

December 30, 2024

**Chair Gregory Rondeau
Town of Franklin Planning Board
355 East Central Street
Franklin, Massachusetts 02038**

**RE: 55 Constitution Boulevard
Site Plan Review
Peer Review Response**

Dear Chair Rondeau:

Beals Associates, Inc. (“BAI”) has received the BETA Group peer review comments dated December 11, 2024. Our office would like to provide the following responses, where necessary, to the comments raised in the letter. Where supporting figures, exhibits, or other materials are necessary, we have included them as attachment to this letter. References have been made to the prior submittal letters as needed. We hope that these responses, updated plans, and supporting documentation are acceptable to your department.

In order to simplify this letter, our office has the comments from BETA in italics and the Beals Associates, Inc responses in black.

Zoning Requirements Comments

Comment Z1:

Provide data quantifying anticipated sound, noise, vibrations, odor, and flashing to determine conformity with these requirements (§185-22.A).

Response Z1:

Chapter 185, Section 22.A reads as follows:

“Disturbances. No sound, noise, vibration, odor or flashing (except for warning devices, temporary construction or maintenance work, parades, agricultural activities or other special circumstances) shall be perceptible without instruments more than 400 feet from the boundaries of the originating premises within an Industrial District or more than 200 feet inside the boundaries of a commercial or business district or more than 100 feet inside the boundaries of a residential district. However, the Board of Appeals may grant a special permit for an exception for activities not meeting these standards in cases where the Board determines that no objectionable conditions will thereby be created for the use of other properties.”

The section of the Bylaw referenced by the reviewer requires that all uses in industrial districts conform to what is noted above. The proposed project and application are for the redevelopment of the existing site into two industrial buildings, and at the time of this writing, no specific tenants have been identified for the proposed development. As there are no tenants identified, there are no specific sounds, noise, vibrations, odors, or flashing that would be otherwise perceptible from the development and any tenants that were to occupy the buildings would be required to comply with the regulation. Should it satisfy the Board, BAI requests as a condition of approval of the project that any tenant be required to comply with Chapter 185, Section 22.A.

Comment Z2:

Indicate if significant earth removal is anticipated. As the proposed earthwork requires a net fill, excavated material should be re-used on-site to the extent practicable. A Special Permit may be required if earth removal is significant.

Response Z2:

It is not anticipated that earth removal will be required as part of this project. The project has been designed to be a balanced site or require fill. Should a need arise to remove earth from the proposed development, then the applicant would file for a special permit from the Board of Appeals as required in the Chapter 185, Section 23.

EARTHWORK SUMMARY	
TOTAL CUT	21,350± CY
TOTAL FILL	24,701± CY
NET EARTHWORK	3,350 CY± (FILL)

Comment Z3:

BETA recommends that the Town consider upgrades to each midblock crosswalk to comply with ADA/MAAB requirements, including detectable warning panels and pedestrian crossing signs when doing next scheduled roadway work.

Response Z3:

Acknowledged.

Comment Z4:

Provide note on the landscaping plan noting that all plantings shall come from the Best Development Practices Guidebook (§185-31.C.(3).(k)).

Comment T4:

Include turning exhibit for WB-67 semi-trailer exiting the Site. A right-turn onto the southbound lane of Constitution Boulevard may not be possible due to the existing median.

Response T4:

A turning exhibit for a WB-67 semi-trailer was previously provided on Sheet C200, WB-67 Turning Analysis included within the planset. As demonstrated on the Plan, a WB-67 has sufficient space to exit the site northerly onto Constitution Boulevard. The site driveway was designed in a manner to prevent trucks from exiting the site in the southerly direction along Constitution Boulevard. A sketch demonstrating this has been attached with this letter under Attachment B.

Comment T5:

Include turning exhibits illustrating a WB-67 can back into the designate spaces, as well as their path when the exit the space.

Response T5:

The loading dock spaces for the proposed development have been designed to be 14 feet wide on center with a 130' apron as measured from the building face to the face of curb. This dimension is typical on industrial projects such as this and provide adequate turning for WB-67 trucks to navigate the docks. Sheet C200 in the planset has been revised demonstrating that there is sufficient space for WB-67 trucks to enter/exit the docks.

Comment T6:

Note that Turning Analysis sheets label both buildings as Building A.

Response T6:

The typo has been corrected.

Comment T7:

Confirm legal right to reconstruct the northern driveway entrance, which is located within an electric easement. BETA notes that proposed grading and landscaping will be conducted very close to existing electric equipment.

Response T7:

Confirmed. No language was found within the easement document restricting relocation of the existing driveway.

Comment T8:

The provided parking greatly exceeds that which is required by the bylaw. BETA recommends that the Applicant confirm that all proposed spaces are needed. Excess spaces could be removed to reduce impervious area and impacts to wetland resource areas.

Response T8:

Confirmed. The parking provided for on the plans has been developed in consideration for current market needs for this type of speculative building, which the applicant believes is appropriate to attract high quality tenants. With that noted, Sheet C120, Site Layout and Materials Plan, has been revised to include an area of reserve parking spaces on the western side of Building B, where if the parking spaces are not determined to be needed, then they would be banked should a future tenant require the spaces.

Comment T9:

Clarify if the locations marked as “egress” on the Site plans also designate building entrances. Parking spaces must be located within 300 feet of the building entrance (§185-21.C(6)).

Response T9:

The locations marked as egress on the Site Plans were not intended to designate the main building entrances, as building entrances would not be expected at multiple locations along the loading dock face of the building. The egress notation was intended to allow for an easier review of the plans to determine where various doors were in lieu of needing to review the architectural plans for door locations. For clarity, the main building entrances into the building are now noted as “Entrance”, and secondary doors for egress and/or emergency access are noted as “Egress”. It should also be noted that Chapter 185 §21.C(6)) reads entirely as follows:

“Parking spaces more than 300 feet from the building entrance they serve may not be counted towards fulfillment of parking requirements unless the Planning Board determines that circumstances justify this greater separation of parking from use.”

All parking spaces for Building A remain located within 300 feet of the building entrance(s). Approximately 60 of the parking spaces provided on the westerly side of

Building B are located greater than 300 feet from the building entrance (300 feet measured along the path of travel along a sidewalk). The spaces have been located along an access drive that provides 360-degree access around the entire building. To minimize the amount of impervious area associated with the development, parking spaces have been provided along the drive to provide an efficient parking layout that reduces the need for additional impervious surfaces. Furthermore, we believe that for industrial use such as this, while the main entrance to the building is provided on the eastern side of the building, it is common for workers in an industrial setting to enter side doors into the building. For these reasons, we believe the separation of the parking from the main entrance is justified.

Comment T10:

Evaluate if a building entrance could be provided in front of the accessible parking spaces for Building B. Per 521 CMR 23.3.1, accessible parking should be located on the shortest accessible route of travel to the building entrance. If an additional entrance not feasible, we recommended relocating the accessible spaces to be along either the east or west side of the building.

Response T10:

The accessible parking spaces have been relocated to provide the shortest accessible route of travel to the building entrances. See Sheet C120, Site Layout and Materials Plan.

Signage & Lighting Comments

Comment SL1:

Provide cutsheet for proposed luminaires.

Response SL1:

Cutsheets have been provided for the proposed light fixtures, and are included with this letter under Attachment C.

Comment SL2:

There is some minor light spillage onto Constitution Boulevard at each of the entrances. It is restricted to the immediate area around the entrance. BETA recommends that the applicant request a waiver.

Response SL2:

It appears that the comment refers to Chapter 185 Section 31.1C(4)(e), which reads as follows:

“No site feature or activity shall create glare or illumination which extends beyond a

site's property lines and creates a hazard or nuisance to neighboring property owners or on adjacent roadways. Lighting shall be designed to provide the minimum illumination necessary for the safety and security of the proposed activity. Lighting shall be designed such that the light source is shielded and the light is directed downward."

As stated in the comment, there is minor light spillage onto Constitution Boulevard at both entrances and is restricted to the immediate area around the entrance. The Bylaw restricts glare or illumination which extends beyond a site's property lines and creates a hazard or nuisance to neighboring property owners or on adjacent roadways. The lighting the spills into Constitution Boulevard is a maximum of a 0.5 foot-candle, and while minimal it will enhance lighting at the intersection of the site driveways for the safety and security of the proposed development. The lighting has also been designed to be shielded and directed downward. As the lighting has been designed in accordance with the requirements of this section, BAI does not believe a waiver is necessary and meets the intent of this Bylaw.

Utilities Comments

Comment U1:

Indicate if a new easement is proposed for conveyance of sanitary sewer and water across the Site and whether the existing easement will be dissolved.

Response U1:

As the sewer and water lines are being relocated outside of the existing easement, a new utility easement will be required to accommodate the new locations, and the existing easement will be dissolved.

Comment U2:

Confirm the purpose of the northwest water service and sanitary sewer connections leading to the Fire Department property.

Response U2:

The purpose of the water and sanitary sewer connections leading to the Fire Department is to maintain existing service connections to the Town of Franklin's Fire Department. Furthermore, as noted in the property deed, which is contained within the Site Plan Application narrative as Appendix A, a 20' Utility Easement was granted to the Town of Franklin for public sewerage facilities.

Comment U3:

Confirm legal right to connect to existing sanitary sewer within utility easement to the south.

Response U3:

Confirmed. The sewer easement is owned by the applicant and has been utilized for the past 23+ years by the existing building with conveyance right to adjacent properties.

Landscape Treatment & Grading Comments

Comment LA1:

Provide required screening for the loading docks and parking areas associated with Building B. Based on BETA's site observations, the residential buildings at #648 and #656 King Street are readily visible from the existing Site, and proposed tree clearing will further reduce the vegetated area (§185-35.A)

Response LA1:

BAI acknowledges Chapter 185 Section 35.A is applicable, however the following sections of the Bylaw reads as follows:

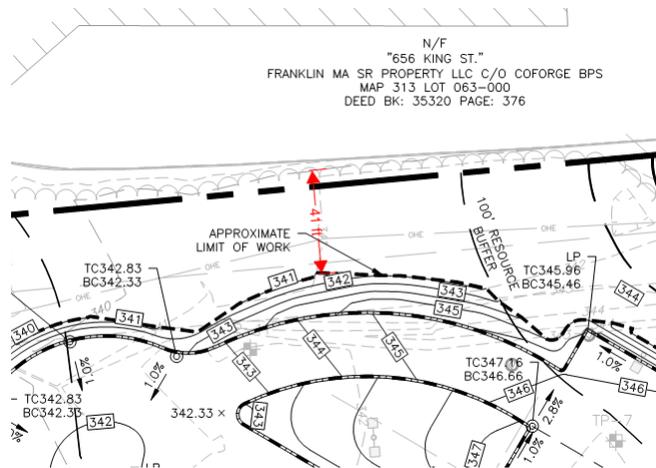
Chapter 185 §35.B "Screening" in this context, shall mean an area four feet wide, densely planted with evergreen trees or shrubs three feet or more in height when planted, or a wall, fence or earth berm 12 inches or more in height or equivalent visual screening by natural vegetation or difference in elevation between potential viewers and the screened areas."

Chapter 185 §35.C "The following shall apply to any use in an Industrial or Business District if located on premises within 500 feet of a residentially used structure in an adjacent residential district not allowing that use and if located on a lot which abuts or extends into that residential district by less than 75 feet or abuts another lot which has frontage only within the residential district. Such uses shall provide a greenbelt along the portion of the lot which abuts the residential district or abutting lot cited above. Such greenbelt shall consist of an area not less than 15 feet wide containing a dense grouping of trees and shrubs providing a natural barrier between the lot and the adjacent premises. The trees and shrubs shall have a height of not less than three feet initially and shall be expected to have an effective height of not less than seven feet within five years."

As noted in Section B, screening can be accomplished by any of the following: new plantings, a wall, an earthen berm 12" or more in height, or equivalent visual screening by

natural vegetation, or difference in elevation between potential viewers and the screened areas. Furthermore, as noted in Section C, for an industrial project such as this less than 500 feet from a residential use, a greenbelt not less than 15 feet wide containing a dense grouping of trees and shrubs providing a natural barrier between the lot and the premises must be provided.

As documented in the screenshot to the right, a natural greenbelt buffer approximately 41 feet wide at the narrowest has been provided between the access drive and the edge of the clearing on the adjacent property. As the greenbelt as is almost three times the required natural barrier in the bylaw, BAI believes adequate screening has been provided.



Comment LA2:

Provide information on seed mixes; use of native seeding is encouraged especially in areas which are not required to be a fine lawn and in proximity to wetland resource areas.

Response LA2:

Our office has revised Sheet C121, Landscape Plan, to include seed mixes such as a New England Showy Wildflower Mix and a New England Conservation/Wildlife Mix, and the locations of these seed mixes have been depicted on the plan. Additional plantings have been added along the pervious areas within the resource areas to improve the vegetated buffer zones. Specifications for each of the two seed mixes being used for stabilization of the site have been provided. See Attachment D for the specifications.

Comment LA3:

Verify that proposed tree plantings near the eastern side of Building B will not impact proposed drainage lines and other utilities.

Response LA3:

Verified. The tree plantings are not anticipated to impact proposed drainage lines or other utilities.

Comment LA4:

Provide contour labels for proposed grading between the eastern parking area and Constitution Boulevard to clarify design intent. Recommend extending limit of work to the existing 347' contour and providing spot grades to ensure that this area will properly drain to the parking area.

Response LA4:

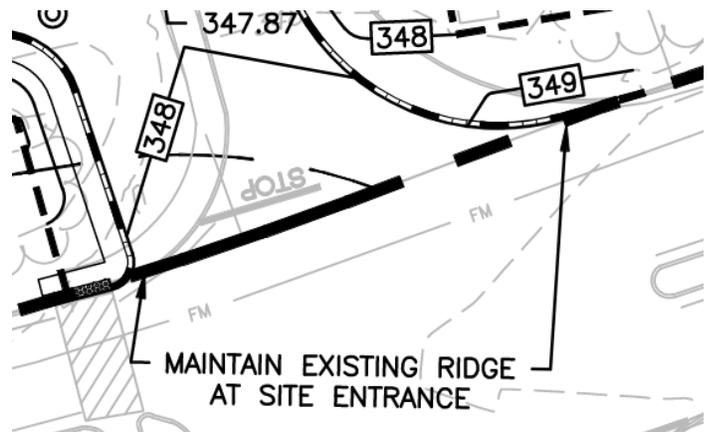
Additional contour labels have been added to the grading on the eastern side of the Building A parking adjacent to Constitution Boulevard. BAI does not agree that extending the limit of work to the 347 contour and clearing many of the trees and screening adjacent to Constitution Boulevard is appropriate nor necessary. The area is intended to remain as has been functioning for the past 23+ years.

Comment LA5:

Provide spot grade(s) at the northern driveway entrance to confirm how the Site will interact with Constitution Boulevard and whether any off-site stormwater runoff will be able to flow onto the Site.

Response LA5:

Additional detail has been provided. The entrance is intended to maintain existing grades within Constitution Boulevard, where the off-site stormwater runoff does not flow into the northern driveway entrance.

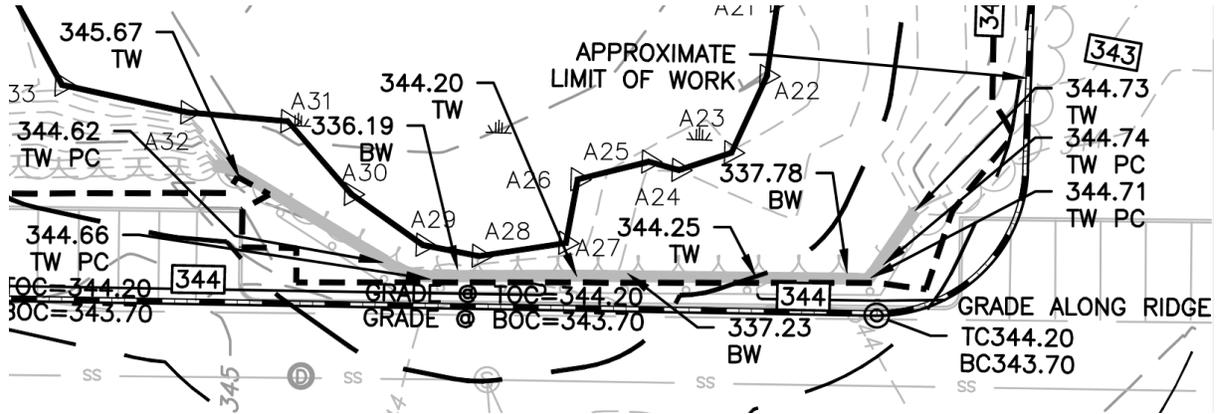


Comment LA6:

Provide spot grades along the top of the existing retaining wall to confirm that its height is suitable for the proposed grading.

Response LA6:

Sheet C101, Supplemental Existing Conditions Plan as well as Sheet C130 Grading Plan, have been updated to include spot grades along the top of the existing retaining wall. BAI continues to believe the grading will function in harmony with the retaining wall.



On behalf of the entire project team, we appreciate the opportunity to provide these responses and clarifications. We look forward to presenting this information to the Franklin Planning Board. If you have any additional questions or comments, please do not hesitate to contact us directly at either dhowe@bealsassociates.com, 617.242.1120 x106 or tlapshanski@bealsassociates.com, 617.242.1120 Ext. 110.

Sincerely,

Beals Associates, Inc.



Tyler Lapshanski
Project Engineer



Devin P. Howe, P.E.
Professional Engineer

Attachments:

- Attachment A – Traffic Engineer Response Letter
- Attachment B – WB-67 Turning Analysis Sketches
- Attachment C – Lighting Fixture Cutsheet
- Attachment D – Seed Mix Specification
- Attachment E – 55 Constitution Boulevard Plans To Accompany Permit Documents (Revised Sheets)

CC: *Jeff Sullivan, Northbridge*

C-1381 File

ATTACHMENT A: TRAFFIC ENGINEER RESPONSE LETTER

December 16, 2024

NEX-2400058.00

Mr. Gregory Rondeau, Chairman
Franklin Planning Board
355 East Central Street
Franklin, MA 02038

SUBJECT: Response to Site Plan Review Comments
55 Constitution Boulevard
Site Plan Application

Dear Mr. Rondeau:

Greenman-Pedersen, Inc. (GPI) previously prepared a Traffic Impact and Access Study¹ (TIAS) for the proposed development at 55 Constitution Boulevard in Franklin, Massachusetts. Subsequently, GPI received comments from the Town's peer review consultant, BETA Engineering (BETA), in a letter dated December 11, 2024. This letter is intended to respond to the comments related to the TIAS. Additional responses to the remaining comments will be provided under separate cover. The original comments are provided in *italics* and GPI's responses are provided in **bold** text.

Comment T1 – Please clarify when the Synchro analysis reports provided in the Appendix do include a pedestrian phase for all the scenarios analyzed at the King Street / Constitution Boulevard intersection.

GPI Response – There is an existing exclusive pedestrian signal phase at the King Street / Constitution Boulevard intersection. While the turning movement counts collected as part of the TIAS indicated that pedestrians were observed actuating the pedestrian phase during the weekday AM peak hour, no pedestrians were observed at the intersection during the weekday PM peak hour. Therefore, to more accurately model the operations during the weekday PM peak hour, the exclusive pedestrian signal phase was not included in the analysis. GPI has performed a sensitivity analysis to evaluate the operations of the King Street / Constitution Boulevard intersection with the exclusive pedestrian signal phase in the weekday PM peak hour. The detailed analysis worksheets are included as an Attachment to this letter and the results are summarized in Table 6R. As shown in Table 6R, even with the exclusive pedestrian signal phase, all movements at this intersection are anticipated to operate at LOS D or better with minimal increases in delay and queuing as a result of the proposed redevelopment.

Comment T2 – Confirm the King Street / Constitution Boulevard traffic signal is not currently coordinated with the adjacent locations along King Street.

GPI Response – GPI conducted a field inventory of the existing signal timings and equipment on April 19, 2024. Although the traffic signal controller was programmed with coordinated signal timings and offset data, the intersection was operating in “Default Free” operation during all time periods at the time of the field inventory. Therefore, this intersection has been analyzed as actuated -uncoordinated under 2024 Existing conditions.

A warehouse development is proposed at #585 King Street, which will be accessed via a new driveway that will form the fourth leg of the King Street / Constitution Boulevard intersection. As mitigation for the project, the developer will implement geometric and signal modifications at the

¹ *Traffic Impact and Access Study, Proposed Warehouse Development, 55 Constitution Boulevard, Franklin, Massachusetts*; prepared by Greenman-Pedersen, Inc.; dated August 12, 2024.

intersection, including installation of a new traffic signal control system. As part of these improvements, coordination between this intersection and the remaining intersections along the King Street corridor is proposed to be restored. Therefore, the analysis of 2031 No-Build and Build conditions in the TIAS assumed the King Street / Constitution Boulevard intersection would operate as part of a coordinated signal system.

We believe these responses adequately address the traffic-related comments in BETA's December 11, 2024 comment letter. Should you have any questions or require additional information, please reach out to me at (603) 766-5223 or rebeccabrown@gpinet.com.

Sincerely,

GREENMAN-PEDERSEN, INC.



Rebecca L. Brown, P.E.
Senior Project Manager
116 South River Road, Building B, Suite 1
Bedford, NH 03110

Enclosures:

- Capacity Analysis Table
- Synchro Analysis Worksheets
- Signal Plans

cc: Todd Morey, Beals Associates, Inc.
Devin Howe, Beals Associates, Inc.

TABLE 6R
Intersection Capacity Analysis Summary

Intersection/Peak Hour/Lane Group	2024 Existing				2031 No-Build without Re-occupancy				2031 Build				2031 Build Sensitivity Analysis			
	V/C ^a	Del. ^b	LOS ^c	Queue ^d	V/C	Del.	LOS	Queue	V/C	Del.	LOS	Queue	V/C	Del.	LOS	Queue
King Street at Constitution Boulevard																
<i>Weekday PM:</i>																
King Street EB approach	0.38	14.7	B	63/134	0.26	10.0	B	81/78	0.27	10.2	B	84/78	0.29	12.4	B	84/138
King Street WB left-turn	0.30	22.0	C	28/92	0.54	42.8	D	64/105	0.59	43.8	D	68/111	0.49	40.0	D	68/101
King Street WB through	0.76	11.3	B	184/483	0.75	10.6	B	338/302	0.75	10.9	B	352/302	0.77	12.3	B	331/609
Constitution Boulevard NB left-turn	0.28	19.9	B	33/80	0.41	38.9	D	50/130	0.44	38.9	D	55/145	0.40	37.2	D	56/101
Constitution Boulevard NB right-turn	0.35	9.7	A	49/105	0.41	27.0	C	90/160	0.44	27.1	C	97/173	0.39	23.9	C	99/124
585 King St SB left-turn	--	--	--	--/--	0.21	37.0	D	<25/58	0.21	36.7	D	<25/58	0.19	35.2	D	<25/50
585 King St SB through/right-turn	--	--	--	--/--	0.01	35.2	D	<25/<25	0.01	34.9	C	<25/<25	0.01	33.6	C	<25/<25
Overall Intersection	0.71	13.1	B	--/--	0.73	17.8	B	--/--	0.74	18.5	B	--/--	0.77	18.5	B	--/--

^a Volume-to-capacity ratio.

^c Level of service.

^b Average control delay in seconds per vehicle.

^d 95th percentile queue length in feet per lane (assuming 25 feet per vehicle).

Lanes, Volumes, Timings
1: Constitution Blvd/Warehouse Driveway & King Street

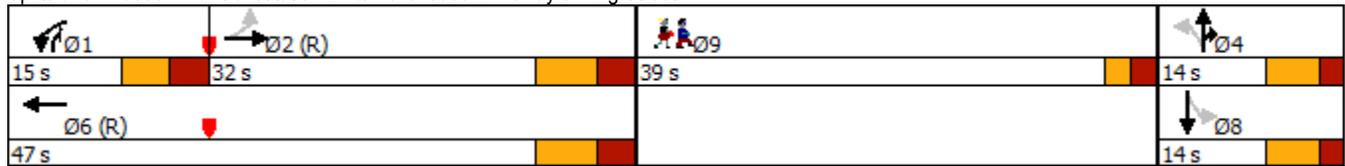
2031 Build
Timing Plan: Weekday PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	422	45	206	916	14	91	0	349	37	0	9
Future Volume (vph)	3	422	45	206	916	14	91	0	349	37	0	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	10	11	11
Storage Length (ft)	0		350	350		0	0		0	110		0
Storage Lanes	0		0	2		0	0		2	1		0
Taper Length (ft)	25			50			100			50		
Right Turn on Red			Yes			Yes			No			Yes
Link Speed (mph)		40			35			20			30	
Link Distance (ft)		1008			1170			339			587	
Travel Time (s)		17.2			22.8			11.6			13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	14%	8%	3%	2%	4%	2%	6%	2%	2%	2%
Shared Lane Traffic (%)												
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		22		22			12			12		12
Link Offset(ft)		0		0			0			0		0
Crosswalk Width(ft)		16		16			16			16		16
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.00	1.00	1.00	1.09	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	
Protected Phases		2		1	6			4	4 1		8	8
Permitted Phases	2						4			8		
Detector Phase	2	2		1	6		4	4	4 1	8	8	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	5.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	14.5	14.5		13.5	12.5		13.0	13.0		13.0	13.0	
Total Split (s)	32.0	32.0		15.0	47.0		14.0	14.0		14.0	14.0	
Total Split (%)	32.0%	32.0%		15.0%	47.0%		14.0%	14.0%		14.0%	14.0%	
Yellow Time (s)	4.5	4.5		3.5	4.5		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-3.5		-2.5	-3.5		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Recall Mode	C-Min	C-Min		None	C-Min		None	None		None	None	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 47 (47%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Constitution Blvd/Warehouse Driveway & King Street



Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	39.0
Total Split (s)	39.0
Total Split (%)	39%
Yellow Time (s)	2.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None

Intersection Summary

Queues
 1: Constitution Blvd/Warehouse Driveway & King Street

2031 Build
 Timing Plan: Weekday PM

							
Lane Group	EBT	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	511	224	1011	99	379	40	10
v/c Ratio	0.29	0.48	0.77	0.40	0.38	0.19	0.01
Control Delay	13.2	42.3	13.8	40.3	23.6	35.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.2	42.3	13.8	40.3	23.6	35.8	0.0
Queue Length 50th (ft)	84	68	331	56	99	22	0
Queue Length 95th (ft)	138	101	609	101	124	50	0
Internal Link Dist (ft)	928		1090	259			507
Turn Bay Length (ft)		350				110	
Base Capacity (vph)	1753	462	1315	248	988	209	756
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.48	0.77	0.40	0.38	0.19	0.01
Intersection Summary							

HCM Signalized Intersection Capacity Analysis
 1: Constitution Blvd/Warehouse Driveway & King Street

2031 Build
 Timing Plan: Weekday PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	3	422	45	206	916	14	91	0	349	37	0	9	
Future Volume (vph)	3	422	45	206	916	14	91	0	349	37	0	9	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	11	11	11	11	11	11	12	12	12	10	11	11	
Total Lost time (s)		4.0		4.0	4.0			4.0	4.0	4.0	4.0		
Lane Util. Factor		0.95		0.97	1.00			1.00	0.88	1.00	1.00		
Frt		0.99		1.00	1.00			1.00	0.85	1.00	0.85		
Flt Protected		1.00		0.95	1.00			0.95	1.00	0.95	1.00		
Satd. Flow (prot)		3333		3134	1779			1736	2682	1652	1531		
Flt Permitted		0.95		0.95	1.00			0.75	1.00	0.66	1.00		
Satd. Flow (perm)		3170		3134	1779			1372	2682	1154	1531		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	3	459	49	224	996	15	99	0	379	40	0	10	
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	8	0	
Lane Group Flow (vph)	0	506	0	224	1011	0	0	99	379	40	2	0	
Heavy Vehicles (%)	2%	2%	14%	8%	3%	2%	4%	2%	6%	2%	2%	2%	
Turn Type	Perm	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA		
Protected Phases		2		1	6			4	4 1		8	8	
Permitted Phases	2						4			8			
Actuated Green, G (s)		51.7		12.2	70.4			16.1	34.3	16.1	16.1		
Effective Green, g (s)		55.2		14.7	73.9			18.1	36.3	18.1	18.1		
Actuated g/C Ratio		0.55		0.15	0.74			0.18	0.36	0.18	0.18		
Clearance Time (s)		7.5		6.5	7.5			6.0		6.0	6.0		
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0		
Lane Grp Cap (vph)		1749		460	1314			248	973	208	277		
v/s Ratio Prot				0.07	c0.57				c0.14		0.00		
v/s Ratio Perm		0.16						0.07		0.03			
v/c Ratio		0.29		0.49	0.77			0.40	0.39	0.19	0.01		
Uniform Delay, d1		11.9		39.2	7.9			36.2	23.6	34.7	33.6		
Progression Factor		1.00		1.00	1.00			1.00	1.00	1.00	1.00		
Incremental Delay, d2		0.4		0.8	4.4			1.1	0.3	0.5	0.0		
Delay (s)		12.4		40.0	12.3			37.2	23.9	35.2	33.6		
Level of Service		B		D	B			D	C	D	C		
Approach Delay (s)		12.4			17.3			26.6			34.9		
Approach LOS		B			B			C			C		
Intersection Summary													
HCM 2000 Control Delay			18.5									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.77										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	16.5
Intersection Capacity Utilization			84.0%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													

TRANSPORTATION IMPROVEMENT PROJECT

PLAN OF
KING STREET & CONSTITUTION BOULEVARD
 IN THE TOWN OF
FRANKLIN
 NORFOLK COUNTY

THE COMMONWEALTH OF MASSACHUSETTS

ISSUED FOR CONSTRUCTION

PROJECT TITLE
**King Street at
 Constitution Boulevard
 Off-site Improvements**

Franklin,
 Massachusetts

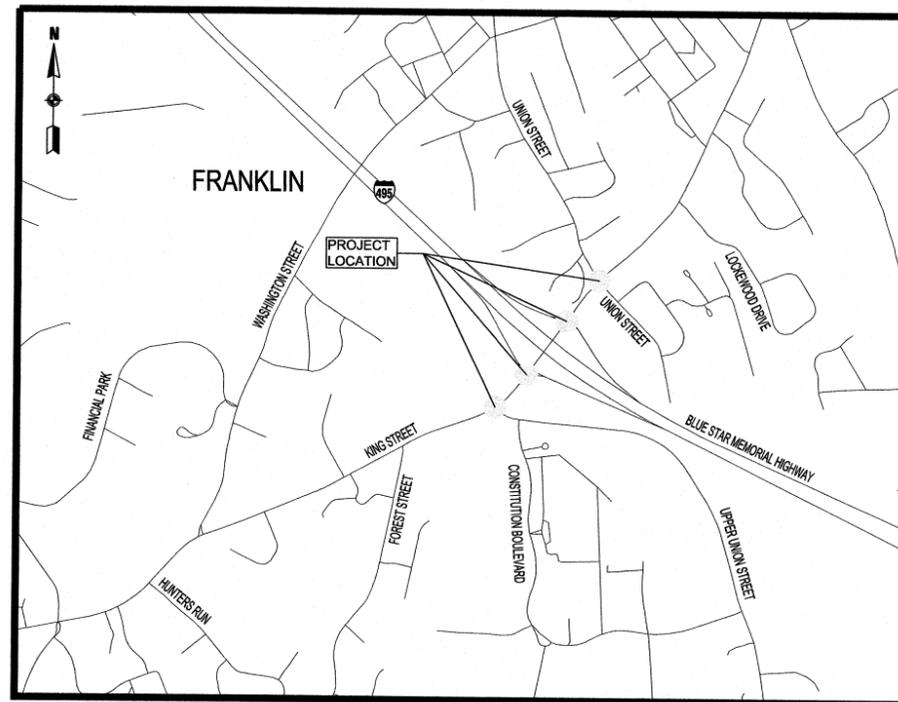
PREPARED FOR
Marcus Partners

Boston,
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35 N.E. BUSINESS CENTER DRIVE
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SHEET NO.	DESCRIPTION
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8	SIGN SUMMARY SHEET
9-16	TRAFFIC SIGNAL PLANS
17-20	TEMPORARY TRAFFIC CONTROL PLANS
21	CURB RAMP DETAILS

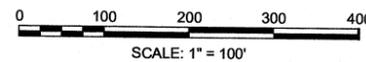


ALL WORK DONE UNDER THIS CONTRACT SHALL BE IN CONFORMANCE WITH THE MASSDOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES 2023 EDITION; THE SUPPLEMENTAL SPECIFICATIONS DATED MARCH 2023; THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS; THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS; THE MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS; THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS; THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS; THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING; THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK; AND ALL RULES AND REGULATIONS OF THE ARCHITECTURAL ACCESS BOARD (521 CMR 1.00 ET. SEQ.); OR LATEST EDITIONS, ALL AS AMENDED, THE SPECIAL PROVISIONS, AND THESE PLANS.

DESIGN DESIGNATION

	KING STREET
DESIGN SPEED	40 MPH
ADT (2023)	20,820 vpd
ADT (2030)	22,680 vpd
K	8.0 %
D	52% EB
T (PEAK HOUR)	2.0%
T (AVERAGE DAY)	5.0%
DHV	1,820 vph
DDHV	945 vph
FUNCTIONAL CLASSIFICATION	URBAN MINOR ARTERIAL

DESIGNED BY	TWO
DRAWN BY	TWO
CHECKED BY	SMB
DATE	SEPTEMBER 2023
SCALE	AS NOTED
STAMP	



LENGTH OF PROJECT = 655.00 FEET = 0.124 MILES (KING STREET)

NOVEMBER 2023

REVISIONS		
NO.	DESCRIPTION	DATE

DRAWING TITLE

Title Sheet

SHEET 1 OF 21	DRAWING NUMBER
JOB NO. 9353	1
CAD 9353DS	

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
JB	JB	JERSEY BARRIER
CB	CB	CATCH BASIN
CB	CB	CATCH BASIN CURB INLET
FP	FP	FLAG POLE
GP	GP	GAS PUMP
MB	MB	MAIL BOX
		POST SQUARE
		POST CIRCULAR
WELL	WELL	WELL
EHH	EHH	ELECTRIC HANDHOLE
		FENCE GATE POST
GG	GG	GAS GATE
BHL #	BHL #	BORING HOLE
MW #	MW #	MONITORING WELL
TP #	TP #	TEST PIT
		HYDRANT
		LIGHT POLE
CO.BD.		COUNTY BOUND
		GPS POINT
		CABLE MANHOLE
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
MHB	MHB	MASSACHUSETTS HIGHWAY BOUND
MON		MONUMENT
SB		STONE BOUND
TB		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
TPL or GUY	TPL or GUY	TROLLEY POLE OR GUY POLE
HTP		TRANSMISSION POLE
UFB	UFB	UTILITY POLE W/ FIREBOX
UPDL	UPDL	UTILITY POLE WITH DOUBLE LIGHT
ULT	ULT	UTILITY POLE W / 1 LIGHT
UPL	UPL	UTILITY POLE
		BUSH
		TREE
		STUMP
		SWAMP / MARSH
WG	WG	WATER GATE
PM	PM	PARKING METER
		OVERHEAD CABLEWIRE
		CURBING
100	99	CONTOURS (ON-THE-GROUND SURVEY DATA)
100	99	CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
		CHAIN LINK OR METAL FENCE
		WOOD FENCE
		HAY BALES/SILT FENCE
		TREE LINE
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		EDGE OF PAVEMENT
		LIMIT OF MICROMILLING AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT

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
OR		SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
		MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
		HIGH MAST POLE OR TOWER
		SIGN AND POST
		SIGN AND POST (2 POSTS)
		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

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
ONLY	ONLY	LEGEND "ONLY" - WHITE
	SL	STOP LINE
	CW	CROSSWALK
	SWL	SOLID WHITE LINE
	SYL	SOLID YELLOW LINE
	BWL	BROKEN WHITE LINE
	BYL	BROKEN YELLOW LINE
	DWL	DOTTED WHITE LINE (3' LINE WITH 9' GAP)
	DYL	DOTTED YELLOW LINE (3' LINE WITH 9' GAP)
	DWLEx	DOTTED WHITE LINE EXTENSION (2' LINE WITH 6' GAP)
	DYLEx	DOTTED YELLOW LINE EXTENSION (2' LINE WITH 6' GAP)
	DBWL	DOUBLE WHITE LINE
	DBYL	DOUBLE YELLOW LINE

PAVEMENT MARKING NOTES:
 1. ALL PAVEMENT MARKINGS SHALL BE THERMOPLASTIC.
 2. ALL LONGITUDINAL PAVEMENT MARKINGS SHALL BE 6" WIDE, UNLESS OTHERWISE NOTED.

PROJECT TITLE

King Street at
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Franklin,
 Massachusetts

PREPARED FOR

Marcus Partners

Boston,
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CHECKED BY	SMB
DATE	SEPTEMBER 2023
SCALE	N.T.S.
STAMP	



NO.	DESCRIPTION	DATE

DRAWING TITLE

Legend

SHEET 2 OF 21	DRAWING NUMBER
JOB NO. 9353	2
CAD 9353DS	

GENERAL NOTES

1. TOPOGRAPHICAL INFORMATION OBTAINED FROM SURVEY CONDUCTED BY CONTROL POINT ASSOCIATES, COORDINATES ARE IN MASSACHUSETTS STATE PLANE (NAD '83). VERTICAL DATUM IS REFERENCED TO NAVD '88.
2. THE CONTRACTOR SHALL NOTIFY DIGSAFE (888-344-7233) AND PROCURE A DIGSAFE NUMBER PRIOR TO DISTURBING GROUND IN ANY WAY.
3. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY 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.
4. WHERE AN EXISTING UNDERGROUND 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.
5. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS WITH PRIVATE UTILITY COMPANIES FOR THE ALTERATION/ADJUSTMENT OF MANHOLES, GATE BOXES AND SERVICE BOXES OWNED/MAINTAINED BY GAS, ELECTRIC, COMMUNICATION, AND ANY OTHER PRIVATE UTILITY COMPANIES.
6. 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. GRASS AREAS SHALL BE RESTORED WITH 4-INCHES OF LOAM AND SEEDED.
7. THE TERM "PROPOSED" (PROP.) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET" (R&R).
8. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS NOTED OTHERWISE.
9. ALL PROPOSED PAVEMENT MARKINGS SHALL BE THERMOPLASTIC.
10. ALL EXISTING STATE, COUNTY, CITY, AND TOWN LOCATION LINES AND PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATIONS ARE NOT GUARANTEED.
11. A MINIMUM 4 FOOT WIDE CLEAR PATH OF TRAVEL (EXCLUDING CURB WIDTH) SHALL BE MAINTAINED ON ALL SIDEWALKS PAST ALL SIGNAL EQUIPMENT, UTILITIES, OR OTHER OBSTRUCTIONS.
12. DIMENSIONS RELATIVE TO EXISTING CURB LINES SHALL CONTROL. THE EXACT LOCATION OF TRAFFIC SIGNAL POLES, POSTS, CONTROLLERS, PULL BOXES, SIGNS, AND PAVEMENT MARKINGS SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD.
13. JOINTS BETWEEN NEW HOT MIX ASPHALT ROADWAY PAVEMENT AND EXISTING PAVEMENT SHALL BE SEALED WITH HOT POURED JOINT SEALER.
15. ALL EXISTING GRANITE CURB AND EDGING THAT MEETS SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER SHALL BE RE-USED IN THE PROPOSED WORK, EXCEPT CURVED STONES OF A DIFFERENT RADIUS THAN PROPOSED CURB.
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION STAKING AT NO ADDITIONAL COST.
17. ALL VERTICAL GRANITE CURB (VGC) SHALL TRANSITION AT THE LIMITS OF WORK WITH A 6' TRANSITION PIECE.
18. ALL TRENCH CUTS WITHIN THE PAVED SURFACE HAVING A DEPTH OF 4' OR LESS SHALL BE BACKFILLED WITH CONTROLLED DENSITY FILL AS SHOWN IN THE TYPICAL TRENCH DETAILS.
19. ALL NEW CATCH BASIN GRATES WITHIN THE LIMITS OF WORK AND WITHIN THE PAVED SURFACE SHALL BE HOOK LOCK CASCADE GRATES. THE CONTRACTOR SHALL ALSO REPLACE EXISTING GRATES DESIGNATED ON THE PLANS WHICH DO NOT MEET THESE CRITERIA.
20. ALL EXISTING SEWER, DRAINAGE, ELECTRIC MANHOLE COVERS, GAS AND WATER GATES, ETC. SHALL BE ADJUSTED TO FINISHED GRADE.
21. THE CONTRACTOR SHALL REVIEW WITH THE ENGINEER THE CONDITION OF ALL EXISTING DRAINAGE STRUCTURES WITHIN LIMITS OF PAVING THAT ARE TO BE RETAINED. FRAMES, GRATES AND COVERS FOUND TO BE BROKEN, CRACKED OR COMPROMISED SHALL BE REPLACED. STRUCTURES FOUND TO BE COLLAPSED, WEAKENED OR COMPROMISED IN ANY WAY SHALL BE REBUILT IN ACCORDANCE WITH ALL RELEVANT STANDARDS. THIS INCLUDES STRUCTURES THAT CONTAIN COVERS OR GRATES THAT DO NOT SIT FIRMLY IN THEIR FRAMES. COVERS AND GRATES THAT NOTICEABLY (BY SIGHT OR SOUND) ROCK OR SHIFT WHEN IMPACTED BY A MOTOR VEHICLE SHALL BE REMOVED, CLEANED (INCLUDING THE FRAME) AND RESET. COVERS AND GRATES THAT CONTINUE TO ROCK OR SHIFT AFTER THIS PROCEDURE SHALL BE REPLACED.
22. ALL PROPOSED PEDESTRIAN ACCOMMODATIONS (I.E. SIDEWALKS, WHEELCHAIR RAMPS, ETC.) SHALL COMPLY WITH CURRENT ADA & AAB RULES AND REGULATIONS AND MUNICIPAL STANDARDS.
23. ALL DRAINAGE STRUCTURES WITHIN THE LIMITS OF WORK SHALL BE CLEANED PRIOR TO CONCLUSION OF THE PROJECT UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
24. THE MINIMUM MOUNTING HEIGHT OF POST MOUNTED SIGNS, MEASURED VERTICALLY FROM THE BOTTOM OF THE SIGN TO THE TOP OF CURB OR SIDEWALK OR NEAREST EDGE OF TRAVELED WAY, SHALL BE 7 FT EXCEPT FOR OM1-1 OBJECT MARKERS WHICH SHALL BE 4 FT.

ABBREVIATIONS

GENERAL	
AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
A.C.	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD.	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR.	BRIDGE
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CI	CURB INLET
CIP	CAST IRON PIPE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DHV	DESIGN HOURLY VOLUME
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	STEADY DON'T WALK - PORTLAND ORANGE
DWP	DETECTABLE WARNING PANEL
DWY	DRIVEWAY
ELEV (or EL.)	ELEVATION
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EXIST (or EX)	EXISTING
EXC	EXCAVATION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN.	FOUNDATION
FLDSTN	FIELDSTONE
GAR	GARAGE
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GRAV	GRAVEL
GRD	GUARD
HDW	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
LB	LEACH BASIN
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO.	NUMBER
OL	OVERLAY
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PROJ	PROJECT
PROP	PROPOSED
PSB	PLANTABLE SOIL BORROW
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION

ABBREVIATIONS (cont.)

GENERAL	
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT
PWW	PAVED WATER WAY
R	RADIUS OF CURVATURE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
R&D	REMOVE AND DISPOSE
RDWY	ROADWAY
REM	REMOVE
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
VGC	VERTICAL GRANITE CURB
WCR	WHEEL CHAIR RAMP
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

TRAFFIC SIGNAL ABBREVIATIONS

CAB	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY UPRAISED HAND
FDW	FLASHING UPRAISED HAND
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR YELLOW
FYL	FLASHING YELLOW LEFT ARROW
FYR	FLASHING YELLOW RIGHT ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
HH	HAND HOLE
MA	MAST ARM
OL	OVERLAP
PB	PULL BOX
PED	PEDESTRIAN
PTZ	PAN, TILT, ZOOM
R	STEADY CIRCULAR RED
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
TS	TRAFFIC SIGNAL/ TRAFFIC SIGNAL POST
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALKING PERSON
Y	STEADY CIRCULAR YELLOW
YL	STEADY YELLOW LEFT ARROW

PROJECT TITLE

**King Street at
Constitution Boulevard
Off-site Improvements**

**Franklin,
Massachusetts**

PREPARED FOR

Marcus Partners

**Boston,
Massachusetts**



35 N.E. BUSINESS CENTER DRIVE
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DESIGNED BY	---
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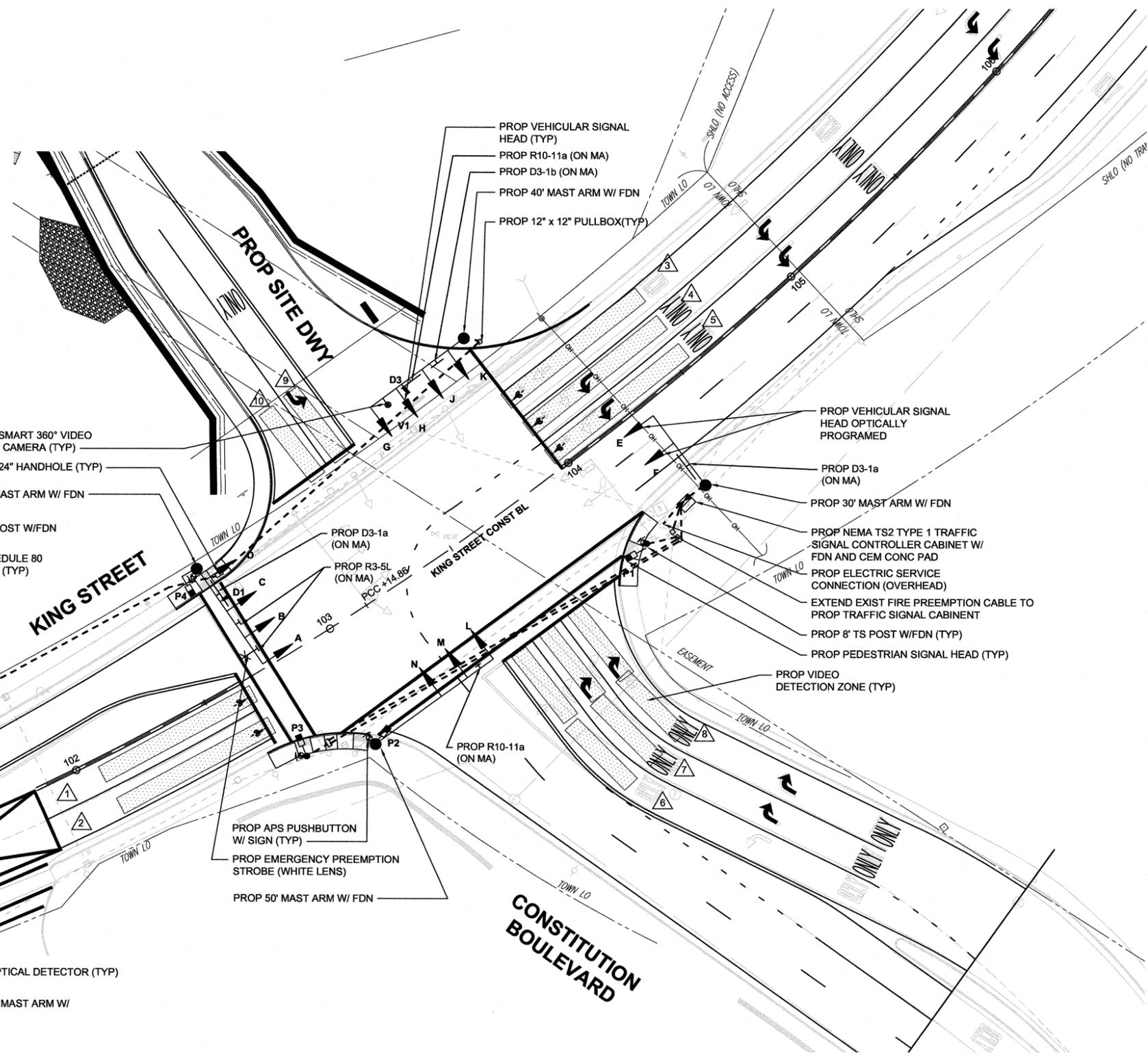
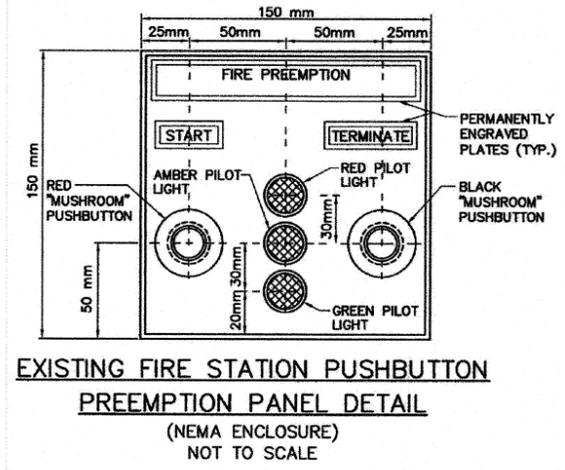
REVISIONS		
NO.	DESCRIPTION	DATE

DRAWING TITLE

Notes

SHEET 3 OF 21	DRAWING NUMBER
JOB NO. 9353	3
CAD 9353DS	

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 Off-site Improvements**

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 Massachusetts

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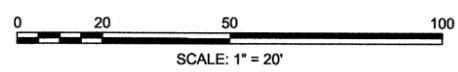
REVISIONS		
NO.	DESCRIPTION	DATE

DRAWING TITLE
**Traffic Signal Plan
 King Street at
 Constitution Blvd**

SHEET 9 OF 21	DRAWING NUMBER
JOB NO. 9353	9
CAD 9353TS	

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NOTE: ALL EXIST SIGNAL EQUIPMENT TO BE R&D
 UNLESS OTHERWISE NOTED



King Street at
Constitution Boulevard
Off-site Improvements

Franklin,
Massachusetts

PREPARED FOR

Marcus Partners

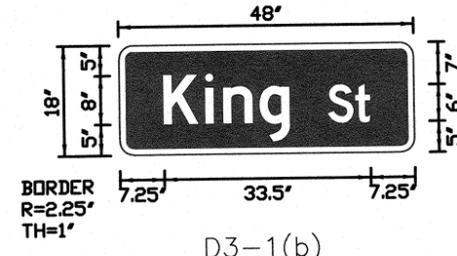
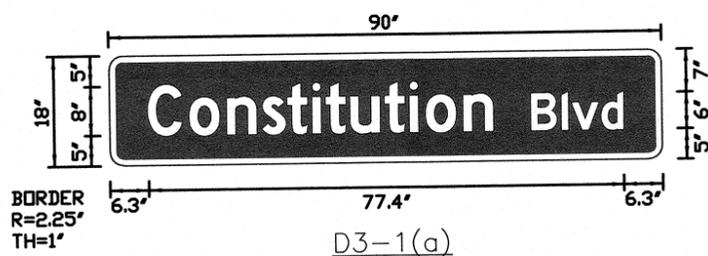
Boston,
Massachusetts



35 N.E. BUSINESS CENTER DRIVE
ANDOVER, MA 01810-1071
TEL: (978) 474-8800
www.rdva.com

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCH)			NUMBER OF SIGNS REQUIRED	COLOR			POST TYPE AND NUMBER REQUIRED	AREA PER SIGN	TOTAL AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	RTE. MKR. ARROW		BACK-GROUND	LEGEND	BORDER			
R3-5L	30"	36"		SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			2	WHITE	BLACK	BLACK	MOUNT ON MAST ARM	7.50	15.00
R3-8e	48"	30"		SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			2	WHITE	BLACK	BLACK	P-5 4 (2 PER SIGN)	10.00	20.00
R3-8f	48"	30"		SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			2	WHITE	BLACK	BLACK	P-5 4 (2 PER SIGN)	10.00	20.00
R10-6	24"	36"		SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			1	WHITE	BLACK	BLACK	P-5 1	6.00	6.00
R10-11a	24"	30"		SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			2	WHITE	BLACK	BLACK	MOUNT ON MAST ARM	5.00	10.00
R10-13	36"	24"		SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			1	WHITE	BLACK	BLACK	MOUNT ON MAST ARM	6.00	6.00
W11-8	36"	36"		SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			1	YELLOW	YELLOW	BLACK	P-5 1	9.00	9.00
W16-9P	24"	12"		SEE FHWA STANDARD HIGHWAY SIGNS 2012 SUPPLEMENT			1	YELLOW	BLACK	BLACK	MOUNT BELOW W11-8	2.00	2.00
D3-1(a)	90"	18"	SEE DETAIL	8D/6D	5" 5"	-	2	GREEN	WHITE	WHITE	MOUNT ON MAST ARM	11.25	22.50
D3-1(b) (PBS)	48"	18"	SEE DETAIL	8D/6D	5" 5"	-	1	GREEN	WHITE	WHITE	MOUNT ON MAST ARM	6.00	6.00

EXISTING SIGN LEGEND					
D3-2a		R3-5L		R10-6	
D9-18b		R3-7L		R10-11c	
MA-D1-6		R3-7R		R10-13	
MA-D1-5		R3-8e		R10-22	
M1-1		R3-8f		W11-8	
M4-5		R5-1		W16-9P	
M6-1		R2-1(40)		R5-11c	



DESIGNED BY	TWO
DRAWN BY	TWO
CHECKED BY	SMB
DATE	SEPTEMBER 2023
SCALE	N.T.S.
STAMP	



REVISIONS NO.	DESCRIPTION	DATE

DRAWING TITLE

Sign Summary
Sheet

SHEET 8 OF 21	DRAWING NUMBER
JOB NO. 9353	8
CAD 9353PM	

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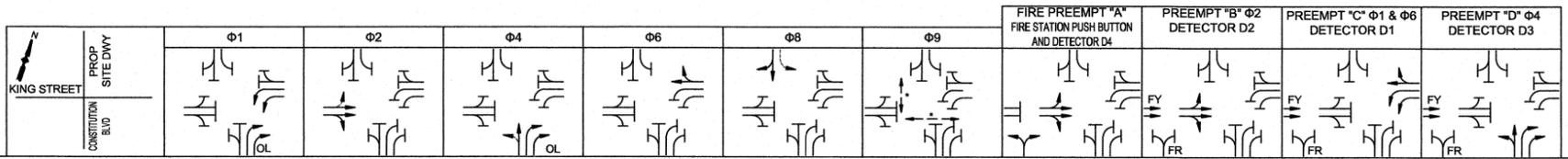


NO.	DESCRIPTION	DATE

DRAWING TITLE

Traffic Signal Data

**King Street at
 Constitution Blvd**



SEQUENCE AND TIMING FOR FULL ACTUATED CONTROL (COORDINATED)			TIMING IN SECONDS																																EMERGENCY ONLY		
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	25	26	27	28	29	30	31	32		FLASH	
KING STREET	WB	A,B	GL	YL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL		RL	FRL														
KING STREET	WB	C,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	R	R	R	R	R	R	R	R		R	FY
KING STREET	EB	E,F	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	G	Y	R	R	R	R	R	R	R	R	R	R		FY	
CONSTITUTION BLVD.	NB	G,H	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		FR	
CONSTITUTION BLVD.	NB	J,K	GR	YR	RR	RR	RR	RR	GR	YR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR		FRR									
SITE DRIVEWAY	SB	L,M,N	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		FR	
KING STREET	EB	P,Q	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY			
FIREHOUSE DRIVEWAY	NB	R,S	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR	R	R	G	Y	R	FR		FR								
PEDESTRIAN	ALL	P1-P4	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT																

COORDINATION PHASE TIMING (WITH/WITHOUT PEDESTRIANS)							
TIMING PLAN	CYCLE LENGTH	REF/OFFSET	SEC.	SEC.	SEC.	SEC.	SEC.
CYCLE 1: M-F 6 AM-10 AM	100	BOG/39	17/17	31/70	13/13	48/87	13/13
CYCLE 2: M-F 3 PM-7 PM	100	BOG/47	15/15	32/71	14/14	47/86	14/14

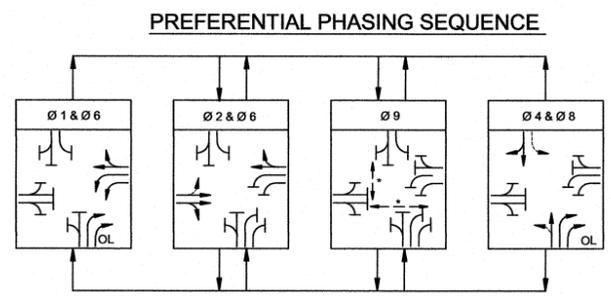
* UPON PEDESTRIAN PUSHBUTTON ACTUATION ONLY
 **TIMING SHALL BE VARIABLE AND BASED ON DURATION OF FLASHING OPTICAL SIGNAL FROM APPROACHING EMERGENCY VEHICLE TRANSMITTER.

- NOTES:
 1. FLASHING OPERATION PER MUTCD.
 2. OFFSET REFERENCED TO BEGINNING OF GREEN (BOG) OF PHASES 2&6 (COORDINATED PHASES).

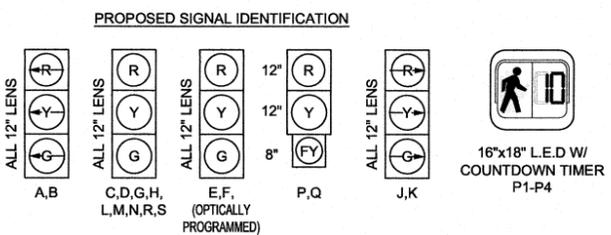
VIDEO DETECTOR DATA					
DETECTION ZONE	CAMERA	DIRECTION	CALL PHASE	EXTEND PHASE	DELAY/EXTEND
1	V1	EBLT	2	2	0/0
2	V1	EBTR	2	2	0/0
3	V1	WBTR	6	6	0/0
4	V1	WBL	1	1	0/0
5	V1	WBL	1	1	0/0
6	V1	NBLT	4	4	0/0
7	V1	NBR	4	4	0/0
8	V1	NBR	4	4	0/0
9	V1	SBL	8	8	0/0
10	V1	SBTR	8	8	0/0

NOTES:
 1. THE VIDEO DETECTION SHALL BE CAPABLE OF BICYCLE DETECTION.

- FIRE PREEMPTION NOTES**
- FIRE PREEMPTION MODE A SHALL BE ACTIVATED BY THE RED PUSHBUTTON LOCATED ON THE PREEMPTION PANEL IN THE FIRE STATION OR ACTUATED BY AN OPTICAL SIGNAL WHILE PREEMPTION MODES B, C, AND D SHALL BE ACTUATED BY AN OPTICAL SIGNAL FROM AN OPTICAL EMITTER MOUNTED ON AN EMERGENCY VEHICLE AND RECEIVED BY AN OPTICAL DETECTOR LOCATED AT THE INTERSECTION. A SEPARATE RECEIVING DETECTOR IS REQUIRED FOR EACH DETECTED APPROACH. MINIMUM GREEN AND NORMAL CLEARANCE PERIODS SHALL BE PROVIDED TO THE INTERRUPTED PHASE.
 - FIRE PREEMPTION MODE A SHALL BE ASSIGNED THE HIGHEST PRIORITY PREEMPTION MODE. PREEMPTION MODES B, C, AND D SHALL BE ON A FIRST COME FIRST SERVE BASIS.
 - PUSHBUTTON FIRE PREEMPTION MODE A MAY BE TERMINATED AT ANY TIME BY ACTIVATION OF THE BLACK PUSHBUTTON, PROVIDED THE PREEMPTION CLEARANCE AND MINIMUM GREEN TIMES HAVE BEEN SERVED. IF THE BLACK PUSHBUTTON IS NOT ACTIVATED, FIRE PREEMPTION MODE A SHALL BE TERMINATED BY THE MAXIMUM GREEN.
 - 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 THAN THAT TO BE SERVED) AND ADVANCE TO AN/OR HOLD IN EMERGENCY VEHICLE PREEMPTION PHASE UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME THE CLEARANCES AND SIMILARLY SERVICE OTHER EMERGENCY VEHICLE PREEMPTION SEQUENCES IN THE ORDER RECEIVED (IF RECEIVED) OTHERWISE RESUME NORMAL PREFERENTIAL PHASE SEQUENCE.
 - PREEMPTION MODE A MINIMUM GREEN SHALL BE 15 SECONDS WHILE THE MINIMUM GREEN FOR PREEMPTION MODES B, C, AND D SHALL BE 10 SECONDS.
 - UPON ACTIVATION OF THE PREEMPTION MODE, THE CONFIRMATION BEACON SHALL BE ILLUMINATED
 - UPON TERMINATION OF THE PREEMPTION MODE, THE SIGNAL SHALL RETURN TO THE BEGINNING OF PHASES 2 & 6.
 - ACTUAL TIMING FOR PREEMPTION SHALL BE DETERMINED IN THE FIELD IN COORDINATION WITH THE FIRE DEPARTMENT AND SHALL BE APPROVED BY THE TOWN PRIOR TO OPERATION.



- NOTES:
 1. ANY PHASE OR PHASE COMBINATION NOT CALLED SHALL BE SKIPPED.
 2. VEHICLE TURNING MOVEMENTS NOT SUPPORTED BY ARROW INDICATIONS SHOWN AS DASHED ARROWS ON PLAN
 * UPON PEDESTRIAN PUSHBUTTON ACTUATION ONLY

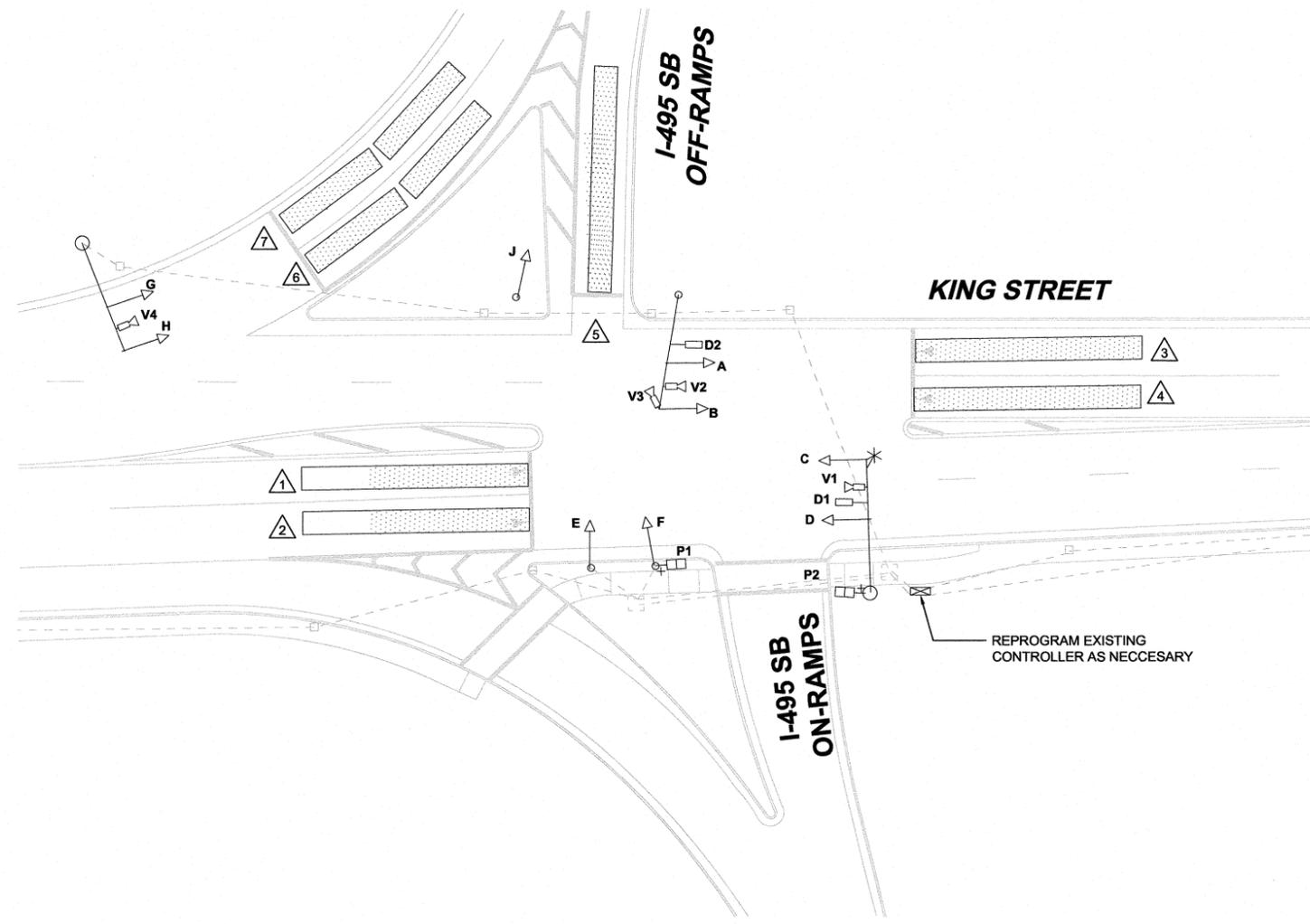
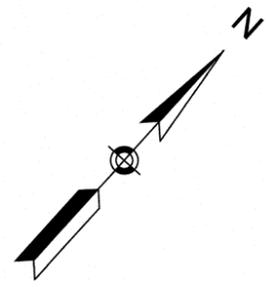


- NOTES:
 1. ALL SIGNAL HEADS SHALL HAVE TUNNEL VISORS
 2. ALL SIGNAL HEADS SHALL HAVE A 5" FLAT BACKPLATE W/ 3" YELLOW RETROREFLECTIVE BORDER.
 3. SIGNAL HEADS P AND Q SHALL HAVE 8" LENS FOR FLASHING OPERATION AND 12" LENS FOR STEADY OPERATION
 4. SIGNAL HEADS E AND F SHALL BE OPTICALLY PROGRAMMED

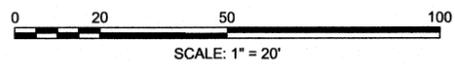
MAJOR ITEMS LIST		
ITEM	QTY	DESCRIPTION
816.01	1	NEMA TS2 TYPE 1 SIGNAL CONTROLLER W/ VIDEO DETECTION SYSTEM AND FULL INPUT SUPPRESSION PACKAGE IN P SIZE CABINET W/ FOUNDATION AND CONCRETE PAD
	1	50 FT TYPE II GALV. STEEL MAST ARM W/ FDN
	2	40 FT TYPE II GALV. STEEL MAST ARM W/ FDN
	2	30 FT TYPE II GALV. STEEL MAST ARM W/ FDN
	2	8 FT PEDESTAL POLE, STEEL, W/ FDN
	2	10 FT PEDESTAL POLE, STEEL, W/ FDN
	13	SIGNAL HEAD 3-SECTION 12" LED W/ 5" FLAT BACKPLATE AND 3" YELLOW RETROREFLECTIVE BORDER
	2	SIGNAL HEAD 3-SECTION 2-12" & 1-8" LED W/ 5" FLAT BACKPLATE AND 3" YELLOW RETROREFLECTIVE BORDER
	2	SIGNAL HEAD 3-SECTION 12" LED (OPTICALLY PROGRAMMED) W/ 5" FLAT BACKPLATE AND 3" YELLOW RETROREFLECTIVE BORDER (SIGNAL HEADS E AND F)
	4	PEDESTRIAN SIGNAL HEAD, LED, W/ COUNTDOWN TIMER AND CAP VISOR
	4	APS PUSHBUTTON AND SIGN W/ AUDIBLE AND VISIBLE INDICATOR, VIBRO-TACTILE ARROW AND SPEECH-WALK MESSAGE
	1	360° VIDEO DETECTION CAMERA WITH MOUNTING HARDWARE
	1	VIDEO DETECTION PROCESSOR 360° CAMERA
	4	EMERGENCY PREEMPTION OPTICAL DETECTOR
	1	EMERGENCY PREEMPTION STROBE (WHITE LENS)
	1	EMERGENCY PREEMPTION PHASE SELECTOR (4 CHANNEL) W/ RACK
804.3	700'	3" SCHEDULE 80 PVC CONDUIT
811.31	4	PULLBOX 12"x12"
811.22	5	HANDHOLE 12"x24"

Plus all necessary duct, cable, labor, miscellaneous material, and equipment to complete the installation and provided a fully functional traffic control signal.

- NOTES:
 1. ALL EXISTING TRAFFIC SIGNAL EQUIPMENT TO BE REMOVED UNLESS OTHERWISE NOTED.



NOTE: ALL EXIST SIGNAL EQUIPMENT TO BE RETAINED
UNLESS OTHERWISE NOTED



T:\9353 Franklin (USD 8863)\Design\DWG\9353TS.dwg 7/25/2023 9:42 AM EDT

PROJECT TITLE

**King Street at
Constitution Boulevard
Off-site Improvements**

**Franklin,
Massachusetts**

PREPARED FOR

Marcus Partners

**Boston,
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35 N.E. BUSINESS CENTER DRIVE
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DESIGNED BY	TWO
DRAWN BY	TWO
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DATE	SEPTEMBER 2023
SCALE	AS NOTED
STAMP	



REVISIONS		
NO.	DESCRIPTION	DATE

DRAWING TITLE

Traffic Signal Plan

**King Street at
I-495 SB
Off-Ramps**

SHEET 11 OF 21	DRAWING NUMBER
JOB NO. 9353	11
CAD 9353TS	

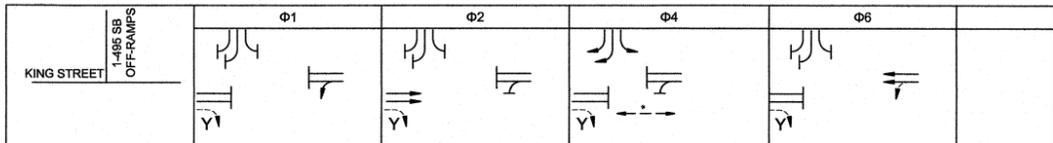


NO.	DESCRIPTION	DATE

DRAWING TITLE

Traffic Signal Data

King Street at
I-495 SB
Off-Ramps



SEQUENCE AND TIMING FOR FULL ACTUATED CONTROL (COORDINATED)

STREET	DIRECTION	HOUSINGS	1	2	3	4	5	6	7	8	9	10	11	12	FLASH
KING STREET	WBT	A	R	R	R	R	R	R	R	R	R	GT	Y	R	FY
KING STREET	WBLT	B	GL	YL	R	R	R	R	R	R	R	G	Y	R	FY
KING STREET	EBT	C,D	R	R	R	GT	Y	R	R	R	R	R	R	R	FY
I-495 SB OFF-RAMP	SBL	E,F	RL	RL	RL	RL	RL	RL	GL	YL	RL	RL	RL	RL	FRL
I-495 SB OFF-RAMP	SBR	G,H,J	RR	RR	RR	RR	RR	RR	GR	YR	RR	RR	RR	RR	FRR
PEDESTRIAN	E-W	P1-P2	DW	DW	DW	DW	DW	DW	W/FDW	DW	DW	DW	DW	DW	OUT

TIMING IN SECONDS

MINIMUM GREEN (INITIAL)	5	7	7	7
PASSAGE TIME (VEHICLE)	3	3	3	3
MAXIMUM 1 (FREE OPERATION)	15	25	20	45
MAXIMUM 2 (DURING COORDINATION)	24	39	23	68
YELLOW CLEARANCE	3.5	4.5	3	4.5
RED CLEARANCE	2	2.5	3	2.5
WALK (W)			7	
PEDESTRIAN CLEARANCE			6	
RECALL	OFF	SOFT	OFF	SOFT
MEMORY	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK

COORDINATION PHASE TIMING

TIMING PLAN	CYCLE LENGTH	REF/OFFSET	SEC.	SEC.	SEC.	SEC.
CYCLE 1: M-F 6 AM-10 AM	100	BOG/41	29	42	29	71
CYCLE 2: M-F 3 PM-7 PM	100	BOG/47	25	46	29	71

* UPON PEDESTRIAN PUSHBUTTON ACTUATION ONLY

- NOTES:
- FLASHING OPERATION PER MUTCD.
 - OFFSET REFERENCED TO BEGINNING OF GREEN (BOG) OF PHASES 2&6 (COORDINATED PHASES).

FIRE PREEMPTION SCHEDULE

DETECTOR	APPROACH	PREEMPTION PHASE	NEXT PHASE CALLED
D1	EASTBOUND	2	2+6
D2	WESTBOUND	1+6	2+6

EMERGENCY VEHICLE PREEMPTION OPERATION:

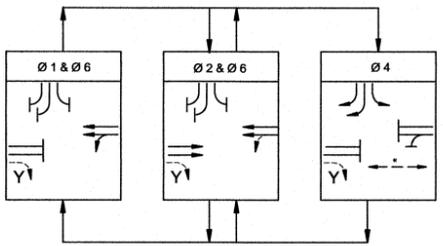
- EMERGENCY VEHICLE PREEMPTION SHALL BE ACTUATED BY AN OPTICAL SIGNAL FROM AN OPTICAL EMITTER MOUNTED ON AN EMERGENCY VEHICLE AND RECEIVED BY AN OPTICAL DETECTOR LOCATED AT INTERSECTION. A SEPARATE RECEIVING DETECTOR IS REQUIRED FOR EACH DETECTED APPROACH. PREEMPTION SIGNALS FROM MULTIPLE APPROACHES SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVED BASIS.
- 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 THAN 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.
- PREEMPTION MINIMUM GREENS SHALL BE TEN SECONDS. NORMAL CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TERMINATED BY PREEMPTION DEMAND.
- ACTUAL TIMING FOR PREEMPTION AND THE LOCATION OF THE DETECTORS SHALL BE DETERMINED IN THE FIELD IN COORDINATION WITH THE FIRE DEPARTMENT AND SHALL BE APPROVED BY MASSDOT PRIOR TO OPERATION.

VIDEO DETECTOR DATA

DETECTION ZONE	CAMERA	DIRECTION	CALL PHASE	EXTEND PHASE	CALL DELAY (SEC)
1	V1	EBT	2	2	0
2	V1	EBT	2	2	0
3	V2	WBT	6	6	0
4	V2	WBLT	1	1/6	5
5	V3	SBL	4	4	0
6	V4	SBR	4	4	0
7	V4	SBR	4	4	0

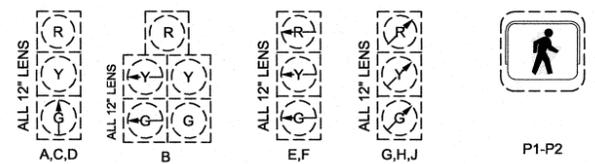
- NOTES:
- EXISTING VIDEO DETECTION TO BE RETAINED.

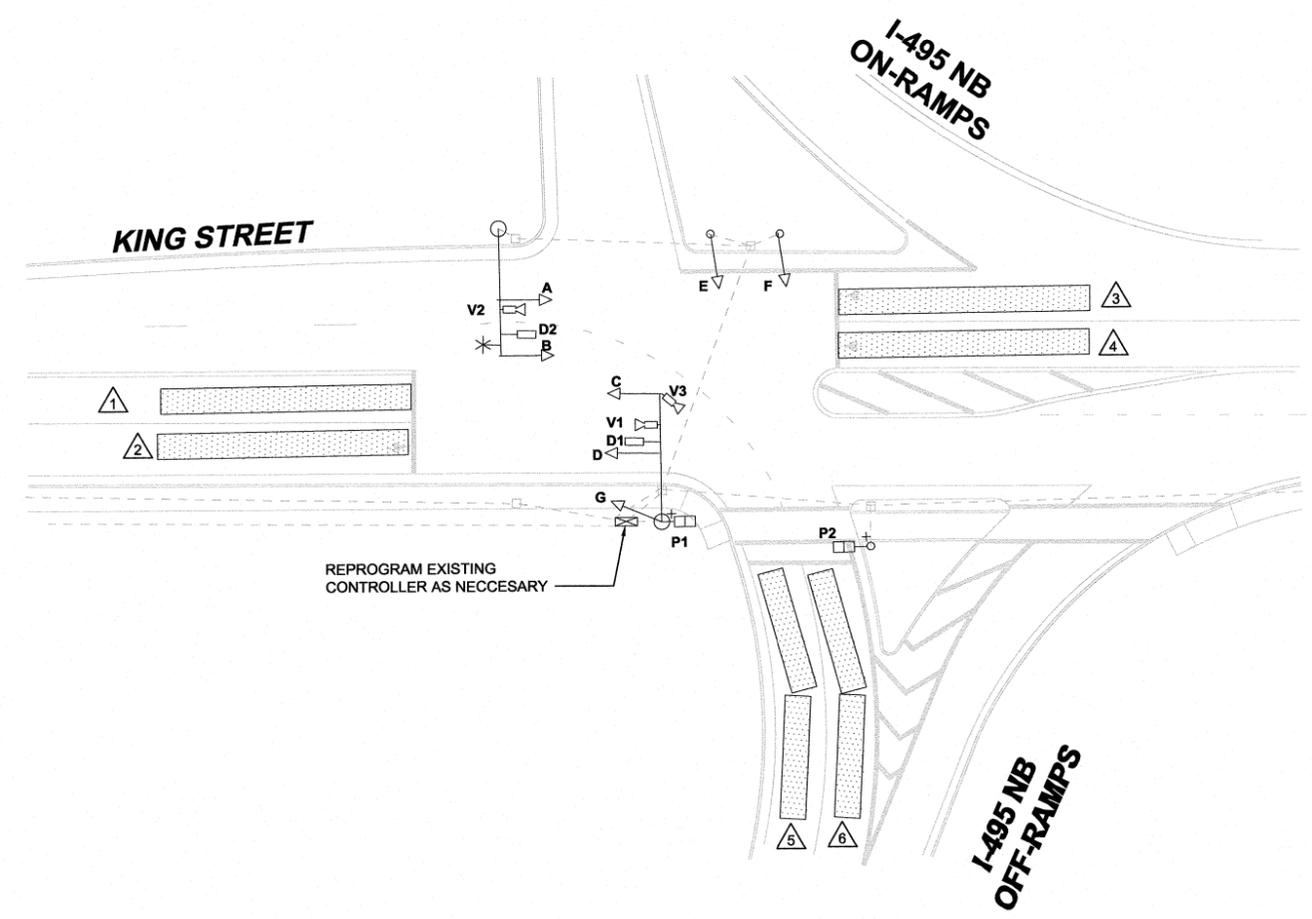
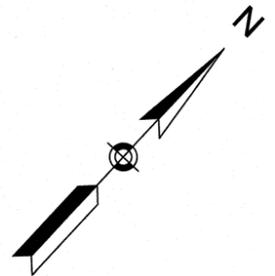
PREFERENTIAL PHASING SEQUENCE



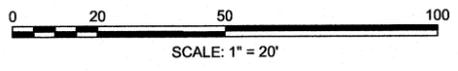
- NOTES:
- ANY PHASE OR PHASE COMBINATION NOT CALLED SHALL BE SKIPPED.
 - VEHICLE TURNING MOVEMENTS NOT SUPPORTED BY ARROW INDICATIONS SHOWN AS DASHED ARROWS ON PLAN
 - UPON PEDESTRIAN PUSHBUTTON ACTUATION ONLY

EXISTING SIGNAL IDENTIFICATION





NOTE: ALL EXIST SIGNAL EQUIPMENT TO BE RETAINED
UNLESS OTHERWISE NOTED



T:\9353 Franklin (JSD 8863)\Design\DWG\9353TS.dwg 7/25/2023 9:42 AM EDT

PROJECT TITLE
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SCALE	AS NOTED
STAMP	



REVISIONS		
NO.	DESCRIPTION	DATE

DRAWING TITLE
Traffic Signal Plan

**King Street at
I-495 NB Off-Ramps**

SHEET 13 OF 21	DRAWING NUMBER
JOB NO. 9353	13
CAD 9353TS	



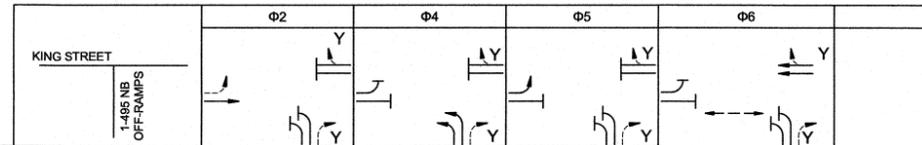
REVISIONS

NO.	DESCRIPTION	DATE

DRAWING TITLE

Traffic Signal Data

King Street at
I-495 NB
Off-Ramps



SEQUENCE AND TIMING FOR FULL ACTUATED CONTROL (COORDINATED)

STREET	DIRECTION	HOUSINGS	1	2	3	4	5	6	7	8	9	10	11	12	FLASH
KING STREET	WBT	A,B	R	R	R	R	R	R	R	R	R	GT	Y	R	FY
KING STREET	EBL	C	FYL	YL	RL	RL	RL	RL	GL	YL	**	RL	RL	RL	FRL
KING STREET	EBT	D	GT	Y	R	R	R	R	R	R	R	R	R	R	FY
KING STREET	EBT	G	G	Y	R	R	R	R	R	R	R	R	R	R	FY
I-495 NB OFF-RAMP	NBL	E,F	RL	RL	RL	GL	YL	RL	RL	RL	RL	RL	RL	RL	FRL
PEDESTRIAN	E-W	P1-P2	DW	DW	DW	DW	DW	DW	DW	DW	DW	W/FDW	DW	DW	OUT

TIMING IN SECONDS

MINIMUM GREEN (INITIAL)	7					5						7			
PASSAGE TIME (VEHICLE)	3					3						3			
MAXIMUM 1 (FREE OPERATION)	45					19						20			
MAXIMUM 2 (DURING COORDINATION)	81					20						34			42
YELLOW CLEARANCE		4.5				3			3.5					4.5	
RED CLEARANCE			1.5				3			1.5					1.5
WALK (W)												7			
PEDESTRIAN CLEARANCE												6			
RECALL			SOFT			OFF			OFF			SOFT			
MEMORY			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			

COORDINATION PHASE TIMING

TIMING PLAN	CYCLE LENGTH	REF/OFFSET	SEC.	SEC.	SEC.	SEC.
CYCLE 1: M-F 6 AM-10 AM	100	BOG/0	74	26	39	35
CYCLE 2: M-F 3 PM-7 PM	100	BOG/0	86	14	38	48

* UPON PEDESTRIAN PUSHBUTTON ACTUATION ONLY

NOTES:

- FLASHING OPERATION PER MUTCD.
- OFFSET REFERENCED TO BEGINNING OF GREEN (BOG) OF PHASES 2 & 6 (COORDINATED PHASES).
- ** FYL IF Ø2 FOLLOWS, RL ALL OTHER PHASES

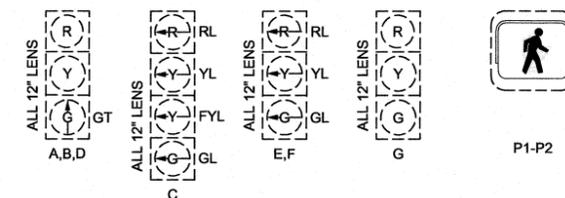
FIRE PREEMPTION SCHEDULE

DETECTOR	APPROACH	PREEMPTION PHASE	NEXT PHASE CALLED
D1	EASTBOUND	2+5	2+6
D2	WESTBOUND	6	2 + 6

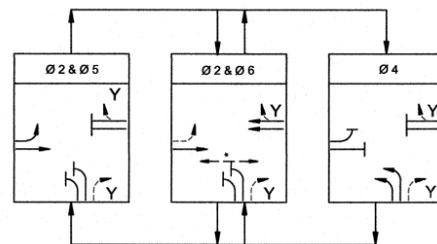
EMERGENCY VEHICLE PREEMPTION OPERATION:

- 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.
- PREEMPTION SIGNALS FROM MULTIPLE APPROACHES SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVED BASIS.
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- PREEMPTION MINIMUM GREENS SHALL BE TEN SECONDS.
- NORMAL CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TERMINATED BY PREEMPTION DEMAND.
- ACTUAL TIMING FOR PREEMPTION AND THE LOCATION OF THE DETECTORS SHALL BE DETERMINED IN THE FIELD IN COORDINATION WITH THE FIRE DEPARTMENT AND SHALL BE APPROVED BY MASSDOT PRIOR TO OPERATION.

EXIST SIGNAL IDENTIFICATION



PREFERENTIAL PHASING SEQUENCE



- NOTES:
- ANY PHASE OR PHASE COMBINATION NOT CALLED SHALL BE SKIPPED.
 - VEHICLE TURNING MOVEMENTS NOT SUPPORTED BY ARROW INDICATIONS SHOWN AS DASHED ARROWS ON PLAN
 - * UPON PEDESTRIAN PUSHBUTTON ACTUATION ONLY

PROJECT TITLE

King Street at
Constitution Boulevard
Off-site Improvements

Franklin,
Massachusetts

PREPARED FOR

Marcus Partners

Boston,
Massachusetts



35 N.E. BUSINESS CENTER DRIVE
ANDOVER, MA 01810-1071
TEL: (978) 474-8800
www.rdva.com

DESIGNED BY TWO
DRAWN BY TWO
CHECKED BY SMB
DATE SEPTEMBER 2023
SCALE AS NOTED
STAMP



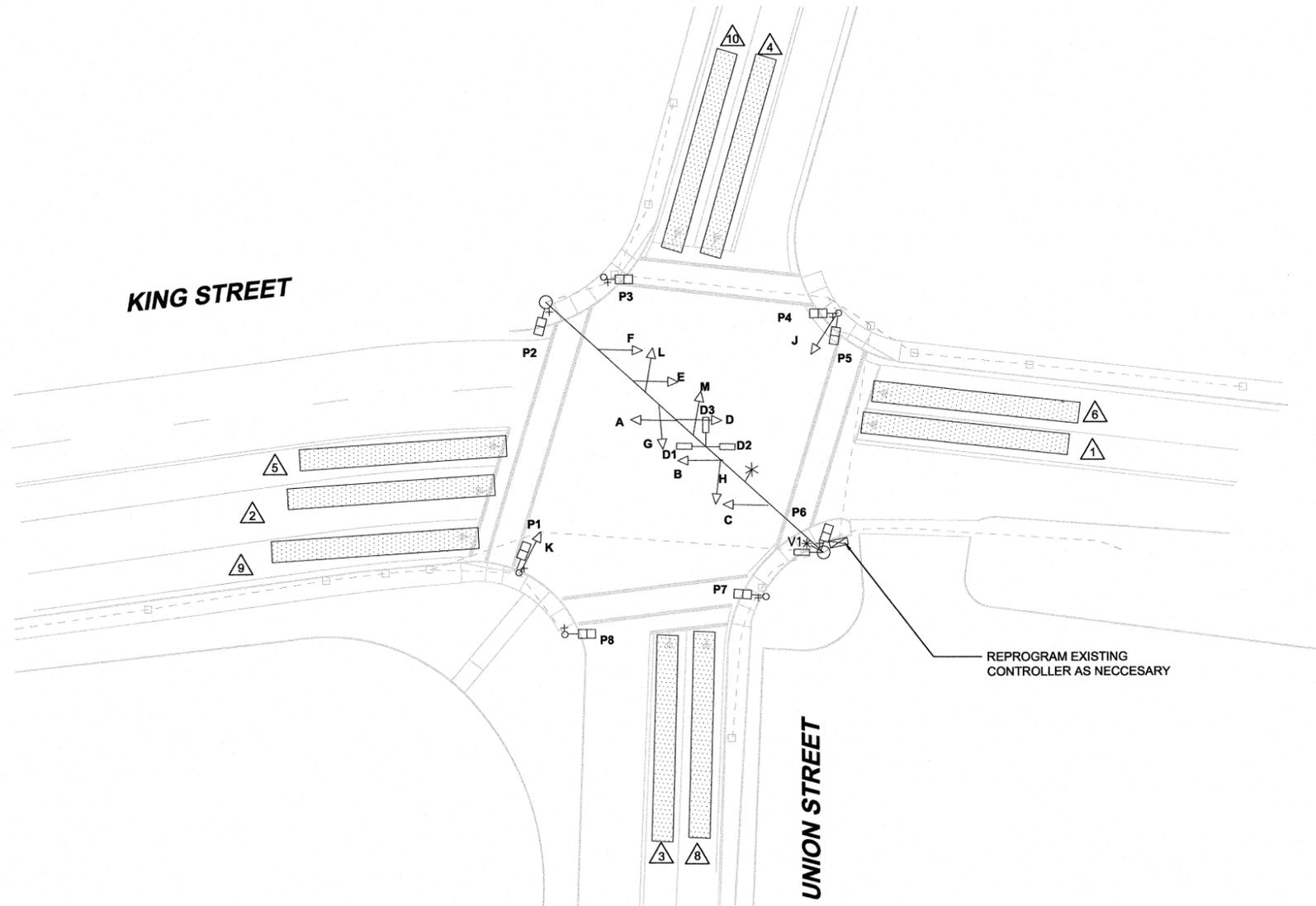
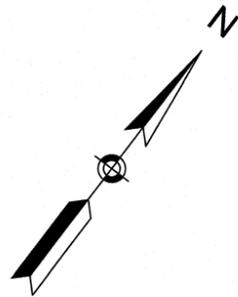
REVISIONS		
NO.	DESCRIPTION	DATE

DRAWING TITLE

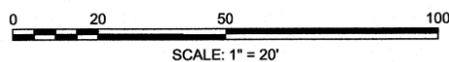
Traffic Signal Plan

King Street at
Union Street

SHEET 15 OF 21 DRAWING NUMBER
JOB NO. 9353
CAD 9353TS
15



NOTE: ALL EXIST SIGNAL EQUIPMENT TO BE RETAINED
UNLESS OTHERWISE NOTED



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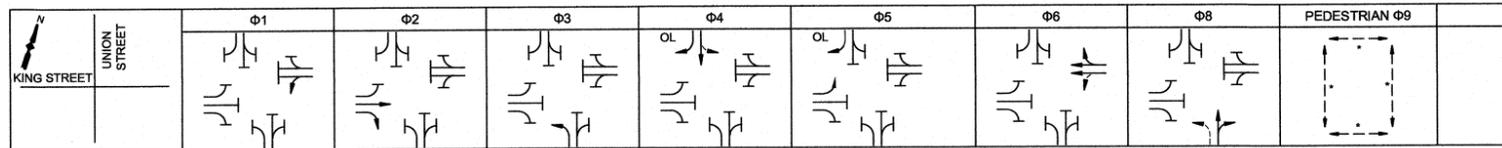


NO.	DESCRIPTION	DATE

DRAWING TITLE

Traffic Signal Data

King Street at
Union Street



SEQUENCE AND TIMING FOR FULL ACTUATED CONTROL (COORDINATED)

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	
KING STREET	EB	A	RL	GL	YL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	FRL											
KING STREET	EB	B,C	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
KING STREET	WB	D	GL	YL	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	FY
KING STREET	WB	E,F	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	FY
UNION STREET	NB	G	R	R	R	R	R	R	GL	YL	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
UNION STREET	NB	H,J	R	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
UNION STREET	SB	K	R	R	R	R	R	R	R	R	R	R	G	Y	R	GR/R	YR/R	R	R	R	R	R	R	R	R	R	R	FR
UNION STREET	SB	L,M	R	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
PEDESTRIAN	ALL	P1-P8	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT													

	TIMING IN SECONDS																											
MINIMUM GREEN (INITIAL)	5				7					5				7					7									
PASSAGE TIME (VEHICLE)	2				3					3				3					3									
MAXIMUM 1 (FREE OPERATION)	11				50				11				11					42										
MAXIMUM 2 (DURING COORDINATION)	11				59				11				11					56										
YELLOW CLEARANCE			4				4					3					3.5			4				4				
RED CLEARANCE				2				2				2			1.5				2				2			1.5		4
WALK (W)																									7			
PEDESTRIAN CLEARANCE																										18		
RECALL					OFF			SOFT			OFF			OFF			OFF			SOFT			OFF			OFF		
MEMORY					NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			LOCK		

		COORDINATION PHASE TIMING (WITH/WITHOUT PEDESTRIANS)								
TIMING PLAN	CYCLE LENGTH	REF/OFFSET	SEC.	SEC.						
CYCLE 1: M-F 6 AM-10 AM	100	BOG/88	11/11	36/65	11/11	13/13	16/16	31/60	24/24	29/0
CYCLE 2: M-F 3 PM-7 PM	100	BOG/0	11/11	36/65	11/11	13/13	19/19	28/57	24/24	29/0

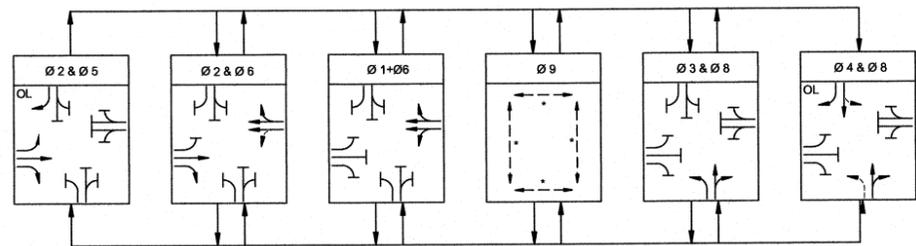
* UPON PEDESTRIAN PUSHBUTTON ACTUATION ONLY

NOTES:
1. FLASHING OPERATION PER MUTCD.
2. OFFSET REFERENCED TO BEGINNING OF GREEN (BOG) OF PHASES 2&6 (COORDINATED PHASES).

FIRE PREEMPTION SCHEDULE

DETECTOR	APPROACH	PREEMPTION PHASE	NEXT PHASE CALLED
D1	EASTBOUND	2 + 5	2 + 6
D2	WESTBOUND	1 + 6	2 + 6
D3	SOUTHBOUND	4	2 + 6

PREFERENTIAL PHASING SEQUENCE

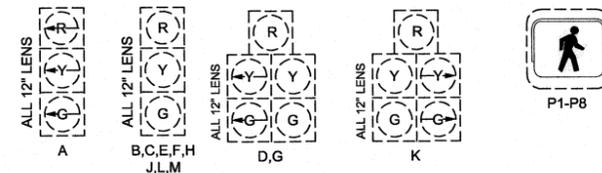


NOTES:
1. ANY PHASE OR PHASE COMBINATION NOT CALLED SHALL BE SKIPPED.
2. VEHICLE TURNING MOVEMENTS NOT SUPPORTED BY ARROW INDICATIONS SHOWN AS DASHED ARROWS ON PLAN
* UPON PEDESTRIAN PUSHBUTTON ACTUATION ONLY

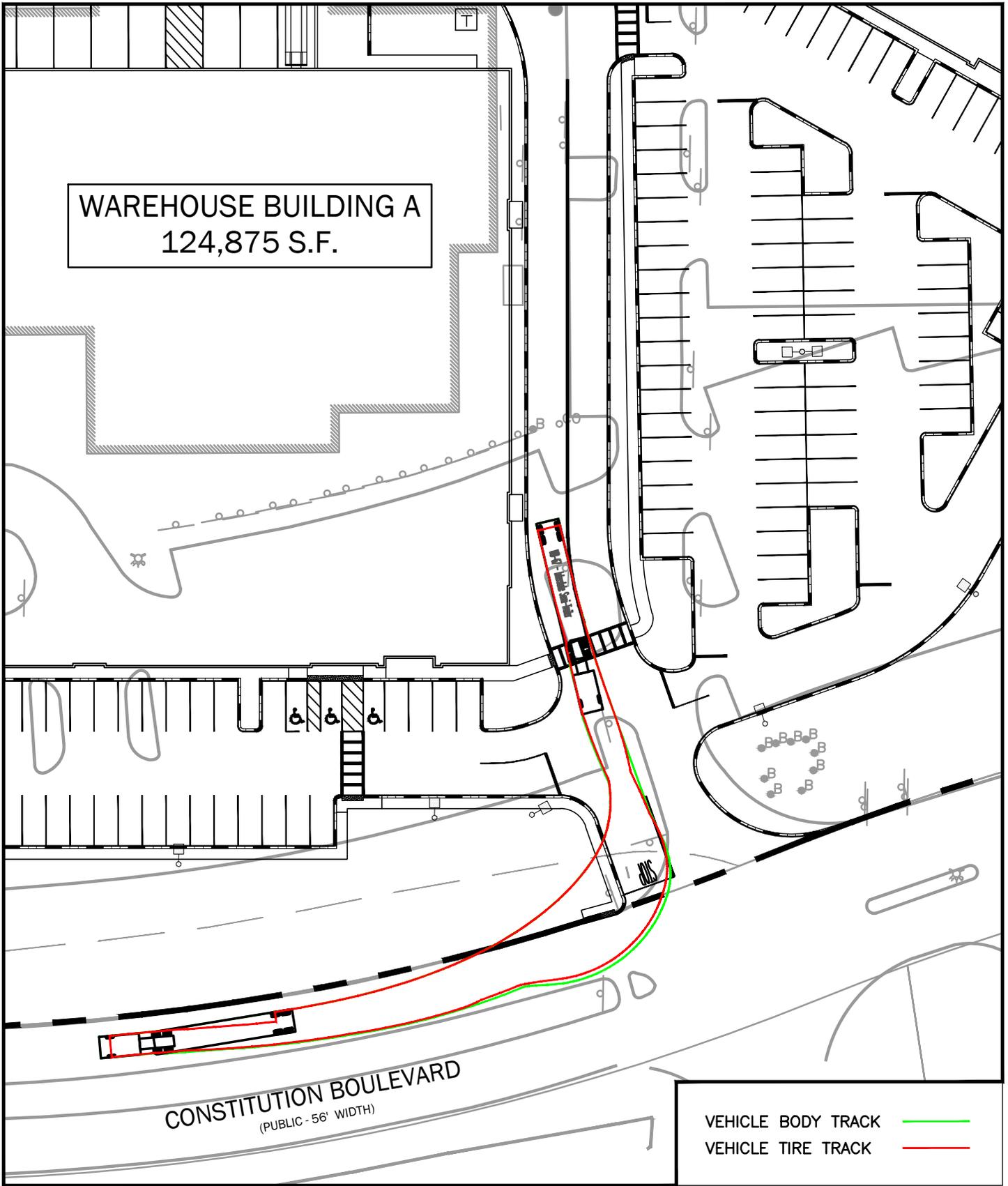
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EXISTING SIGNAL IDENTIFICATION



ATTACHMENT B: WB-67 TURNING ANALYSIS SKETCHES



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PHONE: 617-242-1120
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NORTHBRIDGE

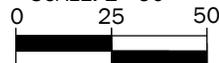
WB-67 Right-Turn onto Constitution Boulevard

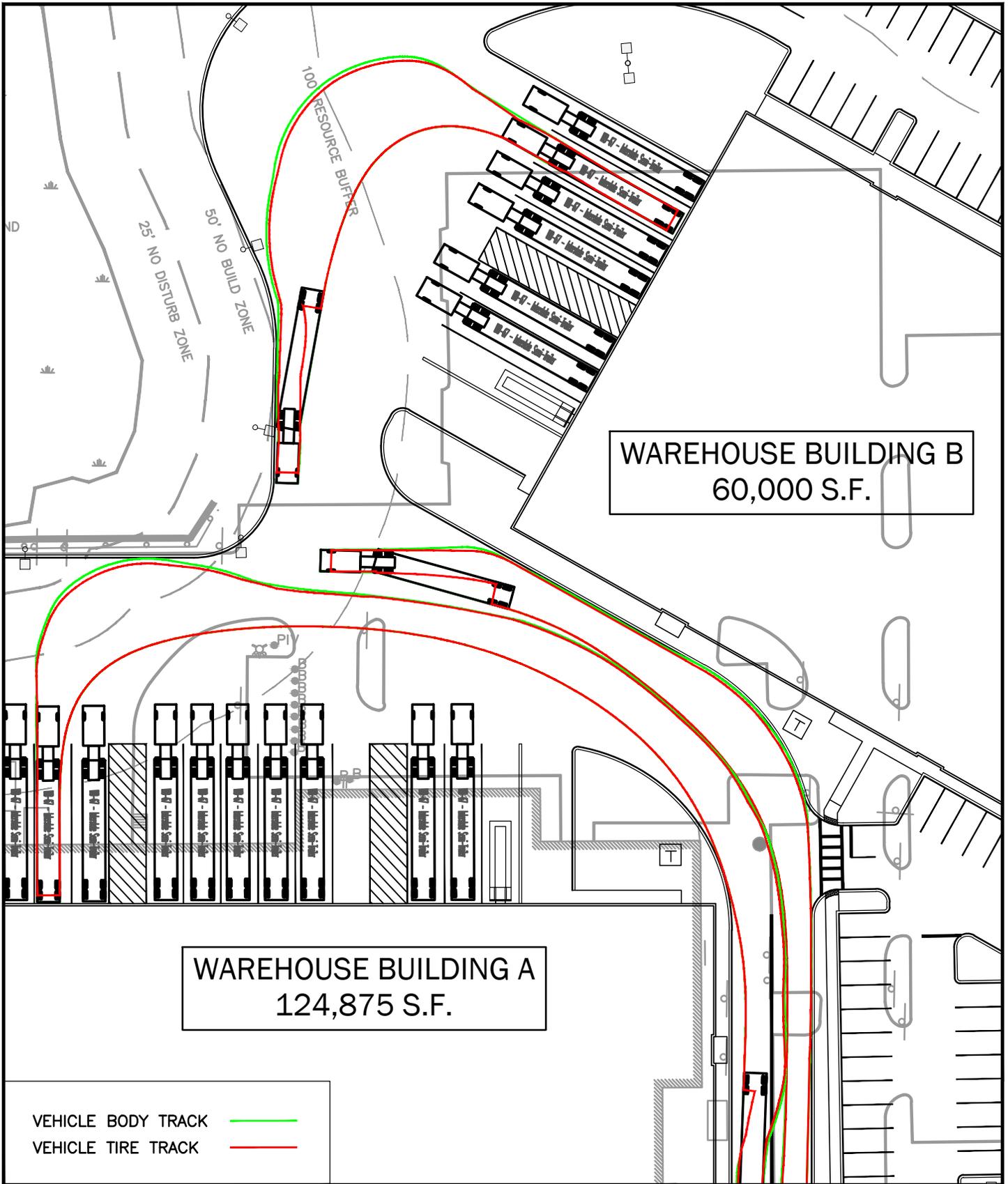
Franklin
Massachusetts

Figure 1

Date: December, 2024

SCALE: 1"=50'





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NORTHBRIDGE

WB-67 Sketch

Franklin
Massachusetts

Figure 2

Date: December, 2024

SCALE: 1"=50'



ATTACHMENT C: LIGHTING FIXTURE CUTSHEET



D-Series Size 0 LED Area Luminaire



Catalog Number
Notes
Type

Hit the Tab key or mouse over the page to see all interactive elements.

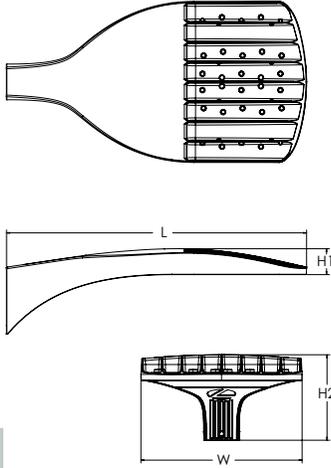
Introduction

The modern styling of the D-Series features a highly refined aesthetic that blends seamlessly with its environment. The D-Series offers the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire.

The photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. D-Series outstanding photometry aids in reducing the number of poles required in area lighting applications, with typical energy savings of 70% and expected service life of over 100,000 hours.

Specifications

EPA:	0.44 ft ² (0.04 m ²)
Length:	26.18" (66.5 cm)
Width:	14.06" (35.7 cm)
Height H1:	2.26" (5.7 cm)
Height H2:	7.46" (18.9 cm)
Weight:	23 lbs (10.4 kg)



ds Design Select options indicated by this color background.



Items marked by a shaded background qualify for the Design Select program and ship in 15 days or less. To learn more about Design Select, visit www.acuitybrands.com/designselect. *See ordering tree for details

Ordering Information

EXAMPLE: DSX0 LED P6 40K 70CRI T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

DSX0 LED	Series	LEDs	Color temperature ²	Color Rendering Index ²	Distribution	Voltage	Mounting		
DSX0 LED	Forward optics	P1 P5	(this section 70CRI only)	70CRI	AFR Automotive front row	T5M Type V medium	Shipped included		
		P2 P6	30K 3000K	70CRI	T1S Type I short	T5LG Type V low glare		SPA Square pole mounting (#8 drilling, 3.5" min. SQ pole)	
		P3 P7	40K 4000K	70CRI	T2M Type II medium	T5W Type V wide		RPA Round pole mounting (#8 drilling, 3" min. RND pole)	
		P4	50K 5000K	70CRI	T3M Type III medium	BLC3 Type III backlight control ³		SPA5 Square pole mounting (#5 drilling, 3" min. SQ pole) ⁹	
		Rotated optics	P10 ¹ P12 ¹	(this section 80CRI only, extended lead times apply)	80CRI	T3LG Type III low glare ³		BLC4 Type IV backlight control ³	SPA5 Square pole mounting (#5 drilling, 3" min. SQ pole) ⁹
			P11 ¹ P13 ¹	27K 2700K	80CRI	T4M Type IV medium		LCCO Left corner cutoff ³	RPAS Round pole mounting (#5 drilling, 3" min. RND pole) ⁹
				30K 3000K	80CRI	T4LG Type IV low glare ³		RCCO Right corner cutoff ³	SPA8N Square narrow pole mounting (#8 drilling, 3" min. SQ pole)
				35K 3500K	80CRI	TFTM Forward throw medium			WBA Wall bracket ¹⁰
				40K 4000K	80CRI				MA Mast arm adapter (mounts on 2 3/8" OD horizontal tenon)
				50K 5000K	80CRI				

Control options	Other options	Finish (required)
Shipped installed NLTAIR2 PIRHN nLight AIR gen 2 enabled with bi-level motion / ambient sensor, 8-40' mounting height, ambient sensor enabled at 2fc. ^{11, 12, 18, 19} PIR High/low, motion/ambient sensor, 8-40' mounting height, ambient sensor enabled at 2fc. ^{13, 18, 19} PER NEMA twist-lock receptacle only (controls ordered separate) ¹⁴ PERS Five-pin receptacle only (controls ordered separate) ^{14, 19}	PER7 Seven-pin receptacle only (controls ordered separate) ^{14, 19} FAO Field adjustable output ^{15, 19} BL30 Bi-level switched dimming, 30% ^{16, 19} BL50 Bi-level switched dimming, 50% ^{16, 19} DMG 0-10v dimming wires pulled outside fixture (for use with an external control, ordered separately) ¹⁷	Shipped installed HS Houseside shield (black finish standard) ²⁰ L90 Left rotated optics ¹ R90 Right rotated optics ¹ CCE Coastal Construction ²¹ HA 50°C ambient operation ²² BAA Buy America(n) Act Compliant SF Single fuse (120, 277, 347V) ²⁴ DF Double fuse (208, 240, 480V) ²⁴ Shipped separately ECSR External Glare Shield (reversible, field install required, matches housing finish) BSDB Bird Spikes (field install required)
		DDBXD Dark Bronze DBLXD Black DNAXD Natural Aluminum DWHXD White DOBTXD Textured dark bronze DBLBXD Textured black DNATXD Textured natural aluminum DWHGXD Textured white



Ordering Information

Accessories

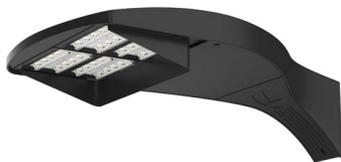
Ordered and shipped separately.

DLL127F 1.5 JU	Photocell - SSL twist-lock (120-277V) ²³
DLL347F 1.5 CUL JU	Photocell - SSL twist-lock (347V) ²³
DLL480F 1.5 CUL JU	Photocell - SSL twist-lock (480V) ²³
DSHORT SBK	Shorting cap ²³
DSX0HS P#	House-side shield (enter package number P1-7, P10-13 in place of #)
DSXRPA (FINISH)	Round pole adapter (#8 drilling, specify finish)
DSXRPA5 (FINISH)	Round pole adapter #5 drilling (specify finish)
DSXSPA5 (FINISH)	Square pole adapter #5 drilling (specify finish)
DSX0EGSR (FINISH)	External glare shield (specify finish)
DSX0SDB (FINISH)	Bird spike deterrent bracket (specify finish)

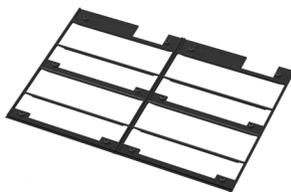
NOTES

- 1 Rotated optics available with packages P10, P11, P12 and P13. Must be combined with option L90 or R90.
- 2 30K, 40K, and 50K available in 70CRI and 80CRI. 27K and 35K only available with 80CRI. Contact Technical Support for other possible combinations.
- 3 T3LG, T4LG, BLC3, BLC4, LCCO, RCCO not available with option HS.
- 4 MVOLT driver operates on any line voltage from 120-277V (50/60 Hz).
- 5 HVOLT driver operates on any line voltage from 347-480V (50/60 Hz).
- 6 HVOLT not available with package P1, P2 and P10 when combined with option NLTAIR2 PIRHN or option PIR.
- 7 XVOLT operates with any voltage between 277V and 480V (50/60 Hz).
- 8 XVOLT not available in packages P1, P2 or P10. XVOLT not available with fusing (SF or DF).
- 9 SPAS and RPA5 for use with #5 drilling only (Not for use with #8 drilling).
- 10 WBA cannot be combined with Type 5 distributions plus photocell (PER).
- 11 NLTAIR2 and PIRHN must be ordered together. For more information on nLight Air 2.
- 12 NLTAIR2 PIRHN not available with other controls including PIR, PER, PER5, PER7, FAO, BL30, BL50 and DMG. NLTAIR2 PIRHN not available with P1, P2 and P10 using HVOLT. NLTAIR2 PIRHN not available with P1, P2 and P10 using XVOLT. NLTAIR2 PIRHN not available with P1 using MVOLT.
- 13 PIR not available with NLTAIR2, PER, PER5, PER7, FAO BL30, BL50 and DMG. PIR not available with P1, P2 and P10 using HVOLT. PIR not available with P1, P2 and P10 using XVOLT. PIR not available with P1 using MVOLT.
- 14 PER/PER5/PER7 not available with NLTAIR2, PIR, BL30, BL50. Photocell ordered and shipped as a separate line item from Acuity Brands Controls. See accessories. Shorting Cap included.
- 15 FAO not available with other dimming control options NLTAIR2 PIRHN, PIR, PER5, PER7, BL30, BL50, or DMG.
- 16 BL30 and BL50 are not available with NLTAIR2 PIRHN, PIR, PER, PER5, PER7, FAO and DMG. BL30 or BL50 must specify 120, 277 or 347V. Consult tech support for 208, 240 or 480V.
- 17 DMG not available with NLTAIR2 PIRHN, PIR, PER, PER5, PER7, BL30, BL50 and FAO.
- 18 Reference Motion Sensor Default Settings table on page 4 to see functionality.
- 19 Reference Controls Options table on page 4.
- 20 Option HS not available with T3LG, T4LG, BLC3, BLC4, LCCO and RCCO distribution. Also available as a separate accessory; see Accessories information.
- 21 CCE option not available with option B5 and EGSR. Contact Technical Support for availability.
- 22 Option HA not available with performance packages P6, P7, P12 and P13.
- 23 Requires luminaire to be specified with PER, PER5 or PER7 option. See Controls Table on page 4.
- 24 Single fuse (SF) requires 120V, 277V, or 347V. Double fuse (DF) requires 208V, 240V or 480V. XVOLT not available with fusing (SF or DF).

Shield Accessories



External Glare Shield (EGSR)

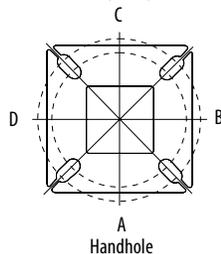


House Side Shield (HS)

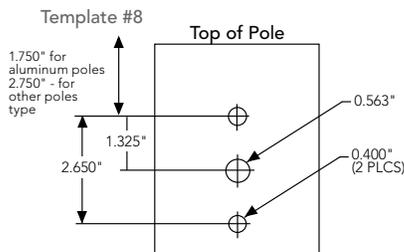
Drilling

HANDHOLE ORIENTATION

(from top of pole)



Handhole



Tenon Mounting Slipfitter

Tenon O.D.	Mounting	Single Unit	2 @ 180	2 @ 90	3 @ 90	3 @ 120	4 @ 90
2-3/8"	RPA	AS3-5 190	AS3-5 280	AS3-5 290	AS3-5 390	AS3-5 320	AS3-5 490
2-7/8"	RPA	AST25-190	AST25-280	AST25-290	AST25-390	AST25-320	AST25-490
4"	RPA	AST35-190	AST35-280	AST35-290	AST35-390	AST35-320	AST35-490

Mounting Option	Drilling Template	Single	2 @ 180	2 @ 90	3 @ 90	3 @ 120	4 @ 90
Head Location		Side B	Side B & D	Side B & C	Side B, C & D	Round Pole Only	Side A, B, C & D
Drill Nomenclature	#8	DM19AS	DM28AS	DM29AS	DM39AS	DM32AS	DM49AS
Minimum Acceptable Outside Pole Dimension							
SPA	#8	3.5"	3.5"	3.5"	3.5"		3.5"
RPA	#8	3"	3"	3"	3"	3"	3"
SPAS	#5	3"	3"	3"	3"		3"
RPA5	#5	3"	3"	3"	3"	3"	3"
SPA8N	#8	3"	3"	3"	3"		3"

DSX0 Area Luminaire - EPA

*Includes luminaire and integral mounting arm. Other tenons, arms, brackets or other accessories are not included in this EPA data.

Fixture Quantity & Mounting Configuration	Single DM19	2 @ 180 DM28	2 @ 90 DM29	3 @ 90 DM39	3 @ 120 DM32	4 @ 90 DM49
Mounting Type						
DSX0 with SPA	0.44	0.88	0.96	1.18	---	1.16
DSX0 with SPAS, SPA8N	0.51	1.02	1.06	1.26	---	1.29
DSX0 with RPA, RPA5	0.51	1.02	1.06	1.26	1.24	1.29
DSX0 with MA	0.64	1.28	1.24	1.67	1.70	1.93

Isofootcandle plots for the DSX0 LED P7 40K 70CRI. Distances are in units of mounting height (20').



Performance Data

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

Ambient	Lumen Multiplier	
0°C	32°F	1.04
5°C	41°F	1.04
10°C	50°F	1.03
15°C	59°F	1.02
20°C	68°F	1.01
25°C	77°C	1.00
30°C	86°F	0.99
35°C	95°F	0.98
40°C	104°F	0.97

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in a **25°C ambient**, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	Lumen Maintenance Factor
0	1.00
25,000	0.94
50,000	0.89
100,000	0.80

FAO Dimming Settings

FAO Position	% Wattage	% Lumen Output
8	100%	100%
7	93%	95%
6	80%	85%
5	66%	73%
4	54%	61%
3	41%	49%
2	29%	36%
1	15%	20%

*Note: Calculated values are based on original performance package data. When calculating new values for given FAO position, use published values for each package based on input watts and lumens by optic type.

Electrical Load

	Performance Package	LED Count	Drive Current (mA)	Wattage	Current (A)					
					120V	208V	240V	277V	347V	480V
Forward Optics (Non-Rotated)	P1	20	530	34	0.28	0.16	0.14	0.12	0.10	0.07
	P2	20	700	45	0.38	0.22	0.19	0.16	0.13	0.09
	P3	20	1050	69	0.57	0.33	0.29	0.25	0.20	0.14
	P4	20	1400	94	0.78	0.45	0.39	0.34	0.27	0.19
	P5	40	700	89	0.75	0.43	0.38	0.33	0.26	0.19
	P6	40	1050	136	1.14	0.66	0.57	0.49	0.39	0.29
	P7	40	1300	170	1.42	0.82	0.71	0.62	0.49	0.36
Rotated Optics (Requires L90 or R90)	P10	30	530	51	0.42	0.24	0.21	0.18	0.15	0.11
	P11	30	700	67	0.57	0.33	0.28	0.25	0.20	0.14
	P12	30	1050	103	0.86	0.50	0.43	0.37	0.30	0.22
	P13	30	1300	129	1.07	0.62	0.54	0.46	0.37	0.27

LED Color Temperature / Color Rendering Multipliers

	70 CRI		80CRI		90CRI	
	Lumen Multiplier	Availability	Lumen Multiplier	Availability	Lumen Multiplier	Availability
5000K	102%	Standard	92%	Extended lead-time	71%	(see note)
4000K	100%	Standard	92%	Extended lead-time	67%	(see note)
3500K	100%	(see note)	90%	Extended lead-time	63%	(see note)
3000K	96%	Standard	87%	Extended lead-time	61%	(see note)
2700K	94%	(see note)	85%	Extended lead-time	57%	(see note)

Note: Some LED types are available as per special request. Contact Technical Support for more information.

Motion Sensor Default Settings

Option	Unoccupied Dimmed Level	High Level (when occupied)	Photocell Operation	Dwell Time	Ramp-up Time	Dimming Fade Rate
PIR	30%	100%	Enabled @ 2FC	7.5 min	3 sec	5 min
NLTAIR2 PIRHN	30%	100%	Enabled @ 2FC	7.5 min	3 sec	5 min

Controls Options

Nomenclature	Description	Functionality	Primary control device	Notes
FAO	Field adjustable output device installed inside the luminaire; wired to the driver dimming leads.	Allows the luminaire to be manually dimmed, effectively trimming the light output.	FAO device	Cannot be used with other controls options that need the 0-10V leads
DS (not available on DSX0)	Drivers wired independently for 50/50 luminaire operation	The luminaire is wired to two separate circuits, allowing for 50/50 operation.	Independently wired drivers	Requires two separately switched circuits. Consider nLight AIR as a more cost effective alternative.
PERS or PER7	Twist-lock photocell receptacle	Compatible with standard twist-lock photocells for dusk to dawn operation, or advanced control nodes that provide 0-10V dimming signals.	Twist-lock photocells such as DLL Elite or advanced control nodes such as ROAM.	Pins 4 & 5 to dimming leads on driver, Pins 6 & 7 are capped inside luminaire. Cannot be used with other controls options that need the 0-10V leads.
PIR	Motion sensor with integral photocell. Sensor suitable for 8' to 40' mounting height.	Luminaires dim when no occupancy is detected.	Acuity Controls rSBG	Cannot be used with other controls options that need the 0-10V leads.
NLTAIR2 PIRHN	nLight AIR enabled luminaire for motion sensing, photocell and wireless communication.	Motion and ambient light sensing with group response. Scheduled dimming with motion sensor over-ride when wirelessly connected to the nLight Eclipse.	nLight Air rSBG	nLight AIR sensors can be programmed and commissioned from the ground using the CIAIRity Pro app. Cannot be used with other controls options that need the 0-10V leads.
BL30 or BL50	Integrated bi-level device that allows a second control circuit to switch all light engines to either 30% or 50% light output	BLC device provides input to 0-10V dimming leads on all drivers providing either 100% or dimmed (30% or 50%) control by a secondary circuit	BLC UVOLT1	BLC device is powered off the 0-10V dimming leads, thus can be used with any input voltage from 120 to 480V

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of configurations shown within the tolerances described within LM-79. Contact factory for performance data on any configurations not shown here.

Forward Optics																							
Performance Package	System Watts	LED Count	Drive Current (mA)	Distribution Type	30K					40K					50K								
					(3000K, 70 CRI)					(4000K, 70 CRI)					(5000K, 70 CRI)								
					Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW				
P1	33W	20	530	T1S	4,906	1	0	1	148	5,113	1	0	1	154	5,213	1	0	1	157				
				T2M	4,545	1	0	2	137	4,736	1	0	2	143	4,829	1	0	2	145				
				T3M	4,597	1	0	2	138	4,791	1	0	2	144	4,885	1	0	2	147				
				T3LG	4,107	1	0	1	124	4,280	1	0	1	129	4,363	1	0	1	131				
				T4M	4,666	1	0	2	141	4,863	1	0	2	146	4,957	1	0	2	149				
				T4LG	4,244	1	0	1	128	4,423	1	0	1	133	4,509	1	0	1	136				
				TFTM	4,698	1	0	2	141	4,896	1	0	2	147	4,992	1	0	2	150				
				T5M	4,801	3	0	1	145	5,003	3	0	1	151	5,101	3	0	1	154				
				T5W	4,878	3	0	1	147	5,084	3	0	2	153	5,183	3	0	2	156				
				T5LG	4,814	2	0	1	145	5,018	2	0	1	151	5,115	2	0	1	154				
				BLC3	3,344	0	0	1	101	3,485	0	0	1	105	3,553	0	0	1	107				
				BLC4	3,454	0	0	2	104	3,599	0	0	2	108	3,670	0	0	2	111				
				RCCO	3,374	0	0	1	102	3,517	0	0	1	106	3,585	0	0	1	108				
				LCCO	3,374	0	0	1	102	3,517	0	0	1	106	3,585	0	0	1	108				
				AFR	4,906	1	0	1	148	5,113	1	0	1	154	5,213	1	0	1	157				
				P2	45W	20	700	T1S	6,328	1	0	1	140	6,595	1	0	1	146	6,724	1	0	1	149
								T2M	5,862	1	0	2	130	6,109	1	0	2	135	6,228	1	0	2	138
T3M	5,930	1	0					3	131	6,180	1	0	3	137	6,301	1	0	3	140				
T3LG	5,297	1	0					1	117	5,521	1	0	1	122	5,628	1	0	1	125				
T4M	6,018	1	0					3	133	6,272	1	0	3	139	6,395	1	0	3	142				
T4LG	5,474	1	0					1	121	5,705	1	0	1	126	5,816	1	0	1	129				
TFTM	6,060	1	0					3	134	6,316	1	0	3	140	6,439	1	0	3	143				
T5M	6,192	3	0					1	137	6,453	3	0	2	143	6,579	3	0	2	146				
T5W	6,293	3	0					2	139	6,558	3	0	2	145	6,686	3	0	2	148				
T5LG	6,210	2	0					1	138	6,472	3	0	1	143	6,598	3	0	1	146				
BLC3	4,313	0	0					2	96	4,495	0	0	2	100	4,583	0	0	2	102				
BLC4	4,455	0	0					2	99	4,643	0	0	2	103	4,733	0	0	2	105				
RCCO	4,352	0	0					2	96	4,536	0	0	2	100	4,624	0	0	2	102				
LCCO	4,352	0	0					2	96	4,536	0	0	2	100	4,624	0	0	2	102				
AFR	6,328	1	0					1	140	6,595	1	0	1	146	6,724	1	0	1	149				
P3	69W	20	1050					T1S	9,006	1	0	2	131	9,386	1	0	2	136	9,569	1	0	2	139
								T2M	8,343	2	0	3	121	8,694	2	0	3	126	8,864	2	0	3	129
				T3M	8,439	2	0	3	122	8,795	2	0	3	128	8,967	2	0	3	130				
				T3LG	7,539	1	0	2	109	7,857	1	0	2	114	8,010	1	0	2	116				
				T4M	8,565	2	0	3	124	8,926	2	0	3	129	9,100	2	0	3	132				
				T4LG	7,790	1	0	2	113	8,119	1	0	2	118	8,277	1	0	2	120				
				TFTM	8,624	1	0	3	125	8,988	1	0	3	130	9,163	2	0	3	133				
				T5M	8,812	3	0	2	128	9,184	4	0	2	133	9,363	4	0	2	136				
				T5W	8,955	4	0	2	130	9,333	4	0	2	135	9,515	4	0	2	138				
				T5LG	8,838	3	0	1	128	9,211	3	0	1	134	9,390	3	0	1	136				
				BLC3	6,139	0	0	2	89	6,398	0	0	2	93	6,522	0	0	2	95				
				BLC4	6,340	0	0	3	92	6,607	0	0	3	96	6,736	0	0	3	98				
				RCCO	6,194	1	0	2	90	6,455	1	0	2	94	6,581	1	0	2	95				
				LCCO	6,194	1	0	2	90	6,455	1	0	2	94	6,581	1	0	2	95				
				AFR	9,006	1	0	2	131	9,386	1	0	2	136	9,569	1	0	2	139				
				P4	93W	20	1400	T1S	11,396	1	0	2	122	11,877	1	0	2	128	12,109	2	0	2	130
								T2M	10,557	2	0	3	113	11,003	2	0	3	118	11,217	2	0	3	121
T3M	10,680	2	0					3	115	11,130	2	0	3	120	11,347	2	0	3	122				
T3LG	9,540	1	0					2	103	9,942	1	0	2	107	10,136	1	0	2	109				
T4M	10,839	2	0					3	117	11,296	2	0	3	121	11,516	2	0	4	124				
T4LG	9,858	1	0					2	106	10,274	1	0	2	110	10,474	1	0	2	113				
TFTM	10,914	2	0					3	117	11,374	2	0	3	122	11,596	2	0	3	125				
T5M	11,152	4	0					2	120	11,622	4	0	2	125	11,849	4	0	2	127				
T5W	11,332	4	0					3	122	11,811	4	0	3	127	12,041	4	0	3	129				
T5LG	11,184	3	0					1	120	11,656	3	0	2	125	11,883	3	0	2	128				
BLC3	7,768	0	0					2	83	8,096	0	0	2	87	8,254	0	0	2	89				
BLC4	8,023	0	0					3	86	8,362	0	0	3	90	8,524	0	0	3	92				
RCCO	7,838	1	0					2	84	8,169	1	0	2	88	8,328	1	0	2	90				
LCCO	7,838	1	0					2	84	8,169	1	0	2	88	8,328	1	0	2	90				
AFR	11,396	1	0					2	122	11,877	1	0	2	128	12,109	2	0	2	130				



Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of configurations shown within the tolerances described within LM-79. Contact factory for performance data on any configurations not shown here.

Forward Optics																			
Performance Package	System Watts	LED Count	Drive Current (mA)	Distribution Type	30K					40K					50K				
					(3000K, 70 CRI)					(4000K, 70 CRI)					(5000K, 70 CRI)				
					Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
P5	90W	40	700	T1S	12,380	2	0	2	137	12,902	2	0	2	143	13,154	2	0	2	146
				T2M	11,468	2	0	3	127	11,952	2	0	3	133	12,185	2	0	3	135
				T3M	11,601	2	0	3	129	12,091	2	0	3	134	12,326	2	0	4	137
				T3LG	10,363	2	0	2	115	10,800	2	0	2	120	11,011	2	0	2	122
				T4M	11,774	2	0	4	131	12,271	2	0	4	136	12,510	2	0	4	139
				T4LG	10,709	1	0	2	119	11,160	2	0	2	124	11,378	2	0	2	126
				TFTM	11,856	2	0	3	132	12,356	2	0	4	137	12,596	2	0	4	140
				T5M	12,114	4	0	2	134	12,625	4	0	2	140	12,871	4	0	2	143
				T5W	12,310	4	0	3	137	12,830	4	0	3	142	13,080	4	0	3	145
				T5LG	12,149	3	0	2	135	12,662	3	0	2	141	12,908	3	0	2	143
				BLC3	8,438	0	0	2	94	8,794	0	0	2	98	8,966	0	0	2	99
				BLC4	8,715	0	0	3	97	9,083	0	0	3	101	9,260	0	0	3	103
				RCCO	8,515	1	0	2	94	8,874	1	0	2	98	9,047	1	0	2	100
				LCCO	8,515	1	0	2	94	8,874	1	0	2	98	9,047	1	0	2	100
				AFR	12,380	2	0	2	137	12,902	2	0	2	143	13,154	2	0	2	146
				P6	137W	40	1050	T1S	17,545	2	0	3	128	18,285	2	0	3	133	18,642
T2M	16,253	3	0					4	119	16,939	3	0	4	124	17,269	3	0	4	126
T3M	16,442	2	0					4	120	17,135	3	0	4	125	17,469	3	0	4	128
T3LG	14,687	2	0					2	107	15,306	2	0	2	112	15,605	2	0	2	114
T4M	16,687	2	0					4	122	17,391	3	0	5	127	17,730	3	0	5	129
T4LG	15,177	2	0					2	111	15,817	2	0	2	115	16,125	2	0	2	118
TFTM	16,802	2	0					4	123	17,511	2	0	4	128	17,852	2	0	5	130
T5M	17,168	4	0					2	125	17,893	5	0	3	131	18,241	5	0	3	133
T5W	17,447	5	0					3	127	18,183	5	0	3	133	18,537	5	0	3	135
T5LG	17,218	4	0					2	126	17,944	4	0	2	131	18,294	4	0	2	134
BLC3	11,959	0	0					3	87	12,464	0	0	3	91	12,707	0	0	3	93
BLC4	12,352	0	0					4	90	12,873	0	0	4	94	13,124	0	0	4	96
RCCO	12,067	1	0					3	88	12,576	1	0	3	92	12,821	1	0	3	94
LCCO	12,067	1	0					3	88	12,576	1	0	3	92	12,821	1	0	3	94
AFR	17,545	2	0					3	128	18,285	2	0	3	133	18,642	2	0	3	136
P7	171W	40	1300					T1S	20,806	2	0	3	122	21,683	2	0	3	127	22,106
				T2M	19,273	3	0	4	113	20,086	3	0	4	118	20,478	3	0	4	120
				T3M	19,497	3	0	5	114	20,319	3	0	5	119	20,715	3	0	5	121
				T3LG	17,416	2	0	2	102	18,151	2	0	2	106	18,504	2	0	2	108
				T4M	19,787	3	0	5	116	20,622	3	0	5	121	21,024	3	0	5	123
				T4LG	17,997	2	0	2	105	18,756	2	0	2	110	19,121	2	0	2	112
				TFTM	19,924	3	0	5	117	20,765	3	0	5	122	21,170	3	0	5	124
				T5M	20,359	5	0	3	119	21,217	5	0	3	124	21,631	5	0	3	127
				T5W	20,689	5	0	3	121	21,561	5	0	3	126	21,982	5	0	3	129
				T5LG	20,418	4	0	2	120	21,279	4	0	2	125	21,694	4	0	2	127
				BLC3	14,182	0	0	3	83	14,780	0	0	3	87	15,068	0	0	3	88
				BLC4	14,647	0	0	4	86	15,265	0	0	4	89	15,562	0	0	4	91
				RCCO	14,309	1	0	3	84	14,913	1	0	3	87	15,204	1	0	3	89
				LCCO	14,309	1	0	3	84	14,913	1	0	3	87	15,204	1	0	3	89
				AFR	20,806	2	0	3	122	21,683	2	0	3	127	22,106	2	0	3	129

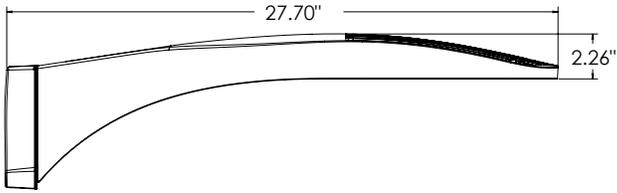
Performance Data

Lumen Output

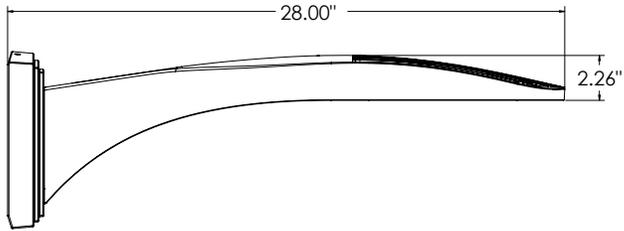
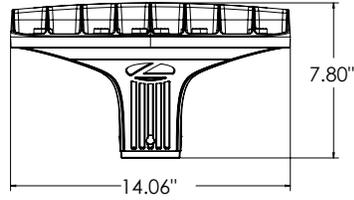
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Rotated Optics																							
Performance Package	System Watts	LED Count	Drive Current (mA)	Distribution Type	30K					40K					50K								
					(3000K, 70 CRI)					(4000K, 70 CRI)					(5000K, 70 CRI)								
					Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW				
P10	51W	30	530	T1S	7,399	3	0	3	145	7,711	3	0	3	151	7,862	3	0	3	154				
				T2M	6,854	3	0	3	135	7,144	3	0	3	140	7,283	3	0	3	143				
				T3M	6,933	3	0	3	136	7,225	3	0	3	142	7,366	3	0	3	145				
				T3LG	6,194	2	0	2	122	6,455	2	0	2	127	6,581	2	0	2	129				
				T4M	7,036	3	0	3	138	7,333	3	0	3	144	7,476	3	0	3	147				
				T4LG	6,399	2	0	2	126	6,669	2	0	2	131	6,799	2	0	2	134				
				TFTM	7,086	3	0	3	139	7,385	3	0	3	145	7,529	3	0	3	148				
				T5M	7,239	3	0	2	142	7,545	3	0	2	148	7,692	3	0	2	151				
				T5W	7,357	3	0	2	145	7,667	3	0	2	151	7,816	4	0	2	154				
				T5LG	7,260	3	0	1	143	7,567	3	0	1	149	7,714	3	0	1	152				
				BLC3	5,043	3	0	3	99	5,256	3	0	3	103	5,358	3	0	3	105				
				BLC4	5,208	3	0	3	102	5,428	3	0	3	107	5,534	3	0	3	109				
				RCCO	5,089	0	0	2	100	5,303	0	0	2	104	5,407	0	0	2	106				
				LCCO	5,089	0	0	2	100	5,303	0	0	2	104	5,407	0	0	2	106				
				AFR	7,399	3	0	3	145	7,711	3	0	3	151	7,862	3	0	3	154				
				P11	68W	30	700	T1S	9,358	3	0	3	138	9,753	3	0	3	143	9,943	3	0	3	146
								T2M	8,669	3	0	3	127	9,034	3	0	3	133	9,211	3	0	3	135
T3M	8,768	3	0					3	129	9,138	3	0	3	134	9,316	3	0	3	137				
T3LG	7,833	3	0					3	115	8,164	3	0	3	120	8,323	3	0	3	122				
T4M	8,899	3	0					3	131	9,274	3	0	3	136	9,455	3	0	3	139				
T4LG	8,093	3	0					3	119	8,435	3	0	3	124	8,599	3	0	3	126				
TFTM	8,962	3	0					3	132	9,340	3	0	3	137	9,522	3	0	3	140				
T5M	9,156	4	0					2	135	9,542	4	0	2	140	9,728	4	0	2	143				
T5W	9,304	4	0					2	137	9,696	4	0	2	143	9,885	4	0	2	145				
T5LG	9,182	3	0					1	135	9,569	3	0	1	141	9,756	3	0	1	143				
BLC3	6,378	3	0					3	94	6,647	3	0	3	98	6,777	3	0	3	100				
BLC4	6,587	3	0					3	97	6,865	3	0	3	101	6,999	3	0	3	103				
RCCO	6,436	0	0					2	95	6,707	0	0	2	99	6,838	0	0	2	101				
LCCO	6,436	0	0					2	95	6,707	0	0	2	99	6,838	0	0	2	101				
AFR	9,358	3	0					3	138	9,753	3	0	3	143	9,943	3	0	3	146				
P12	103W	30	1050					T1S	13,247	3	0	3	128	13,806	3	0	3	134	14,075	3	0	3	136
								T2M	12,271	4	0	4	119	12,789	4	0	4	124	13,038	4	0	4	126
				T3M	12,412	4	0	4	120	12,935	4	0	4	125	13,187	4	0	4	128				
				T3LG	11,089	3	0	3	107	11,556	3	0	3	112	11,782	3	0	3	114				
				T4M	12,597	4	0	4	122	13,128	4	0	4	127	13,384	4	0	4	129				
				T4LG	11,457	3	0	3	111	11,940	3	0	3	116	12,173	3	0	3	118				
				TFTM	12,686	4	0	4	123	13,221	4	0	4	128	13,479	4	0	4	130				
				T5M	12,960	4	0	2	125	13,507	4	0	2	131	13,770	4	0	2	133				
				T5W	13,170	4	0	3	127	13,726	4	0	3	133	13,994	4	0	3	135				
				T5LG	12,998	3	0	2	126	13,546	3	0	2	131	13,810	3	0	2	134				
				BLC3	9,029	3	0	3	87	9,409	3	0	3	91	9,593	3	0	3	93				
				BLC4	9,324	4	0	4	90	9,718	4	0	4	94	9,907	4	0	4	96				
				RCCO	9,110	1	0	2	88	9,495	1	0	2	92	9,680	1	0	2	94				
				LCCO	9,110	1	0	2	88	9,494	1	0	2	92	9,680	1	0	2	94				
				AFR	13,247	3	0	3	128	13,806	3	0	3	134	14,075	3	0	3	136				
				P13	129W	30	1300	T1S	15,704	3	0	3	122	16,366	3	0	3	127	16,685	4	0	4	130
								T2M	14,547	4	0	4	113	15,161	4	0	4	118	15,457	4	0	4	120
T3M	14,714	4	0					4	114	15,335	4	0	4	119	15,634	4	0	4	121				
T3LG	13,145	3	0					3	102	13,700	3	0	3	106	13,967	3	0	3	108				
T4M	14,933	4	0					4	116	15,563	4	0	4	121	15,867	4	0	4	123				
T4LG	13,582	3	0					3	105	14,155	3	0	3	110	14,431	3	0	3	112				
TFTM	15,039	4	0					4	117	15,673	4	0	4	122	15,979	4	0	4	124				
T5M	15,364	4	0					2	119	16,013	4	0	2	124	16,325	4	0	2	127				
T5W	15,613	5	0					3	121	16,272	5	0	3	126	16,589	5	0	3	129				
T5LG	15,409	3	0					2	120	16,059	3	0	2	125	16,372	4	0	2	127				
BLC3	10,703	4	0					4	83	11,155	4	0	4	87	11,372	4	0	4	88				
BLC4	11,054	4	0					4	86	11,520	4	0	4	89	11,745	4	0	4	91				
RCCO	10,800	1	0					2	84	11,256	1	0	2	87	11,475	1	0	3	89				
LCCO	10,800	1	0					2	84	11,255	1	0	2	87	11,475	1	0	3	89				
AFR	15,704	3	0					3	122	16,366	3	0	3	127	16,685	4	0	4	130				

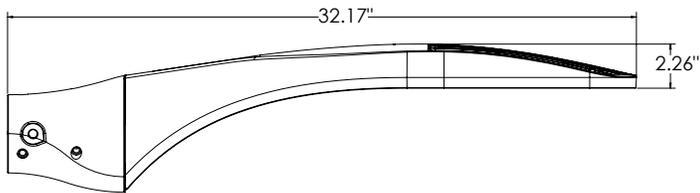
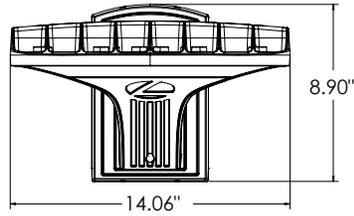
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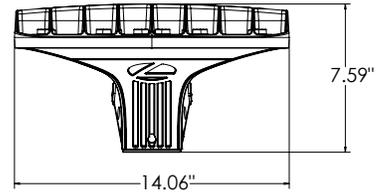
DSX0 with RPA, RPA5, SPA5, SPA8N mount
Weight: 25 lbs



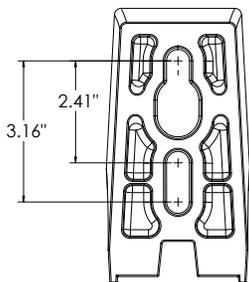
DSX0 with WBA mount
Weight: 27 lb



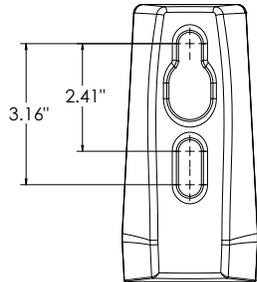
DSX0 with MA mount
Weight: 28 lbs



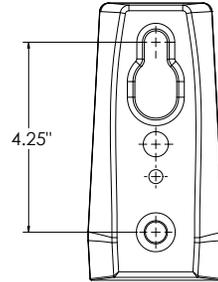
SPA (STANDARD ARM)



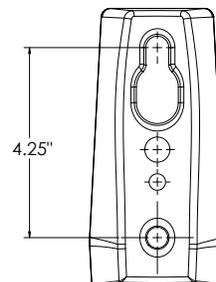
RPA



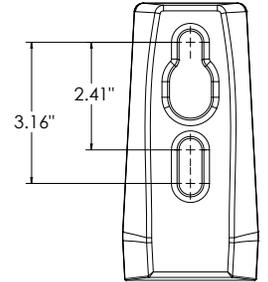
SPA5



RPA5

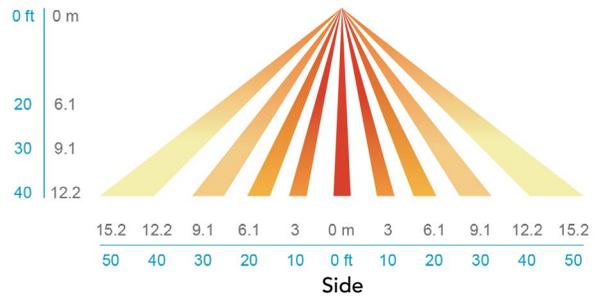
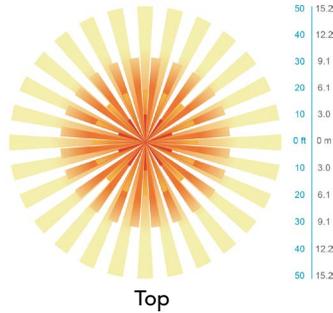


SPA8N



nLight Sensor Coverage Pattern

NLTAIR2 PIRHN



FEATURES & SPECIFICATIONS

INTENDED USE

The sleek design of the D-Series Size 0 reflects the embedded high performance LED technology. It is ideal for many commercial and municipal applications, such as parking lots, plazas, campuses, and pedestrian areas.

CONSTRUCTION

Single-piece die-cast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. Modular design allows for ease of maintenance and future light engine upgrades. The LED driver is mounted in direct contact with the casting to promote low operating temperature and long life. Housing driver compartment is completely sealed against moisture and environmental contaminants (IP66). Vibration rated per ANSI C136.31 for 3G. Low EPA (0.44 ft²) for optimized pole wind loading.

FINISH

Exterior parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a minimum 3 mils thickness for a finish that can withstand extreme climate changes without cracking or peeling. Available in both textured and non-textured finishes.

COASTAL CONSTRUCTION (CCE)

Optional corrosion resistant construction is engineered with added corrosion protection in materials and/or pre-treatment of base material under super durable paint. Provides additional corrosion protection for applications near coastal areas. Finish is salt spray tested to over 5,000 hours per ASTM B117 with scribe rating of 10. Additional lead-times may apply.

OPTICS

Precision-molded proprietary silicone lenses are engineered for superior area lighting distribution, uniformity, and pole spacing. Light engines are available in 3000 K, 4000 K or 5000 K (70 CRI) configurations. 80CRI configurations are also available. The D-Series Size 0 has zero uplight and qualifies as a Nighttime Friendly™ product, meaning it is consistent with the LEED® and Green Globes™ criteria for eliminating wasteful uplight.

ELECTRICAL

Light engine(s) configurations consist of high-efficacy LEDs mounted to metal-core circuit boards to maximize heat dissipation and promote long life (up to L80/100,000 hours at 25°C). Class 1 electronic drivers are designed to have a power factor >90%, THD <20%, and an expected life of 100,000 hours with <1% failure rate. Easily serviceable 10kV surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2).

STANDARD CONTROLS

The DSX0 LED area luminaire has a number of control options. DSX Size 0, comes standard with 0-10V dimming driver. Dusk to dawn controls can be utilized via optional NEMA twist-lock photocell receptacles. PIR integrated motion sensor with on-board photocell feature field-adjustable programming and are suitable for mounting heights up to 40 feet. Control option BL features a bi-level device that allows a second control circuit to switch all light engines to either 30% or 50% light output.

nLIGHT AIR CONTROLS

The DSX0 LED area luminaire is also available with nLight® AIR for the ultimate in wireless control. This powerful controls platform provides out-of-the-box basic motion sensing and photocontrol functionality and is suitable for mounting heights up to 40 feet. Once commissioned using a smartphone and the easy-to-use CLAIRITY app, nLight AIR equipped luminaires can be grouped, resulting in motion sensor and photocell group response without the need for additional equipment. Scheduled dimming with motion sensor over-ride can be achieved when used with the nLight Eclipse. Additional information about nLight Air can be found [here](#).

INSTALLATION

Integral mounting arm allows for fast mounting using Lithonia standard #8 drilling and accommodates pole drilling's from 2.41 to 3.12" on center. The standard "SPA" option for square poles and the "RPA" option for round poles use the #8 drilling. For #5 pole drillings, use SPA5 or RPA5. Additional mountings are available including a wall bracket (WBA) and mast arm (MA) option that allows luminaire attachment to a 2 3/8" horizontal mast arm.

LISTINGS

UL listed to meet U.S. and Canadian standards. UL Listed for wet locations. Light engines are IP66 rated; luminaire is IP66 rated. Rated for -40°C minimum ambient.

DesignLights Consortium® (DLC) Premium qualified product and DLC qualified product. Not all versions of this product may be DLC Premium qualified or DLC qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.

International Dark-Sky Association (IDA) Fixture Seal of Approval (FSA) is available for all products on this page utilizing 3000K color temperature only.

GOVERNMENT PROCUREMENT

BAA – Buy America(n) Act: Product with the BAA option qualifies as a domestic end product under the Buy American Act as implemented in the FAR and DFARS. Product with the BAA option also qualifies as manufactured in the United States under DOT Buy America regulations.

BABA – Build America Buy America: Product with the BAA option also qualifies as produced in the United States under the definitions of the Build America, Buy America Act.

Please refer to www.acuitybrands.com/buy-american for additional information.

WARRANTY

5-year limited warranty. This is the only warranty provided and no other statements in this specification sheet create any warranty of any kind. All other express and implied warranties are disclaimed. Complete warranty terms located at: www.acuitybrands.com/support/warranty/terms-and-conditions

Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.

ATTACHMENT D: SEED MIX SPECIFICATION

NEW ENGLAND WETLAND PLANTS, INC

14 Pearl Lane South Hadley, MA 01075

PHONE: 413-548-8000 FAX 413-549-4000

EMAIL: INFO@NEWP.COM WEB ADDRESS: WWW.NEWP.COM

New England Conservation/Wildlife Mix

Botanical Name	Common Name	Indicator
<i>Elymus virginicus</i>	Virginia Wild Rye	FACW-
<i>Schizachyrium scoparium</i>	Little Bluestem	FACU
<i>Andropogon gerardii</i>	Big Bluestem	FAC
<i>Festuca rubra</i>	Red Fescue	FACU
<i>Sorghastrum nutans</i>	Indian Grass	UPL
<i>Panicum virgatum</i>	Switch Grass	FAC
<i>Chamaecrista fasciculata</i>	Partridge Pea	FACU
<i>Desmodium canadense</i>	Showy Tick Trefoil	FAC
<i>Asclepias tuberosa</i>	Butterfly Milkweed	NI
<i>Bidens frondosa</i>	Beggar Ticks	FACW
<i>Eupatorium purpureum (Eutrochium maculatum)</i>	Purple Joe Pye Weed	FAC
<i>Rudbeckia hirta</i>	Black Eyed Susan	FACU-
<i>Aster pilosus (Symphyotrichum pilosum)</i>	Heath (or Hairy) Aster	UPL
<i>Solidago juncea</i>	Early Goldenrod	

APPLY: 25 LBS/ACRE :1750 sq ft/lb

The New England Conservation/Wildlife Mix provides a permanent cover of grasses, wildflowers, and legumes For both good erosion control and wildlife habitat value. The mix is designed to be a no maintenance seeding, and is appropriate for cut and fill slopes, detention basin side slopes, and disturbed areas adjacent to commercial and residential projects.

New England Wetland Plants, Inc. may modify seed mixes at any time depending upon seed availability. The design criteria and ecological function of the mix will remain unchanged. Price is \$/bulk pound, FOB warehouse, Plus SH and applicable taxes.

NEW ENGLAND WETLAND PLANTS, INC

14 Pearl Lane South Hadley, MA 01075

PHONE: 413-548-8000 FAX 413-549-4000

EMAIL: INFO@NEWP.COM WEB ADDRESS: WWW.NEWP.COM

New England Showy Wildflower Mix

Botanical Name	Common Name	Indicator
<i>Schizachyrium scoparium</i>	Little Bluestem	FACU
<i>Chamaecrista fasciculata</i>	Partridge Pea	FACU
<i>Sorghastrum nutans</i>	Indian Grass	UPL
<i>Festuca rubra</i>	Red Fescue	FACU
<i>Elymus canadensis</i>	Canada Wild Rye	FACU+
<i>Elymus riparius</i>	Riverbank Wild Rye	FACW
<i>Heliopsis helianthoides</i>	Ox Eye Sunflower	UPL
<i>Coreopsis lanceolata</i>	Lance Leaved Coreopsis	FACU
<i>Rudbeckia hirta</i>	Black Eyed Susan	FACU-
<i>Liatris spicata</i>	Spiked Gayfeather/Marsh Blazing Star	FAC+
<i>Asclepias syriaca</i>	Common Milkweed	FACU-
<i>Vernonia noveboracensis</i>	New York Ironweed	FACW+
<i>Aster novae-angliae (Symphyotrichum novae-anglia)</i>	New England Aster	FACW-
<i>Eupatorium purpureum (Eutrochium maculatum)</i>	Purple Joe Pye Weed	FAC
<i>Asclepias tuberosa</i>	Butterfly Milkweed	NI
<i>Solidago juncea</i>	Early Goldenrod	
<i>Eupatorium perfoliatum</i>	Boneset	FACW

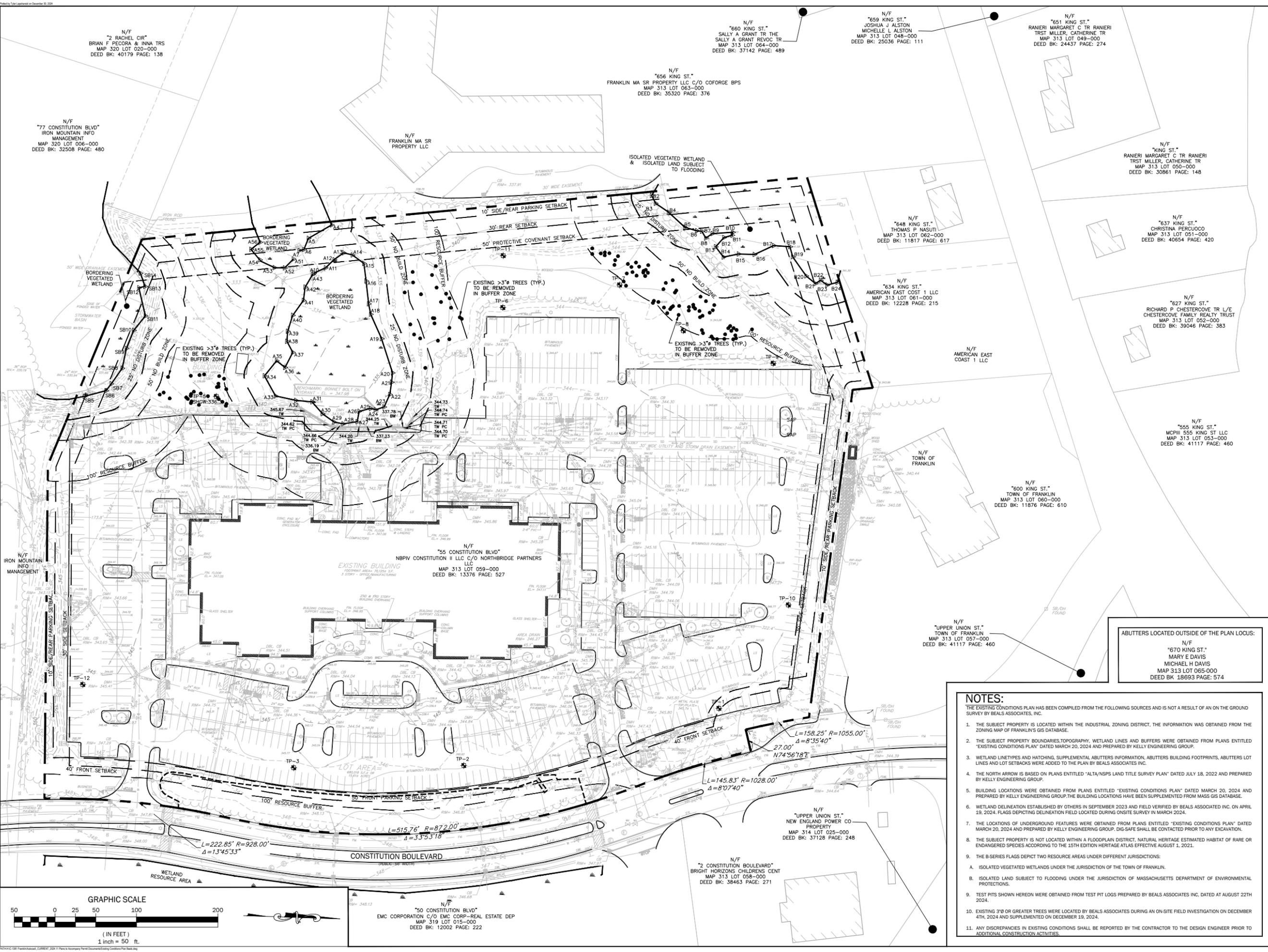
APPLY: 23 LBS/ACRE :1900 sq ft/lb

The New England Showy Wildflower mix includes a selection of native wildflowers and grasses that will mature into a colorful and vibrant native meadow. It is appropriate seed mix for roadsides, commercial landscaping, parks, golf courses, and industrial sites. Always apply on clean bare soil. The mix may be applied by mechanical spreader, or on small sites it can be spread by hand. Lightly rake, or roll to ensure proper seed to soil contact. Best results are obtained with a Spring or late Fall dormant seeding. Late Spring and early Summer seeding will benefit with a light mulching of weed-free straw to conserve moisture. If conditions are drier than usual, watering may be required. Late Fall and Winter dormant seeding require an increase in the seeding rate. Fertilization is not required unless the soils are particularly infertile. Preparation of a clean weed free seed bed is necessary for optimal results.

New England Wetland Plants, Inc. may modify seed mixes at any time depending upon seed availability. The design criteria and ecological function of the mix will remain unchanged. Price is \$/bulk pound, FOB warehouse, Plus SH and applicable taxes.

**ATTACHMENT E: 55 CONSTITUTION BOULEVARD PLANS TO
ACCOMPANY PERMIT DOCUMENTS (REVISED SHEETS)**

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N/F
"2 RACHEL CIR"
BRIAN F PECORA & INNA TRS
MAP 320 LOT 020-000
DEED BK: 40179 PAGE: 138

N/F
"77 CONSTITUTION BLVD"
IRON MOUNTAIN INFO
MANAGEMENT
MAP 320 LOT 006-000
DEED BK: 32508 PAGE: 480

N/F
FRANKLIN MA SR
PROPERTY LLC

N/F
"656 KING ST."
FRANKLIN MA SR PROPERTY LLC C/O COFORGE BPS
MAP 313 LOT 063-000
DEED BK: 35320 PAGE: 376

N/F
"660 KING ST."
SALLY A GRANT TR THE
SALLY A GRANT REVOC TR
MAP 313 LOT 064-000
DEED BK: 37142 PAGE: 489

N/F
"659 KING ST."
JOSHUA J ALSTON
MICHELLE L ALSTON
MAP 313 LOT 048-000
DEED BK: 25036 PAGE: 111

N/F
"651 KING ST."
RANIERI MARGARET C TR RANIERI
TRST MILLER, CATHERINE TR
MAP 313 LOT 049-000
DEED BK: 24437 PAGE: 274

N/F
"KING ST."
RANIERI MARGARET C TR RANIERI
TRST MILLER, CATHERINE TR
MAP 313 LOT 050-000
DEED BK: 30861 PAGE: 148

N/F
"648 KING ST."
THOMAS P NASUTI
MAP 313 LOT 062-000
DEED BK: 11817 PAGE: 617

N/F
"637 KING ST."
CHRISTINA PERCUOCO
MAP 313 LOT 051-000
DEED BK: 40654 PAGE: 420

N/F
"634 KING ST."
AMERICAN EAST COST 1 LLC
MAP 313 LOT 061-000
DEED BK: 12228 PAGE: 215

N/F
"627 KING ST."
RICHARD P CHESTEROV TR L/E
CHESTEROV FAMILY REALTY TRUST
MAP 313 LOT 052-000
DEED BK: 39046 PAGE: 383

N/F
"555 KING ST."
MCP III 555 KING ST LLC
MAP 313 LOT 053-000
DEED BK: 41117 PAGE: 460

N/F
TOWN OF FRANKLIN

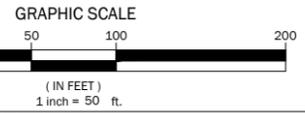
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"600 KING ST."
TOWN OF FRANKLIN
MAP 313 LOT 060-000
DEED BK: 11876 PAGE: 610

N/F
IRON MOUNTAIN
INFO
MANAGEMENT

N/F
"55 CONSTITUTION BLVD"
NBPIV CONSTITUTION II LLC C/O NORTHBRIDGE PARTNERS
MAP 313 LOT 058-000
DEED BK: 13376 PAGE: 527

N/F
"UPPER UNION ST."
TOWN OF FRANKLIN
MAP 313 LOT 057-000
DEED BK: 41117 PAGE: 460

ABUTTERS LOCATED OUTSIDE OF THE PLAN LOCUS:
N/F
"670 KING ST."
MARY E DAVIS
MICHAEL H DAVIS
MAP 313 LOT 065-000
DEED BK 18693 PAGE: 574



N/F
"50 CONSTITUTION BLVD"
EMC CORPORATION C/O EMC CORP-REAL ESTATE DEP
MAP 319 LOT 015-000
DEED BK: 12002 PAGE: 222

N/F
"UPPER UNION ST."
NEW ENGLAND POWER CO
PROPERTY
MAP 314 LOT 025-000
DEED BK: 37128 PAGE: 248

N/F
"2 CONSTITUTION BOULEVARD"
BRIGHT HORIZONS CHILDRENS CENT
MAP 313 LOT 058-000
DEED BK: 38463 PAGE: 271

- NOTES:**
THE EXISTING CONDITIONS PLAN HAS BEEN COMPILED FROM THE FOLLOWING SOURCES AND IS NOT A RESULT OF AN ON THE GROUND SURVEY BY BEALS ASSOCIATES, INC.
1. THE SUBJECT PROPERTY IS LOCATED WITHIN THE INDUSTRIAL ZONING DISTRICT, THE INFORMATION WAS OBTAINED FROM THE ZONING MAP OF FRANKLIN'S GIS DATABASE.
 2. THE SUBJECT PROPERTY BOUNDARIES, TOPOGRAPHY, WETLAND LINES AND BUFFERS WERE OBTAINED FROM PLANS ENTITLED "EXISTING CONDITIONS PLAN" DATED MARCH 20, 2024 AND PREPARED BY KELLY ENGINEERING GROUP.
 3. WETLAND LINETYPES AND HATCHING, SUPPLEMENTAL ABUTTERS INFORMATION, ABUTTERS BUILDING FOOTPRINTS, ABUTTERS LOT LINES AND LOT SETBACKS WERE ADDED TO THE PLAN BY BEALS ASSOCIATES INC.
 4. THE NORTH ARROW IS BASED ON PLANS ENTITLED "ALTA/NSPS LAND TITLE SURVEY PLAN" DATED JULY 18, 2022 AND PREPARED BY KELLY ENGINEERING GROUP.
 5. BUILDING LOCATIONS WERE OBTAINED FROM PLANS ENTITLED "EXISTING CONDITIONS PLAN" DATED MARCH 20, 2024 AND PREPARED BY KELLY ENGINEERING GROUP. THE BUILDING LOCATIONS HAVE BEEN SUPPLEMENTED FROM MASS GIS DATABASE.
 6. WETLAND DELINEATION ESTABLISHED BY OTHERS IN SEPTEMBER 2023 AND FIELD VERIFIED BY BEALS ASSOCIATED INC. ON APRIL 19, 2024. FLAGS DEPICTING DELINEATION FIELD LOCATED DURING ONSITE SURVEY IN MARCH 2024.
 7. THE LOCATIONS OF UNDERGROUND FEATURES WERE OBTAINED FROM PLANS ENTITLED "EXISTING CONDITIONS PLAN" DATED MARCH 20, 2024 AND PREPARED BY KELLY ENGINEERING GROUP. DIG-SAFE SHALL BE CONTACTED PRIOR TO ANY EXCAVATION.
 8. THE SUBJECT PROPERTY IS NOT LOCATED WITHIN A FLOODPLAIN DISTRICT, NATURAL HERITAGE ESTIMATED HABITAT OF RARE OR ENDANGERED SPECIES ACCORDING TO THE 15TH EDITION HERITAGE ATLAS EFFECTIVE AUGUST 1, 2021.
 9. THE B-SERIES FLAGS DEPICT TWO RESOURCE AREAS UNDER DIFFERENT JURISDICTIONS:
 - A. ISOLATED VEGETATED WETLANDS UNDER THE JURISDICTION OF THE TOWN OF FRANKLIN.
 - B. ISOLATED LAND SUBJECT TO FLOODING UNDER THE JURISDICTION OF MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTIONS.
 9. TEST PITS SHOWN HEREON WERE OBTAINED FROM TEST PIT LOGS PREPARED BY BEALS ASSOCIATES INC, DATED AT AUGUST 22TH 2024.
 10. EXISTING 3"Ø OR GREATER TREES WERE LOCATED BY BEALS ASSOCIATES DURING AN ON-SITE FIELD INVESTIGATION ON DECEMBER 4TH, 2024 AND SUPPLEMENTED ON DECEMBER 19, 2024.
 11. ANY DISCREPANCIES IN EXISTING CONDITIONS SHALL BE REPORTED BY THE CONTRACTOR TO THE DESIGN ENGINEER PRIOR TO ADDITIONAL CONSTRUCTION ACTIVITIES.

BEALS ASSOCIATES, INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-252-1231
FAX: 617-252-1232
WWW.BEALSASSOCIATES.COM
PLANNING • ENGINEERING • PERMITTING • MANAGEMENT

Owner/Applicant
NBPIV Constitution II LLC
401 Edgewater Place, Suite 205
Woburn, MA 01890

NORTHBRIDGE

55 Constitution Boulevard
Franklin, MA

2024.12.05	2024.12.27		Date
Revised per peer review comments			
Revised per peer review comments			
1	2		No.

Not for Construction

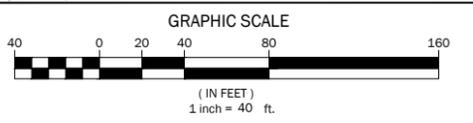
Permit Documents

Designed by: BGJ | Checked by: DPH
Proj. No.: C-1381 | Issue Date: 10.17.24
Drawing Scale: 1"=50'

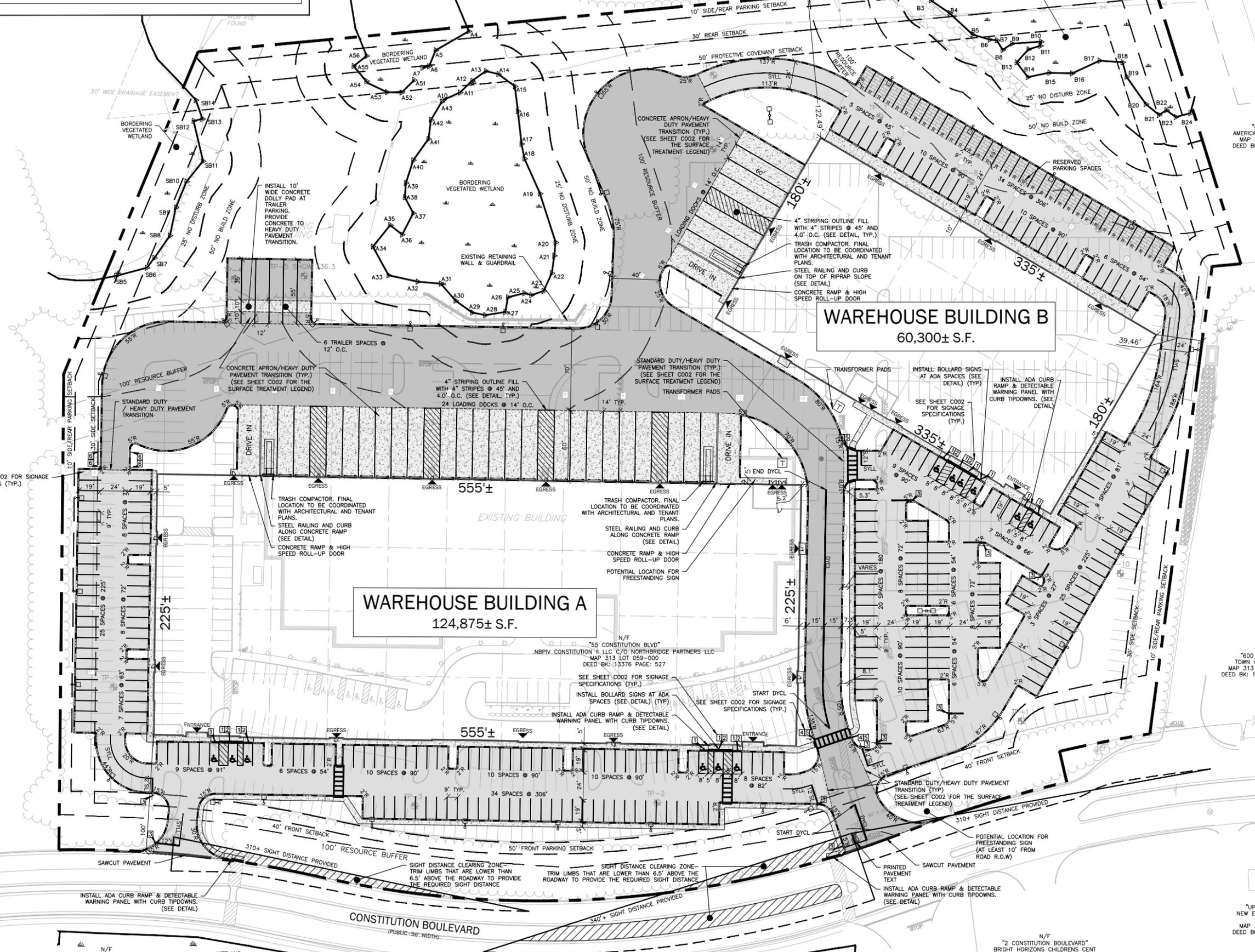
Sheet Title
SUPPLEMENTAL EXISTING CONDITIONS PLAN

Sheet Number
C101

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SEE SHEET C002 FOR SITE PLAN ZONING/PARKING TABLES, SURFACE TREATMENT LEGEND, SIGNAGE LEGEND, AND SYMBOLS LEGEND



N/F
"77 CONSTITUTION BLVD"
IRON MOUNTAIN INFO MANAGEMENT
MAP 320 LOT 006-000
DEED BK: 32508 PAGE: 480

N/F
"50 CONSTITUTION BLVD"
EMC CORPORATION C/O EMC CORP-REALESTATE DEP
MAP 319 LOT 015-000
DEED BK: 12002 PAGE: 222

WETLAND
RESOURCE
AREA

CONSTITUTION BOULEVARD
(PUBLIC: 56' WIDTH)

N/F
"55 CONSTITUTION BLVD"
NBPIV CONSTITUTION II LLC C/O NORTHBIDGE PARTNERS LLC
MAP 313 LOT 059-000
DEED BK: 13376 PAGE: 527

N/F
"656 KING ST."
FRANKLIN MA SR PROPERTY LLC C/O COFORGE BPS
MAP 313 LOT 063-000
DEED BK: 35320 PAGE: 376

ISOLATED VEGETATED WETLAND
& ISOLATED LAND SUBJECT
TO FLOODING

N/F
"648 KING ST."
THOMAS P NASUTI
MAP 313 LOT 062-000
DEED BK: 11817 PAGE: 617

N/F
"600 KING ST."
TOWN OF FRANKLIN
MAP 313 LOT 060-000
DEED BK: 11876 PAGE: 610

N/F
"UPPER UNION ST."
NEW ENGLAND POWER CO
PROPERTY
MAP 314 LOT 025-000
DEED BK: 37128 PAGE: 248

N/F
"2 CONSTITUTION BOULEVARD"
BRIGHT HORIZONS CHILDRENS CENT
MAP 313 LOT 058-000
DEED BK: 38463 PAGE: 271

Beals Associates, Inc.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-252-1120
FAX: 617-252-1121
PLANNING - ENGINEERING - PERMITTING - MANAGEMENT

Owner/Applicant
NBPIV Constitution II LLC
401 Edgewater Place, Suite 205
Woburn, MA 01890

NORTHBRIDGE

55 Constitution Boulevard
Franklin, MA

Revised per peer review comments	Date	Reason	No.
2024.12.05			
2024.12.27			
1			
2			

Not for Construction
Permit Documents

Designed by: TML Checked by: DPH
Proj. No.: C-1381 Issue Date: 10.17.24
Drawing Scale: 1"=40'

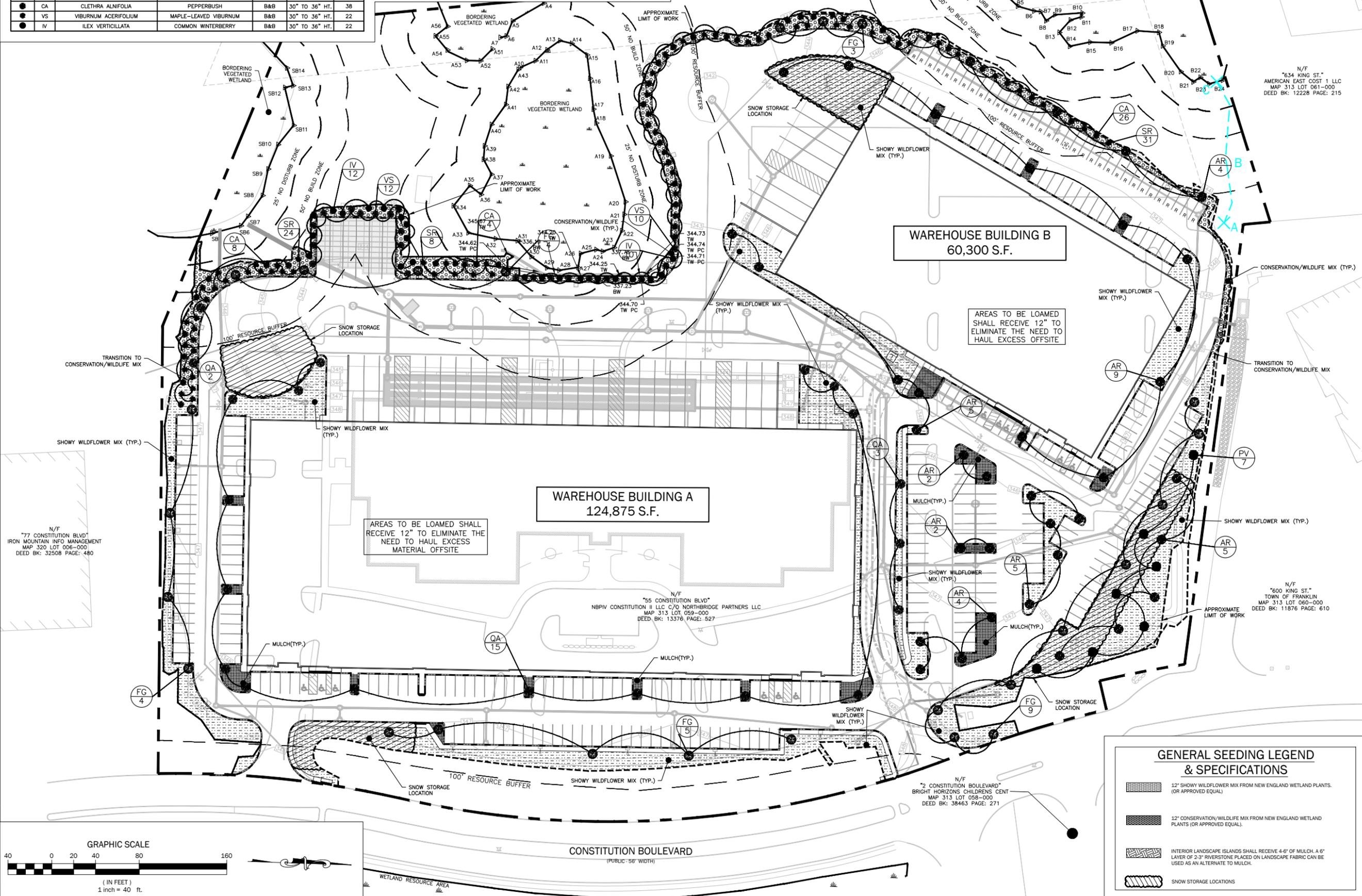
SITE LAYOUT AND MATERIALS PLAN

Sheet Number
C120

Not for Construction

PLANTING SCHEDULE					
AREV.	BOTANICAL NAME	COMMON NAME	CONTAINER	SIZE	QUANTITY
DECIDUOUS TREES					
AR	ACER RUBRUM	RED MAPLE	B&B	2 1/2" TO 3" CAL.	36
QA	QUERCUS ALBA	WHITE OAK	B&B	3" TO 3 1/2" CAL.	20
FG	FAGUS GRAND FOLIA	AMERICAN BEECH	B&B	2 1/2" TO 3" CAL.	25
PV	PRUNUS VIRGINIANA	CHOKE CHERRY	B&B	2 1/2" TO 3" CAL.	7
SHRUBS					
SR	SWIDA RUGOSA	ROUND-LEAVED DOGWOOD	B&B	18" TO 24" HT.	63
CA	CLETHRA ALNIFOLIA	PEPPERBUSH	B&B	30" TO 36" HT.	38
VS	VIBURNUM ACERIFOLIUM	MAPLE-LEAVED VIBURNUM	B&B	30" TO 36" HT.	22
IV	ILEX VERTICILLATA	COMMON WINTERBERRY	B&B	30" TO 36" HT.	22

- NOTES:
- THE LANDSCAPING SHOWN HEREON IS THE MINIMUM REQUIRED. ANY SUBSTITUTIONS TO THE PLANTING SCHEDULE SHALL BE APPROVED IN WRITING BY THE ENGINEER OF WHICH ONLY NATIVE SPECIES OR VARIETIES MAY BE ACCEPTABLE.
 - THE LANDSCAPING PLAN HAS BEEN DESIGNED TO AVOID CONFLICTS WITH UNDERGROUND UTILITIES TO THE GREATEST EXTENT PRACTICABLE. ANY CONFLICT WITH UTILITIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER, AND MAY REQUIRE AN ADJUSTMENT OF THE PLANTING LOCATION.
 - PLANTING MATERIALS SHALL BE GUARANTEED FOR TWO YEARS AFTER PLANTING. ANY DEAD, DAMAGED, OR UNHEALTHY PLANTS SHALL BE REPLACED AT NO COST TO THE OWNER UPON REVIEW OF THE ENGINEER/OWNER.
 - PLANTINGS SHALL NOT INHIBIT VEHICULAR ACCESS.
 - ALL PLANTINGS SHALL COME FROM THE TOWN OF FRANKLIN BEST DEVELOPMENT PRACTICES GUIDEBOOK.



BEALS ASSOCIATES INC.
 2 PARK PLAZA SUITE 200 BOSTON, MA 02116
 PHONE: 617-252-1125
 FAX: 617-252-1126
 PLANNING • ENGINEERING • PERMITTING • MANAGEMENT

Owner/Applicant
 NBPIV Constitution II LLC
 401 Edgewater Place, Suite 205
 Woburn, MA 01880

NORTHBRIDGE

55 Constitution Boulevard
 Franklin, MA

Revised per peer review comments	Date
2024.12.05	
2024.12.27	

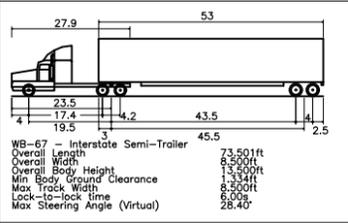
Not for Construction
Permit Documents

Designed by: BGJ Checked by: DPH
 Proj. No.: C-1381 Issue Date: 10.17.24
 Drawing Scale: 1"=40'

Sheet Title
SITE LANDSCAPE PLAN

Sheet Number
C121

Not for Construction



VEHICLE BODY TRACK

VEHICLE TIRE TRACK

N/F
"77 CONSTITUTION BLVD"
IRON MOUNTAIN INFO MANAGEMENT
MAP 320 LOT 006-000
DEED BK: 32508 PAGE: 480

N/F
IRON MOUNTAIN INFO
MANAGEMENT

N/F
FRANKLIN MA SR
PROPERTY LLC

N/F
"656 KING ST."
FRANKLIN MA SR PROPERTY LLC C/O COFORGE BPS
MAP 313 LOT 063-000
DEED BK: 35320 PAGE: 376

ISOLATED VEGETATED WETLAND
& ISOLATED LAND SUBJECT
TO FLOODING

N/F
"648 KING ST."
THOMAS P NASUTI
MAP 313 LOT 062-000
DEED BK: 11817 PAGE: 617

N/F
"634 KING ST."
AMERICAN EAST COST 1 LLC
MAP 313 LOT 061-000
DEED BK: 12228 PAGE: 215

N/F
TOWN OF
FRANKLIN

N/F
"600 KING ST."
TOWN OF FRANKLIN
MAP 313 LOT 060-000
DEED BK: 11876 PAGE: 610

EXISTING BUILDING
WAREHOUSE BUILDING A
124,875 S.F.

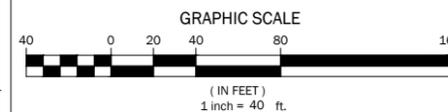
WAREHOUSE BUILDING B
60,000 S.F.

CONSTITUTION BOULEVARD
(PUBLIC - 56' WIDTH)

N/F
"50 CONSTITUTION BLVD"
EMC CORPORATION C/O EMC CORP-REAL ESTATE DEP
MAP 319 LOT 015-000
DEED BK: 12002 PAGE: 222

WETLAND
RESOURCE
AREA

N/F
"2 CONSTITUTION BOULEVARD"
BRIGHT HORIZONS CHILDRENS CENT
MAP 313 LOT 058-000
DEED BK: 38463 PAGE: 271



Revised per peer review comments	Date	Reason
2024.12.05		
2024.12.27		
1		No.
2		No.

Not for Construction
Permit
Documents

Designed by: BGJ Checked by: DPH
Proj. No.: C-1381 Issue Date: 10.17.24
Drawing Scale: 1"=40'
Sheet Title

WB-67
TURNING
ANALYSIS

Sheet Number

C200