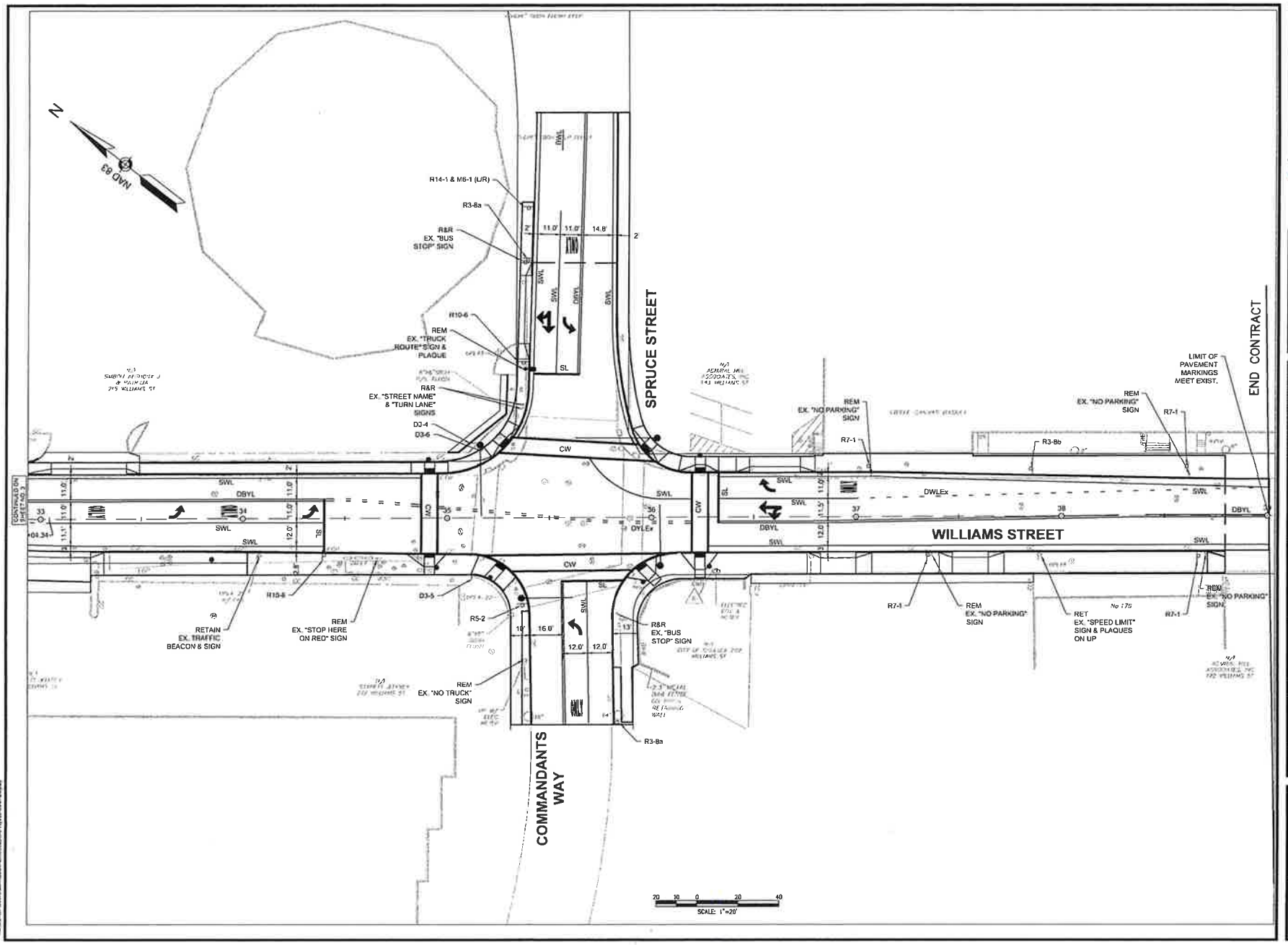
Scale	AS NOTED
Date	
Drawn By	MRD
Reviewed By	RPK
Approved By	LFK
W&S Project No.	2190031
W&S File No.	

Drawing Title

TRAFFIC SIGNS AND PAVEMENT MARKINGS PLAN 3 OF 4

Sheet Number

CT603



BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 35752

COPYRIGHT © 2018 BY WESTON & SAMPSON THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF INFORMATION OF THE DRAWING CONTRARY TO THIS RESTRICTION AND ON OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	MRD
Reviewed By	RPK
Approved By	LFK
W&S Project No.	[illegible]
W&S File No.	

Drawing Title

TRAFFIC SIGNS AND PAVEMENT MARKINGS PLAN 4 OF 4

Sheet Number

CT604

COPYRIGHT 2018 WESTON & SAMPSON

TRAFFIC SIGN SUMMARY

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER			
R1-1	30"	30"	STOP	SEE MUTCD STANDARDS			3	SEE MUTCD STANDARDS			P-5 (3)	6.25	18.75
R2-1 (30 MPH)	24"	30"	SPEED LIMIT 30				2				P-5 (2)	5	10
R2-1 (25 MPH)	24"	30"	SPEED LIMIT 25				1				P-5 (1)	5	5
R3-8a	30"	30"	ONLY				2				P-5 (2)	6.25	12.5
R3-8b	30"	30"	ONLY				1				P-5 (1)	6.25	6.25
R7-1	12"	18"					6				P-5 (1)	1.5	12
R7-201	12"	18"	NO PARKING TOW ZONE				4				P-5 (1)	1.5	6
R10-6	24"	36"	STOP HERE ON RED				2				P-5 (1)	6	12
R5-2	24"	24"					1				P-5 (1)	4	4
R10-12c	30"	36"	LEFT TURN YIELD ON FLASHING				2				MOUNT ON M.A. (2)	7.5	15
M6-4 (L/R)	21"	15"					1				MOUNT W/ R14-1	2.2	2.2
W3-3	30"	30"					1				P-5 (1)	6.25	6.25
R14-1	24"	18"	TRUCK ROUTE				1				P-5 (1)	3	3

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER	
D3-1	VAR.	12"	Beacham St	SEE MUTCD STANDARDS			2	SEE MUTCD STANDARDS			P-5 (8)
D3-2	VAR.	12"	Market St				3				P-5 (2)
D3-3	VAR.	12"	Justin Dr				2				P-5 (1)
D3-4	VAR.	18"	Williams St				1				MOUNT ON M.A. (1)
D3-5	VAR.	18"	Commandants Way				1				MOUNT W/ MA-D3-4 (1)
D3-6	VAR.	18"	Spruce St				1				MOUNT ON M.A. (1)

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants

Comments

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 34952 COMMONWEALTH OF MASSACHUSETTS PROFESSIONAL ENGINEER

COA

COPYRIGHT © 2019 BY WESTON & SAMPSON THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTENTS BY OTHER CLIENTS / PERSONS AND ON OTHER PROJECTS IS PROHIBITED BY LAW

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE & USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN

Issued For

DRAFT DESIGN

Scale: AS NOTED

Date:

Drawn By: VRD

Reviewed By: RKP

Approved By: LFK

W&S Project No. 01150031

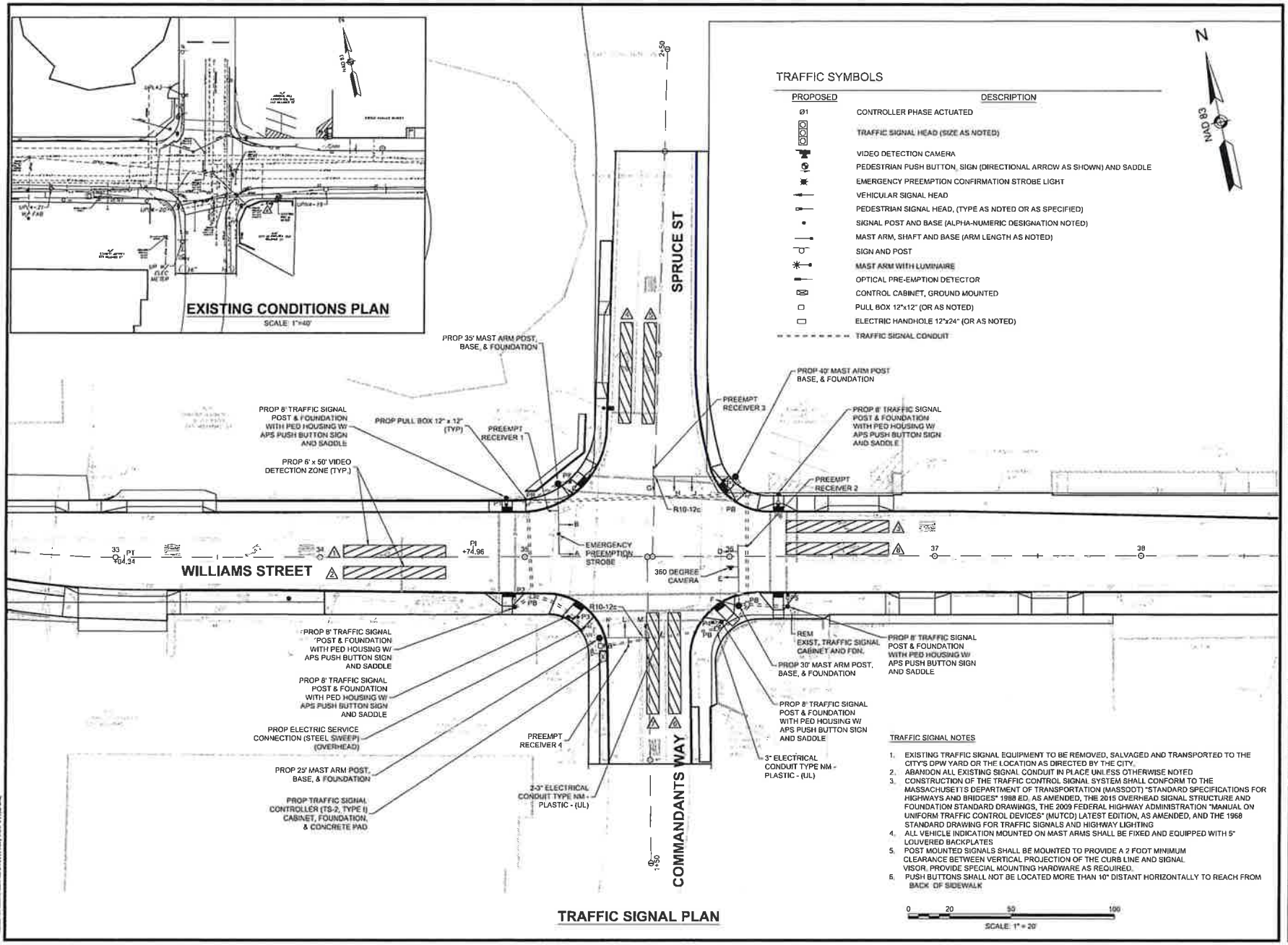
W&S File No.

Drawing Title

TRAFFIC SIGN SUMMARY 1 OF 1

Sheet Number

CT605



TRAFFIC SYMBOLS

PROPOSED	DESCRIPTION
Ø1	CONTROLLER PHASE ACTUATED
	TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
	VIDEO DETECTION CAMERA
	PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE
	EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
	VEHICULAR SIGNAL HEAD
	PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)
	SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
	MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
	SIGN AND POST
	MAST ARM WITH LUMINAIRE
	OPTICAL PRE-EMPTION DETECTOR
	CONTROL CABINET, GROUND MOUNTED
	PULL BOX 12"x12" (OR AS NOTED)
	ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
	TRAFFIC SIGNAL CONDUIT

TRAFFIC SIGNAL NOTES

1. EXISTING TRAFFIC SIGNAL EQUIPMENT TO BE REMOVED, SALVAGED AND TRANSPORTED TO THE CITY'S DPW YARD OR THE LOCATION AS DIRECTED BY THE CITY.
2. ABANDON ALL EXISTING SIGNAL CONDUIT IN PLACE UNLESS OTHERWISE NOTED
3. CONSTRUCTION OF THE TRAFFIC CONTROL SIGNAL SYSTEM SHALL CONFORM TO THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION (MASSDOT) "STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES" 1988 ED. AS AMENDED, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, THE 2009 FEDERAL HIGHWAY ADMINISTRATION "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) LATEST EDITION, AS AMENDED, AND THE 1968 STANDARD DRAWING FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING
4. ALL VEHICLE INDICATION MOUNTED ON MAST ARMS SHALL BE FIXED AND EQUIPPED WITH 5" LOUVERED BACKPLATES
5. POST MOUNTED SIGNALS SHALL BE MOUNTED TO PROVIDE A 2 FOOT MINIMUM CLEARANCE BETWEEN VERTICAL PROJECTION OF THE CURB LINE AND SIGNAL VISOR. PROVIDE SPECIAL MOUNTING HARDWARE AS REQUIRED.
6. PUSH BUTTONS SHALL NOT BE LOCATED MORE THAN 10" DISTANT HORIZONTALLY TO REACH FROM BACK OF SIDEWALK

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

COMMONWEALTH OF MASSACHUSETTS
BRUCE W. ADAMS
CIVIL
No. 35752
REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2019 BY WESTON & SAMPSON
THIS DRAWING WAS MADE PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTENT BY OTHER CLIENTS, FIRMS AND ON OTHER PROJECTS IS PROHIBITED BY LAW

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN

Issued For

DRAFT DESIGN

Scale: AS NOTED

Date:

Drawn By: NAD

Reviewed By: RKP

Approved By: LFK

W&S Project No.: [illegible]

W&S File No.:

Drawing Title

TRAFFIC SIGNAL PLANS SHEET 1 OF 2

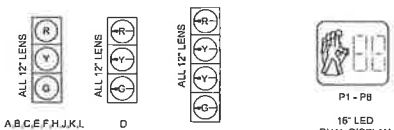
Sheet Number

CT606

			Ø2			Ø3			Ø4			Ø5			Ø6			Ø7			Ø8			Ø9			
SEQUENCE AND TIMING FOR FULL ACTUATED CONTROL (ISOLATED)																											
STREET	DIRECTION	HOUSINGS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	FLASH OP
WILLIAMS STREET	WB	A	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FY
WILLIAMS STREET	WB	B	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FY
WILLIAMS STREET	WB	C	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FY
WILLIAMS STREET	EB	D	<R	<R	<R	<R	<R	<R	<R	<R	<R	<G	<Y	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<FR
WILLIAMS STREET	EB	E	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
WILLIAMS STREET	EB	F	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
COMMANDANTS WAY	NB	G	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<G	<Y	<R	<FYA	<Y	<R	R	R	R	<FR
COMMANDANTS WAY	NB	H	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
COMMANDANTS WAY	NB	J	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
SPRUCE STREET	SB	K	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FR
SPRUCE STREET	SB	L	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FR
SPRUCE STREET	SB	M	<R	<R	<R	<G	<Y	<R	<FYA	Y	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<R	<FR
PEDESTRIAN	ALL	P1-P8	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	
TIMING IN SECONDS																											
MINIMUM GREEN (INITIAL)			6			6			6			6			6			6			6						EMERGENCY ONLY
PASSAGE TIME (VEHICLE)			3			3			3			3			3			3			3						
MAXIMUM 1 PM PEAK (3-7PM)			57			16			12			15			35			7			21						
MAXIMUM 2 ALL OTHER TIMES			33			12			12			6			20			7			17						
YELLOW CLEARANCE			3			3			3			3			3			3			3						
RED CLEARANCE			4			-			2			4			4			-			2						
WALK (W)																								7			
PEDESTRIAN CLEARANCE																									23	1	
RECALL			MIN			NONE			NONE			NONE			MIN			NONE			NONE			LOCK			
MEMORY															-			-									

PAY ITEM	QUANTITY	MAJOR ITEMS REQUIRED ITEM
20A (MASSDOT ITEM 815.01)	1	CONTROLLER NEMA 8 PHASE TS2 - TYPE 1 CAB. FDN
	1	SERVICE CONNECTION, TYPE OVERHEAD
	5	8' SIGNAL POLE, BASE & FDN
	1	30' TYPE II GALV. STEEL MAST ARM ASSEMBLY, BASE & FDN
	1	35' TYPE II GALV. STEEL MAST ARM ASSEMBLY, BASE & FDN
	1	40' TYPE II GALV. STEEL MAST ARM ASSEMBLY, BASE & FDN
	1	25' TYPE II GALV. STEEL MAST ARM ASSEMBLY, BASE & FDN
	9	1 WAY, 3 SECTION, SIGNAL HOUSING (12" LED)
	1	1 WAY, 3 SECTION, SIGNAL HOUSING (12" LED) (LEFT ARROW)
	2	1 WAY, 4 SECTION, SIGNAL HOUSING (12" LED) (FYA)
	10	5" 3 SECTION BACK PLATES (LOUVERED) WITH 3" RETROREFLECTIVE TAPE
	2	5" 4 SECTION BACK PLATES (LOUVERED) WITH 3" RETROREFLECTIVE TAPE
	8	16" PEDESTRIAN COUNTDOWN HOUSING, TYPE LED (INTL SYMBOL)
	8	PEDESTRIAN PUSH BUTTON SIGN & SADDLE (APS)
	4	EMERGENCY PREEMPTION RECEIVERS
	1	EMERGENCY PREEMPTION PHASE SELECTOR
	1	EMERGENCY PREEMPTION STROBE LIGHT
	1	VIDEO DETECTION SYSTEM WITH 1- 360 DEGREE CAMERA WITH MOUNTING BRACKETS & 10' EXTENSION ARM, MULTIPLEXER, MONITOR, AUTOMATIC CONTROL UNIT & POINTING DEVICE, ISOLATION AMPLIFIERS FOR CABLING & SOFTWARE
20C (MASSDOT ITEM 811.31)	7	12" x 12" PULL BOX SD2.031
		Plus all necessary duct, cable, labor, miscellaneous material and equipment to complete the installation.

SIGNAL IDENTIFICATION



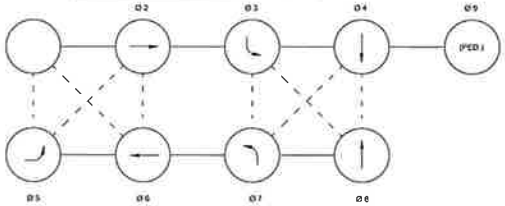
NOTES:

1. ALL SIGNALS SHALL HAVE CAP VISORS.
2. ALL SIGNALS SHALL HAVE 12" LED MODULES WITH 5" LOUVERED BACK PLATES
3. ALL BACK PLATES SHALL HAVE A 3" RETROREFLECTIVE BORDER
4. ALL PED INDICATORS SHALL HAVE SUN CAP VISORS

VIDEO DETECTOR DATA

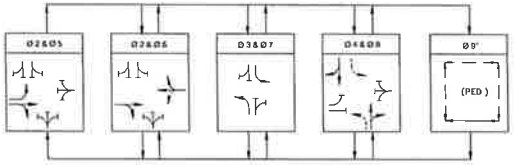
DETECTOR NUMBER	DETECTOR ZONE SIZE	Ø CALLED	MODE A=PULSE B=PRES.	DELAY TIME	EXT. TIME
1	VIDEO 6'x50'	Ø5	B	-	-
2	VIDEO 6'x50'	Ø2	B	-	-
3	VIDEO 6'x50'	Ø6	B	-	-
4	VIDEO 6'x50'	Ø4	B	-	-
5	VIDEO 6'x50'	Ø4	B	-	-
6	VIDEO 6'x50'	Ø8	B	-	-
7	VIDEO 6'x50'	Ø7	B	-	-
8	VIDEO 6'x50'	Ø6	B	-	-

NEMA DUAL RING PHASING NOTES:



1. PHASES ASSOCIATED BY A SOLID LINE SHALL NOT OPERATE CONCURRENTLY
2. PHASES ASSOCIATED WITH A DASHED LINE MAY OPERATE CONCURRENTLY
3. THROUGH MOVEMENTS MAY INCLUDE RIGHT TURNS
4. IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT SHALL NOT CHANGE DURING THE CHANGE INTERVAL(S) UNLESS OTHERWISE NOTED

PREFERENTIAL PHASING SEQUENCE



★ = UPON PUSH BUTTON ACTIVATION

FIRE PREEMPTION SCHEDULE

APPROACH	PREEMPTION PHASE DETECTOR	PHASE CALLED
EASTBOUND	1	Ø7 & Ø8
WESTBOUND	2	Ø5
SOUTHBOUND	3	Ø3 & Ø8
NORTHBOUND	4	Ø4 & Ø7

EMERGENCY VEHICLE PREEMPTION OPERATION

1. EMERGENCY VEHICLE PREEMPTION SHALL BE ACTUATED BY AN OPTICAL SIGNAL FROM AN OPTICAL EMITTER MOUNTED ON AN EMERGENCY VEHICLE AND RECEIVED BY AN OPTICAL DETECTOR LOCATED AT INTERSECTION. A SEPARATE RECEIVING DETECTOR IS REQUIRED FOR EACH DETECTED APPROACH.
2. PREEMPTION SIGNALS FROM MULTIPLE APPROACHES SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVED BASIS.
3. IN RESPONSE TO A PREEMPTION SIGNAL RECEIVED AT AN INTERSECTION BY AN OPTICAL DETECTOR, THE CONTROLLER SHALL TIME THE CLEARANCE INTERVALS OF THE ACTIVE PHASE (IF DIFFERENT THAT TO BE SERVICED) AND ADVANCE TO AND/OR HOLD IN EMERGENCY VEHICLE PREEMPTION PHASE UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME CLEARANCES AND SIMILARLY SERVICE OTHER EMERGENCY VEHICLE PREEMPTION SEQUENCES IN THE ORDER RECEIVED (IF RECEIVED) OTHERWISE, RESUME NORMAL PREFERENTIAL PHASE SEQUENCE.
4. PREEMPTION MINIMUM GREENS SHALL BE SIX SECONDS
5. NORMAL CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TERMINATED BY PREEMPTION DEMAND.
6. ACTUAL TIMING FOR PREEMPTION SHALL BE DETERMINED IN THE FIELD IN COORDINATION WITH THE FIRE DEPARTMENT AND SHALL BE APPROVED BY MHD PRIOR TO OPERATION.

Project:

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAWFSDA
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

COPYRIGHT 2018 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CHELSEA PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, REUSE OF UTILIZATION OF THE DRAWING CONTENT BY OTHER CLIENTS, PEOPLE AND ON OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For:

DRAFT DESIGN

Scale: AS NOTED

Date:

Drawn By: MRD

Reviewed By: RKP

Approved By: LFK

W&S Project No.: [illegible]

W&S File No.:

Drawing Title:

TRAFFIC SIGNAL PLANS SHEET 2 OF 2

Sheet Number:

CT607

NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS, UNLESS SUPERCEDED BY THESE PLANS
2. ALL SIGN LEGENDS, BORDERS, AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD
3. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK
4. TEMPORARY CONSTRUCTION SIGNING, BARRICADES, AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
5. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, CHANNELIZING DEVICES, BARRIERS, AND CRASH ATTENUATORS MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES" AND/OR "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH)
6. CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT, AND SIMILAR OPERATIONS
7. THE FIRST FIVE PLASTIC DRUMS OF A TAPER SHALL BE MOUNTED WITH TYPE A LIGHTS
8. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
9. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
10. MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH
11. MINIMUM LANE WIDTH IS TO BE 11 FEET (3.3m) UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
12. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.

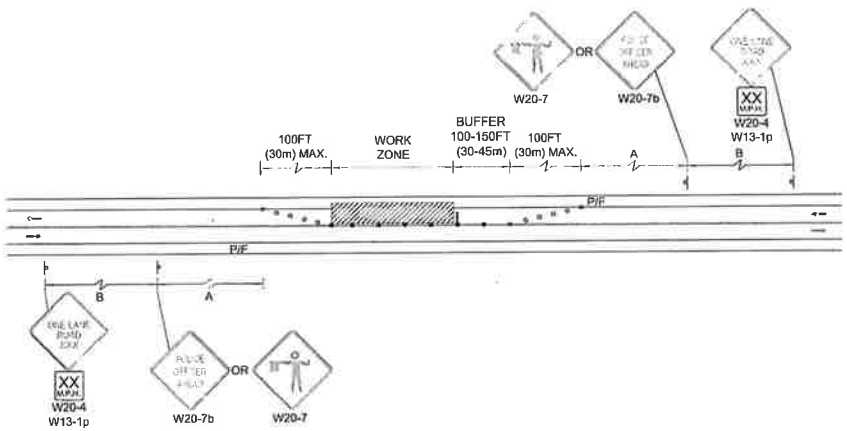
THE IDEAL CAPACITY OF A MAJOR HIGHWAY IS GENERALLY CONSIDERED TO BE 1900 PASSENGER CARS PER HOUR PER LANE (PCPHPL). IN WORK ZONES ON A MULTI-LANE DIVIDED HIGHWAY, THE FOLLOWING VOLUME GUIDELINES HAVE BEEN SUGGESTED:

MEASURED AVERAGE WORK ZONE CAPACITIES

NUMBER OF LANES		NUMBER OF STUDIES	AVERAGE CAPACITY	
NORMAL (EXISTING)	OPEN (TO TRAFFIC)		VPH	VPHPL
3	1	7	1,170	1,170
2	1	8	1,340	1,340
5	2	8	2,740	1,370
4	2	4	2,960	1,480
3	2	9	2,980	1,490
4	3	4	4,560	1,520

Source: Dudek, C. Notes on Work Zone Capacity and Level of Service. Texas Transportation Institute, Texas A&M University, College Station, Texas (1984)

BY OBTAINING HOURLY TRAFFIC COUNTS FOR A PARTICULAR ROADWAY (WITH A MINIMUM OF A 48-HOUR AUTOMATIC TRAFFIC RECORDER (ATR) COUNT), THIS WILL HELP TO DETERMINE AT WHAT TIMES OF THE DAY OR NIGHT A CERTAIN NUMBER OF LANES MAY BE CLOSED.



TEMPORARY TRAFFIC SIGN SUMMARY

IDENTIFICATION NUMBER	SIZE OF SIGN WIDTH	SIZE OF SIGN HEIGHT	TEXT	
R2-10e	36"	48"	END ROAD WORK / DOUBLE FINES END	
R2-10a	48"	36"	WORK ZONE / SPEEDING FINES DOUBLED	PLACE SIGN BETWEEN FIRST AND SECOND ADVANCED WARNING SIGN OR AS DIRECTED BY THE ENGINEER
W5-1	48"	48"	ROAD NARROWS	
W13-1p	18"	18"	XX M.P.H.	ADVISORY SPEED LIMIT AS DETERMINED BY THE ENGINEER
W20-1	48"	48"	ROAD WORK AHEAD	
W20-4	48"	48"	ONE LANE ROAD XX FT	
W20-7	48"	48"		
W20-7b	48"	48"	POLICE OFFICER AHEAD	
W11-2	30"	30"		
W16-7pL	24"	12"		
R9-11a	48"	24"	SIDEWALK CLOSED / CROSS HERE	
R9-9	30"	18"	SIDEWALK CLOSED	
W1-4R	48"	48"		
W1-4L	48"	48"		
WB-7	48"	48"	PAVEMENT ENDS	

LEGEND

- REFLECTORIZED CHANNELIZING DEVICE
- REFLECTORIZED DRUM
- TRAFFIC FLOW DURING CONSTRUCTION
- NORMAL TRAFFIC FLOW
- P/F — POLICE/FLAGGER DETAIL
- PORTABLE BREAKAWAY BARRICADE TYPE III
- TEMPORARY IMPACT ATTENUATOR
- CONSTRUCTION SIGN
- WORK AREA
- N.T.S. — NOT TO SCALE
- ARROW BOARD
- TEMPORARY PRECAST PORTABLE CONCRETE BARRIER W/WARNING LIGHTS

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants

Revisions

No.	Date	Description

Seal

COPYRIGHT © 2018 BY WESTON & SAMPSON ENGINEERS, INC. HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTENT BY OTHER CLIENTS, FIRMS AND ON OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For

DRAFT DESIGN

Scale: AS NOTED

Date

Drawn By: MRD

Reviewed By: RPK

Approved By: LPK

W&S Project No.: 0190031

W&S File No.

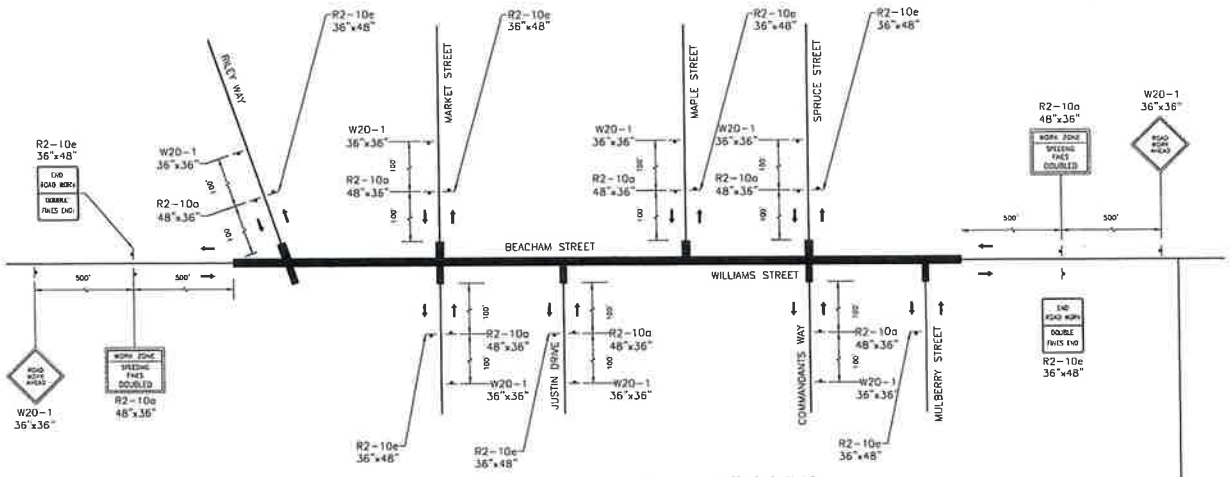
Drawing Title

TEMPORARY TRAFFIC CONTROL PLAN

Sheet No. (Plan)

CT608

COPYRIGHT 2018 WESTON & SAMPSON

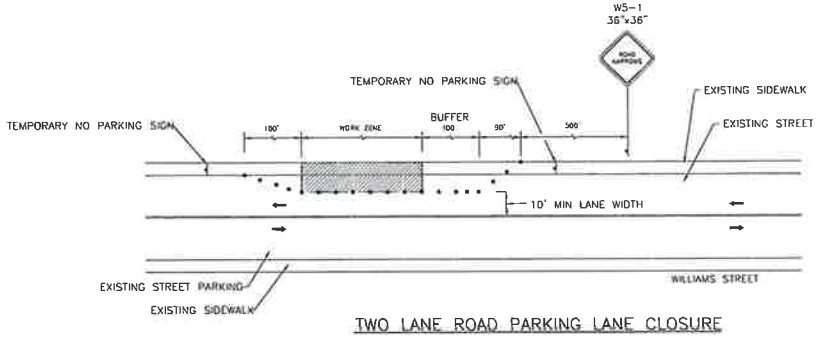


PROJECT LIMIT SIGNING

NOT TO SCALE

LEGEND:

- WORK AREA
- SIGN
- CHANNELIZING DEVICE
- FLASHING ARROW BOARD
- TYPE III BARRICADE
- PEDESTRIAN CHANNELIZING DEVICE
- TEMPORARY PEDESTRIAN RAMP (TYP)
- P/F POLICE/FLAGGER
- FLOW DIRECTION
- PROJECT WORK LIMIT



TWO LANE ROAD PARKING LANE CLOSURE

NOT TO SCALE

TEMPORARY TRAFFIC CONTROL NOTES:

1. ALL TRAFFIC CONTROL DEVICES AND WORK ZONE SET-UPS ARE TO BE IN ACCORDANCE WITH MASSDOT AND MUTCD STANDARDS.
2. DRUM SPACING SHALL BE 30 FEET ON BROADWAY (RTE 107).
3. MINIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS AND CONES) IS EQUAL IN FEET TO THE POSTED SPEED LIMIT IN MILES PER HOUR.
4. ALL SIGNS SHOWN SHALL BE MOUNTED ON SUITABLE TEMPORARY SUPPORTS SUCH THAT SIGNS ARE CLEARLY VISIBLE TO APPROACHING TRAFFIC.
5. MAINTAIN ACCESS TO ALL DRIVEWAYS AND PEDESTRIAN SIDEWALKS AT ALL TIMES, UNLESS OTHERWISE NOTED.
6. THE FIRST FIVE PLASTIC DRUMS OF A TAPER SHALL BE MOUNTED WITH TYPE A LIGHTS.
7. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
8. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
9. MINIMUM LANE WIDTH IS 10 FEET, MEASURED FROM THE EDGE OF DRUMS OR TEMPORARY BARRIER.
10. ADA COMPLIANT PEDESTRIAN ACCESS SHALL BE MAINTAINED AT ALL TIMES, INCLUDING PROPER BARRICADES, RAILINGS, RAMPS, AND SIGNAGE FOR PEDESTRIAN DETOURS OR BYPASSES.

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

COMMONWEALTH OF MASSACHUSETTS
BRUCE W. ADAMS
CIVIL
No. 35752
PROFESSIONAL ENGINEER

COA

COPYRIGHT © 2013 BY WESTON & SAMPSON
THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTENT BY OTHER CLIENTS / FIRMS AND ON OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN

Issued For

DRAFT DESIGN

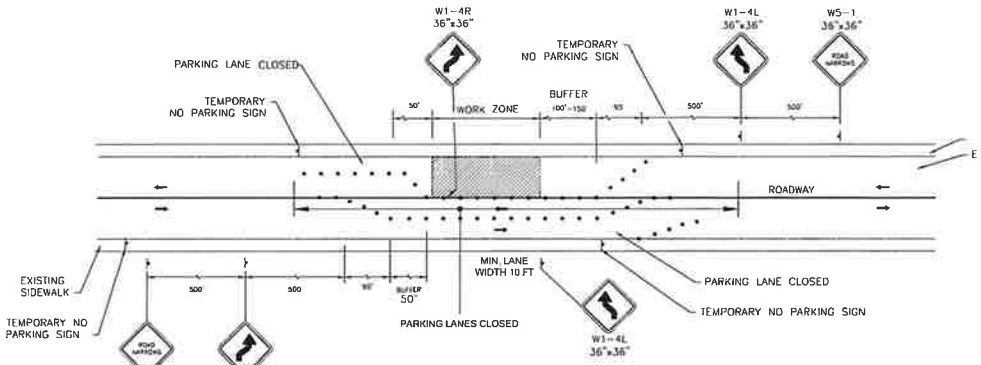
Scale	AS NOTED
Date	
Drawn By	MRD
Reviewed By	RPX
Approved By	LFK
W&S Project No.	01-00031
W&S File No	

Drawing Title

TEMPORARY TRAFFIC CONTROL PLAN

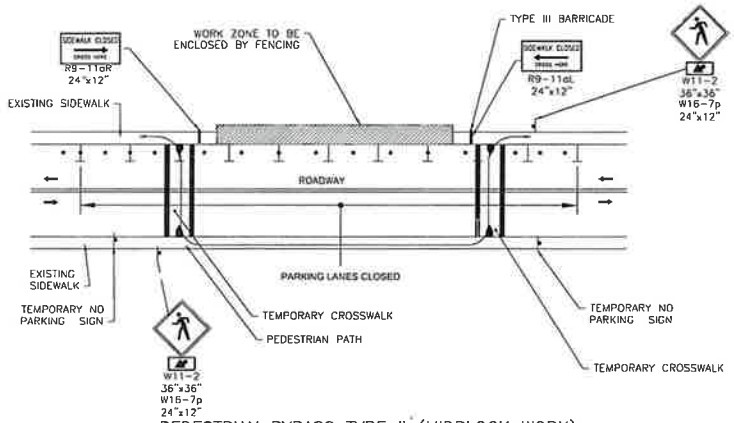
Sheet Number

CT609



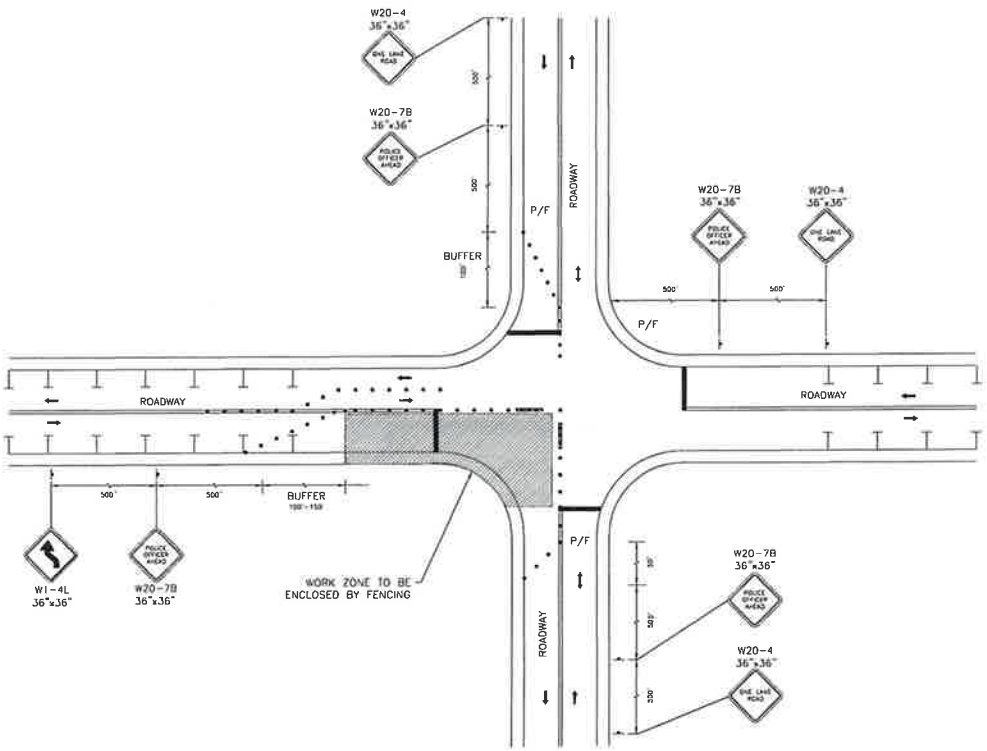
TWO LANE ROAD SINGLE LANE AND PARKING LANE CLOSURE

NOT TO SCALE



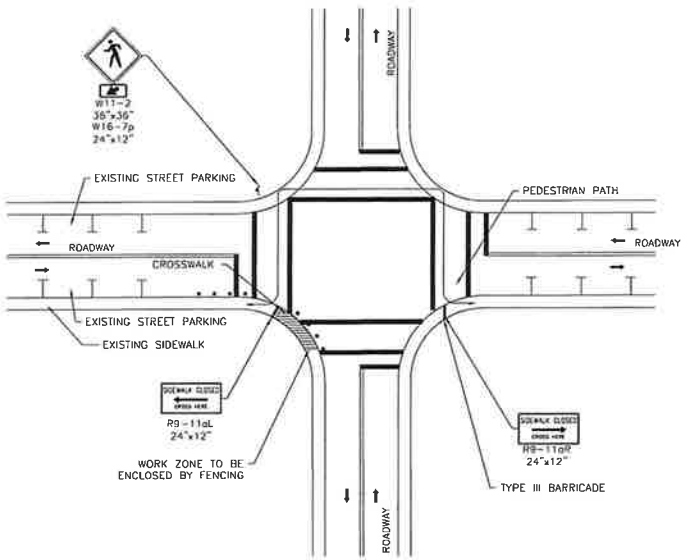
PEDESTRIAN BYPASS TYPE II (MIDBLOCK WORK)

NOT TO SCALE



SINGLE LANE APPROACH ONE QUADRANT CLOSURE

NOT TO SCALE



PEDESTRIAN BYPASS TYPE II (INTERSECTION WORK)

NOT TO SCALE

PEDESTRIAN BYPASS NOTES:

1. ADDITIONAL ADVANCE WARNING MAY BE NECESSARY.
2. CONTROLS ONLY FOR PEDESTRIAN TRAFFIC ARE SHOWN. VEHICULAR TRAFFIC SHOULD BE HANDLED AS SHOWN ELSEWHERE.
3. STREET LIGHTING SHOULD BE CONSIDERED WHEN LOCATING CONTROL DEVICES.
4. IF THE WORK ZONE DOES NOT PERMIT PEDESTRIANS TO TRAVEL ADJACENT TO IT, TEMPORARY CROSSWALKS WITH APPROPRIATE SIGNS SHOULD BE INSTALLED TO CROSS PEDESTRIANS TO THE OPPOSITE SIDE OF THE STREET AS SHOWN IN PEDESTRIAN BYPASS TYPE II, AND AS DIRECTED BY THE ENGINEER.
5. BYPASS IS TO BE USED IN CONJUNCTION WITH THE PROPOSED LANE CLOSURE DETAILS AND DURING CONSTRUCTION STAGING, AS DIRECTED BY THE ENGINEER.

Project

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Consultants

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS
No. 35752
REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2019 BY WESTON & SAMPSON

THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT & PROJECT NAME LISTED ON THIS DRAWING ONLY.

REPRODUCTION, RELEASE OF UTILIZATION OF THE DRAWING CONTENT OR OTHERWISE DISTRIBUTING ON OTHER PROJECTS IS PROHIBITED BY LAW.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HERIN.

Issued For

DRAFT DESIGN

Scale	AS NOTED
Date	
Drawn By	MRD
Reviewed By	RPK
Approved By	LFK
W&S Project No.	2190021
W&S File No.	

Drawing Title

TEMPORARY TRAFFIC CONTROL PLAN

Sheet Number

CT610

SUGGESTED WORK ZONE WARNING SIGN SPACING

ROAD TYPE	DISTANCE BETWEEN SIGNS **		
	A	B	C
LOCAL OR LOW VOLUME ROADWAYS*	350 (100)	350 (100)	350 (100)
MOST OTHER ROADWAYS*	500 (150)	500 (150)	500 (150)
FREEWAYS AND EXPRESSWAYS*	1,000 (300)	1,500 (450)	2,640 (800)

* ROAD TYPE TO BE DETERMINED BY MASSDOT OFFICE OF TRANSPORTATION PLANNING

** DISTANCES ARE SHOWN IN FEET (METERS). THE COLUMN HEADINGS A, B, AND C ARE THE DIMENSIONS SHOWN IN THE DETAIL/ TYPICAL SETUP FIGURES. THE A DIMENSION IS THE DISTANCE FROM THE TRANSITION OR POINT OF RESTRICTION TO THE FIRST SIGN. THE B DIMENSION IS THE DISTANCE BETWEEN THE FIRST AND SECOND SIGNS. THE C DIMENSION IS THE DISTANCE BETWEEN THE SECOND AND THIRD SIGNS. (THE "THIRD" SIGN IS THE FIRST ONE TYPICALLY ENCOUNTERED BY A DRIVER APPROACHING A TEMPORARY TRAFFIC CONTROL (TTC) ZONE.)

THE "THIRD" SIGN ABOVE IS TYPICALLY REFERRED TO AS AN "ADVANCE WARNING" SIGN ON THE TTCP SETUPS. THESE ADVANCE WARNING SIGNS ARE LOCATED PRIOR TO THE PROJECT LIMITS ON ALL APPROACHES (i.e. THE W20-1 SERIES (ROAD WORK XX FT) SIGNS), AND USUALLY REMAIN FOR THE DURATION OF THE PROJECT. ADDITIONAL SIGNS (i.e. "RIGHT LANE CLOSED 1 MILE" AND "LEFT LANE CLOSED 1 MILE") HAVE BEEN SHOWN IN SOME FIGURES AS EXAMPLES OF REINFORCEMENT SIGN PLACEMENT BUT ARE USED IN RARE OCCASIONS.

THE FIRST AND SECOND WARNING SIGNS ABOVE ARE REFERRED TO AS THE OPERATIONAL (DAY-TO-DAY) WORK ZONE SIGNS AND MAY BE MOVED DEPENDING ON WHERE THE SPECIFIC ROADWAY WORK FOR THAT DAY IS LOCATED.

R2-10a SIGNS SHALL BE PLACED BETWEEN THE SECOND AND THIRD SIGNS AS DESCRIBED ABOVE.

R2-10a, R2-10e, AND W20-1 SERIES SIGNS ARE TO BE INCLUDED ON ALL DETAILS/TYPICAL SETUPS.

Based on: Table 6C-1 MUTCD LATEST EDITION

TAPER LENGTH CRITERIA FOR TEMPORARY TRAFFIC CONTROL ZONES

TYPE OF TAPER	TAPER LENGTH (L)*
MERGING TAPER	AT LEAST L
SHIFTING TAPER	AT LEAST 0.5L
SHOULDER TAPER	AT LEAST 0.33L
ONE-LANE, TWO-WAY TRAFFIC TAPER	50 FT MIN (15 m) 100 FT (30 m) MAX.
DOWNSTREAM TAPER	50 FT MIN (15 m) 100 FT MAX (30 m) PER LANE

FORMULAS FOR DETERMINING TAPER LENGTHS

SPEED LIMIT (S)	TAPER LENGTH (L) FEET
40 MPH OR LESS	$L = \frac{WS^2}{60}$
45 MPH OR MORE	$L = WS$

SPEED LIMIT (S)	TAPER LENGTH (L) Meters
60 KM/H OR LESS	$L = \frac{WS^2}{155}$
70 KM/H OR MORE	$L = \frac{WS}{1.6}$

WHERE: L = TAPER LENGTH IN FEET (METERS)

W = WIDTH OF OFFSET IN FEET (METERS)

S = POSTED SPEED LIMIT, OR OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED IN MPH (KM/H)

NOTES ON WORK ZONE DISTANCES

NOT TO SCALE

STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED

SPEED* (km/h)	DISTANCE (m)
30	35
40	50
50	65
60	85
70	105
80	130
90	160
100	185
110	220
120	250

SPEED* (mph)	DISTANCE (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

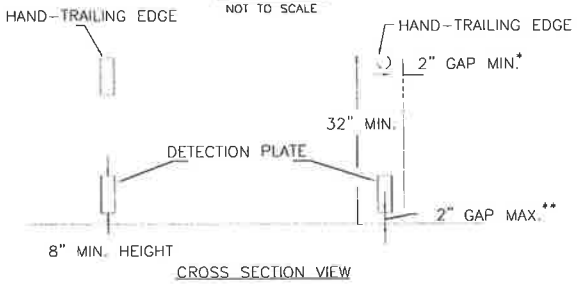
*POSTED SPEED, OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED

THESE VALUES MAY BE USED TO DETERMINE THE LENGTH OF LONGITUDINAL BUFFER SPACES

THE DISTANCES IN THE ABOVE CHART REPRESENT THE MINIMAL VALUES FOR BUFFER SPACING

NOTES ON WORK ZONE DISTANCES

NOT TO SCALE

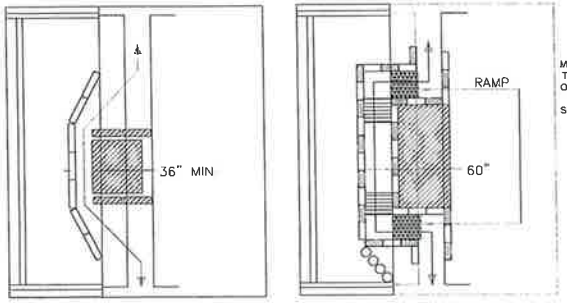


PEDESTRIAN CHANNELIZING DEVICE

NOTES:

* THERE SHALL BE A 2 INCH GAP BETWEEN THE HAND-TRAILING EDGE AND ITS SUPPORT.

** A MAXIMUM 2 INCH GAP BETWEEN THE BOTTOM OF THE BOTTOM RAIL AND THE SURFACE MAY BE USED TO PROVIDE DRAINAGE.



When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, temporary facilities shall be provided and they shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.

A pedestrian channelizing device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.

When used, temporary ramps shall comply with Americans with Disabilities Act (see Figures Ped-1 & Ped-2).

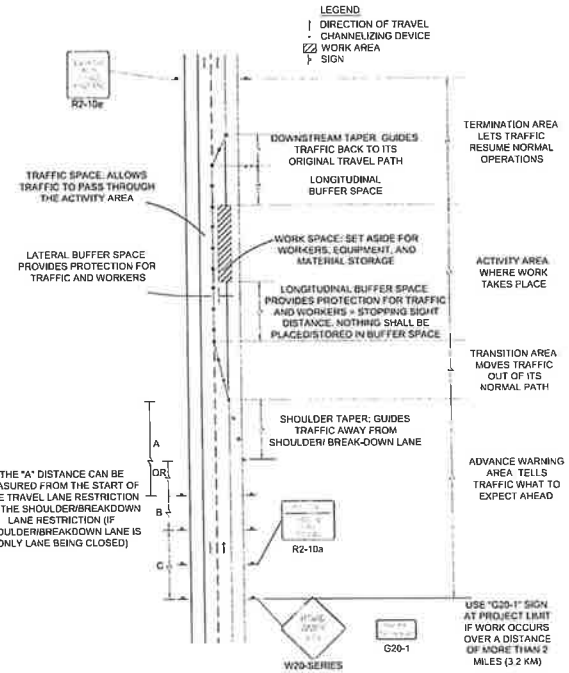
The alternate pathway should have a smooth continuous hard surface for the entire length of the temporary pedestrian facility.

The protective requirements of a TTC situation have priority in determining the need for temporary traffic barriers and their use in this situation should be based on engineering judgment.

Audible information devices should be considered where midblock closings and changed crosswalk areas cause inadequate communication to be provided to pedestrians who have visual disabilities.

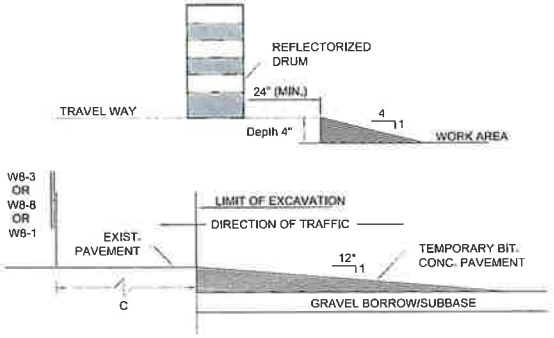
PEDESTRIAN DETAILS

NOT TO SCALE



COMPONENT PARTS OF A TEMPORARY TRAFFIC CONTROL (TTC) ZONE

NOT TO SCALE



LATERAL AND LONGITUDINAL DROP-OFF DETAILS

NOT TO SCALE

BEACHAM ST AND WILLIAMS ST UTILITY & ROADWAY IMPROVEMENTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkup Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants

Revisions

No.	Date	Description

Seal

BRUCE W. ADAMS CIVIL No. 39752 COMMONWEALTH OF MASSACHUSETTS REGISTERED PROFESSIONAL ENGINEER

COPYRIGHT © 2019 BY WESTON & SAMPSON. THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT OF WESTON & SAMPSON. REPRODUCTION, REUSE OF, OR UTILIZATION OF THE DRAWING CONTAINED BY OTHER CLIENTS OR THIRD PARTIES, OR OTHER PROJECTS OR PURPOSES, IS NOT LAWFUL.

WESTON & SAMPSON RETAINS THE EXCLUSIVE USE OF THE INTELLECTUAL PROPERTY CONTAINED HEREIN.

Issued For: DRAFT DESIGN

Scale: AS NOTED

Date:

Drawn By: MRD

Reviewed By: RPK

Approved By: LFK

W&S Project No. 19002

W&S File No.

Drawing Title: TEMPORARY TRAFFIC CONTROL PLAN

Sheet Number: CT611

PROJECT UNDERSTANDING & APPROACH

Weston & Sampson supported the City of Chelsea ("the City") Department of Planning and Development in design and bid of *Beacham Street and Williams Street Roadway and Utility Improvements, Contract 2020-201*. The construction contract is scheduled to be bid in the first half of 2020 and awarded in summer 2020. Construction is scheduled to begin in August 2020 and conclude in June 2022. The construction scope of work is described below:

> *"The scope of work includes utility and roadway construction in Beacham Street and Williams Street between the City limit and Spruce Street in the City of Chelsea, Massachusetts. Utility construction shall include cleaning and cured-in-place pipe lining of approximately 1,967 linear feet of 8-, 10-, and 12-inch mainline sewer plus building connections; sewer spot repairs; rehabilitation or replacement of existing sewer manholes; installation of approximately 3,907 linear feet of 12-, 15-, 18-inch drain including manholes and catch basins; and 270 linear feet of 6- ,8-, 10-, and 12-inch water main with fittings, appurtenances, and water services. Roadway construction shall include approximately 17,070 square yards of roadway reclamation; approximately 3,550 square yards of full depth roadway reconstruction; base, binder and top course pavement; approximately 3,977 square yards of cement concrete sidewalks; installation of new granite curb; and pavement markings and signage. The scope of work will require extensive provisions for construction zone safety and traffic management as well as handling and disposal of contaminated soil and groundwater."*

The program will be funded by the United States Department of Commerce Economic Development Administration (EDA) and Massachusetts Water Resources Authority (MWRA) grants, among other finance sources.

SCOPE OF WORK, FEE, AND SCHEDULE

Weston & Sampson proposes a fee of $1,200,000 to deliver this scope of services. Weston & Sampson's current-year employee rate chart and typical amendments to the City of Chelsea terms and conditions apply. Weston & Sampson is prepared to begin upon receipt of Notice to Proceed and will complete work by August 30, 2022. Weston & Sampson will complete the following tasks as part of this contract.

1.0 Construction Administration (Provide up to 4,170 hours):

The contract requires a qualified contractor substantially complete roadway and utility improvements by the end of June 2022. Weston & Sampson estimates twenty one (21) working construction months and six (6) months preconstruction, winter shutdown, and administrative closeout.

1.1 Meet with the City or designated representative of the City, local officials (and state/federal officials as appropriate) throughout the construction phase of the project to discuss construction issues, progress of the project, and to coordinate the work as needed.

1.2 Arrange and conduct a pre-construction conference with the construction contractor(s), the City and representatives of the Police and Fire Department, City's EEO, Transportation, Utilities

and any other group directly affected.

1.3 Retain subconsultants as required to support construction of the project.

1.4 Review shop and erection drawings and shop and mill test reports submitted by the construction contractor(s) for general compliance with contract documents.

1.5 Prepare and process any change orders that may be required during the project.

1.6 Prepare supplementary drawings/sketches as required to clarify/resolve field construction problems that may occur.

1.7 Conduct monthly visits to the construction site by the project manager or project engineer to observe construction progress.

1.8 Submit reports on project progress to the City and the responsible local building official as required. Provide the City daily work-area/parking-restriction notices, week-ahead schedules, and other "notice" information for their use sharing via City Twitter or for direct distribution by Weston & Sampson to abutter email distribution lists.

1.9 Review construction contractor(s) monthly application for payment requests based on quantities and work completed and prepare a recommendation to the City for payment to the construction contractor(s).

1.10 Attend bi-monthly meetings with the City and the Construction Contractor. Attend monthly conference calls with the City and the EDA project manager to report on program construction and financial status.

1.11 New URAM for Everett Avenue and Locust Street:

a. Open and administer a URAM for area soils. This shall include URAM notification (verbal and written), contaminated soil excavation and removal oversight, LSP Opinion Letters and soil disposal paperwork, URAM Status Reports (6 reports), a URAM Completion Report, and up to four (4) meetings with the City. Review Construction Contractor's environmental submittals/documentation.

1.12 Prepare and submit recommendation of substantial completion and readiness of the project for occupancy to the City.

1.13 Prepare and submit a report on the completed construction contract(s) based on the final observations of the resident project representative listed below in Duties and Responsibilities of the Resident Project Representative, paragraph I. Completion.

1.14 Prepare record drawings of the completed project and submit one set of reproducible plans to the City. Prepare valve and service tie-cards for all mainline valves, hydrant valves, and water/sewer services per recent project conventions.

2.0 Resident Representative Services (Provide up to 3,700 hours):

Weston & Sampson estimates twenty one (21) working construction months to complete the contract. A senior resident representative will be provided for the estimated utility construction period of thirteen (13) working months, and an resident representative will be provided for eight (8) working months.

2.1 Resident Project Representative is Weston & Sampson's Agent and shall act under the supervision of Weston & Sampson. His authority and responsibilities are limited to observing the work for general conformance to the contract documents, and are not to be construed as directing or supervising the work. He shall confer with Weston & Sampson regarding his actions. His involvement in matters pertaining to onsite work will, in general, be with Weston & Sampson and the construction contractor(s), keeping the City advised as indicated below and as necessary. His involvement with subcontractors will only be through or in the presence of the construction contractor(s) or his designated representative. He shall generally communicate with the City with the knowledge of Weston & Sampson. Duties and Responsibilities of the Resident Project Representative:

a. Schedules: Review the proposed progress schedule, schedule of shop drawing submissions and schedule of project values, all as prepared by the construction contractor(s) and consult with Weston & Sampson concerning their acceptability.

b. Conferences: Attend a preconstruction conference; arrange a schedule of work progress meetings and other pertinent conferences as required in consultation with Weston & Sampson or the City and notify in advance those expected to attend. Attend meetings, prepare, circulate and maintain copies of minutes thereof.

c. Liaison:

   i. Serve as Weston & Sampson's liaison with the construction contractor(s), working principally through the construction contractor(s) designated onsite representative, and assist him in understanding the intent of the contract documents. Assist Weston & Sampson in serving as the City's liaison with the construction contractor(s) when the construction contractor(s) operations affect the City's onsite operations.

   ii. Assist in obtaining from the City additional details or information when required at the job site for proper execution of the work.

d. Shop Drawings and Samples:

   i. Maintain a file of shop drawings and samples submitted by the construction contractor(s).

   ii. Advise Weston & Sampson and the construction contractor(s) immediately at the commencement of any work requiring a shop drawing or sample submission if the submission has not been accepted by Weston & Sampson.

e. Review of Work, Rejection of Defective Work, Inspections and Tests:

   i. Observe daily work in progress, or as otherwise necessary, to determine (1) if the work is proceeding in general conformance with the contract documents and (2) that completed work generally conforms to the contract documents. The Resident Project Representative shall confirm the accuracy of horizontal and vertical controls established by the construction contractor(s) prior to the start of construction, but such does not relieve the construction contractor(s) of its independent obligation to establish the starting controls.

ii. Report to Weston & Sampson who, in turn, will notify the City whenever any work is unsatisfactory, faulty, or defective, or does not conform to the contract documents, or has been damaged, or does not meet the requirements of any inspections, tests, or approvals required to be made. Advise Weston & Sampson when he believes work should be uncovered for observation, or requires special testing or inspection or approval. Record and advise the construction contractor(s) of work failing to meet the contract requirements.

iii. Verify that tests, equipment, and system start-ups are performed and operating and maintenance training is conducted as required by the contract documents and in the presence of the required personnel, and that the construction contractor(s) maintains adequate records thereof; observe, record and report to Weston & Sampson appropriate details relative to the test procedures and start-ups.

iv. Accompany visiting inspectors representing public or other agencies having jurisdiction over the project, record the outcome of these inspections.

v. Performance of the services outlined in Subsection "e", parts 1 through 4, will not guarantee the construction contractor(s) performance, but it endeavors to verify compliance with the contract documents and thereby protect the City against defects and deficiencies in the work. Nothing in Subsection "e" relieves the construction contractor(s) of its independent obligations under its contract with the City in performing its services. Weston & Sampson shall not be responsible for the construction contractor(s) failure to perform the construction work in accordance with the contract documents nor for the construction contractor(s) construction methods and procedures, nor for the safety program and safety precautions implemented by the construction contractor(s).

f. Interpretation of Contract Documents: Transmit to the construction contractor(s), clarifications and interpretations of the contract documents.

g. Modifications:

i. Consider and evaluate the construction contractor(s) suggestions for modifications in contract documents and report them with recommendations to Weston & Sampson.

ii. Monitor and record the labor, equipment and materials utilized by the construction contractor(s) and subcontractors when modifications are constructed.

h. Records:

i. Maintain at the job site orderly files for correspondence, reports of job conferences, shop drawings, sample submissions, reproductions of original contract documents, including all addenda, change orders, field orders, additional drawings issued subsequent to the execution of the contract, Weston & Sampson's clarifications and interpretations of the contract

documents, progress reports, record drawings and records, and other project-related documents.

ii. Keep a diary or log book, recording hours worked by the construction contractor(s) on the job site, weather conditions, data relative to questions of extras or deductions, list of principal visitors and representatives of fabricators, manufacturers, suppliers and distributors, daily activities, decisions, observations in general and specific observations in more detail as in the case of observing test procedures.

iii. Record names, addresses and telephone numbers of the construction contractor(s), subcontractors, and major suppliers of equipment and materials.

i. Reports:

i. Prepare periodic reports as required of progress of the work and of the construction contractor(s) compliance with the progress schedule and schedule of shop drawing submissions.

ii. Consult with Weston & Sampson in advance of scheduled major tests, inspections by others or start of important phases of the work.

iii. Obtain all backup material, prepare and recommend to Weston & Sampson Change Orders, Extra Work Orders, and Field Changes.

j. Payment Requisitions: Review applications for payment with the construction contractor(s) for compliance with the established procedure and forward them with recommendations to Weston & Sampson, noting particularly their relation to the schedule of values, work completed, and materials and equipment delivered at the site but not incorporated in the work. Assist the City to monitor the construction contractor(s) compliance with wage rates.

k. Certificates, Operation and Maintenance Manuals: During the course of the work verify that certificates, operation and maintenance manuals and other data required to be assembled and furnished by the construction contractor(s) are applicable to the items actually installed and deliver this material to Weston & Sampson for review.

l. Completion:

i. Before Weston & Sampson issues a recommendation of substantial completion to the City, submit to the construction contractor(s) a list of observed items requiring correction or completion.

ii. Conduct final observation of the project in the company of Weston & Sampson, the City, and the construction contractor(s) and prepare a final list of items to be corrected.

iii. Verify that all items on final list have been completed or corrected and make recommendations to Weston & Sampson concerning acceptance and start of warranty.

2.2 Limitations of Authority: The Resident Project Representative:

a. Shall not authorize any deviation from the contract documents or approve any substitute materials or equipment.

b. Shall not direct, supervise, or undertake any of the responsibilities of the construction contractor(s).

c. Shall not expedite work for the construction contractor(s).

d. Shall not advise on or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the contract documents.

e. Shall not advise or issue directions as to safety precautions and programs in connection with the work.

f. Shall not authorize the City to occupy the project in whole or in part.

g. Shall not participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by Weston & Sampson.

h. Shall not exceed limitations of Weston & Sampson's authority as set forth in the contract documents.

i. Shall not issue "stop work" orders unless directed by the City, in writing, to do so.

DRAFT

Client:	City of Chelsea Massachusetts		
Description:	Engineer's Estimate of Probable Construction Cost	Prep. By:	JC, CW, JM, MD
Job Name:	Beacham Street & Wiliams Street Roadway Improvements	Check By:	TPC
W&S Job:	2190031	Rev. Date:	January 23, 2020

BASE BID

ITEM#	DESCRIPTION	EST UNIT $	QTY	VALUE
1	**SEWER REHABILITATION**			
a	6" Sewer Service rehabilitation with CIPP, per linear foot	$90.00	1,250	$112,500.00
b	8" Sewer rehabilitation with CIPP, per linear foot	$105.00	200	$21,000.00
c	10" Sewer rehabilitation with CIPP, per linear foot	$115.00	1,202	$138,230.00
d	12" Sewer rehabilitation with CIPP, per linear foot	$125.00	565	$70,625.00
e	Reinstate service connections, per service	$700.00	18	$12,600.00
f	Cut off protruding service connection, per service	$700.00	7	$5,040.00
g	Point repair for sewer, per point repair	$10,000.00	7	$72,000.00
h	Heavy cleaning of 6" sewer, per linear foot	$9.00	1,250	$11,250.00
i	Heavy cleaning of 8" sewer, per linear foot	$10.00	200	$2,000.00
j	Heavy cleaning of 10" sewer, per linear foot	$12.00	1,202	$14,424.00
k	Heavy cleaning of 12" sewer, per linear foot	$15.00	565	$8,475.00
l	8-inch PVC sewer, per lin ft	$190.00	44	$8,360.00
m	10-inch PVC sewer, per lin ft	$220.00	5	$1,100.00
n	8-inch cap, per cap	$700.00	2	$1,400.00
2	**SEWER MANHOLES AND APPURTENANCES**			
a	4-foot diameter precast concrete manhole complete with frame and cover, per manhole	$10,500.00	1	$10,500.00
3	**SEWER MANHOLE REHABILITATIONS**			
a	Cementitious lining of manholes, per vertical foot	$130.00	85	$11,050.00
b	Furnish and install manhole frame and cover, per frame and cover	$1,500.00	14	$21,000.00
4	**SEWER AND DRAIN RECONSTRUCTION**			
a(1)	Sewer and drain reconstruction within water, sewer, or drain trench limits, per reconst. (min.)	$500.00	8	$4,000.00
a(2)	Sewer and drain reconstruction within water, sewer, or drain trench limits, per reconst. (add 'l)	$50.00	8	$400.00
5	**DRAINS COMPLETE IN PLACE**			
a	12-inch HDPE drain, per lin ft	$200.00	2,223	$444,618.00
a	12-inch HDPE drain drop connection, per connection	$1,500.00	1	$1,500.00
b	15-inch HDPE drain, per lin ft	$250.00	658	$164,587.50
b	15-inch HDPE drain drop connection, per connection	$1,800.00	2	$3,600.00
c	18-inch HDPE drain, per lin ft	$350.00	575	$201,299.00
d	24-inch HDPE drain, per lin ft	$425.00	16	$6,587.50
e	8-inch DI drain, per lin ft	$175.00	13	$2,220.75
f	12-inch DI drain, per lin ft	$175.00	147	$25,805.50
6	**DRAIN MANHOLES, CATCH BASINS, AND APPURTENANCES**			
a	4-foot diameter precast concrete manhole complete with frame and cover, per manhole	$9,500.00	25	$237,500.00
b	Precast concrete catch basin complete with frame and cascade grate, per catch basin	$8,000.00	21	$168,000.00
c	Connections to existing structures, per connection	$1,000.00	6	$6,000.00
d	Gutter inlet, frame, and grate, per structure	$1,500.00	15	$22,500.00
e	Sump manhole, complete with frame and cover, per manhole	$8,000.00	14	$112,000.00
f	Connection to culvert, per connection	$7,500.00	5	$37,500.00
g	18-inch inline check valve, per valve	$10,000.00	4	$40,000.00
h	24-inch inline check valve, per valve	$13,500.00	2	$27,000.00
7	**ABANDONMENT OF SEWER AND DRAIN**			
a	Abandonment of mahole or catch basin, per structure	$400.00	15	$6,000.00
8	**WATER MAINS AND FITTINGS**			
a	12-inch and 16-inch ductile iron pipe & fittings, per lin ft	$260.00	96	$24,960.00
b	10-inch ductile iron pipe & fittings, per lin ft	$250.00	25	$6,250.00
c	8-inch ductile iron pipe & fittings, per lin ft	$210.00	35	$7,350.00
d	6-inch ductile iron pipe & fittings, per lin ft	$180.00	130	$23,400.00
e	Additional fittings, per pound	$2.00	630	$1,260.00
9	**POLYETHYLENE ENCASEMENT**			
a	Polyethylene encasement, per lin ft	$2.00	300	$600.00

Client:	City of Chelsea Massachusetts		
Description:	Engineer's Estimate of Probable Construction Cost	Prep. By:	JC, CW, JM, MD
Job Name:	Beacham Street & Wiliams Street Roadway Improvements	Check By:	TPC
W&S Job:	2190031	Rev. Date:	January 23, 2020

BASE BID

ITEM#	DESCRIPTION	EST UNIT $	QTY	VALUE
10	**WATER SERVICE CONNECTIONS**			
a	1-inch corporation stop, per unit	$1,200.00	3	$3,600.00
b	1-inch curb stop, per unit	$500.00	3	$1,500.00
c	1-inch copper piping, per lin ft	$50.00	30	$1,500.00
d	1.5-inch or 2-inch corporation stop, per unit	$2,750.00	1	$2,750.00
e	1.5-inch or 2-inch curb stop, per unit	$750.00	4	$3,000.00
f	1.5-inch or 2-inch copper piping, per lin ft	$125.00	80	$10,000.00
11	**HYDRANTS AND VALVES**			
a	Hydrant, per hydrant	$7,500.00	10	$75,000.00
b	Remove existing hydrant, per hydrant	$550.00	7	$3,850.00
c	12-inch gate valves, per valve	$6,500.00	8	$52,000.00
d	10-inch gate valves, per valve	$6,000.00	1	$6,000.00
e	8-inch gate valves, per valve	$4,800.00	3	$14,400.00
f	6-inch gate valves, per valve	$2,750.00	11	$30,250.00
g	12-inch insertion valve, per valve	$20,000.00	1	$20,000.00
h	10-inch insertion valve, per valve	$18,000.00	1	$18,000.00
12	**ROCK & CONCRETE EXCAVATION AND DISP.**			
a(1)	Rock and concrete removal & disposal, per cu yd. (min)	$75.00	753	$56,444.44
a(2)	Rock and concrete removal & disposal, per cu yd. (add 'l)	$10.00	753	$7,525.93
13	**EARTHWORK**			
a(1)	Removal and disposal of Group B1 Excavated Material (min), per ton	$55.00	796	$43,789.33
a(2)	Removal and disposal of Group B1 Excavated Material (add 'l), per ton	$10.00	796	$7,961.70
b(1)	Removal and disposal of Group B2 Excavated Material (min), per ton	$70.00	250	$17,500.00
b(2)	Removal and disposal of Group B2 Excavated Material (add 'l), per ton	$10.00	250	$2,500.00
c(1)	Removal and disposal of Group B3 Excavated Material (min), per ton	$90.00	1,285	$115,605.76
c(2)	Removal and disposal of Group B3 Excavated Material (add 'l), per ton	$10.00	1,285	$12,845.08
d(1)	Removal and disposal of Group C Excavated Material (min), per ton	$125.00	932	$116,448.21
d(2)	Removal and disposal of Group C Excavated Material (add 'l), per ton	$10.00	932	$9,315.86
e(1)	Removal and disposal of Group D Excavated Material (min), per ton	$350.00	4,517	$1,581,061.00
e(2)	Removal and disposal of Group D Excavated Material (add 'l), per ton	$50.00	4,517	$225,865.86
f	Additional earthwork below normal grade, per cubic yard	$10.00	648	$6,481.48
g	Additional crushed stone, per cu yd	$20.00	100	$2,000.00
h(1)	Test pits (min), per cu yd	$60.00	400	$24,000.00
h(2)	Test pits (add 'l), per cu yd	$40.00	400	$16,000.00
14	**DEWATERING & HANDLING OF EXISTING FLOWS**			
a	Dewatering, lump sum	$120,000.00	1	$120,000.00
b	Handling of existing flows, lump sum	$35,000.00	1	$35,000.00
15	**ENVIRONMENTAL PROTECTION**			
a	Catch basin protection, per catch basin	$125.00	41	$5,125.00
b	Compost filter tubes, per ft	$5.00	250	$1,250.00
16	**PAVEMENT REPLACEMENT**			
a(1)	Temporary pavement (min), per ton	$160.00	600	$96,000.00
a(2)	Temporary pavement (add'l), per ton	$120.00	600	$72,000.00
b	Pavement Milling, per sq. yd.	$4.50	1,080	$4,860.00
c	Superpave Surface Course - 12.5 (SSC-12.5), per ton	$110.00	1,900	$209,000.00
d	Superpave Intermediate Course - 19.0 (SIC-19.0), per ton	$100.00	2,330	$233,000.00
e	Superpave Base Course - 37.5 (SBC-37.5), per ton	$100.00	3,400	$340,000.00
f	Gravel Borrow, Type B, per cu yd	$40.00	2,700	$108,000.00

Client:	City of Chelsea Massachusetts		
Description:	Engineer's Estimate of Probable Construction Cost	Prep. By:	JC, CW, JM, MD
Job Name:	Beacham Street & Wiliams Street Roadway Improvements	Check By:	TPC
W&S Job:	2190031	Rev. Date:	January 23, 2020

BASE BID

ITEM#	DESCRIPTION	EST UNIT $	QTY	VALUE
g	Reclaimed Pavement, per sq yd	$5.00	17,070	$85,350.00
h	Roadway reconstruction soil removal, per cu yd	$100.00	3,300	$330,000.00
i	Crushed stone for blending, per cu yd	$20.00	540	$10,800.00
j	Adjust manhole or catch basin structure, per structure	$300.00	37	$11,100.00
k	Adjust valve box structure, per structure	$150.00	30	$4,500.00
l	Dense Graded Crushed Stone for Sub-base, per cu yd	$100.00	10	$1,000.00
m	Scored Cement Concrete Pavement, per sq yd	$80.00	125	$10,000.00
17	**PAVEMENT MARKINGS & SIGNAGE**			
a	Signage, per square foot	$40.00	60	$2,400.00
b	6 inch reflectorized white line (thermoplastic), per lf	$1.00	6,800	$6,800.00
c	6 inch reflectorized yellow line (thermoplastic), per lf	$1.00	7,000	$7,000.00
d	12 inch reflectorized white line (thermoplastic), per lf	$3.00	2,000	$6,000.00
e	Pavement symbols, per sf	$7.00	180	$1,260.00
18	**LANDSCAPING**			
a	Tree pruning and removal, per tree	$800.00	5	$4,000.00
b	Loam & Seed, per sq yd	$30.00	915	$27,450.00
c	Tree (various types), per tree	$800.00	8	$6,400.00
d	Individual Tree Protection, per tree	$250.00	9	$2,250.00
19	**CURB & SIDEWALK**			
a	New granite curb, per lin ft	$41.00	4,200	$172,200.00
b	New granite transition curb for WCR, straight, per lin ft	$40.00	210	$8,400.00
c	New granite transition curb for WCR, curved, per lin ft	$38.25	70	$2,677.50
d	Granite inlet block, per unit	$300.00	36	$10,800.00
e	Remove and Reset Curb, per linear feet	$30.00	230	$6,900.00
f	Steel backed wood guardrail, per ft	$125.00	580	$72,500.00
g	4-inch cement concrete sidewalk, per sq. yd.	$55.00	1,750	$96,250.00
h	6-inch cement concrete sidewalk, per sq. yd	$95.00	365	$34,675.00
i	8-inch cement concrete sidewalk, per sq yd	$100.00	1,862	$186,200.00
j	Bollards removed and disposed, per bollard	$125.00	17	$2,125.00
k	New bollards, per bollard	$1,200.00	16	$19,200.00
l	Fence and Fence Gate Removed and Reset, per lin foot	$60.00	600	$36,000.00
20	**TRAFFIC SIGNAL**			
a	Traffic Control Signal at Spruce Street & Williams Street, lump sum	$239,635.00	1	$239,635.00
b	Flashing Warning Beacon w/ Sign Removed & Reset, lump sum	$5,000.00	1	$5,000.00
c	12" x 12" Pull Box SD2.031, per pull box	$1,000.00	7	$7,000.00
21	**TRAFFIC CONTROL**			
a	Trailer-Mounted Changeable Message Sign, per day	$30.00	1,440	$43,200.00
b	Maintenance and protection of traffic, lump sum	$75,000.00	1	$75,000.00
22	**LIGHTING**			
a	New Street Light with Arm on Existing Pole, per assembly	$1,200.00	6	$7,200.00
23	**RODENT CONTROL**			
a	Rodent control, lump sum	$10,000.00	1	$10,000.00
24	**DUST CONTROL**			
a	Calcium Chloride, per pound	$1.00	31,340	$31,340.00
25	**PRICE ADJUSTMENTS**			
a	Price Adjustment for Liquid Asphalt used in hot mix asphalt mixtures, where price variance is five (5) percent or greater, per ton	$55.00	461	$25,355.00
b	Price Adjustment for Gasoline used in construction operations, where price variance is five (5) percent or greater, per gallon	$0.23	4,400	$1,012.00
c	Price Adjustment for Diesel Fuel used in construction operations, where price variance is five (5) percent or greater, per gallon	$0.24	41,800	$10,032.00

Client:	City of Chelsea Massachusetts		
Description:	Engineer's Estimate of Probable Construction Cost	Prep. By:	JC, CW, JM, MD
Job Name:	Beacham Street & Wiliams Street Roadway Improvements	Check By:	TPC
W&S Job:	2190031	Rev. Date:	January 23, 2020

BASE BID

ITEM#	DESCRIPTION	EST UNIT $	QTY	VALUE
d	Price Adjustment for Cement Concrete used in construction operations, where price variance is five (5) percent or greater, per cubic yard	$13.00	210	$2,730.00
26	MOBILIZATION			
a	Mobilization (not more than 5% of total for items excluding Price Adjustments,and Mobilization), lump sum	4%	1	$295,621.38
	TOTAL			$7,725,284.76

Construction Cost Subtotal:	$7,725,284.76
Police:	$600,000.00
Construction Engineering Services:	$1,200,000.00
Program Contingency (30% of Construction):	$2,317,585.43
Subtotal:	$11,842,870.19

Summary of Costs	Value
Sewer	$525,954
Drain	$1,506,718
Water	$305,670
Earthwork, Disposal, Rock & Concrete Excavation	$2,245,345
Dewatering, Handling of Existing Flows, Environmental Protect.	$161,375
Pavement Replacement, Markings, and Signage	$1,539,070
Curb and Sidewalk, Landscaping	$688,028
Traffic Signal Replacement	$251,635
Traffic Control (Not Including Police)	$118,200
Lighting	$7,200
Dust and Rodent Control	$41,340
Price Adjustment Allowance	$39,129
Mobilization	$295,621
Construction Cost Subtotal:	$7,725,285
Police:	$600,000
Construction Engineering Services:	$1,200,000
Program Contingency (30% of Construction):	$2,317,585
Subtotal:	$11,842,870

City of Chelsea
Department of Planning & Development

Beacham Street and Williams Street Roadway and Utility Improvements, Contract 2020-201
Estimated Construction Schedule

Revised January 23, 2020

Task	Duration (mo)	2020					2021												2022							
		Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Mobilization																										
Drain (New)	8																									
Sewer (Rehab.)	2																									
Water (Maint.)	2																									
Signals & Lighting	2																									
Road Reclaim and Binder	2																									
Curb, Path, & Sidewalk	5																									
Landscaping, Guard Rail, Signage	1																									
Top Course Pavement & Striping	2																									

Beacham & Williams Transportation Corridor Project: Sources & Uses

Project Uses	AMOUNT
Construction Cost Estimate	$7,725,284.76
Project Contingency (30% of Construction Cost Estimate)	$2,317,585.43
Construction Engineering Services	$1,200,000.00
Police Details	$600,000.00
Total Project Cost	**$11,842,870.19**

UNITED STATES DEPARTMENT OF COMMERCE
Economic Development Administration
Philadelphia Regional Office
Robert N.C. Nix Federal Building
900 Market Street, Room 602
Philadelphia, PA 19107

JUN 26 2018

In reply refer to:
Investment No.: 01-01-14797

Mr. Tom G. Ambrosino
City Manager
City of Chelsea
500 Broadway
Chelsea, Massachusetts 02150-2900

Dear Mr. Ambrosino:

I am pleased to inform you that the Department of Commerce's Economic Development Administration (EDA) has approved your application for a $3,000,000 investment for assistance with the construction and improvements to the Beacham/Williams Road Corridor for the City of Chelsea's Food Cluster. The total project cost is estimated to be $6,232,000 and is funded under EDA's Public Works Program of the Public Works and Economic Development Act of 1965, as amended (42 U.S.C 3121 et seq.).

Enclosed are three signed copies of the Financial Assistance Award. Your agreement to the terms and conditions of the award should be indicated by the signature of your principal official on each of the signed copies of the Financial Assistance Award. Two of the executed copies should be returned to Linda Cruz-Carnall, Regional Director, U.S. Department of Commerce, Economic Development Administration, Philadelphia Regional Office, Robert Nix Building, 900 Market Street, Room 602, Philadelphia, Pennsylvania, 19107. If not signed and returned within 30 days of receipt, EDA may declare the Award null and void.

Please do not make any commitments in reliance on this award until you have carefully reviewed and accepted the terms and conditions. Any commitments entered into prior to obtaining the approval of EDA in accordance with its regulations and requirements will be at your own risk.

EDA's mission is to lead the federal economic development agenda by promoting innovation and competitiveness, preparing American regions for growth and success in the worldwide economy. EDA implements this mission by making strategic investments in the nation's most economically distressed communities that encourage private sector collaboration and creation of higher-skill, higher wage jobs. EDA investments are results driven, embracing the principles of technological innovation, entrepreneurship and regional development.

I share your expectations regarding the impact of this investment and look forward to working with you to meet the economic development needs of your community.

Sincerely,

Linda Cruz-Carnall

Linda Cruz-Carnall
Regional Director

Enclosures: Form CD-450, Financial Assistance Award (3)
EDA Standard Terms and Conditions for Construction Projects (February 2016)
EDA Special Award Conditions