Draft Environmental Assessment

Norwood Memorial Airport
Taxiway C Realignment and Runway Safety Area

September 2021

Submitted to:
Federal Aviation Administration
1200 District Ave #3,
Burlington, MA 01803

Submitted by:
Norwood Airport Commission
111 Access Road
Norwood, MA 02062 ss

Prepared by:
Epsilon Associates, Inc.
3 Mill & Main Place, Suite 250
Maynard, MA 01754

In Association with:
Dubois & King, Inc.

This Environmental Assessment becomes a Federal document when evaluated, signed and dated by the responsible FAA official.

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LIST OF ACRONYMS

AC	Advisory Circular
ACEC	Area of Critical Environmental Concern
APE	Area of Potential Effect
ASDA	Accelerated Stop Distance Available
ATCT	Air Traffic Control Tower
BLSF	Bordering Land Subject to Flooding
BMP	Best Management Practices
BVW	Bordering Vegetated Wetland
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CGP	Construction General Permit
CO	Carbon Monoxide
DCR	Department of Conservation and Recreation
DNL	Day-Night Sound Levels
EA	Environmental Assessment
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FBO	Fixed Base Operator
FEMA-FIRM	Federal Emergency Management Agency - Flood Insurance Rate Map
FPPA	Farmland Protection Policy Act
GA	General Aviation
GHG	Greenhouse Gas
lf	Linear Feet
LID	Low Impact Development
LUHPPL	Land Uses with Higher Potential Pollutant Loads
LUW	Land Under Water
MACRIS	Massachusetts Cultural Resource Information System
MAAQS	Massachusetts Ambient Air Quality Standards
MassDEP	Massachusetts Department of Environmental Protection
Mass DOT	Massachusetts Department of Transportation
Massport	Massachusetts Port Authority
MALSF	Medium-intensity Approach Lighting System with Sequenced Flashing lights
MALSR	Medium Intensity Runway Lighting System with Runway Alignment Indicator Lights
MCP	Massachusetts Contingency Plan
MEPA	Massachusetts Environmental Policy Act
MESA	Massachusetts Endangered Species Act
MHC	Massachusetts Historical Commission
MNHESP	Massachusetts Natural Heritage and Endangered Species Program
MSGP	Multisector General Permit

LIST OF ACRONYMS (CONTINUED)

MWRA	Massachusetts Water Resources Authority
MVP	Municipal Vulnerability Preparedness
NAAQS	National and State Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Pollutants
NLEB	Northern Long-eared Bat
NO_2	Nitrogen Dioxide
NPC	Notice of Project Change
NPDES	National Pollutant Discharge Elimination System
NRCC	National Regional Climate Center
NRCS	Natural Resources Conservation Service
O_3	Ozone
O&M	Operation and Maintenance
PM	Particulate Matter
RAO	Response Action Outcome
RFA	Riverfront Area
RTN	Release Tracking Number
PAPI	Precision Approach Path Indicator
SEIR	Single Environmental Impact Report
sf	Square Feet
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SWPPP	Stormwater Pollution Prevention Plan
TMPU	Technical Master Plan Update
TODA	Take Off Distance Available
TSP	Total Suspended Particulate
TSS	Total Suspended Solids
URAM	Utility-related Abatement Measure
VFR	Visual Flight Rules
WPA	Wetlands Protection Act

Section 1.0

Introduction

1.0 INTRODUCTION

1.1 Overview

The Norwood Airport Commission (the Proponent) proposes to realign Taxiway C, pave Runway Safety Areas for Runway 17/35, and replace deteriorated sections of the existing wildlife perimeter fence (the Proposed Action) to improve operations and enhance safety at the Norwood Memorial Airport (Proposed Action site).

This Environmental Assessment (EA) has been prepared in accordance with the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (CEQ Regulations) 40 Code of Federal Regulations (CFR) parts 1500-1508, U.S. Department of Transportation (DOT) Order 5610.1C, Procedures for Considering Environmental Impacts, and Federal Aviation Administration (FAA) Order 1050.1F Environmental Impacts: Policies and Procedures, and FAA Order 5050.4b, National Environmental Policy Act Implementing Instructions for Airport Actions. The EA analyzes the potential environmental impacts associated with the Proposed Action and considers alternatives to realign Taxiway C and to improve the Airport's operations and safety.

1.2 Proposed Action Site

The Norwood Memorial Airport (Airport) is a general aviation (GA) "reliever" airport on approximately 672 acres in Norwood, Massachusetts, as shown on Figure 1-1. Norwood is one of four reliever airports to Boston Logan Airport and has been in operation since 1942. Since 1946, the Airport has been under the direct control of the Town of Norwood. The Airport handles approximately 60,000 aircraft landings or takeoffs per year from both based and itinerant aircrafts. The number of aircraft using the Airport has been steady for several years. Norwood Memorial Airport primarily serves small aircraft, light jets, and helicopters used for business transportation, industrial and commercial support, flight training, news helicopters, sightseeing, and recreational flying. Medical and emergency health-care aviation services are also provided by Air Ambulance/Med Flight, Angel Flight, the State Police Air Wing, organ transplant flights, and the local Caritas Hospital Emergency Medical Services. Most of the aircraft using the Airport are 2- to 12-seat single engine and twin-engine aircraft.

The Airport has an air traffic control tower (ATCT) that operates under a Federal Aviation Administration (FAA) contract to provide air traffic control and flight separation services. The Airport also has nine helipads and two runways: Runway 17/35 and Runway 10/28. Runway 17/35, the Airport's primary runway, is 4,007 feet long, 100 feet wide, and is aligned northwest-southeast. This runway is equipped with Medium Intensity Runway Lighting (MALSF) Systems for nighttime and low visibility operations and Precision Approach Path Indicator (PAPI) systems. Runway 10/28 is 3,995 feet long, 75 feet wide, and is aligned west-east. Runway 10/28 is restricted to daytime use visual flight rules (VFR) conditions. Five paved taxiways, designated A, ~~B~~, C, D, F, and G, facilitate airside facilities and comprise a complete parallel taxiway system,

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

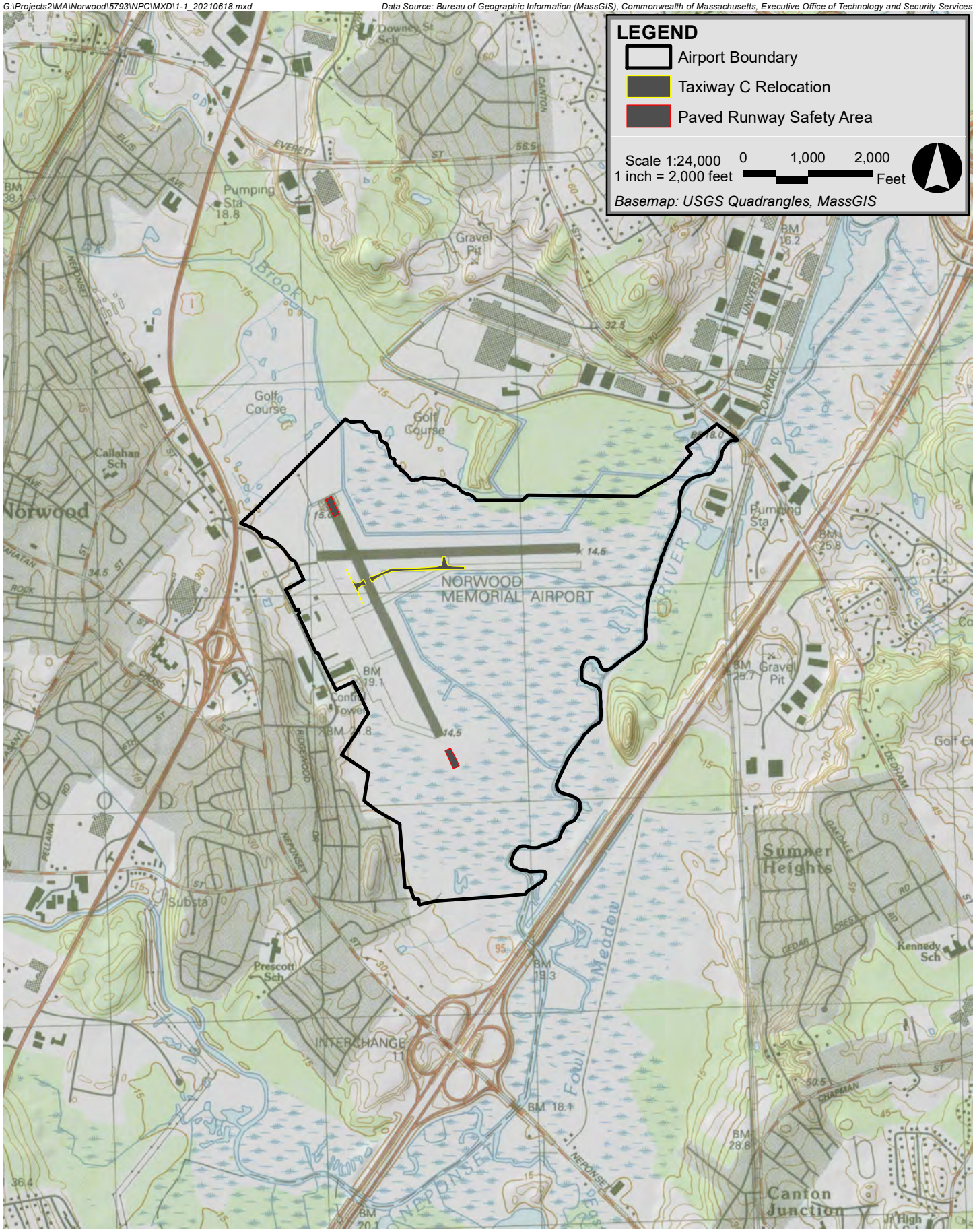

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Figure 1-1
USGS Locus

several general aviation aprons, and T-hangars. The Airport also includes offices, a restaurant, and commercial space located near the airport entrance and adjacent to the paved vehicle parking area. Land uses abutting the Airport include industrial, business, and residential. Existing Conditions are shown on Figure 1-2, Previously Reviewed Project Components.

The Proposed Action site is within the Norwood Memorial Airport and would primarily be limited to Runway 17/35 and the surrounding wetland system. A significant portion of the Proposed Action site is designated as wetland resource areas and is within the 100-year floodplain (see Figure 1-3). Further analysis of wetland impacts and mitigation is provided in Section 5.13.2. As shown on Figure 1-4, the Airport is also located within the state-designated Fowl Meadow and Ponkapoag Bog Area of Critical Environmental Concern (ACEC) and portions of the Airport, including the area around Runway 35 end, are mapped as Massachusetts Natural Heritage and Endangered Species Program (NHESP) Priority Habitat of Rare Species.

The Neponset River and Interstate 95 (I-95) border the Proposed Action site to the south and east.

To the west of the Proposed Action site is approximately 170,733 sf of on airport developed space, including an administration building, flight schools, maintenance buildings, aircraft hangars, the ATCT, and fuel storage facilities.

1.3 Federal, State, and Local Agency Jurisdiction

The Proponent will be required to obtain the federal, state, and local permits identified in Table 1-1 in order to carry out the Proposed Action. Table 1-1 also identifies the agency responsible for issuing the permit, and the standards with which the Proposed Action must comply.

The Proponent considered whether the Proposed Action would be subject to review under the Massachusetts Environmental Policy Act (MEPA) and its implementing regulations (301 CMR 11.00 et seq.) and consulted with the MEPA office. It was determined that the Proposed Action is within MEPA jurisdiction and will exceed MEPA thresholds at 301 CMR 11.03(3)(a) and 11.03(11)(b) and is therefore subject to MEPA review.

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

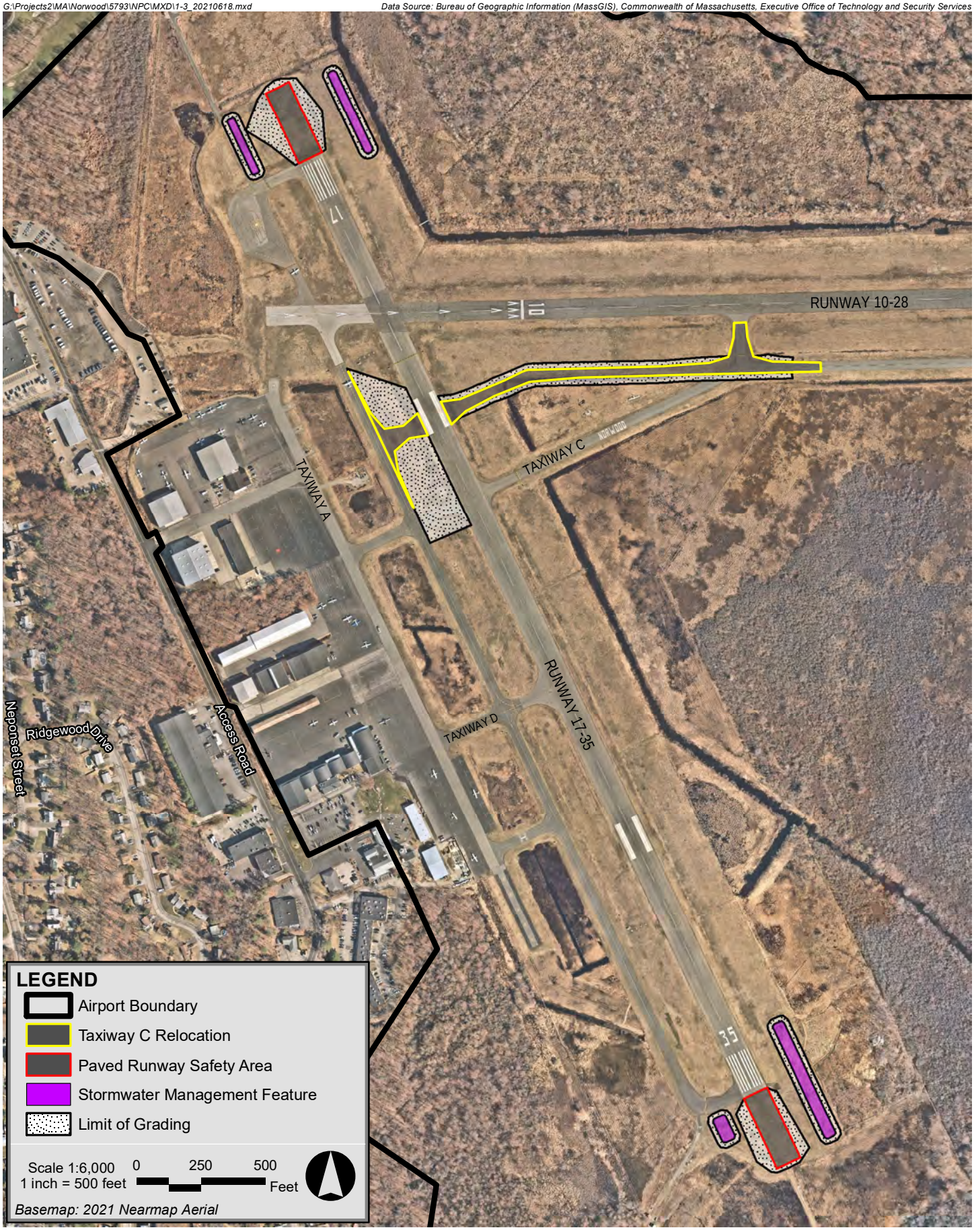

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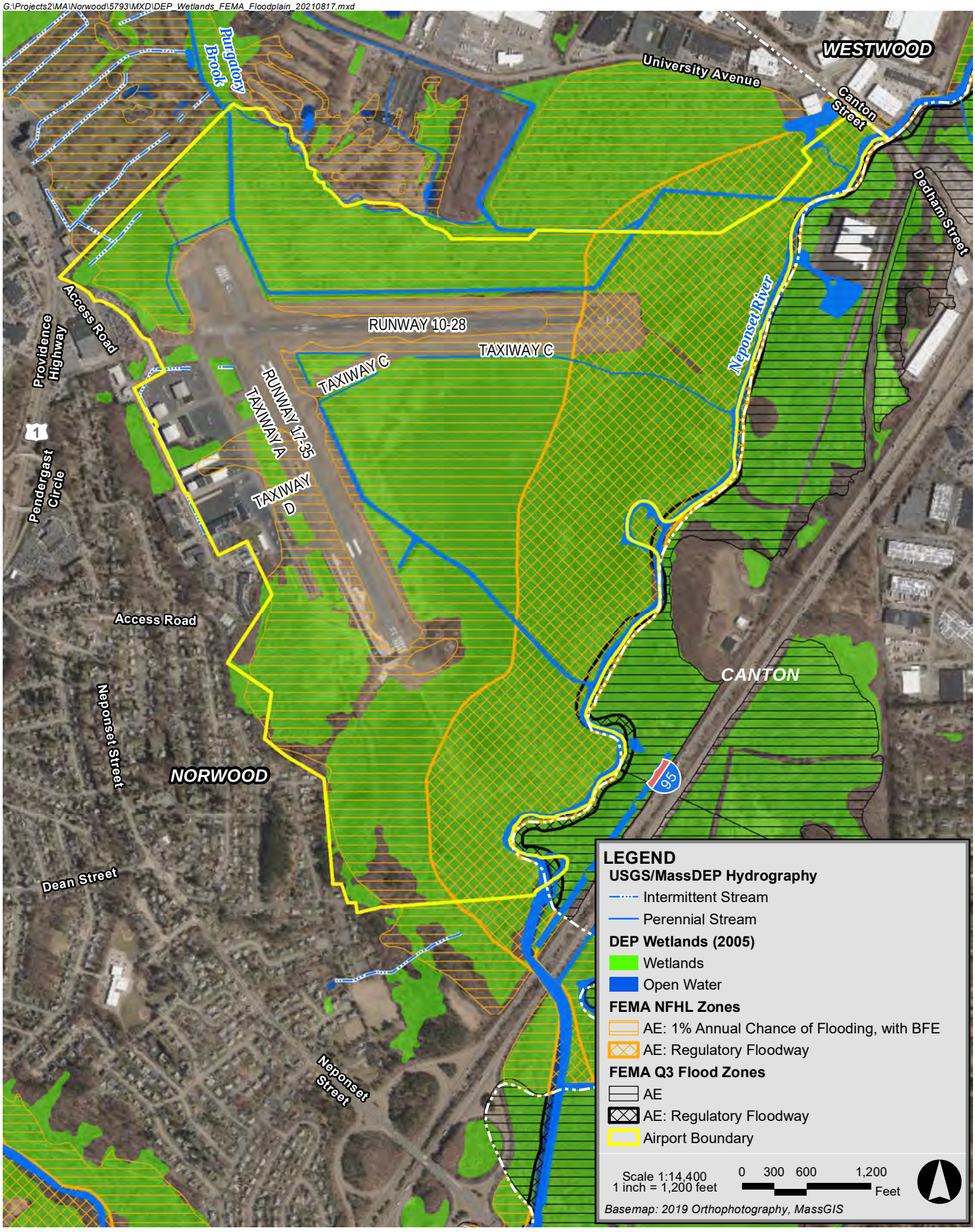
Figure 1-3

Aerial Locus with Proposed Action Components



Taxiway C Realignment and Runway Safety Areas at Norwood Memorial Airport

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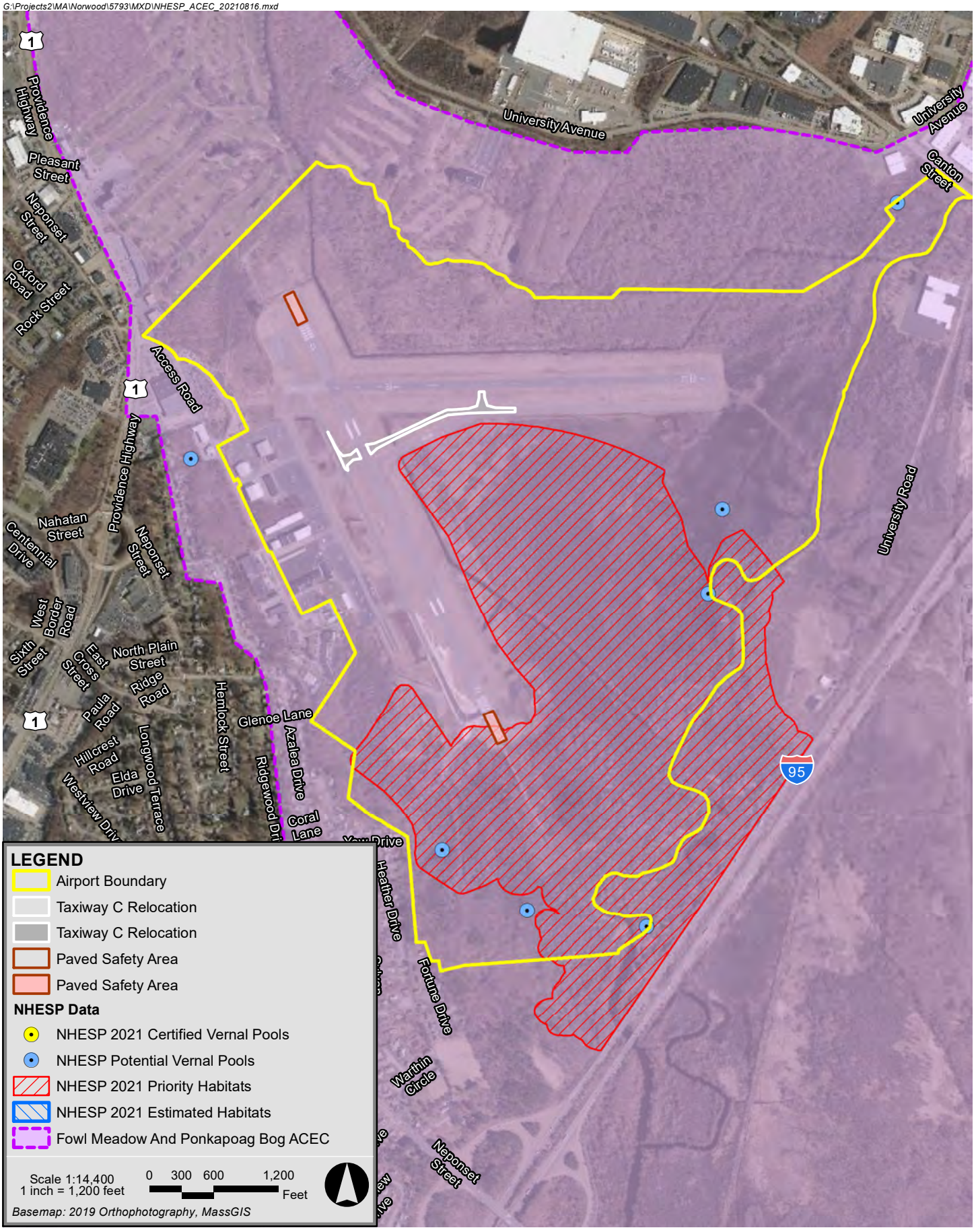
Figure 1-3
Wetland Resource Map



Taxiway C Realignment and Runway Safety Areas at Norwood Memorial Airport

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Figure 1-4

NHESP and Areas of Critical Environmental Concern

Table 1-1 Permits and Approvals Required for the Proposed Action

Permit	Agency	Measures to Comply with Applicable Performance Standards
Federal		
Section 404 General Permit (Pre-Construction Notification)	Army Corps of Engineers	Selection of the least environmentally damaging practicable alternative including measures designed to avoid, minimize, and mitigate impacts to wetlands and other waters of the U.S.
Coverage under National Pollutant Discharge Elimination System (NPDES) Construction Activities Permit	Environmental Protection Agency	Stormwater Pollution Prevention Plan to be developed and implemented, involving series of construction BMPs to reduce potential for erosion and sedimentation
Review under Section 106 of the National Historic Preservation Act (36 CFR 800)	FAA, U.S. Army Corps of Engineers; Tribal Consultation; State Historic Preservation Officer (SHPO)	The Project would be designed to avoid or minimize impacts to historic resources. Consultation has occurred with FAA and a determination of "no effect" has been made by the MA SHPO based on review of the prior Taxiway C alternative.
Federal Aviation Administration (FAA) planning, design, and safety Standards: AC 150/5300-13A Airport Design	Federal Aviation Administration (FAA)	Taxiways would be designed to comply with FAA requirements.
Section 7 Consultation under U.S. Endangered Species Act	Department of Interior, U.S. Fish and Wildlife Service (USFWS)	The Proposed Action would be reviewed by the USFWS through the Section 404 permitting process with the Corps as well as NEPA.
State		
Individual 401 Water Quality Certificate	Department of Environmental Protection (MassDEP)	Similar BMPs to be employed as required by NPDES and the Corps and under the Massachusetts Wetlands Protection Act. Avoid, minimize and mitigate impacts to wetlands and waterbodies.
Wetlands Protection Act M.G.L. c. 131 § 40 Variance	MA Department of Environmental Protection (MassDEP)	Construction of the Preferred Alternative would require that the Commissioner of MassDEP issue a Variance from the Regulations for work in BVW. Avoid, minimize and mitigate impacts to wetlands and other waterbodies including a minimum of 2:1 replication for unavoidable fill placed in BVW and compensatory flood storage.
M.G.L. c. 90 § 35B, 780 CMR 111.7	Massachusetts Department of Transportation (MassDOT) – Aeronautics Division	Taxiway surfaces would be designed to comply with MassDOT requirements.

Table 1-1 Permits and Approvals Required for the Proposed Action (Continued)

Permit	Agency	Measures to Comply with Applicable Performance Standards
Federal		
Review under Massachusetts Endangered Species Act	Natural Heritage and Endangered Species Program	Avoid and minimize impacts to state listed species habitats.
State Historic Register Review (Chapter 256)	Massachusetts Historical Commission (MHC)	The Proposed Action would be designed to avoid or minimize impacts to historic resources. Consultation would be led by FAA and a determination of "no effect" is anticipated to be made by the MA SHPO based on review of the prior Taxiway C alternative.
Local		
Wetlands Bylaw Order of Conditions	Norwood Conservation Commission	Avoid, minimize, and mitigate impacts to wetlands and other waterbodies including a minimum of 2:1 replication for fill placed in BVW and compensatory flood storage. Similar BMPs to be employed during construction as required by NPDES, the Corps, and MassDEP to prevent erosion and sedimentation that could result in discharges to wetlands.

Section 2.0

Purpose and Need

2.0 PURPOSE AND NEED

2.1 Overview

The FAA must approve proposed changes to Norwood Memorial Airport, and such approval constitutes a federal action requiring NEPA review. The purpose and need for a project is a key element of the NEPA review. It explains the reason for the action and what the agency expects to achieve. Further, it provides the basis for evaluating the effectiveness of the alternatives, *i.e.*, how best each alternative achieves the purpose of the project by addressing the documented needs.

2.2 Purpose and Need

The Proposed Action has the following purposes:

- To improve airfield safety and compliance with FAA design guidelines by eliminating direct connections from apron areas to runways, and
- To meet the runway length needs of existing aircraft using the Airport.

As described below, the Proposed Action is needed to improve overall operational safety and efficiency at Norwood Memorial Airport.

2.2.1 Taxiway C

The Proposed Action includes the realignment of a portion of Taxiway C to remove a direct connection from the apron area to Runway 17/35.

Currently, Taxiway C begins at the terminal area apron and runs easterly until it reaches Taxiway F where it turns and parallels Runway 10/28. The geometry of Taxiway C is non-standard according to FAA Advisory Circular (AC) 150/5300-13A Airport Design and creates an unsafe situation where aircraft leaving the apron have direct access to the intersection of Runway 17/35, increasing the possibility of an incursion[1] into an active runway or its surfaces. Relocating Taxiway C to meet FAA standards decreases the potential for runway incursions and increases overall operational safety at the Airport.

2.2.2 Runway Safety Areas

Runway Safety Areas (RSAs) at the Airport are currently level, grassed areas designed to support an aircraft in the case of overrun or undershoot on take-off or landing. By paving the RSA's associated with Runway 17-35 areas, the total length of the paved Runway 17-35 area would be extended by 600 feet. The runway operational length needs at the Airport were evaluated

[1] Incursion definition: Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take off of aircraft (see https://www.faa.gov/airports/runway_safety/resources/runway_incursions/)

previously in the Airport's 2007 Master Plan and were reviewed and validated in the 2020 Technical Master Plan Update (TMPU). The current lengths of both runways (17/35 is 4,007 feet long, 10/28 is 3,995 feet) are adequate for single-engine aircraft operations but are marginal for larger twin-engine aircraft and the corporate jets that make up an increasing percentage of the Airport's fleet. This is of concern on hot days or during poor weather when runway takeoff and landing length requirements increase. When operating from a runway where the required takeoff distance exceeds the runway length, the pilot is forced to reduce either the amount of fuel, the number of passengers, or the amount of cargo, in order to reduce the takeoff distance required given the takeoff weight. Modifications to the RSAs are proposed to increase the useable runway through declared distances of Take Off Distance Available (TODA) to 4,600 feet and Accelerated Stop Distance Available (ASDA) to 4,307 feet, which increases the runway safety.

While this solution would not bring Runway 17/35 to desired length of 5,001 feet as described in the TMPU, it would increase the useable runway through declared distances of TODA to 4,600 feet and ASDA to 4,307 feet which increases the runway safety. This would also allow a higher percentage of B-II design aircraft to utilize the airport during hot days. A longer runway would also allow corporate aircraft to operate at heavier takeoff weights, which achieves the goal to safely meet regional demand for corporate aviation access to the southwest Boston metropolitan area.

2.2.3 Perimeter Wildlife/Security Fence

The Proponent also proposes to replace deteriorated sections of the wildlife perimeter fence (installed in 2001) and to relocate these sections of fencing to more accessible areas of the Airport for maintenance purposes, removing as much as feasible from vegetated wetlands (see Figure 3-2). Current conditions permit movement of mammals across the fence in discrete locations, causing a potential for a wildlife hazard and aircraft strikes.

2.3 Public Involvement

This Project has been discussed at the Commission's public meetings on April 30, 2019 and June 17, 2020.

Please refer to Section 7.0 of this document for a circulation list.

Section 3.0

Proposed Action and Alternatives

3.0 PROPOSED ACTION AND ALTERNATIVES

3.1 Proposed Action

The Proposed Action builds upon planning done in 2015 for the relocation of Taxiway C, which was postponed, and it incorporates additional components. The 2015 project proposed shifting portions of Taxiways C and D to remove a direct connection from the apron area to Runway 17-35. Figure 3-1 shows previously proposed project components. The shift was proposed because having a direct connection increases the potential for an aircraft incursion into active runway space. The proposed Taxiway C modifications are closely associated with locations where aircraft actively operate. The modifications are intended to improve airfield safety and compliance with FAA design guidelines by eliminating direct connections from apron areas to runways, and to meet the runway length needs of existing aircraft using the Airport.

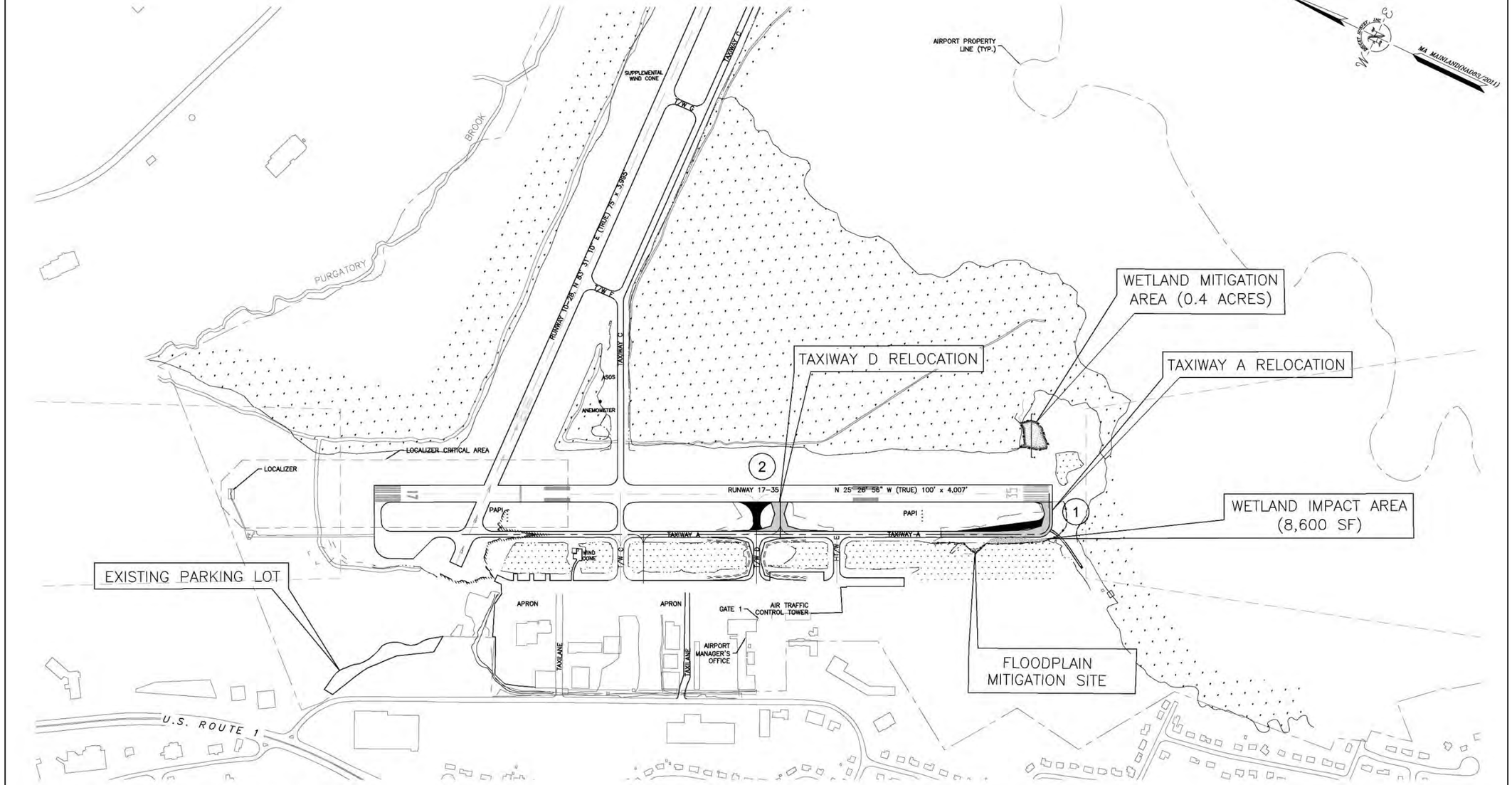
The Proposed Action consists of three components (see Figure 3-2) as described below.

3.1.1 Taxiway C Realignment

The Proposed Action would relocate a 1,350-foot segment of Taxiway C from Taxiway F to Taxiway A, by shifting the angle within the current Taxiway C configuration 800 linear-feet to the west. Relocating Taxiway C to meet FAA standards would decrease the potential for runway incursions and thereby increase overall operational safety. A new 800-foot segment of Taxiway C would extend west of Taxiway F parallel to Runway 10/28. A second 360-foot segment would be constructed from this new angle to Taxiway A (see Figure 3-2 and 3-3). The existing Taxiway C would be removed and replaced with a wetland mitigation and floodplain compensation area east of Runway 17/35. Approximately 31,045 sf of Bordered Vegetated Wetlands (BVW) associated with a perennial drainage ditch in the infield would be impacted, along with 150 sf of Land Under Water within the ditch. Work in Riverfront Area (RFA) associated with the perennial waterway totals 86,484 sf however 30,605 sf of RFA would be restored through the removal of pavement and wetland replication. New impervious surface would total 18,594 sf.

Wetland mitigation would be provided at a ratio of 2:1 on site, totaling 62,090 sf. A portion of the same ditch would be daylighted as part of the removal of the existing Taxiway C.

The estimated work in the 100-year floodplain is 79,000 sf. A detailed cut/fill analysis has been completed to determine volume of floodplain that would be filled and requisite compensatory floodplain storage requirements.



PROJECT WORK ELEMENTS

1. CONSTRUCT, MARK, AND LIGHT TAXIWAY D RELOCATION
2. CONSTRUCT, MARK, AND LIGHT TAXIWAY A RELOCATION

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300 ft.

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

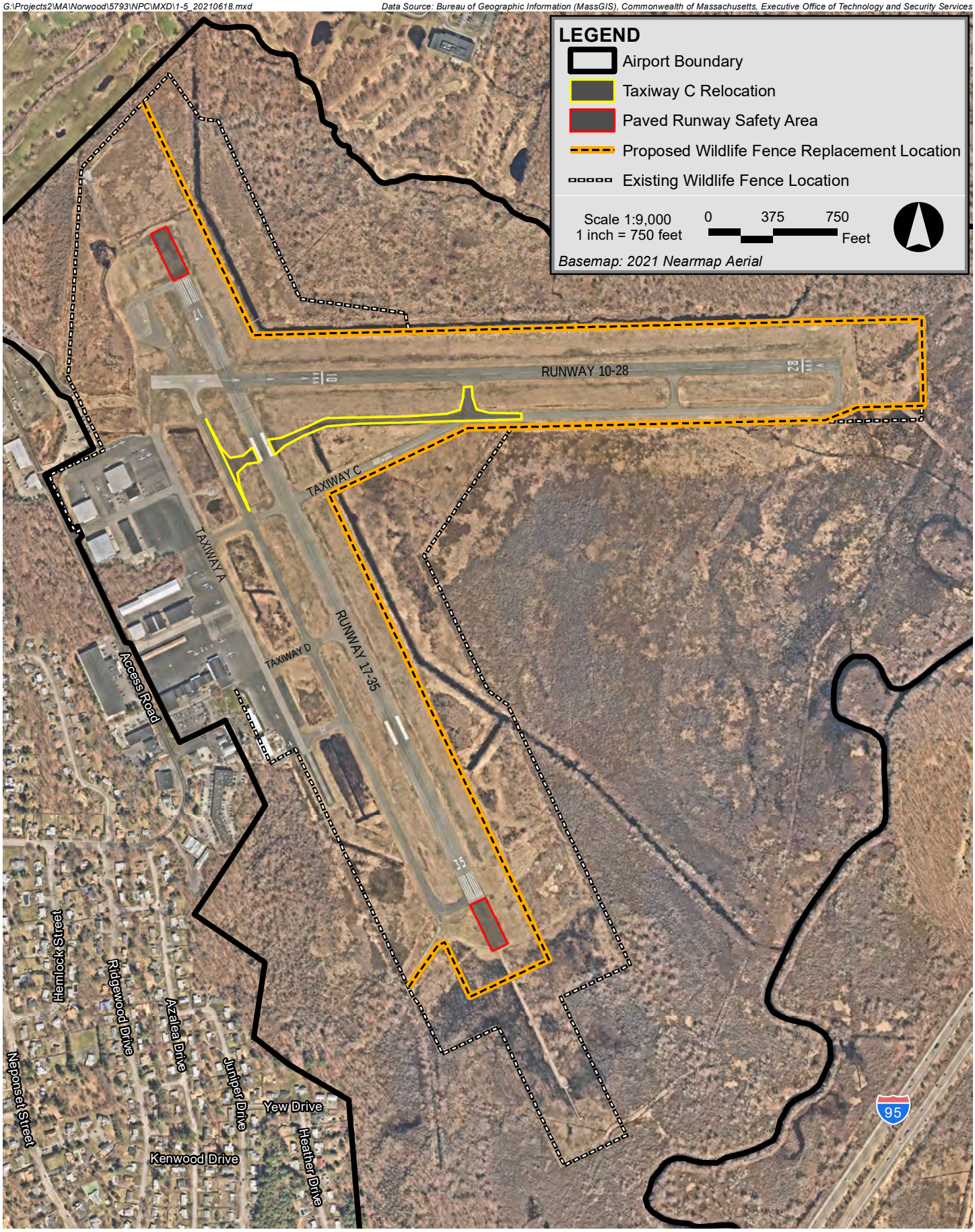


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Figure 3-2
Proposed Action Plan

3.1.2 Runway Safety Areas

The Proponent proposes to pave the existing grassed 100-foot by 300-foot RSAs runway safety areas (RSAs) to provide additional runway length through the use of declared distances (see Figures 3-2 and 3-3). The Runway Safety Areas on Runway 17/35 are currently unpaved and grassed. These are currently level, grassed areas designed to support an aircraft in the case of overrun or undershoot on take-off or landing. A total of an additional 60,000 sf of impervious surface would be added, along with associated stormwater vegetated filter strips. Work is proposed within the 100-foot Buffer Zone and BLSF. There are no vegetated wetland impacts associated with this proposed work.

3.1.3 Airport Perimeter Wildlife Fence Replacement

The Proponent also proposes to replace deteriorated sections of the wildlife perimeter fence (installed in2001) and to relocate these sections of fencing to more accessible areas of the Airport for maintenance purposes, removing as much as feasible from vegetated wetlands (see Figure 3-2). Approximately 13,700 linear feet (lf) of fence would be installed and 14,350 lf of fence removed, of which almost all is currently within vegetated wetlands.

3.1.4 Phasing

The Proposed Action would be constructed in phases as funding becomes available. Important additional timing considerations include maintaining at least one open runway on the Airport, groundwater levels, and working around the academic school year schedule for the off-site stormwater management mitigation area (described in Section 4.0 below). Currently proposed construction phasing is as follows:

- 2022: Wetland Replication and Compensatory Storage Areas, Taxiway C Realignment, and On-Airport Stormwater Management System for Taxiway C, Parking Lot Stormwater Management, and Off-Airport Taxiway C Stormwater Management Mitigation Area (summer);
- 2023: commence Wildlife Exclusion Fence Replacement;
- 2024: Complete Wildlife Exclusion Fence Replacement; and
- 2026: Runway Safety Area Paving and affiliated Stormwater Management.

3.2 Alternatives

3.2.1 Taxiway C Realignment

Six alternatives for the Taxiway C relocation were evaluated against the following criteria: wetland resource area impacts, feasibility and quality of on-site wetland and floodplain mitigation, impervious surface area modifications, stormwater management, airport operations and their construction costs. Resource area impacts are associated with Bordering Vegetated Wetlands

(BVW), drainage features with Inland Bank and Land Under Water, and Bordering Land Subject to Flooding (BLSF). All are located within infield areas (i.e., between Taxiway and Runway) and are connected hydrologically via culverts to the larger wetland system surrounding the Airport associated with the Neponset River. The majority of the Airport also lies within the 100-year floodplain of the Neponset River (Elevation 47.1).

A scoring matrix was created to assist in selecting the Preferred Alternative. Please see Table 3-1 for a comparison of the alternatives based on these criteria listed above.

This evaluation concluded that although Alternative 1A has slightly greater BVW impacts compared to Alternative 4, it also offers the significant advantages of allowing for an adequately sized on-site wetland mitigation area of and improved Airport safety and operations; therefore, the Proponent has selected Alternative 1A as the Preferred Alternative.

Table 3-1 Comparison of Taxiway C Relocation Alternatives

	Alternative 1	Alternative 1A (preferred)	Alternative 2	Alternative 3	Alternative 4
Bordering Vegetated Wetland Impacts (SF)	31,754	31,045	40,267	34,550	24,227
Land Under Water Impacts (SF)	0	150	2,130	2,550	0
BLSF (100-year Floodplain) Impacts (SF)	45000	386,972	54,000	79,000	58,500
2:1 Mitigation for BVW Impacts (SF)	63,508	62,090	80,534	69,100	48,454
Potential BVW Mitigation (SF)	94,700	110,870	94,700	94,700	13,000
Net BVW Mitigation (SF)	31,192	48,780	14,166	25,600	(35,454)
New Impervious (SF)	94,626	74,217	91,134	89,271	28,198
Impervious Removal (SF)	60,248	60,248	60,248	60,248	12,020
Net Impervious (SF)	34,378	16,522	30,886	29,023	16,178
Airport Operations Impacts Ranking	●●●● (Most)	●●	●●●	●●	● (Least)
Estimated Construction Cost Ranking (Including Wetland Mitigation)	$$$	$ (Least)	$$	$ (Least)	$$$$ (Most)

3.2.2.1 No Action Alternative

Under the No Action Alternative, conditions at the Airport would remain unchanged. Taxiway C would not be relocated and extended and the deteriorating airport perimeter wildlife fence would not be replaced. This alternative would allow for the existing non-standard geometry issues to continue; therefore, potential runway incursions would not be decreased and overall operational safety not improved.

3.2.2.2 Alternative 1A – Short Angle Relocation (Preferred Alternative/Proposed Action)

The Preferred Alternative is a modification of Alternative 1 described below. Alternative 1A would relocate the 1,350-foot segment of Taxiway C from Taxiway F to Taxiway A, by shifting the angle within the current Taxiway C configuration 800 linear-feet to the west. A new 800-foot segment of Taxiway C would extend west of Taxiway F parallel to Runway 10/28. A second 360-foot segment would be constructed from this new angle to Taxiway A (see Figure 3-2 and 3-3). Finally, a new 320-foot segment of Taxiway C would extend west of Taxiway F parallel to Runway 10-28. The existing Taxiway C would be removed and a portion east of Runway 17/35 replaced with a wetland mitigation and floodplain compensation area east. Approximately 32,655 sf of BVW associated with a perennial drainage ditch in the infield would be impacted, along with 150 sf of LUW within the ditch. Work in RFA associated with the perennial waterway totals 86,484 sf. New impervious surface would total 18,594 sf.

This alternative is preferred as it meets the purpose and need, minimized wetland impacts, avoidance of weather instruments, and the availability of wetland restoration of existing Taxiway C.

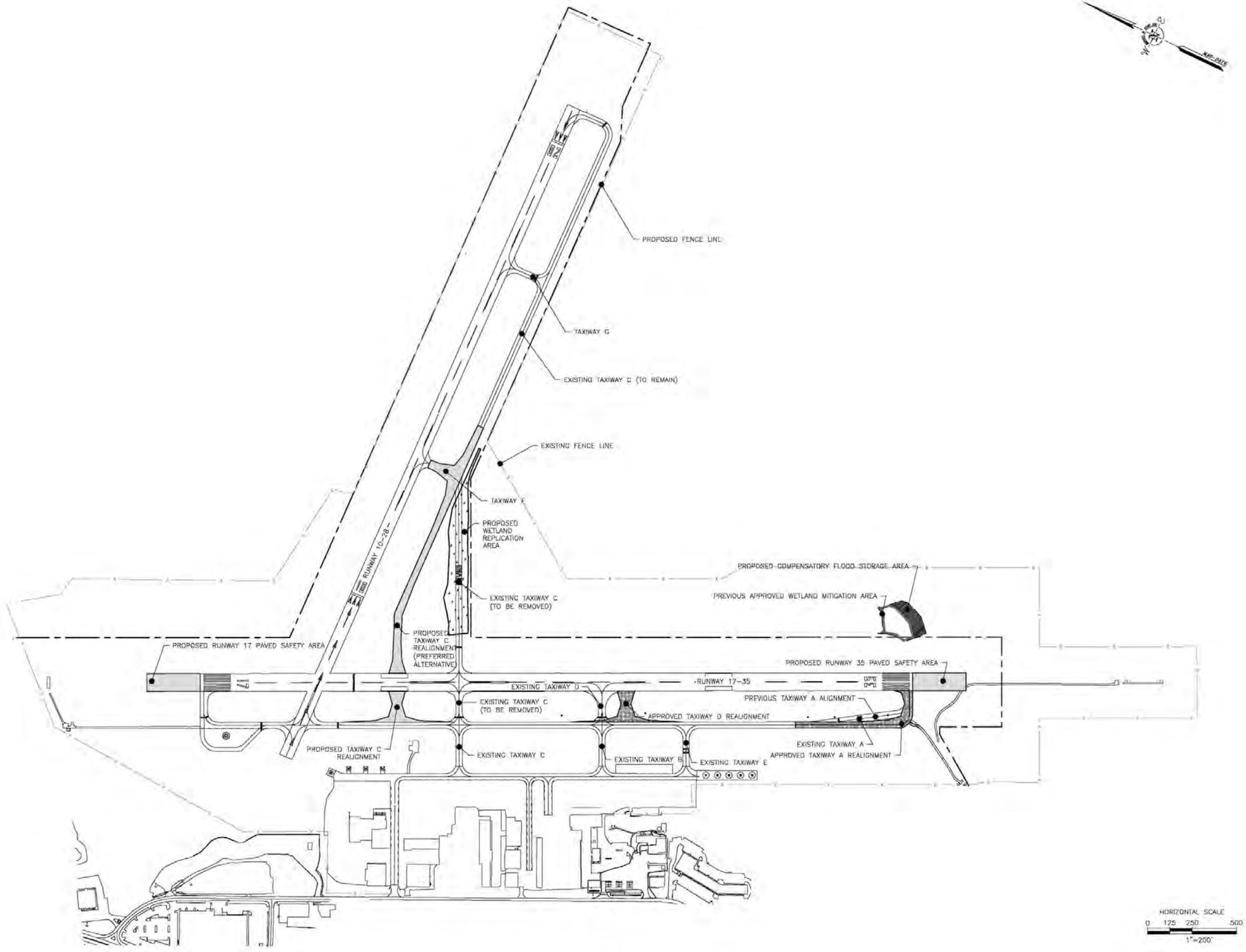
3.2.2.3 Alternative 1 – Straighten Taxiway C

This alternative would relocate the 1,350-foot segment of Taxiway C from Taxiway F to Taxiway A (see Figure 3-4). It would remove both the angle within the taxiway itself and the direct connection from the Airport's apron area to Runway 17-35 via Taxiway C. A new 170-foot segment of Taxiway C would be constructed north of its current location between Taxiway A and Runway 17-35. A second 1,520-foot segment would be constructed between Runway 17-35 and Taxiway F north of the existing Taxiway C, parallel to Runway 10-28. The existing Taxiway C would be removed and replaced with a wetland mitigation and floodplain compensation area. Approximately 31,754 sf of BVW associated with an intermittent drainage ditch in the infield would be impacted by this alternative. New impervious surface totals 34,378 sf. The estimated work in the 100-year floodplain is 45,000 sf.

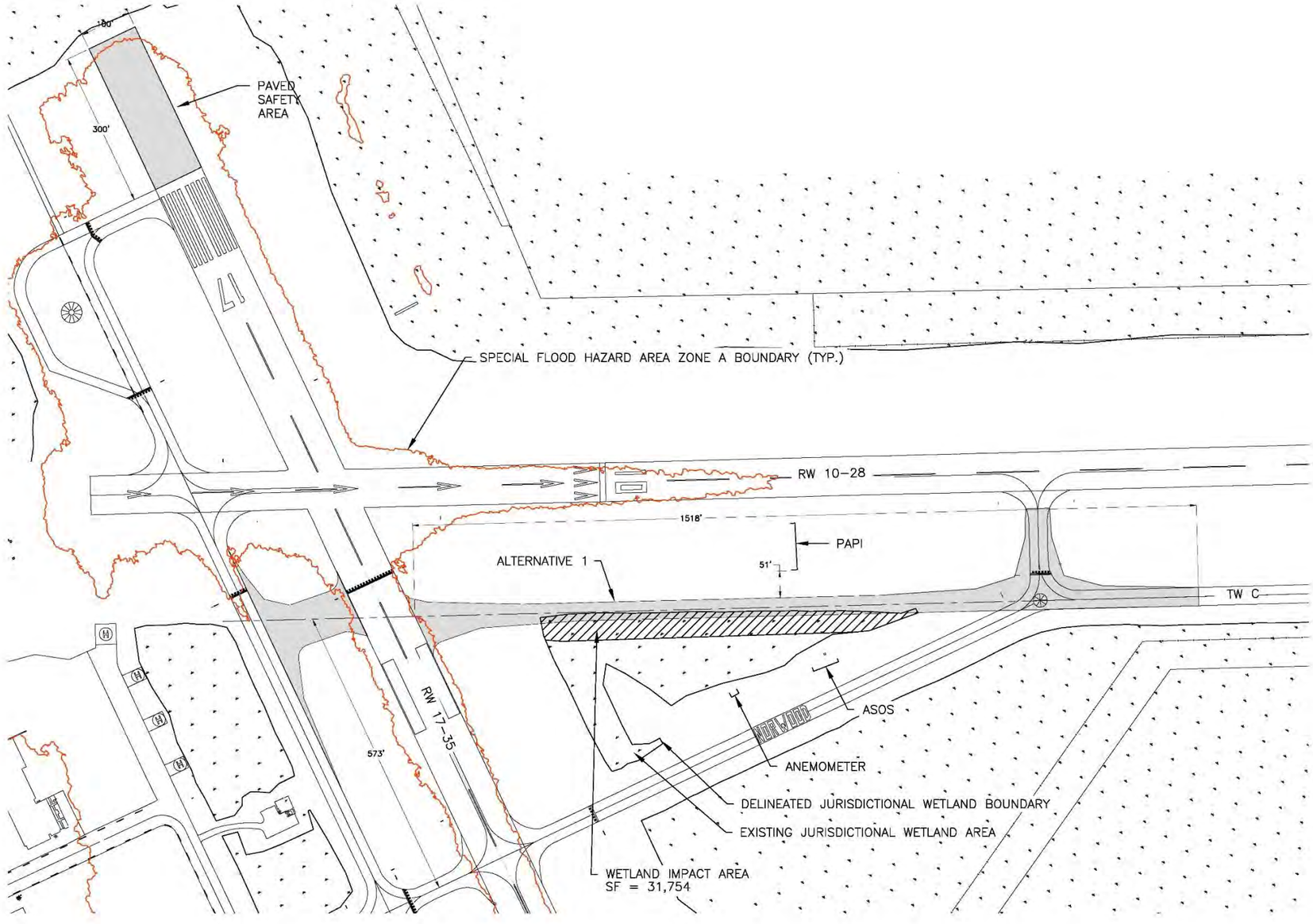
From an operations perspective, the relocation of the segment between Taxiway A and the runway northward would shift active operations within 250 feet of the centerline to Runway 10-28 which is deemed disadvantageous to operations and safety.

3.2.2.4 Alternative 2 – Modified Angle Relocation

This alternative would relocate the 1,350-foot segment of Taxiway C from Taxiway F to Taxiway A. It would shift the angle within the current Taxiway C configuration 913 feet to the west (see Figure 3-5). A new 600-foot segment of Taxiway C would extend west of Taxiway F parallel to Runway 10-28. A second 830-foot segment would be constructed from this new angle to Taxiway A. The existing Taxiway C would be removed and replaced with a wetland mitigation and floodplain compensation area east of runway 17-35. Approximately 40,267 sf of BVW associated with an



Taxiway C Realignment and Runway Safety Areas at Norwood Memorial Airport



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ENVIRONMENTAL ASSESMMENT PHASE 1 FOR TW 'C' RELOCATION AND RW 17-35 PAVED SAFETY AREAS

SHEET TITLE

TW C REALIGNMENT ALTERNATIVE 1

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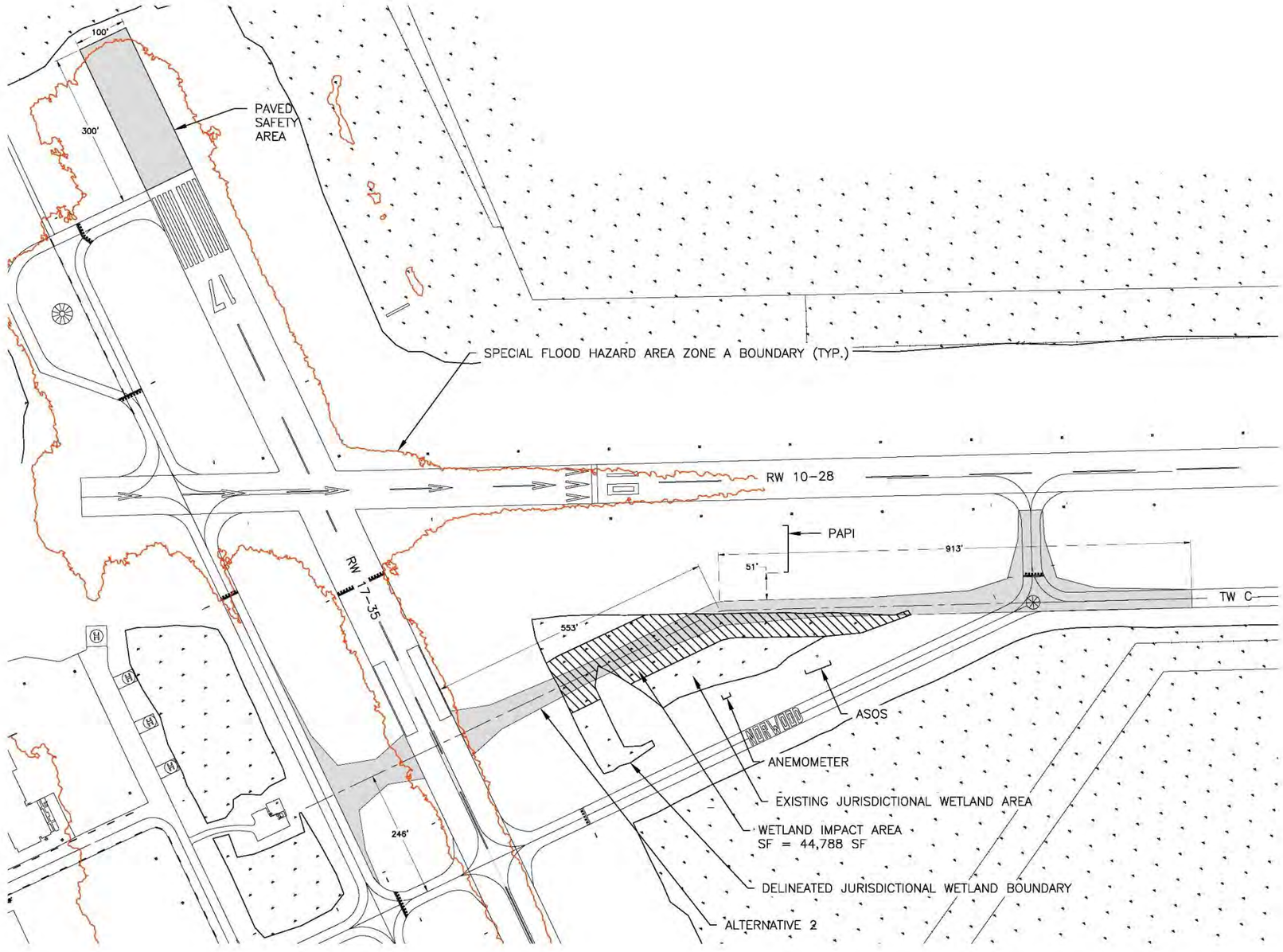
Figure 3-4
Alternative 1 – Straighten Taxiway C



HORIZONTAL SCALE
0 50 100 200
1"=100'

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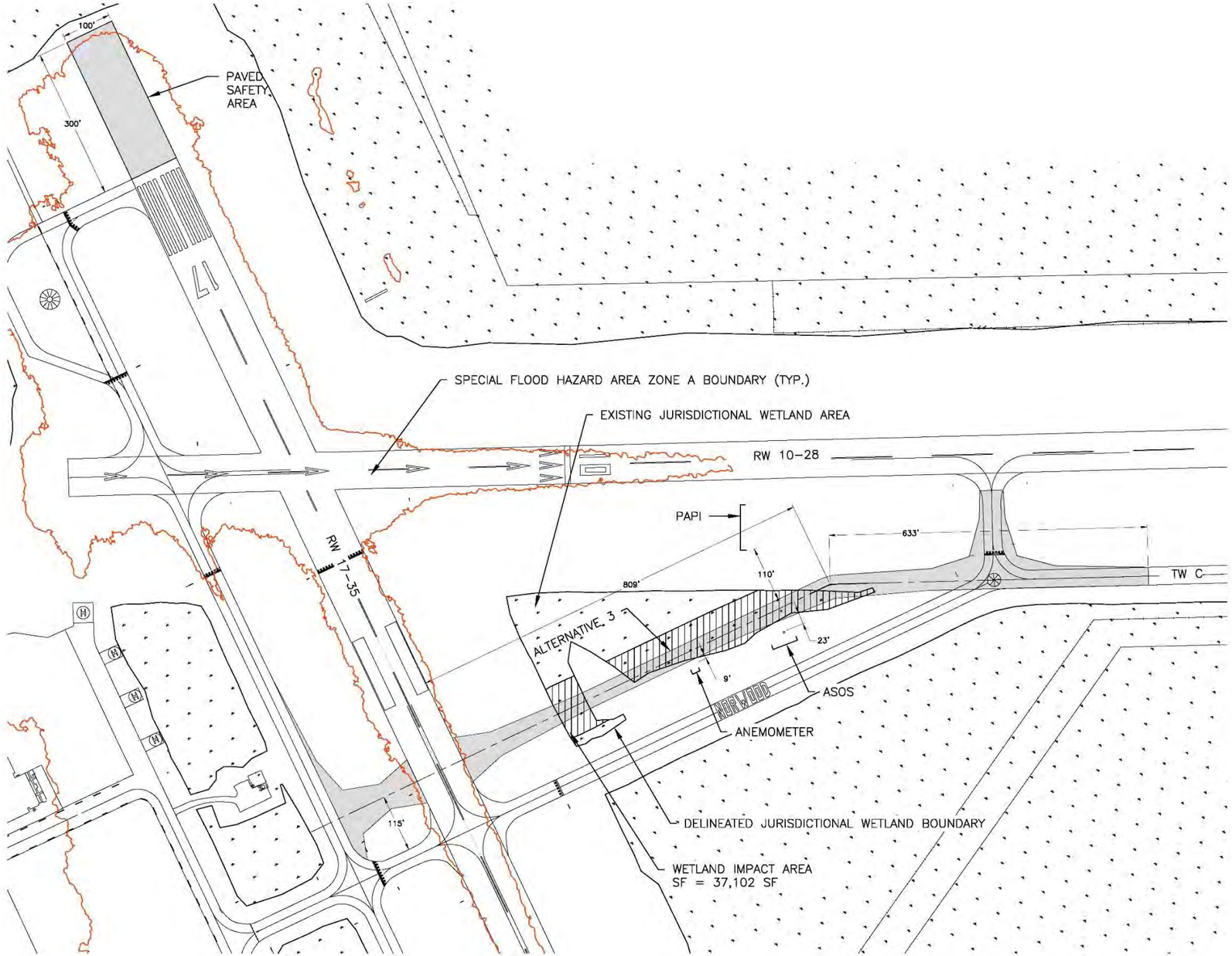

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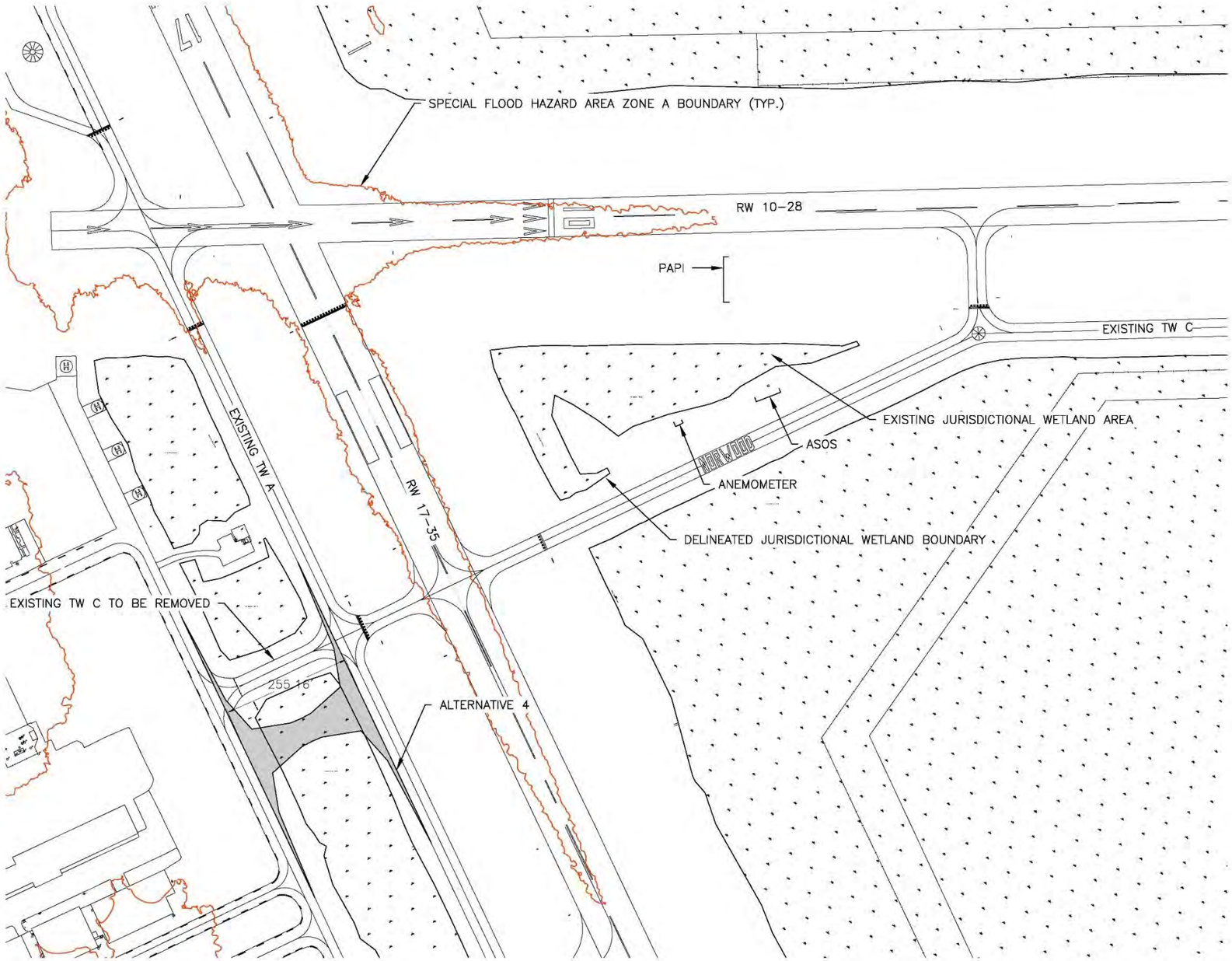

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Figure 3-7

Alternative 4 – Stub Relocation (2015 Taxiway C Preferred Alternative)

intermittent drainage ditch in the infield would be impacted by this alternative, along with 2,130 sf of Land Under Water (LUW). New impervious surface totals 30,886 sf. The estimated work in the 100-year floodplain is 54,000 sf.

From an operations perspective, the relocation of the segment between Taxiway A and the runway northward would still shift active operations closer to Runway 10-28, although not as close as would Alternative 1 or Alternative 5. This alternative also has the greatest wetland resource area impacts.

3.2.2.5 Alternative 3 – Angle Relocation

This alternative would relocate the 1,350-foot segment of Taxiway C from Taxiway F to Taxiway A. It would shift the angle within the current Taxiway C configuration 320 feet to the west (see Figure 3-6). A new 320-foot segment of Taxiway C would extend west of Taxiway F parallel to Runway 10-28. A second 990-foot segment would be constructed from this new angle to Taxiway A. The existing Taxiway C would be removed and replaced with a wetland mitigation and floodplain compensation area east of runway 17-35. Approximately 34,550 sf of BVW associated with an intermittent drainage ditch in the infield would be impacted by this alternative, along with 2,550 sf of LUW within the ditch. New impervious surface would total 29,023 sf. The estimated work in the 100-year floodplain is 79,000 sf. Upon review of requisite object free areas, it was determined that the weather instruments located just north of the current taxiway alignment would be too close to the taxiway to meet FAA standards.

3.2.2.6 Alternative 4 – Stub Relocation (2015 Taxiway C Preferred Alternative)

This alternative proposed shifting just the western stub of Taxiway C southward (impacting 0.44 acre of wetlands) to remove the direct connection (see Figure 3-7). This would enable a 0.1-acre wetland mitigation area to be created from the former location of Taxiway C. It would also, however, create airport operational challenges due to inadequate space for aircraft to queue on the taxiway as well as an inability to properly provide wetland mitigation onsite. MassDEP indicated during project review that due to the constrained hydrological connection from the impact site to potential wetland replication area due to infield culverts, they would not consider the replication adequate.

3.2.2 Runway 17-35 Length Alternatives

The runway operational length needs at Norwood were evaluated previously in the 2005 master plan and were validated in the 2020 TMPU. The current lengths of both runways (17/35 is 4,008 feet long, 10/28 is 3,995 feet) are adequate for single-engine aircraft operations but are marginal for larger twin-engine aircraft and the corporate jets that make up an increasing percentage of the Airport's fleet. This is of concern on hot days or during poor weather when runway takeoff and landing length requirements increase. When operating from a runway where the required

takeoff distance exceeds the runway length, the pilot is forced to reduce either the amount of fuel, the number of passengers, or the amount of cargo, in order to reduce the takeoff distance required given the takeoff weight.

As a result of evaluating the runway operational length needs for the Cessna Citation Composite aircraft fleet mix operating at Norwood, the recommended runway length remains 5,001 feet in the TMPU. A 5,001-foot runway would accommodate a majority of the small and mid-sized aircraft operating at the Airport, under most conditions. Alternatives were evaluated which could increase the operational length of Runway 17-35 using the following considerations:

- Environmental Impact;
- FAA Standards;
- Facility Requirements;
- Development Costs; and
- Development Flexibility.

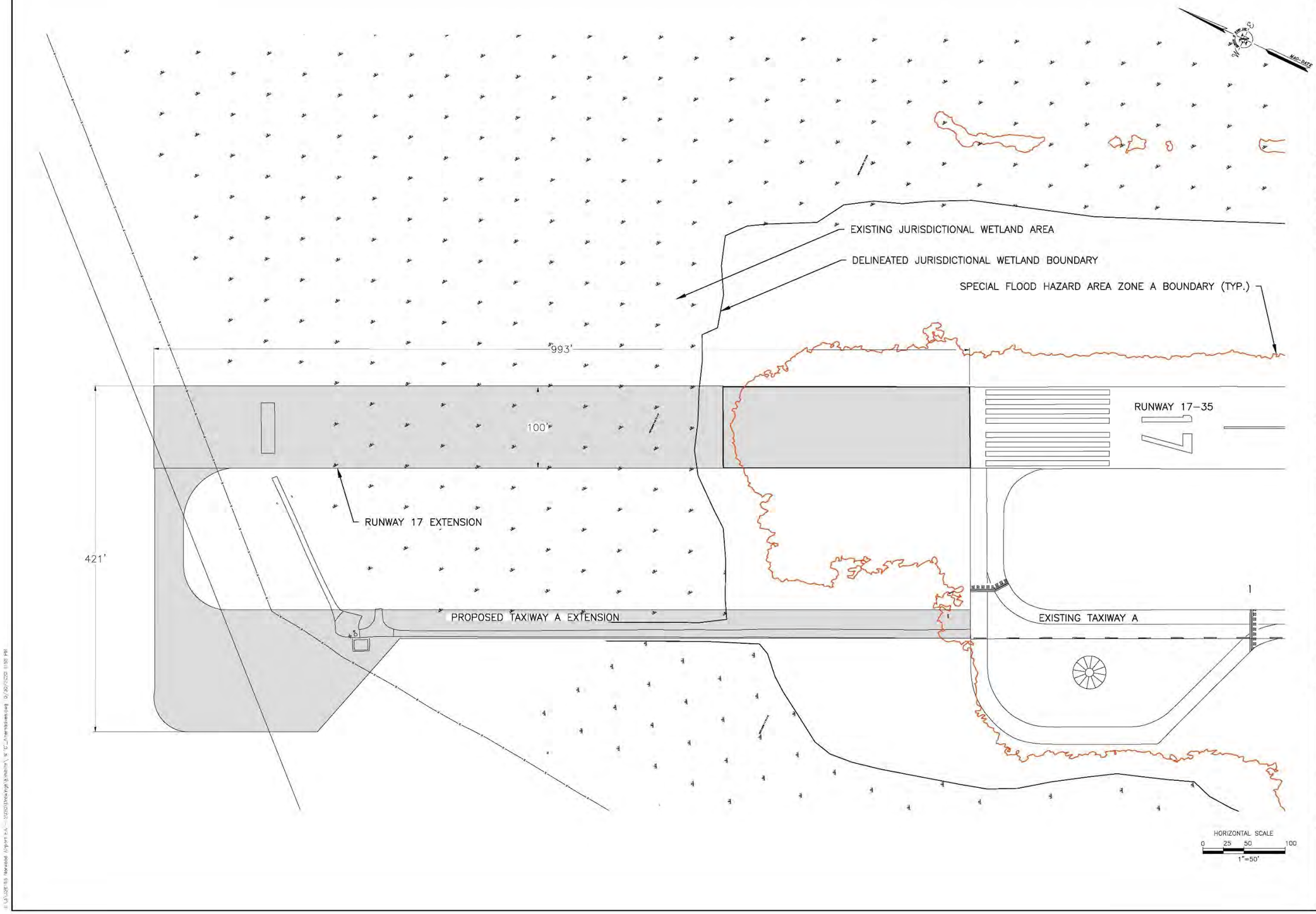
3.2.2.1 Alternative A – Extend Runway 17-35

This alternative involves extending Runway 17 by 993 feet to the north to achieve the targeted length of 5,001 feet (see Figure 3-8). This alternative allows corporate aircraft to operate at full takeoff weights, which meets the existing and future regional demand for corporate aviation access to the southwest Boston metropolitan area.

Extensive wetland impacts (~10 acres), work within floodplain and riverfront area would be necessary to construct the extension. The golf course to the north of the runway lies within the runway protection zone and would need to be acquired in order to facilitate this alternative. Wetlands adjacent to the north end of the runway that would be filled in have previously been identified as spotted turtle *(Clemmys guttata*) nesting habitat. The appraised land value of the Golf Course, as estimated in 2019 was almost $7,000,000, making acquisition of the property potentially cost-prohibitive.

3.2.2.2 Alternative B – Paving Runway Safety Areas (Preferred Alternative)

The RSAs on Runway 17/35 are currently unpaved. By paving these areas, the total length of the paved Runway area would be extended by 600 feet (see Figure 3-9). While this solution would not bring Runway 17/35 to 5001 feet, it would increase the useable runway through declared distances of TODA to 4,600 feet and Accelerated Stop Distance Available (ASDA) to 4,307 feet. The RSAs on Runway 17/35 are currently unpaved and grassed, designed to support an aircraft in the case of overrun or undershoot on take-off or landing.



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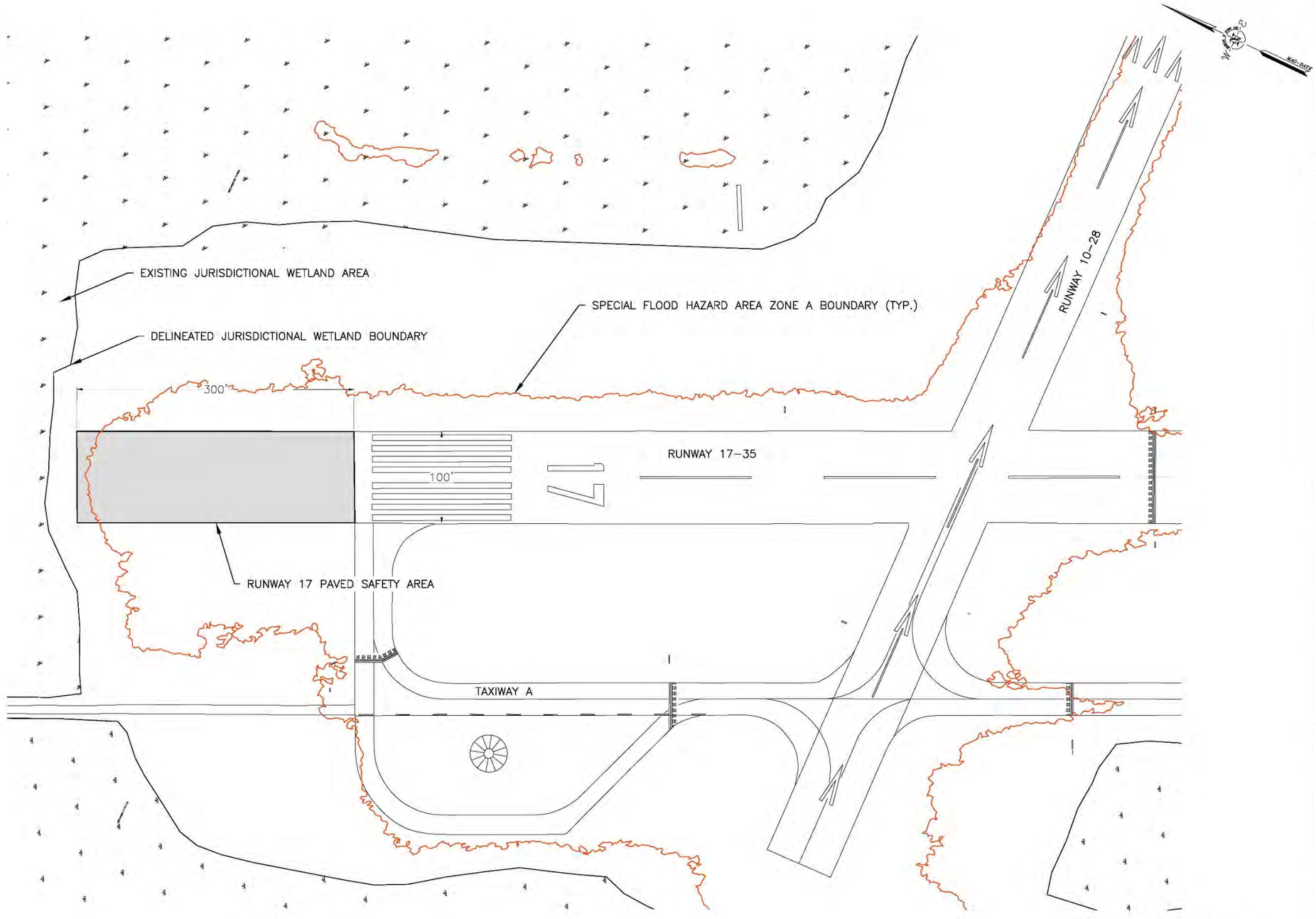

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This is an improvement over the no-build alternative, with minimal costs and only minor environmental impacts. There are no direct impacts to vegetated wetland resources. Impacts would be limited to work in the 100-foot Buffer Zone, a small portion of Riverfront Area and the 100-year floodplain.

This alternative allows corporate aircraft to operate at heavier takeoff weights, which improves the airport's goals of being better able to meet the existing and future regional demand for corporate aviation access to the southwest Boston metropolitan area. This alternative would also eliminate some of the issues associated with the shorter runway length, enable the Airport to sell more fuel and allow a higher percentage of B-II design aircraft to utilize the airport during hot days. Lastly, the costs for this alternative are low when compared to the other alternatives.

Paving the RSAs has been identified as the Preferred Alternative due to its relatively minor environmental impacts, less costly development cost, and immediate operational benefits.

3.2.2.3 Alternative C -No Build Alternative

The No-Build Alternative would make no changes to the existing Runway 17/35. Accordingly, Runway 17/35 would remain 4,008 feet in length, 100 feet in width and maintain an FAA Airport Reference Cord (ARC) of B-II. This includes small aircraft and light jets with approach speeds of less than 121 knots and wingspans less than 79 feet.

This alternative is undesirable from an operational safety standpoint because of limitations on current design critical aircraft and the Airport's increasing role as an economic engine in the southwest metropolitan area. This alternative does not allow corporate aircraft to operate at full takeoff weights. The ultimate consequence of limiting or reducing an aircraft's operating weight is a reduction in the aircraft's operational efficiency, decreasing business economic growth, and a reduction in the airports ability to be sustainable.

While the No-Build Alternative has no environmental impacts, it has negative long-term social and economic impacts.

Table 3-2 Comparison of Runway Length Alternatives

	Alternative A: Extend Runway 17/35	Alternative B: Pave 17/35 RSAs Preferred	Alternative C: No Build
Environmental Impact	10 acres wetlands	Floodplain impact only	None
Meets FAA Standards	Yes	Yes	No
Meets Facility Requirements	Yes	Yes	No
Development Cost	$$$$	$	None
Flexibility	Excellent	Good	Poor

3.2.3 Perimeter Fence Alternatives

3.2.3.1 No-Build Alternative

The no build alternative would make no changes to the existing wildlife fence and it would remain in a deteriorated condition. Repairs would be made as feasible but the potential for wildlife hazards within the air operations area would remain. The No Build Alternative does not meet the purpose and need for this project which is to enhance Airport safety.

3.2.3.2 Fence Replacement in current location

This alternative would replace the fence in its current location within wetlands. This location has been proven to be problematic for access for repairs, vegetation management along the fenceline, and vulnerable to treefall along the tree line. While this alternative would serve the purpose and need, it would cause increased wetland impacts both during installation and ongoing maintenance of the fence. No fencing would be removed from wetlands. The challenge of fence maintenance would not be resolved either.

3.2.3.3 Proposed Action (Fence Relocation)

This preferred alternative to replace deteriorated sections of the wildlife perimeter fence (installed in2001) will relocate these sections of fencing to more accessible areas of the Airport for maintenance purposes, removing as much as feasible from vegetated wetlands. Approximately 13,700 linear feet (lf) of fence would be installed and 14,350 lf of fence removed, of which almost all is currently within vegetated wetlands. This Proposed Action minimizes impacts to wetlands while enhancing Airport safety and impeding wildlife passage onto the air operations area.

Section 4.0

Affected Environment

4.0 AFFECTED ENVIRONMENT

This section describes existing conditions on and near the Proposed Action site at Norwood Memorial Airport. The Region of Influence (ROI) includes the area where ground and resource disturbance would occur during construction due to the Proposed Action and the immediate surrounding area. There are 14 possible environmental impact categories identified by FAA Order 1050.1F. As stated in Paragraph of 4-2.c of FAA Order 1050.1F, *"[i]f an environmental impact category is not relevant to the proposed action or any of the reasonable alternatives identified (i.e., the resources included in the category are not present or the category is not otherwise applicable to the proposed action and alternative(s)), this should be briefly noted and no further analysis is required."* It is not the intent of this document to provide detailed discussion or analysis of all categories; rather, only those areas where there is the potential for there to be significant environmental impact caused by the proposed action and alternatives, or where there are uncertainties which require evaluation, are identified in this document. The area of analysis for direct and indirect impacts includes the Norwood Memorial Airport, and where necessary, is expanded to include the surrounding communities.

Environmental concerns and possible hazards are an important consideration for any public use airport. This environmental overview takes as its guide the requirements of FAA Order 1050.1F. The following sections describe the existing conditions of the NEPA review factors that potentially may be affected by the Proposed Action.

This EA also relies on the 2020 Norwood Memorial Airport Technical Master Plan Update (TMPU) for detailed discussion of airport-wide site conditions and overall proposed action context and potential impacts.

4.1 Operations and Future Forecasting

According to the 2020 TMPU, Norwood Memorial Airport is the second busiest general aviation airport in Massachusetts. It is a nonprimary reliever serving approximately 66,823 in 2017.

Flight schools are a large contributor to the total flight operation activity at the Airport and these have seen steady growth over the years. According to airfield Air Traffic Control, the total flight training operations made up 19,444 or 31 percent of the total airport operations in 2017. During the five years 2013 to 2018, the Airport experienced a shift from predominantly flight training activity to a greater percentage of corporate aviation activity. As a center for corporate aircraft, the Airport is undergoing a transition in its flight operations that reflects this shift. In 2014, 546 or one percent of Norwood's total annual operations were attributed to Air Taxi (small private aircraft that offer short on-demand flights) operations and in 2017, 4,650 or 7.7 percent of Norwood's total annual operations were attributed to Air Taxi operations, a significant increase in Air Taxi operations.

As the Norwood area continues to develop into a regional business center, the activity levels of corporate aviation will continue to grow and place unique demands upon the Airport that were not present ten years ago. The Airport's Fixed Base Operators (FBO) are servicing more corporate aircraft and have clearly seen increased requests to operate corporate aircraft to and from the Airport. In addition to the increasing corporate activity, helicopter traffic has also increased. There are numerous companies operating fifteen helicopters based at Norwood. While the role of Norwood Memorial Airport has not changed, the type of flight activity at the Airport is transitioning from flight training into high-end corporate use, with overall flight activity expected to continuously grow.

4.2 Existing Conditions

4.2.1 Air Quality

This section describes the existing air quality conditions at the Airport. The regulations that establish standards for the pollutants are overviewed, and Norwood's current attainment of these standards is reported.

4.2.1.1 National and State Ambient Air Quality Standards

The 1970 CAA was enacted by Congress to protect the health and welfare of the public from the adverse effects of air pollution. As required by the CAA, the United States Environmental Protection Agency (EPA) promulgated National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: nitrogen dioxide (NO_2), sulfur dioxide ($SO_{2)}$, particulate matter (PM10 and PM2.5), carbon monoxide (CO), ozone ($O_{3)}$, and lead (Pb). The NAAQS are listed in Table 4-1. Massachusetts has similar standards, referred to as Massachusetts Ambient Air Quality Standards (MAAQS).

The NAAQS presented in Table 4-1 specify concentration levels for various averaging times. The NAAQS includes both "primary" and "secondary" standards. The primary standards are intended to protect human health; whereas, the secondary standards are intended to protect public welfare from any known or anticipated adverse effects associated with the presence of air pollutants, such as damage to vegetation.

The NAAQS also reflect various durations of exposure. The short-term periods (24 hours or less) refer to exposure levels not to be exceeded more than once a year. Long-term periods refer to limits that cannot be exceeded for exposure averaged over three months or longer.

Although not considered a "criteria pollutant" in the traditional sense where there is a concentration standard protective of human health and/or property, carbon dioxide (CO_2) is considered a "greenhouse gas" and analysis of CO_2 emissions are required as part of an air quality analysis.

Table 4-1 National and Massachusetts Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS/MAAQS (µg/m³) Primary	NAAQS/MAAQS (µg/m³) Secondary
NO_2	Annual [1]	100	Same
	1-hour [2]	188	None
SO_2	3-hour [3]	None	1300
	1-hour [4]	196	None
PM2.5	Annual [1]	12	15
	24-hour [5]	35	Same
PM10	24-hour [3]	150	Same
CO	8-hour [3]	10,000	Same
	1-hour [3]	40,000	Same
Ozone	8-hour [6]	147	Same
Pb	3-month [1]	0.15	Same

Source: http://www.epa.gov/ttn/naaqs/criteria.html and 310 CMR 6.04
[1] Not to be exceeded.
[2] 98th percentile of one-hour daily maximum concentrations, averaged over three years.
[3] Not to be exceeded more than once per year.
[4] 99th percentile of one-hour daily maximum concentrations, averaged over three years.
[5] 98th percentile, averaged over three years.
[6] Annual fourth-highest daily maximum eight-hour concentration, averaged over three years.

4.2.1.2 Attainment Status

Section 107 of the 1977 CAA Amendment requires that the EPA publish a list of the geographic areas in compliance with the NAAQS, and those areas not in compliance with the NAAQS. Areas not in NAAQS compliance are deemed non-attainment areas. Areas that have insufficient data to make a determination are deemed unclassified and are treated as being attainment areas until proven otherwise. An area's designation is based on the data collected by the state monitoring network on a pollutant-by-pollutant basis.

The attainment status for each pollutant is shown in Table 4-2.

Table 4-2 Norfolk County Attainment Status

Pollutant	Status
Sulfur Dioxide (SO_2) (1-hour and annual)	Better than national standards (Attainment) EPA is still designating States for the 1-hour SO_2 standard.
Carbon Monoxide (CO) (1- and 8-hour)	Maintenance (moderate) (Only the city of: Quincy.)
Ozone (O_3) (8-hour)	Unclassifiable/Attainment (2008) Unclassified (2015)
Particulate Matter (PM10) (24-hour)	Unclassifiable

Table 4-2 Norfolk County Attainment Status (Continued)

Nitrogen Dioxide (NO_2) (annual)	Unclassifiable/Attainment
Particulate Matter (PM2.5) (annual and 24-hour)	Unclassifiable/Attainment
Lead (Quarterly)	Unclassifiable/Attainment

Source: 40 CFR 81.322, EPA's "Green Book," and Massachusetts 2015 Air Quality Report

4.2.1.3 State Implementation Plan

States with nonattainment areas show their intent to meet the NAAQS by preparing State Implementation Plans (SIP) outlining realistic methods to do so in the required timeframe.

Massachusetts has an approved SIP for 1-hour ozone (from 2002) and an approved SIP for 8-hour ozone (from 2008).

4.2.1.4 Environmental Conditions

The study area for Air Quality includes the Norwood Memorial Airport.

4.2.1.5 Criteria Pollutant Ambient Air Quality Data

To estimate background pollutant levels representative of the area, the most recent data obtained from MassDEP air quality reports were reviewed. Typically, the use of the latest three years of available monitoring data is representative of a project site. The closest most representative monitoring location is at Harrison Avenue in Boston.

A summary of the background air quality concentrations is presented in Table 4-3.

For short-term averages (24 hours or less), the highest of the yearly observations will be estimated to be the background concentration, with the exception of the PM2.5 24-hour value where the average of the 98th percentile concentrations was used, consistent with the short-term ambient air quality standards. The short-term ambient air quality standards are not to be exceeded more than once per year. For long-term averages, the highest yearly observation was used as the background concentration. Again, with PM2.5, the annual background concentration is the average of the three years.

Table 4-3 Observed Ambient Air Quality Concentrations

Pollutant	Averaging Time	2017	2018	2019	Background Concentration ($\mu g/m^3$)[2]	NAAQS	Percent of NAAQS
SO_2 [(1)(5)]	1-Hour (4)	10.5	10.0	4.5	8.3	196.0	4%
	3-Hour (6)	9.4	11.0	4.2	11.0	1300.0	1%
PM-10	24-Hour	27.0	23.0	27.0	27.0	150.0	18%
PM-2.5	24-Hour (4)	12.1	14.3	13.0	13.1	35.0	38%
	Annual (4)	5.3	5.3	5.2	5.3	12.0	44%
NO_2 [(3)]	1-Hour (4)	86.5	90.2	92.1	89.6	188.0	48%
	Annual	41.6	21.0	21.0	41.6	100.0	42%
CO [(2)]	1-Hour	1512.7	1266.3	1843.9	1843.9	40000.0	5%
	8-Hour	1439.4	802.2	1146.0	1439.4	10000.0	14%
Ozone	8-Hour	135.4	131.5	119.7	1354	147.0	92%
Lead [(6)]	Rolling 3-Month	N/A	N/A	N/A	N/A	0.15	N/A

Notes:

From 2018-2020 EPA's AirData Website

(1) SO_2 reported ppb. Converted to µg/m3 using factor of 1 ppb = 2.62 µg/m3.

(2) CO reported in ppm. Converted to µg/m3 using factor of 1 ppm = 1146 µg/m3.

(3) NO_2 reported in ppb. Converted to µg/m3 using factor of 1 ppb = 1.88 µg/m3.

(4) Background level is the average concentration of the three years.

(5) The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, page 35520.

(6) Lead is no longer monitored at any site in Massachusetts

The NAAQS also reflect various durations of exposure. The short-term periods (24 hours or less) refer to exposure levels not to be exceeded more than once a year. Long-term periods refer to limits that cannot be exceeded for exposure averaged over three months or longer.

The inhalable particulate (PM10) NAAQS were promulgated on July 1, 1987 at the federal level with the intent of replacing the existing standards limiting ambient levels of Total Suspended Particulate (TSP). EPA also promulgated a Fine Particulate (PM2.5) NAAQS effective December 2006 with an annual standard of 15 $\mu g/m^3$ and the 24-hour standard of 35 $\mu g/m^3$. The annual PM2.5 standard has since been strengthened to 12 $\mu g/m^3$ in 2012 while the annual PM10 standard was revoked in 2006.

[2] Microgram per cubic meter.

4.2.1.6 Methodology

The FAA has produced guidance[3] on the necessary steps to perform an air quality analysis for airports undergoing changes as part of a Federal action. Since the Proposed Action is not an FHWA/FTA project, nor is it regionally significant, a Transportation Conformity determination is not necessary. Additionally, the Commonwealth of Massachusetts does not require indirect source permits, so that review is also not necessary. Since the taxiway realignment, pavement repair, and fence repair are considered exempt and presumed to conform, a general conformity assessment is not required. However, for completeness, it will be addressed.

4.2.1.7 Conformity

Section 176 (c) of the Clean Air Act requires that any entity of the federal government that engages in, supports, or in any way provides financial support for, licenses or permits, or approves any activity must demonstrate that the action conforms to the area's commitment of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of those standards.

General conformity applies to all other actions in non-attainment or maintenance areas not specifically covered by transportation conformity. To determine whether general conformity requirements apply to an action, the agency in charge must consider the nonattainment and maintenance status of the area, the exemptions from and presumptions to conformity, the Proposed Action's emissions, and the regional significance of the Proposed Action's emissions. The current conformity rule only applies to actions located in nonattainment and maintenance areas.

The proposed improvements can be considered actions "presumed to conform", under the list of exemptions presented in (72 Fed. Reg. 145 (Jul. 30, 2007). The rule states that "Airport maintenance, repair, removal, replacement, and installation work that matches the characteristics, size, and function of a facility as it existed before the replacement or repair activity typically qualifies as routine maintenance and repair for purposes of general conformity. Such activity does not increase the capacity of the airport or change the operational environment of the airport."

Subsequently, the rule states "Taxiway construction projects [presumed to conform] are limited to improvements of existing taxiways that will not affect runway use, increase capacity, enable new aircraft types, or change existing airfield operations when complete (e.g., new high-speed exits would represent such a change)."

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[3] Federal Aviation Administration (FAA) Air Quality Procedures For Civilian Airports and Air Force Bases, FAA-AEE-97-03 AL/EQ-TR-1996-0017, April 1997.

Therefore, the Preferred Alternative is "presumed to conform" and is deemed to comply with all requirements of General Conformity.

4.2.2 Biological Resources (Fish, Wildlife, and Plants)

Biological resources include terrestrial and aquatic plant and animal species; game and non-game species; special status species (state- or federally-listed threatened or endangered species, marine mammals, or species of concern, such as species proposed for listing or migratory birds); and environmentally-sensitive or critical habitats. Wildlife species have specific habitat requirements, such that the distribution and abundance of each species are limited by the quality and quantity of available habitat in a given area.[4] The analysis area for biological resources affected by the Proposed Action focuses on the immediate site and the entire Norwood Memorial Airport. Certain undeveloped portions of the Airport provide suitable habitat for a number of plant and wildlife species common to Massachusetts.

4.2.2.1 Vegetation

Wetlands on site are generally emergent marsh, shrub swamp, and forested wetland plant communities (see Figure 4-1). Where not bordered by roads, runways, taxiways, or structures, the emergent marsh areas transition to shrub swamp and forested red maple swamp habitat at a distinct, maintained tree line. Wetlands are dominated by meadowsweet (*Spiraea sp.),* bluejoint grass (*Calamagrostis canadensis*), purple loosestrife (*Lythrum salicaria*), elderberry (*Sambucus sp.*), narrow-leaved goldenrods (*Solidago sp*.), wool-grass (*Scirpus cyperinus*), joe pye-weed (*Eutrochium purpureum*), soft rush (*Juncus effusus*), buttonbush (*Cephalanthus occidentalis*), sedges (*Carex sp.),* and buckthorn (*Rhamnus cathartica*).

Dominant species in the wetland system proximate to the proposed impact area consist of broadleaf cattails, meadowsweet, button bush, blue joint grass, soft rush (*Juncus effusus*), tussocks sedge, elderberry, deer tongue (*Dichanthelium clandestinum*) and tearthumb (*Polygonum perfoliatum*). Standing water is present throughout most of the growing season. This area is maintained as an emergent marsh habitat in accordance with the Airport's Vegetation Management Plan.

Portions of the Airport are also mapped as Priority Habitat under the Massachusetts Endangered Species Act (MESA) for a plant species (PH 1044). A small portion of the Proposed Action area is located within this mapped habitat polygon within the actively mowed RSA associated with the Runway 35 approach end of runway 17-35 (see Figure 1-4).

[4] See "Technical Guide to Forest Wildlife Habitat Management in New England," DeGraaf, Richard M. et al; 2006.

Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division - Data Obtained October 2014

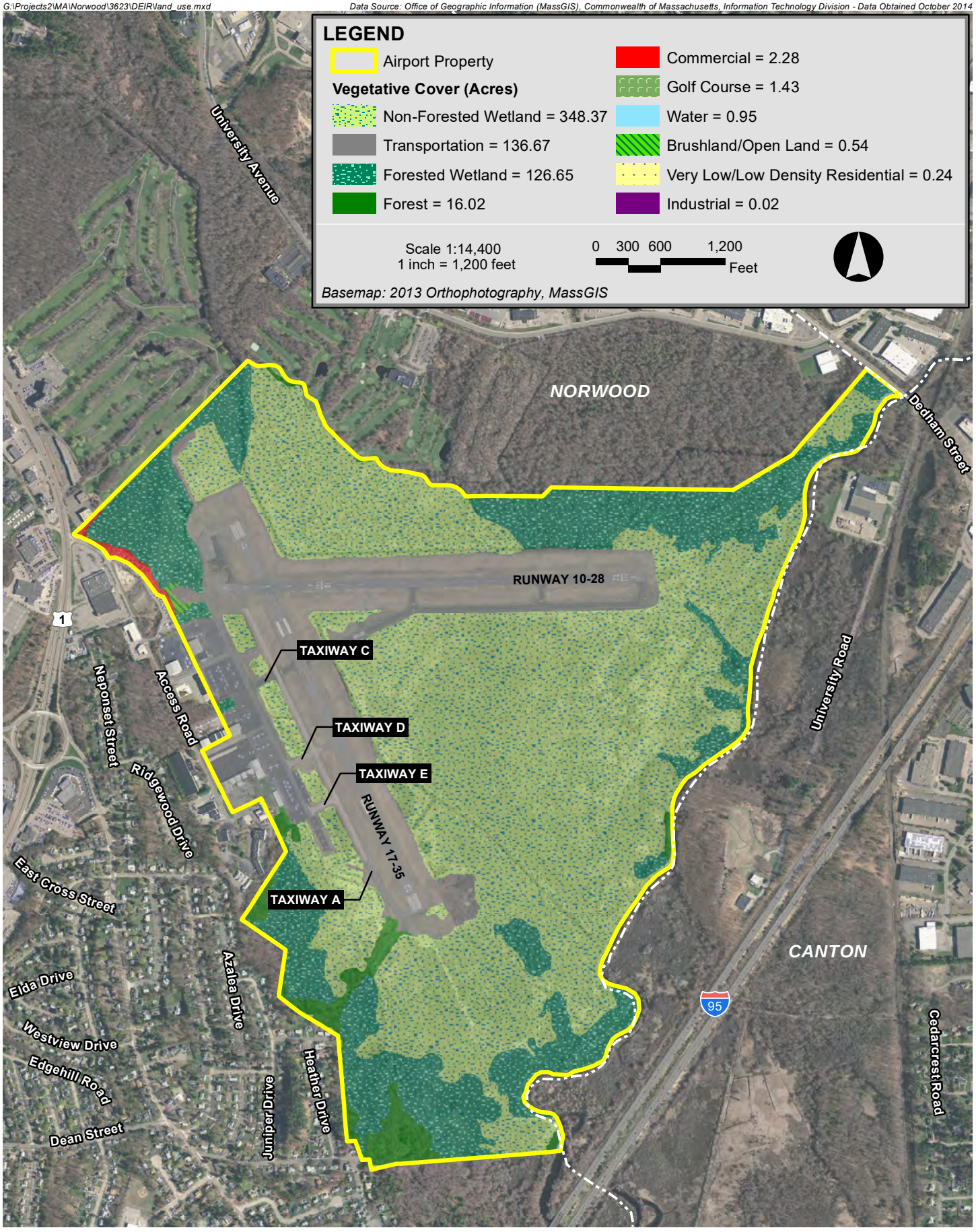

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Figure 4-1

Vegetative Cover (2005 Land Use, MassGIS)

4.2.2.2 Aquatic Habitat

Aquatic habitat refers to intermittent streams, ditches, and rivers located on the Airport property. There are no ponds located on the Airport property. This habitat type is primarily limited to ditches and their associated watercourses within the Proposed Action site (see Figure 1-3). The Neponset River lies approximately 2,000 feet east of the Proposed Action and forms the eastern boundary of the Airport property. Purgatory Brook, a perennial stream which had been previously ditched (during Airport development in the 1940s) where it enters the Airport property on the northern boundary flows easterly along the northern edge of Runway 10-28 to where it meets the Neponset River. This stream may provide some warm water fisheries habitat. An unnamed ditch flows in a southerly direction parallel to Runway 17-35 and then turns easterly and drains into the Neponset River. A smaller ditch originates by the Airport's apron area, is culverted beneath Runway 17-35, flows easterly and then drains into this larger ditch. This ditch is located just north of the Proposed Action area. Fisheries habitat values within these ditches are limited by the water depth, slow moving water, anticipated low dissolved oxygen levels at certain times of the year and turbidity.

4.2.2.3 Rare and Endangered Species

Federally-Listed Species

The USFWS issued the Final Rule on the Northern Long-Eared Bat *(Myotis septentrionalis*) (NLEB) in the January 14, 2016 edition of the Federal Register (V. 81, No. 9, page 1900 – 1922) titled "Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat" (i.e., the "Final Rule). The purpose of the Final Rule is to prohibit the intentional, or purposeful, take of NLEB throughout its range; except for specific instances to protect human health, property, or for scientific and conservation purposes. Take of NLEB is prohibited in hibernacula throughout its range, in areas affected by white nose syndrome, unless permitted by the USFWS. Incidental take of NLEB outside of hibernacula from otherwise lawful activities, other than tree clearing, is not prohibited by the Final Rule.

The NLEB range includes much of the eastern and north central United States, and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia. NLEB spend winter hibernating in caves and mines, called hibernacula. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. During the summer, NLEB roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and dead trees (snags). Northern long-eared bats seem to be flexible in selecting roosts, choosing roost trees based on suitability to retain bark or provide cavities or crevices. The majority of airfield, including the Proposed Action site, is generally free of forest stands and thus lacks summer tree roosting habitat.

The USFWS does not require private landowners to conduct surveys on their lands for hibernacula and maternity roost trees. Location information for known hibernacula and maternity roost trees is generally kept in state Natural Heritage Inventory databases, thus consultation with state Natural Heritage Inventory databases is encouraged.

No hibernacula and maternity roost trees are located within or around the Airport.

State-Listed Species

The Airport is located within the Fowl Meadow and Ponkapoag Bog Area of Critical Environmental Concern (ACEC). The Massachusetts Natural Heritage and Endangered Species Program (NHESP) mapped portions of the Airport, including the area around Runway 35 end, as Priority Habitat of Rare Species (see Figure 1-4) for a plant, Long's Bulrush (*Scirpus longyi*), a globally rare, Massachusetts state threatened, robust sedge that can be found in peat wetlands.

4.2.3 Farmlands

Soils that exhibit good drainage are typically considered by the U.S. Department of Agriculture Soil Conservation Service to be prime farmland. The Farmland Protection Policy Act (FPPA) requires coordination with the local office of the Natural Resources Conservation Service (NRCS) if the proposed action entails irreversible conversion of prime farmland to nonagricultural uses. Farmland subject to this requirement does not have to be currently used for cropland; it may also be forestland or pastureland, but not urban or built-up land. This requirement is intended to monitor the impact that federal programs or federally funded projects have on the conversion of this resource.

The NRCS identifies important farmland areas by soils that have ideal combinations of physical and chemical attributes for a variety of farming uses; these are identified as Prime Farmland, Farmland of Unique Importance, and Farmland of Statewide Importance. Prime Farmland are those areas with ideal farming conditions; Farmland of Unique Importance are those soil types that high-value crops require; and Farmland of Statewide Importance are those soils that do not meet the previous grouping criteria but are important at the state or local level. The Proposed Action site does not contain soils that are considered "Farmland of Statewide Importance," however, it does contain "Farmland of Unique Importance" soils like the Freetown and Swansea series (see Figure 4-2). Currently, areas within the Proposed Action site containing soils are not in agricultural use.

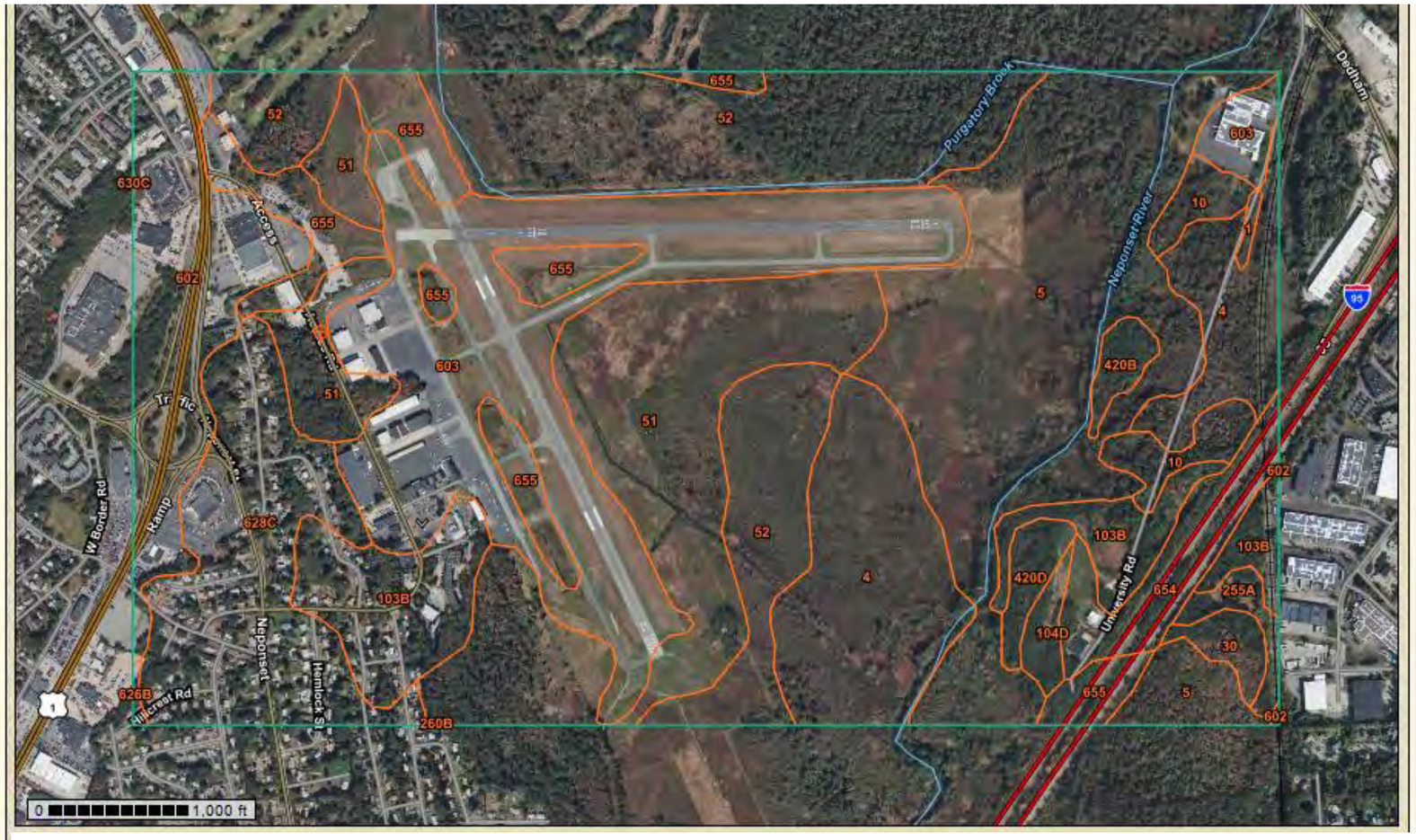
4.2.4 Hazardous Materials, Solid Waste, and Pollution Prevention

To determine the potential for encountering soils contaminated from historical releases or former land development practices during excavation and grading activities associated with the Proposed Action, the MassDEP reportable release database was reviewed for spills at sites located within 300 feet of the Proposed Action site. No releases were reported within 300 feet.

Norfolk and Suffolk Counties, Massachusetts (MA616)

Norfolk and Suffolk Counties, Massachusetts (MA616)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	1.0	0.1%
4	Rippowam silt loam, 0 to 3 percent slopes	77.3	8.7%
5	Saco silt loam, 0 to 3 percent slopes	144.9	16.4%
10	Scarboro and Birdsall soils, 0 to 3 percent slopes	13.7	1.5%
30	Raynham silt loam, 0 to 3 percent slopes	5.4	0.6%
51	Swansea muck, 0 to 1 percent slopes	121.0	13.7%
52	Freetown muck, 0 to 1 percent slopes	123.6	14.0%
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	47.5	5.4%
104D	Hollis-Rock outcrop-Charlton complex, 15 to 35 percent slopes	4.7	0.5%



There are a total of two reportable release sites within the vicinity of the Preferred Alternative. Release Tracking Number (RTN) 4-0021020 submitted a Response Action Outcome (RAO) on March 19, 2008. RTN 4-0024325 submitted an RAO on March 29, 2013. These are associated with the apron area of the Airport and are located over 1,000 feet away from the Preferred Alternative.

Hazardous materials used for operation and maintenance of aircraft, runways, and taxiways include fuels, degreasers, and aviation lubricants and oils. The Airport has a Spill Prevention Control and Countermeasures (SPCC) Plan that establishes procedures for handling these substances. Aircraft fuel storage and refueling areas are limited to the apron areas on the western side of the Airport near the Airport Access Road. Please note the Airport does not conduct any firefighting training and does not have a documented release of any firefighting materials in the past 15 years.

4.2.5 Historical, Architectural, Archeological, and Cultural Resources

The Proposed Action is subject to Section 106 of the National Historic Preservation Act (36 CFR 800) and Massachusetts General Laws, Chapter 9, Sections 26-27C as amended by the Acts of 1988 (950 CMR 71). Section 106 of the National Historic Preservation Act of 1966 requires Federal agencies to consider the effects of their projects on properties that are listed in, or are eligible for listing in, the National Register of Historic Places. The lead Federal agency for a project must determine whether any property located within the project's Area of Potential Effect (APE) is listed in, or may be eligible for listing in, the National Register. The APE for archaeological resources is defined as locations where the proposed project may alter or disturb surface and/or subsurface soils that contain, or have the potential to contain, archaeological sites. For the purposes of Section 106, FHWA is the lead Federal Agency and the process will be administered on the state level by the State Historic Preservation Officer (Massachusetts Historical Commission).

In addition to the State Historic Preservation Officer (SHPO), projects that may cause potential impacts to historic properties must consult other involved parties including local historic commissions and Native American tribes. The FAA is required to engage in government-to-government consultation consistent with FAA Order 1210.20, American Indian and Alaska Native Tribal Consultation Policy and Procedures, if an Indian Tribe is a consulting party.

4.2.6 Land Use

This section describes land uses and zoning in the vicinity of the Airport and is based on the May 10, 2012 Zoning Bylaw with Amendments (see Figures 4-3 and 4-4). The Airport and immediate surrounding land to the south and within the approach to Runway 17-35 has a "manufacturing" zoning designation. Land immediately to the west-northwest is given a "general residence" zoning designation, within the approach to Runway 10-28 and Runway 17-35. Also within runway approaches, areas to the north-northeast and east are designated as "manufacturing and light manufacturing". Areas to the southwest, west, and northwest are comprised of residences and

Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division - Data Obtained October 2014

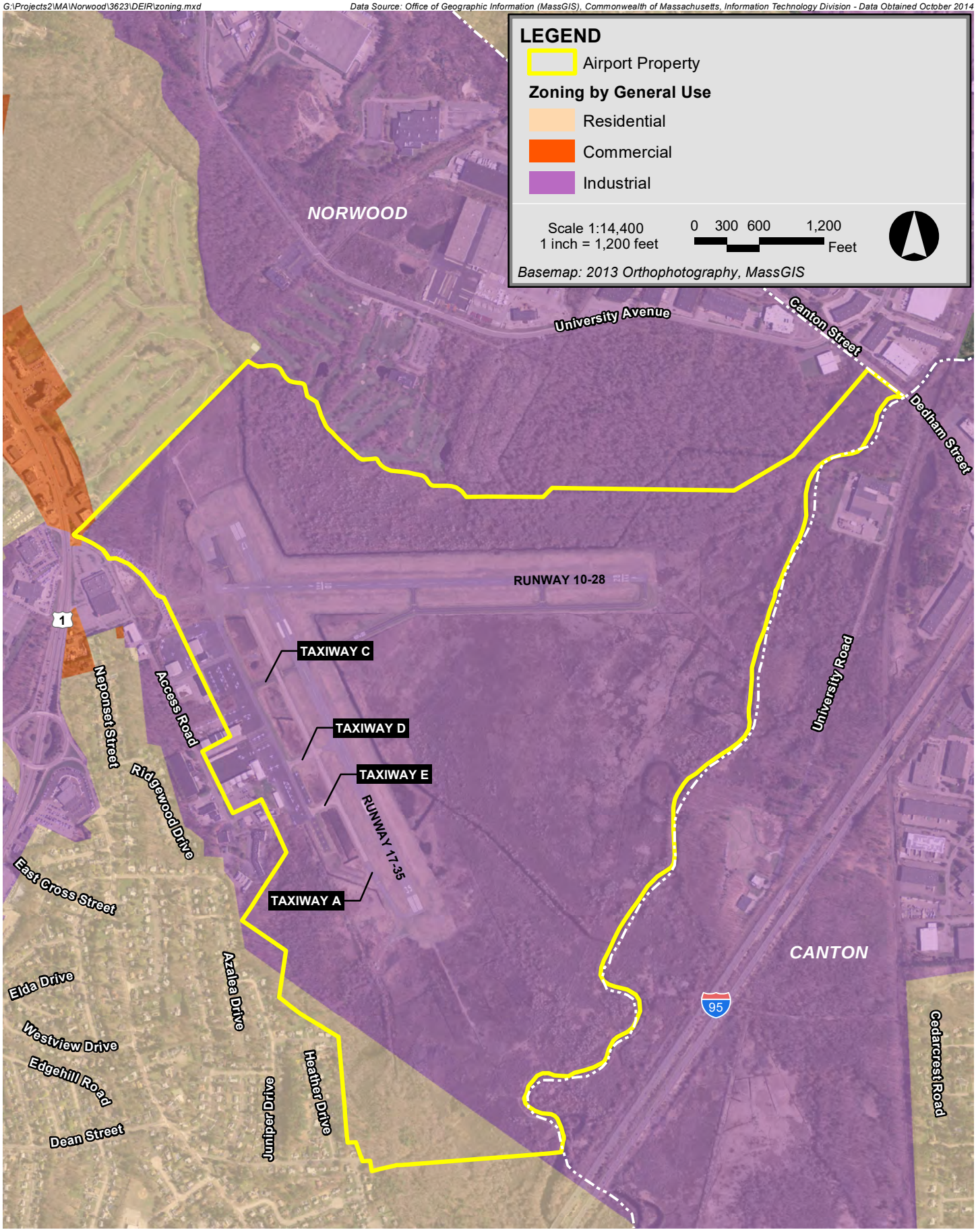


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Figure 4-3
Zoning

Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division - Data Obtained October 2014

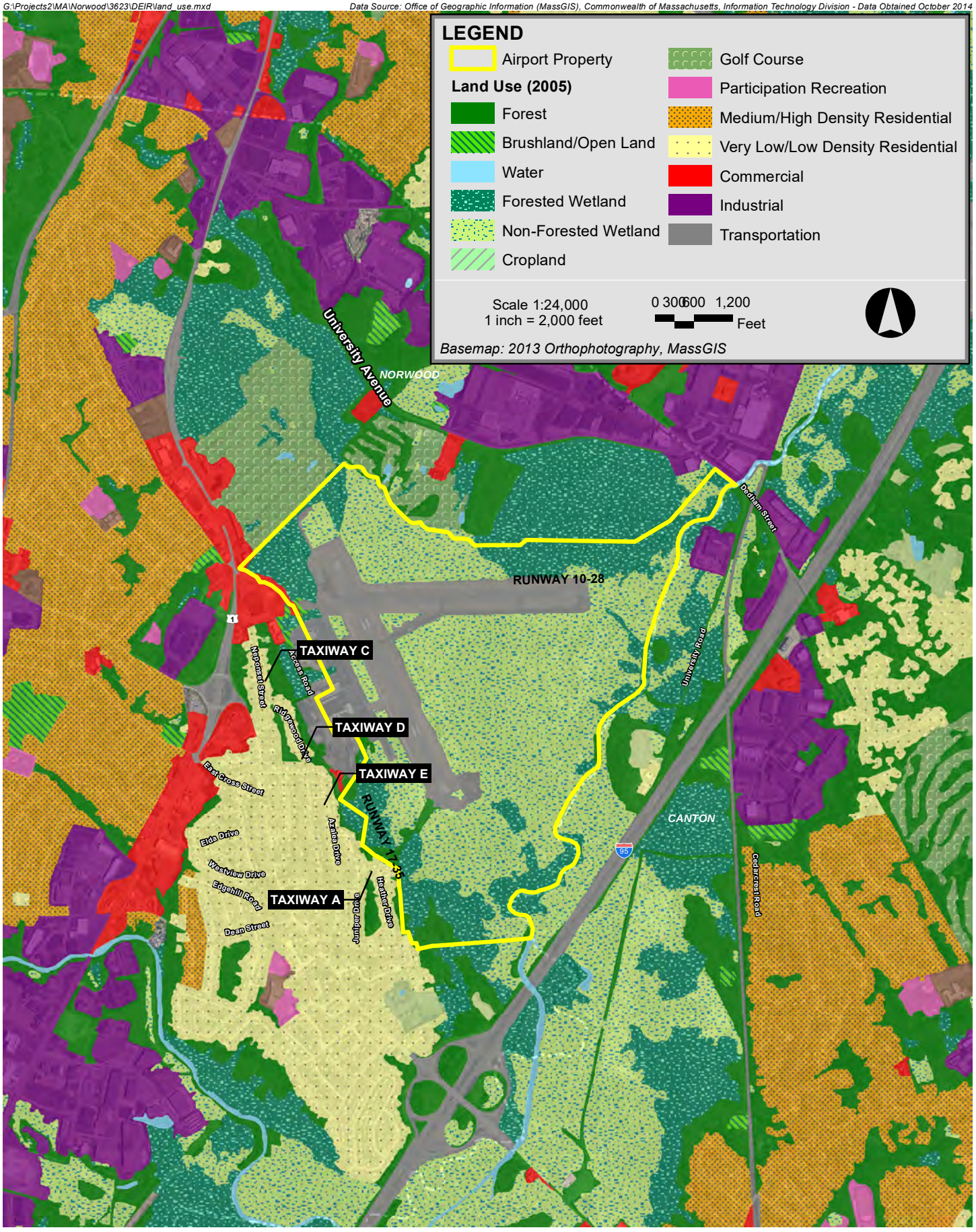

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Figure 4-4
Land Use

are zoned as “single residence”. Land to the immediate northwest along each side of US Route 1 is designated “highway business”. These uses are generally compatible with airport activities and flight operations, with the exception of a highway, business, and flagpole that causes a displaced threshold on the end of Runway 17.

Current land uses directly surrounding the Airport do not reflect, however, the existing zoning designations (see Figure 4-4). Land directly north of the Airport is used as a golf course. Land east of the airport on University Avenue is used as an industrial park. Marshland and vacant zones are found south of the Airport. Adjacent to those plots southwest of the Airport are single family residences with few clusters of limited businesses, some of which are aviation-related. Two schools are located within approximately a half-mile of the Airport: Prescott School, which is located to the south and Callahan School, located to the west. Police and fire stations are located near the center of town, more than a mile west of the Airport.

4.2.7 Noise and Noise-Compatible Land Use

A Federal Aviation Regulations (FAR) Part 150 Noise Study was prepared for the Airport in 1990. This study presented an analysis of existing and future noise levels both at the airport and in the vicinity thereof resulting from aircraft operations. It also provided suggestions that, when implemented, would help to reduce noise impacts. These suggestions are currently in effect as voluntary noise abatement flight procedures. These procedures are for use in visual flight rule (VFR) weather conditions. These procedures (1) indicate priority runway use for noise abatement; (2) identify known noise sensitive areas in the vicinity of the airport; and (3) provide optimum noise abatement arrival and departure paths for each runway. These are to be followed unless otherwise directed by ATC, or unless, in the pilot’s judgment, safety of the flight will be compromised. At the Airport, pilots are educated of these procedures via a handout and via airfield signage.

Jet aircraft utilize the same arrival and departure procedures as non-jet aircraft. Unless operationally required, turbojet and twin-engine aircraft are encouraged to avoid using Runway 28 for departure and Runway 10 for landing to minimize noise over the Town of Norwood.

The proposed taxiway realignment is not expected to generate an increase in the amount or different aircraft operational activity at the Airport. Consequently, increased noise impacts are not anticipated to occur. The Preferred Alternative would not affect community noise levels from the Airport. The distance shift in the taxiway is small compared to the overall distance to the nearest residences southwest of the taxiways. Therefore, any change in noise from taxiing airplanes would be on the order of 0.1-0.2 dBA which is not perceptible. Furthermore, noise levels from taxi operations are insignificant as compared to takeoff and landings which are the operations used to develop the Ldn noise contour maps published by the FAA.

4.2.8 Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks

According to the Commonwealth's Environmental Justice Viewer, which shows Census 2020 block groups with Environmental Justice populations (high minority, non-English speaking, low-income, and foreign-born populations), the Norwood Memorial Airport is located within a mile from low income and minority Environmental Justice communities (see Figure 4-5). The blocks are labeled as a low-income population of about 22.5 percent and a minority population of approximately 24.9 percent.

Charles J. Prescott Elementary School is located southwest of the Airport at 66 Richland Road and Cornelius M. Callahan Elementary School is located northwest of the Airport at 116 Garfield Avenue. Both schools are located in Norwood, Massachusetts, less than a mile from the Airport.

4.2.9 Visual Effects

It is important to consider whether lighting associated with a proposed project might confuse or interfere with the vision of the air traffic controller, the vision of the pilots on approach to an airport runway, or whether it results in significant impacts to airport neighbors.

Light emissions at the Airport are associated with runway and taxiway edge lighting, rotating beacons, Precision Approach Path Indicators (PAPI), approach lighting systems, and other visual navigational aids that help pilots locate the Airport and execute safe landings. Additionally, apron ramp lighting and street lighting on access roadways create light emissions from the Airport.

4.2.10 Water Resources

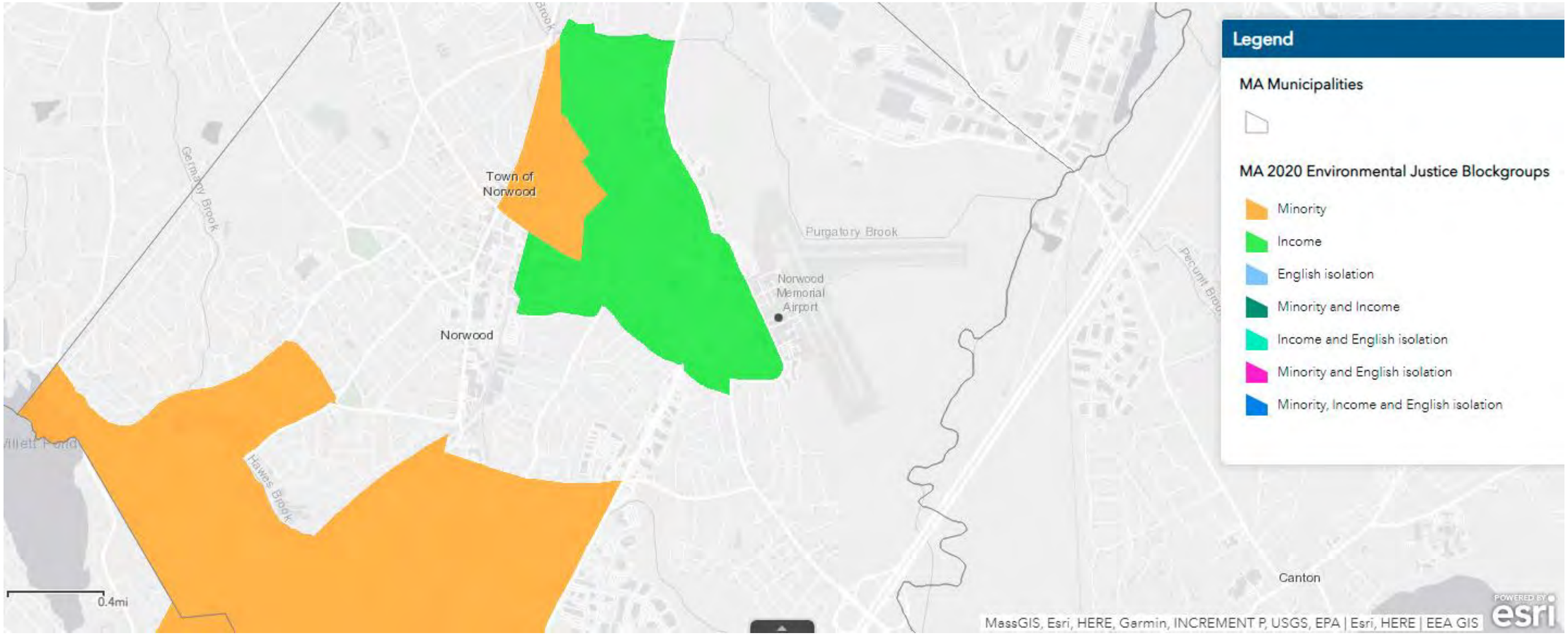
4.2.10.1 Groundwater

The Airport is serviced by the Massachusetts Water Resources Authority (MWRA) municipal water supply and sanitary wastewater. Figure 4-6 depicts water resources close to the Airport.

4.2.10.2 Wetlands

Wetland resource areas, as defined by the Massachusetts Wetlands Protection Act (MGL c.131 §40) (WPA), the Norwood Wetland Bylaw and Regulations (Article XXV) and U.S. Clean Water Act (33 U.S.C. 1344, waters of the U.S.), are associated with a large wetland complex which borders the Neponset River, the eastern property limits of the Norwood Memorial Airport, depicted on Figure 1-3 (Airport-wide) and 4-7 (Proposed Action site). Purgatory Brook also flows through the Airport north of the airfield, discharging into the Neponset River.

Wetlands were delineated in accordance with the U.S. Army Corps of Engineer's "1987 Wetland Delineation Manual" (USACE, 1987) and the "Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region" (USACE, 2012); the Act and Regulations (310 CMR 10.00); and the MassDEP handbook entitled "Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act" (MassDEP, 1995).


Legend
MA Municipalities
MA 2020 Environmental Justice Blockgroups
Minority
Income
English isolation
Minority and Income
Income and English isolation
Minority and English isolation
Minority, Income and English isolation
Town of Norwood
Norwood
Norwood Memorial Airport
Purgatory Brook
Germany Brook
Hawes Brook
Canton
0.4mi
MassGIS, Esri, HERE, Garmin, INCREMENT P, USGS, EPA | Esri, HERE | EEA GIS
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Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division - Data Obtained October 2014

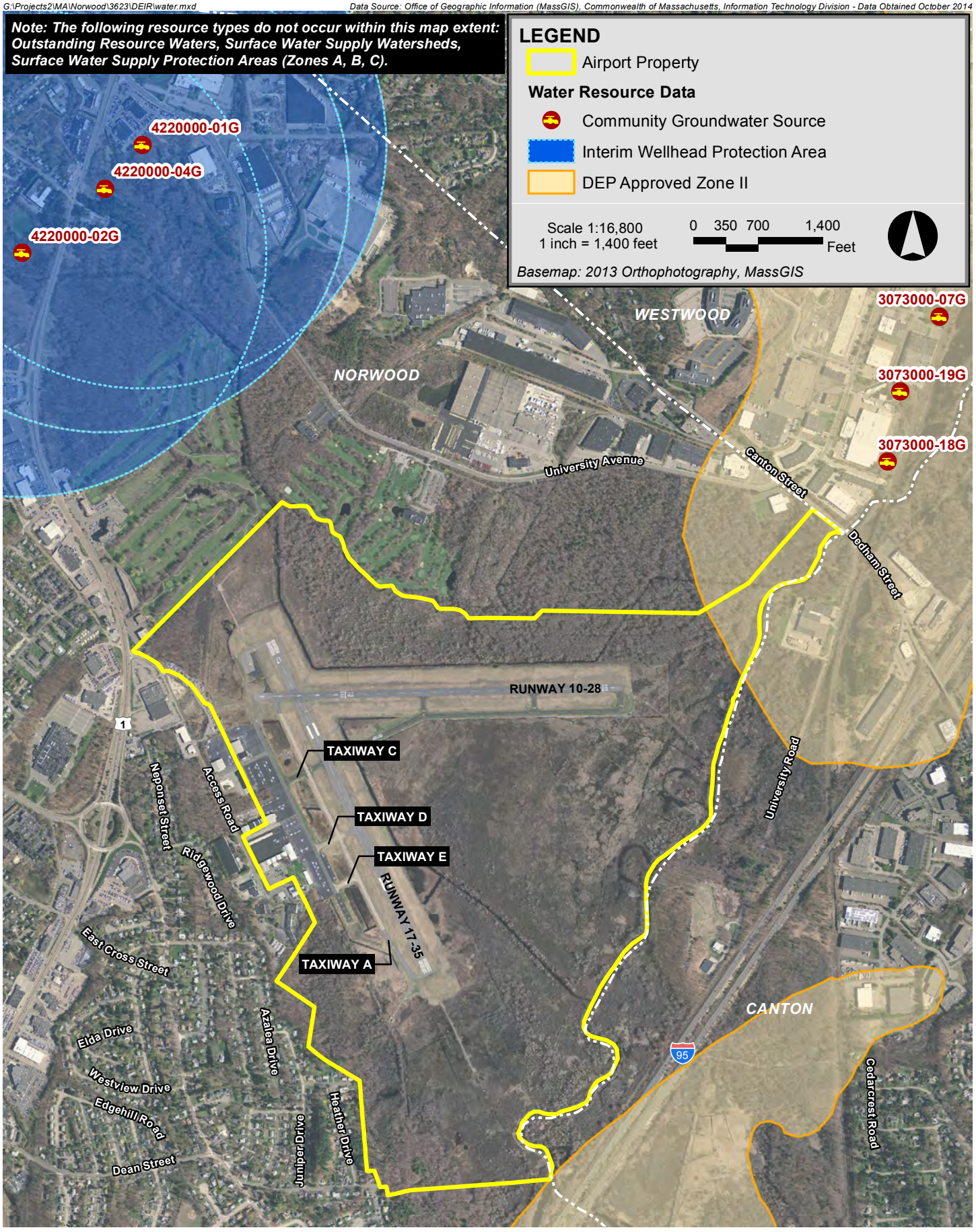

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Figure 4-6

Water Supply Resources

The delineated wetland resource areas include palustrine emergent wetlands located south of Runway 35-end and north of Runway 17-end, west of taxiway A and south of taxiway C, and infield westlands surrounded by both runways and Taxiways C and F. Other state regulated resource areas present within the project area include Inland Bank, 200-foot Riverfront Area and Land Under Water Bodies and Waterways. The entire Proposed Action site contains mapped Bordering Land Subject to Flooding (i.e., FEMA-FIRM 100-year floodplain). There is a perennial stream, Purgatory Brook, and a combination of grassy and previously developed Riverfront Area within the Proposed Action site.

4.2.10.3 Surface Waters and Watersheds

Norwood Memorial is located within the Boston Harbor Watershed and in proximity to the Neponset River and Purgatory Brook (see Figure 1-3). The Neponset River lies approximately 2,000 feet east of the Proposed Action site and forms the eastern boundary of the Airport property. Purgatory Brook, a perennial stream which had been previously ditched (during Airport development in the 1940s) where it enters the Airport property on the northern boundary flows easterly along the northern edge of Runway 10-28 to where it meets the Neponset River. An unnamed ditch flows in a southerly direction parallel to Runway 17-35 and then turns easterly and drains into the Neponset River. A smaller ditch originates by the Airport's apron area, is culverted beneath Runway 17-35, flows easterly and then drains into this larger ditch. This ditch is located just north of the Proposed Action area. Purgatory Brook flows through the Airport north of the airfield, discharging into the Neponset River.

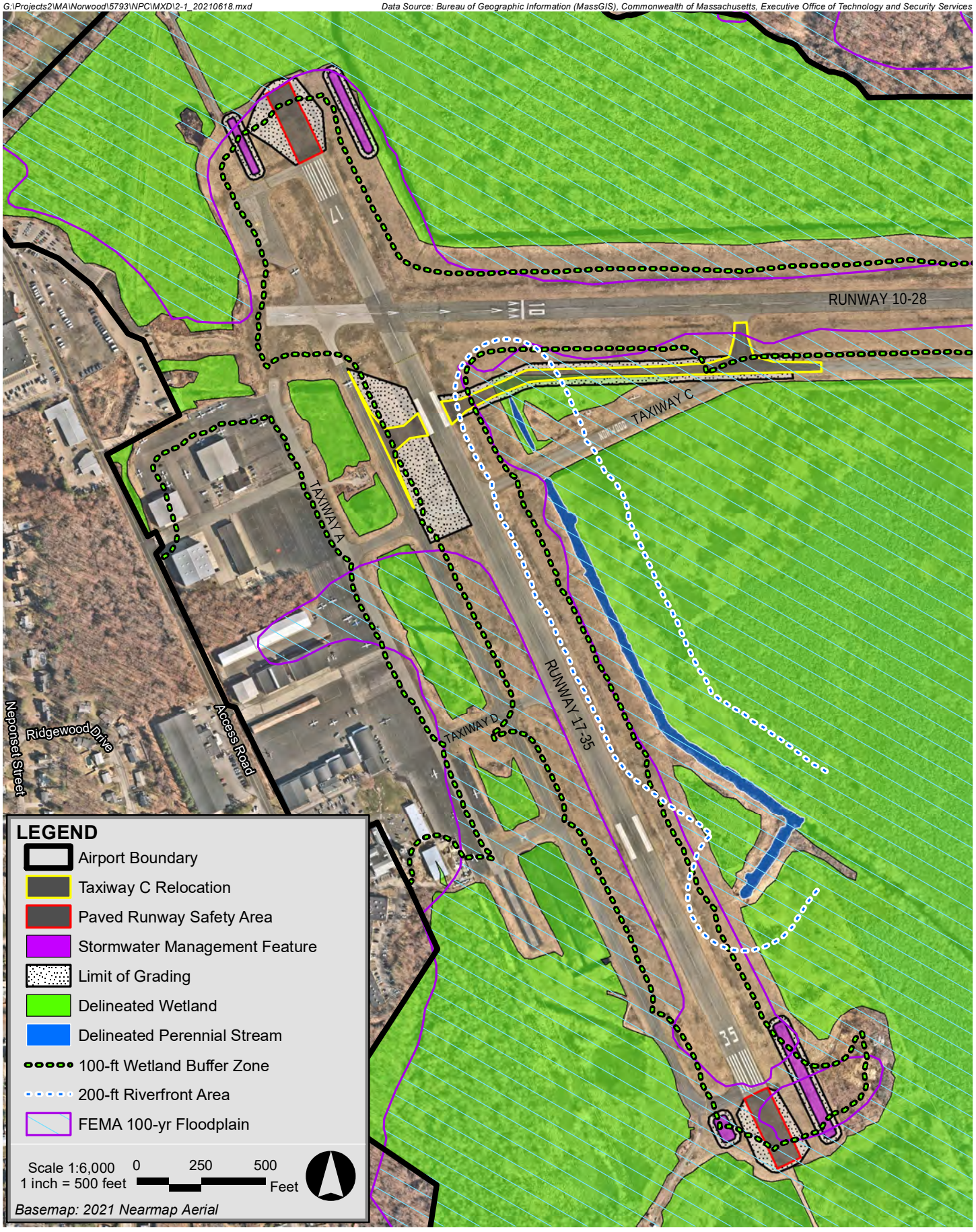
4.2.10.4 Floodplains

The Airport's location within the FEMA floodplain and floodway (flood map 25021C0183E, effective on 07/17/2012) and its proximity to the Neponset River, which sometimes overflows, pose flooding risks during extreme weather conditions (see Figure 4-7). Approximately 500 feet of the eastern end of Runway 10/28, and the MALSF access road south of Runway 17/35 are mapped as FEMA floodways. The Airport's location within the FEMA floodplain and floodway (flood map 25021C0183E, effective on 07/17/2012) and its proximity to the Neponset River, which sometimes overflows, pose flooding risks during extreme weather conditions. Approximately 500 feet (ft) of the eastern end of Runway 10/28, and the MALSF access road south of Runway 17/35 are mapped as FEMA floodways.

4.2.11 Not Affected

For the following potential impact categories, they are not applicable to Norwood Memorial Airport due to its location, such as:

- **Coastal Resources**- The Proposed Action is not located within a designated coastal zone according to Massachusetts Coastal Zone Management mapping. No coastal barriers, significant coastal fish and wildlife habitat, or coral reef ecosystems are located on or adjacent to the Airport property.



Norwood Memorial Airport Environmental Assessment **Norwood, Massachusetts**

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Figure 4-7

Flagged Wetlands and Wetland Resource Areas

- **Department of Transportation Act, Section 4(f):** Section 4(f) of the federal Department of Transportation Act of 1966 provides that the " Secretary shall not approve any program or project which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance; or land of a historical site of national, state, or local significance as determined by the officials having jurisdiction thereof unless there is no feasible and prudent alternative to the use of such land, and such program or project includes all possible planning to minimize harm from the land use."

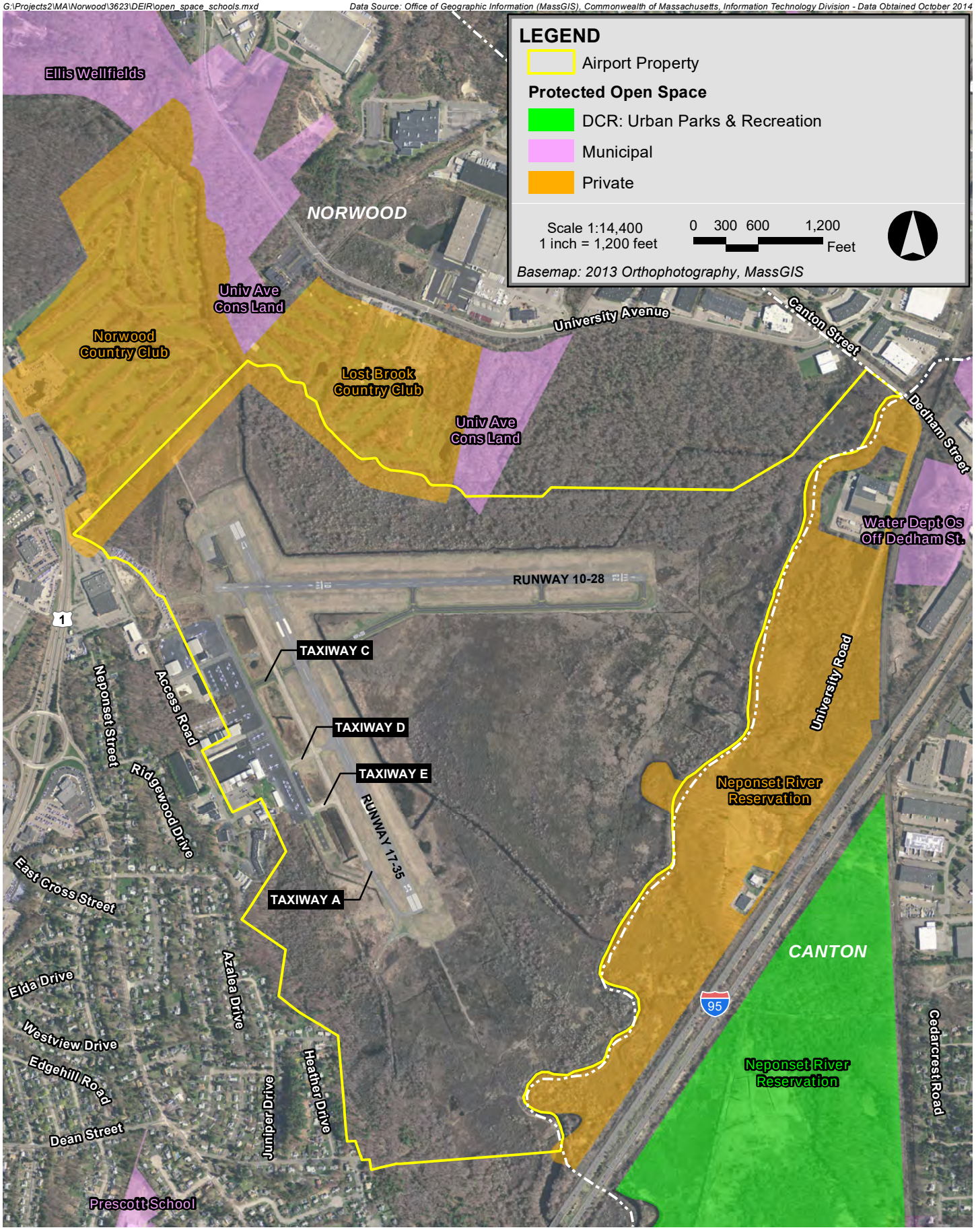
  No lands regulated under Section 4(f) are located within the Norwood Memorial Airport. Two golf courses, Norwood Country Club and Lost Brook Country Club, are adjacent to the Airport but are privately owned and do not fall under the 4(f) lands description. Several Protected and Recreational Lands are located within one mile of the Airport (see Figure 4-8 Protected Lands and Open Space). Conservation lands, owned by the Norwood Conservation Commission, are located north of the Airport. Ellis Wellfields, a Protected Land, is located north of the Airport. To the southeast of the Airport and bisected by Interstate 95 is the Neponset River Reservation, which is owned by the Massachusetts Department of Conservation and Recreation (DCR). Several other small open spaces are within one mile of the Airport, including Hartshorns Swale and the Callahan School, both owned by the Town of Norwood.

- **Wild and Scenic Rivers –** The United States Department of the Interior's National Park Service Wild and Scenic Rivers Program listing has no federally designated wild or scenic rivers within the vicinity of Norwood Memorial Airport.

- **Climate –** The Proposed Action and alternatives would not increase GHG emissions compared to the no action alternative. The Proposed Action is not anticipated to increase number of aircrafts using the Airport and overall increase in annual Norwood Memorial Airport operations are expected to stay the same. Air emissions are expected to remain well within NAAQS and therefore no adverse impact on the climate or greenhouse gas (GHG) emissions would be expected.

- **Natural Resources and Energy Supply** - Energy consumption at an airport consists predominately of electricity and fuel for aircraft and ground vehicles. Fuel consumption at an airport is directly related to the number and activity of the based and transient aircraft population. The Airport currently has three underground fuel tanks of 12,000 gallons each for Jet A fuel, one underground take of 8,000 gallons of Jet A and one underground tank of 12,000 gallons of Avgas. Aviation fuel is pumped from one of these tanks into mobile fueling trucks and delivered to the aircraft. For planning purposes, it is recommended that the Airport have a minimum of ten days' supply of both Jet-A and Avgas. At Norwood Airport, the 10-day supply would be 5,990 gallons for Avgas and 18,160 gallons for Jet-A.

Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division - Data Obtained October 2014



Norwood Memorial Airport Environmental Assessment Norwood, Massachusetts

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Figure 4-8

Protected Open Space and Schools

The Preferred Alternative is not expected to increase aircraft activity; therefore, fuel consumption is anticipated to be consistent with current consumption. All considered alternatives are not expected to impact natural resources and energy supply.

Section 5.0

Environmental Consequences

5.0 ENVIRONMENTAL CONSEQUENCES

The Proposed Action would be an improvement over the existing conditions, with minimal costs and minor environmental impacts. Minimal construction to pave the RSA is required; therefore, there would also be minor environmental impacts associated with work in floodplain and 100-foot Buffer Zone to BVW.

This section describes the environmental consequences of the Preferred and evaluated Alternatives. The Proposed Action's potential environmental impact categories include the following:

- Air quality
- Biological Resources
- Climate
- Farmlands
- Hazardous materials, solid waste, and pollution prevention
- Historical, architectural, archeological, and cultural resources
- Land Use
- Natural Resources and Energy Supply
- Noise and Noise-Compatible land use
- Socioeconomics, environmental justice, and children's environmental health and safety risks
- Visual effects
- Water resources (including wetlands, surface waters and groundwater)
- Construction Impacts

5.1 Air Quality

Section 176 (c) of the Clean Air Act requires that any entity of the federal government that engages in, supports, or in any way provides financial support for, licenses or permits, or approves any activity must demonstrate that the action conforms to the area's commitment of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of those standards.

The Preferred Alternative can be considered an action "presumed to conform", under the list of exemptions presented in (72 Fed. Reg. 145 (Jul. 30, 2007). The rule states that "Airport maintenance, repair, removal, replacement, and installation work that matches the characteristics, size, and function of a facility as it existed before the replacement or repair activity typically qualifies as routine maintenance and repair for purposes of general conformity. Such activity does not increase the capacity of the airport or change the operational environment of the airport."

Subsequently, the rule states "Taxiway construction projects [presumed to conform] are limited to improvements of existing taxiways that will not affect runway use, increase capacity, enable new aircraft types, or change existing airfield operations when complete (e.g., new high-speed exits would represent such a change)."

Therefore, the Preferred Alternative is "presumed to conform" and is deemed to comply with all requirements of General Conformity.

5.1.1 Preferred Alternative

The Preferred Alternative consists of the relocation of the 1,350-foot segment of Taxiway C from Taxiway F to Taxiway A, by shifting the angle within the current Taxiway C configuration 800 linear-feet to the west. A new 800-foot segment of Taxiway C would extend west of Taxiway F parallel to Runway 10/28. A second 360-foot segment would be constructed from this new angle to Taxiway A (see Figure 3-2 and 3-3). Finally, a new 320-foot segment of Taxiway C would extend west of Taxiway F parallel to Runway 10-28T. The existing Taxiway C would be removed and a portion east of Runway 17/35 replaced with a wetland mitigation and floodplain compensation area east. Approximately 32,655 sf of BVW associated with a perennial drainage ditch in the infield would be impacted, along with 123 sf of LUW within the ditch. Work in RFA associated with the perennial waterway totals 86,484 sf. New impervious surface would total 18,594 sf. The Preferred Alternative would also pave the existing grassed runway safety areas (RSAs) to provide additional runway length for existing aircraft and replace deteriorated sections of the existing wildlife perimeter fence (installed in 2002).

As discussed in Section 4.3.1, air quality has generally been improving over time, as shown in both the background concentrations over the past three years, as well as in Massachusetts Department of Environmental Protection's (MassDEP) Annual Air Quality Reports.

Even with the increase in population and development, air quality has been improving, mainly due to emissions reductions as a result of improved technology, usage habits, and environmental awareness.

The Preferred Alternative can be evaluated in two phases: a construction phase and an operational phase.

5.1.1.1 Construction

The construction phase is expected to temporarily increase emissions from the fugitive dust generated from earth moving activities and the exhaust of non-road construction equipment. Several strictly enforced measures would be used by contractors to reduce potential emissions and minimize impacts including:

- Using wetting agents on areas of exposed soil on a scheduled basis;
- Using covered trucks;
- Monitoring actual construction practices to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized;
- Minimizing storage of debris on the site;
- Periodic street and sidewalk cleaning with water to minimize dust accumulations; and
- The contractor would comply with the National Emission Standards for Hazardous Pollutants (NESHAP) throughout demolition and construction activities.

In addition to measures to control earth material particulate dust, the contractor would also strive to minimize diesel emissions during construction. Specific measures to be taken to reduce diesel emissions and other construction related air quality impacts include the following measures:

- Using equipment retrofitted with diesel emissions control devices. The Proponent would specify during the procurement of the subcontractors, that the majority of the heavy equipment operating on the site be retrofitted with diesel emissions control devices;
- Maintaining an “idle free” work zone of fossil fuel trucks and equipment by providing supplemental hoisting and pumping equipment along with “just-in-time” delivery methods. On-site idling would be limited to five minutes. “Do Not Idle” signs would be posted at appropriate locations;
- By locating combustion engines away from sensitive receptors such as fresh air intakes, air conditioners and windows; and
- Using Ultra Low Sulfur Diesel for all trucks and construction machinery as required by the US EPA.

5.1.1.2 Aircraft Operations

The Preferred Alternative is not being carried out to increase aircraft activity but rather to safely accommodate current operations. Aircraft operations would maintain their existing levels and forecast growth. Therefore, air quality impacts from operations would be unaffected.

5.1.2 No Action Alternative

The "no action" alternative consists of leaving the existing areas as they are. Thus, no construction would occur, and both aircraft operations and groundside activities would be unaffected.

5.1.2.1 Construction

Since no construction would occur, no adverse air quality impacts from construction activities would result.

5.1.2.2 Operations

It would be expected that operations would continue as currently trending. Aircraft operations would maintain their existing levels and forecast growth. Groundside activity would also remain unchanged. Reduction of ferrying may not occur. Air quality impacts from operations would be unaffected.

5.2 Biological Resources

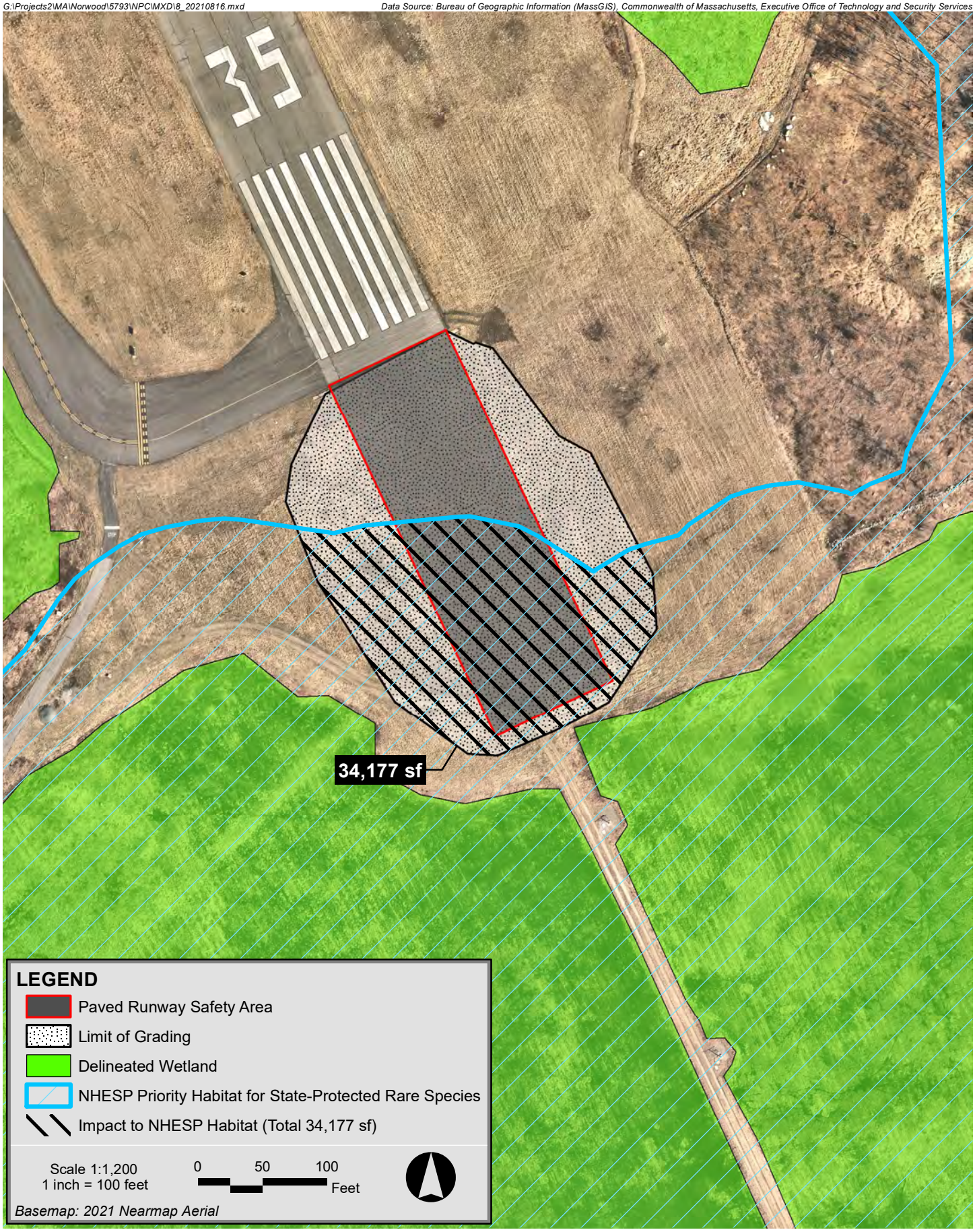
5.2.1 Vegetation

Areas in the vicinity of the Preferred Alternative for RSAs are identified as Priority Habitat and Estimated Habitat for the Long's Bulrush *(Scirpus longyii*), a globally rare, Massachusetts state threatened, robust sedge that can be found in peat wetlands.

Proposed permanent direct impacts within mapped Habitat due to the Preferred Alternative are expected to total approximately 15,750 sf in upland habitat within the existing grassed RSA for the 3-end, of the total approximately 30,000 sf of proposed new impervious surfaces (see Figure 5-1). Temporary grading impacts total an additional approximately 20,000 sf also in upland habitat. These temporarily impacted areas would be restored to existing conditions and seeded with an airport-approved grass seed mix.

In consultation with NHESP on February 4, 2021, it was agreed that prior to the submittal of the MESA checklist, a growing season survey for Long's bulrush would occur within a minimum of 25-feet from the proposed limit of work. On June 4, NHESP approved the vegetative survey methodology. Surveys occurred on June 24, 2021 and no specimens of the plant were identified within the proposed limits of work.

Existing drainage patterns would be modified slightly. Future surface runoff would continue to sheet flow off the area, with some pretreatment provided by the grassy areas prior to conveying to adjoining wetland. This adjoining wetland area would continue to be maintained as an emergent marsh habitat in accordance with the Airport's Vegetation Management Plan.



Taxiway C Realignment and Runway Safety Areas at Norwood Memorial Airport

Epsilon Associates Inc.

Figure 5-1

Rare Species Habitat Impact Locations

5.2.2 Rare and Endangered Species

With regards to federally-listed species such as the northern long-eared bat (*Myotis septentrionalis*), the Preferred Alternative is not anticipated to have any impacts on these species. The Preferred Alternative site does not contain any feeding or foraging habitat for the red knot. Furthermore, the Preferred Alternative does not propose any vegetation management activities, thus avoiding any effects on bat roosting habitat which prefers mature, upland forested areas. There are no known hibernacula (i.e., caves) on the Airport property.

With regards to state-listed species, please see above discussion regarding Long's Bulrush (*Scirpus longyii*).

The no action alternative would not meet the need for Airport infrastructure that complies with FAA planning and design standards and improves overall operational safety and efficiency at the Airport. Other alternatives that were evaluated had greater impacts to vegetated areas and increases in impervious surface except Alternative 4, which would be cost inhibiting and create additional airport operational challenges (see Section 3.2). The Preferred Alternative minimizes impacts to wetlands as discussed in Section 5.12.2.

5.3 Climate

GHG emissions contribute to climate change and pose health risks. There are several sources of greenhouse gas emissions (GHG) at the Norwood Memorial Airport including from buildings, vehicles, and aircrafts. The Preferred Alternative is not expected to increase GHG emissions. Regardless, Norwood Memorial Airport is committed to curbing GHG emissions through various strategies including:

- Installing LED lights to promote energy efficiency,
- Using motion sensors on lights to reduce energy wastage,
- Participating in the FAA's Voluntary Airport Low Emissions (VALE) program, which helps airports reduce all sources of airport ground emissions to meet their state-related air quality responsibilities under the Clean Air Act,
- Exploring the possible installation of solar canopies at the airport parking lot on Access Road, to provide cleaner energy and reduce energy costs,
- Limiting idling by aircrafts,
- Upgrading airport maintenance vehicles and requiring low sulfur diesel fuel use by contractors, and
- Carrying out regular energy audits on on-site buildings.

Other measures will be adopted to adapt to increasing climate-related hazards posed including:

5.3.1 Increased Flooding

Due to climate change, the Northeast is expected to experience more frequent and intense storms, with an average annual precipitation increase of 4.42 inches by 2090 (ReslientMA.org/maps, RCP4.5 scenario). Norwood Memorial Airport is identified as a flooding hot spot with some level of flooding occurring every two to three years. The Airport's location within the FEMA floodplain and floodway and its proximity to the Neponset River, which sometimes overflows, pose flooding risks during extreme weather conditions. Approximately 500 feet of the eastern end of Runway 10/28, and the MALSF access road south of Runway 17/35 are mapped as FEMA floodways. In the past, while flooding has not reached airport structures, some based aircrafts have been impacted by flooding. In 2010, three days of significant rain forced the airport to close to all aircraft other than helicopters due to complete inundation of both runways.

Some flood protection projects have been completed in the vicinity, including: channel and drainage maintenance and improvements beneath the Washington Street bridge and at the Norwood Airport. The clearing of downed trees around the Neponset River is also prioritized in the Municipal Vulnerability Preparedness (MVP) to reduce airport flooding. Vegetation management plans for the Airport require avoidance of the "drop and lop" technique in proximity to the river and Purgatory Brook and tributaries to avoid blocking the channels and minimize hazardous woody debris floating onto the runway and taxiways.

Stormwater management as part of the Preferred Alternative, discussed in Section 5.13.3, would be designed for storm events and peak precipitation values derived from the National Regional Climate Center (NRCC) for each rain event to account for the predicted increase in rainfall quantities and frequency for the region.

Due to the Airport's location above the Baker Dam in Lower Mills and the Tileston and Hollingsworth Dam in Dorchester and Milton, the risk is low for increased sea levels in the future to affect the frequency and severity of the flooding at the Airport.

5.3.2 Drought

Extended periods of drought are predicted due to climate change, with the occurrence of droughts lasting one to three months and could go up by as much as 75 percent over existing conditions by the end of the century, under the high emissions scenario.

To minimize susceptibility to drought conditions, the Preferred Alternative would utilize an appropriate native plant seed mix for the upland maintained grassy areas and native wetland plants within the wetland replication area. Drought is not anticipated to have any effects on the actual Taxiway or RSA construction or pavement.

5.3.3 Extreme Heat

The MVP report predicts that Norwood will have increased extreme heat days and heat waves. ResilientMA.org predicts an annual average increase in rainfall of Norwood of 5.28 inches by the

year 2090 under the medium stabilization scenario of emissions (RCP4.5). Impervious surfaces not only impede drainage, but they also increase temperatures, with every 20 percent increase in imperviousness estimated to raise surface temperatures by up to 1.8°F (Resilientma.org, Interactive Map). Approximately 21 percent of the surface at Norwood Airport is impervious. To address heat sinks, the Town of Norwood will encourage green infrastructure, white roofs, landscaping for parking lots and redevelopment, through a lot leasing bylaw. To mitigate increased temperatures, the Preferred Alternative would incorporate green infrastructure, where feasible.

5.4 Farmlands

No irreversible and irretrievable impacts to resources are anticipated as the Preferred Alternative does not involve the development or conversion of FPPA regulated farmlands to non-agricultural land uses. The physical construction of pavement, drainage, and grading would take place on Airport property and in areas used for Airport activities. As such, the Preferred Alternative would not permanently convert an existing designated important farmland to a non-agricultural use and the Preferred Alternative would not be subject to FPPA coordination.

5.5 Hazardous Materials, Solid Waste, and Pollution Prevention

5.5.1 Hazardous Materials

There are no reported releases of hazardous materials within the Preferred Alternative site at the Airport according the MassDEP reportable release database. Any contaminated soils encountered during construction would be managed pursuant to the Utility-related Abatement Measure (URAM) provisions of the Massachusetts Contingency Plan (MCP). As required under 310 CMR 40.046, a URAM would not be undertaken by the Airport until proper notification to MassDEP is made of:

(a) a release or threat of release of oil and/or hazardous material at the construction site for which notification is required under the provisions of 310 CMR 40.0315;

(b) Airport's intention to conduct a URAM in compliance with all applicable requirements; and

(c) the name and license number of the Licensed Site Professional who has been employed to carry out the URAM.

A status report would be submitted to MassDEP 120 days following the initial notification of intent to conduct a URAM and every six months thereafter until a URAM Completion Report is submitted. A URAM Completion Report would be submitted to MassDEP within 60 days of the completion of response actions associated with a URAM.

The Airport's response to any contamination found during construction would comply with the MCP at 310 CMR 40.0000.

The Preferred Alternative is not anticipated to result in the release of hazardous materials and is not anticipated to generate hazardous waste. If hazardous materials such as asbestos or lead are encountered during demolition and construction activities of the Preferred Alterative, any such materials would be removed at the time of demolition in accordance with laws and regulations. Management of hazardous materials and wastes associated with the Preferred Alternative would also be conducted in accordance with local and state regulations and Best Management Practices (BMPs) would be implemented in accordance with local, state, and federal regulations to ensure compliance. The no action alternative would not meet the need for Airport infrastructure that complies with FAA planning and design standards and improves overall operational safety and efficiency at the Airport.

5.5.2 Solid Waste

General aviation airports ordinarily do not generate significant quantities of solid waste. Aviation-related activities generate only minimal amounts of solid waste. Airport buildings, hangars for storage and maintenance of aircraft, office space, and administration buildings, generate solid waste normally associated with business activity. As the Preferred Alternative is not intended to increase aviation activity at the Airport, the volume of solid waste generated is not expected to change.

The Proponent is committed to minimizing construction waste. Proposed construction activities would generate solid waste, predominantly as a result of earth moving operations. Any solid waste generated during project implementation, including construction waste, would be recycled to the extent feasible and/or disposed of appropriately per federal, state, and local regulations addressing such materials.

Asphalt removed as part of the Taxiway C relocation would be ground up and recycled for use in the new location.

5.6 Historic and Archaeological Resources

FAA will make a determination and submit for concurrence to the State Historic Preservation Officer (SHPO) for review under Section 106 of the National Historic Preservation Act of 1966, as amended. It is anticipated that SHPO will concur that the project will be "unlikely to affect significant historic or archaeological resources" based on prior review of Airport projects.

The Preferred Alternative is not expected to result in a significant change in operations or noise impacts that could impact historic resources or native tribes.

The no action alternative would not meet the need for Airport infrastructure that complies with FAA planning and design standards and improves overall operational safety and efficiency at the Airport.

5.7 Land Use

The purpose of the Preferred Alternative is to enhance safety and efficiency at the Airport. The Preferred Alternative is not anticipated to increase aircraft operations and thus would unlikely have any significant noise impacts or impacts on surrounding land use.

5.8 Natural Resources and Energy Supply

The Preferred Alternative would not significantly affect energy supply or natural resources.

Lighting associated with the runway and taxiway extensions would require de minimis additional energy, which can be easily accommodated within the regional power network.

The proposed safety improvements are not intended to increase aviation activity at the Airport; therefore, the use of aviation fuels at the Airport is not anticipated to increase significantly. Any fuel usage increases are expected to be tied to the natural growth of aviation activity. During construction, there would be a temporary increase in energy consumption; this temporary increase can be accommodated by local supplies. Therefore, impacts associated with the Preferred Alternative to the energy supply and natural resources are anticipated to be minimal.

The no action alternative would not meet the need for Airport infrastructure that complies with FAA planning and design standards and improves overall operational safety and efficiency at the Airport.

5.9 Noise and Noise-Compatible Land Use

The Preferred Alternative is not anticipated to generate an increase of different aircraft operational activity at the Airport. Consequently, impacts to community noise levels are not expected. Noise impacts anticipated would be minimal and temporary due to demolition and construction activities.

The Preferred Alternative would include a noise mitigation plan to minimize, to the extent practicable, the generation of sound levels that would impact off-site receptors. Every reasonable effort would be made to minimize the noise impact of construction activities, including:

- Instituting a proactive program to ensure compliance with the Town of Norwood's noise limitation policy;
- Using appropriate mufflers on all equipment and ongoing maintenance of intake and exhaust mufflers;
- Muffling enclosures on continuously running equipment, such as air compressors and welding generators;

- Replacing specific construction operations and techniques by less noisy ones where feasible;
- Selecting the quietest of alternative items of equipment where feasible;
- Scheduling equipment operations to keep average noise levels low, to synchronize the noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels;
- Turning off idling equipment; and
- Locating noisy equipment at locations that protect sensitive locations by shielding or distance.
- Allowable construction timeframes that adhere to local requirements, which are anticipated to be work hours between 7:00 a.m. and 5:00 p.m., and major activities such as excavation or demolition would typically be limited to normal working hours;
- In accordance with Massachusetts Vehicle Idling Regulations, idling of construction equipment would comply with 310 CMR 7.11;
- Construction equipment would be required to be properly maintained, lubricated, and fitted with properly functioning muffler systems; and
- To the extent practicable, specific activities such as crushing and pulverizing, as well as equipment staging areas, would be located at appropriate distances from residential receptors.

5.10 Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks

Principal social impacts typically resulting from Airport actions include relocation of residences and businesses, alteration of surface transportation patterns, disruption of established communities or planned developments, and significant changes in employment. The Preferred Alternative would not result in the above-mentioned social impacts. On the contrary, as a major construction project, the Preferred Alternative would result in positive economic impacts to the region and the Commonwealth. The generation of new, temporary construction jobs are anticipated during construction and the purchase of construction materials and services would result in direct and indirect impacts throughout the Commonwealth, along with induced impacts as the initial rounds of spending circulate through the economy.

Potential secondary or induced social impacts related to airport development typically include shifts in patterns of population movement and growth, increased public service demands, and changes in business and economic activity. As stated herein, the purpose and need of the proposed improvements at the Airport is to enhance safety for existing Airport users by meeting

FAA Standards. The Preferred Alternative is not designed to increase growth or demand at the Airport, or to change the type or size of aircraft using the Airport. No shifts in population growth or public service demands would be created by the Preferred Alternative; therefore, it is reasonable to assume that there would be no adverse socio-economic impacts as a result of the Preferred Alternative.

The no action alternative would not meet the need for Airport infrastructure that complies with FAA planning and design standards and improves overall operational safety and efficiency at the Airport.

5.11 Visual Effects

The Preferred Alternative would not increase off-airport light emissions or create visual effects. The characteristics of most airport lighting systems create potential sources of annoyance to nearby residents, such as visual navigational aids, edge lights, and others, which may emanate disturbing emissions. There would be no net increase of such lighting emissions.

The Preferred Alternative is not expected to involve the replacement or addition of any taxiway lighting fixtures; the existing lights would be relocated along the new portion of the taxiway. Operation of all of these lights and lighting systems are controlled by the FAA, not the Airport. However, any new light emission impacts would be minimized via design details as specified in the Massport Sustainable Design Standards and Guidelines. All lighting would be designed with reduced energy use in mind with LED lighting utilized for signage and signals.

The no action alternative would not create visual impacts. However, it would not meet the need for Airport infrastructure that complies with FAA planning and design standards and improves overall operational safety and efficiency at the Airport.

5.12 Water Resources

The Preferred Alternative is not anticipated to have impacts on groundwater and water supply resources, either during or after construction due to the implementation of stormwater management BMPs. Any impacts to wetlands would be mitigated appropriately. Therefore, no irreversible and irretrievable impacts to water resources are anticipated.

5.12.1 Groundwater and Water Supply

The Airport would continue to implement its Groundwater Protection Plan, which includes the following commitments:

- Refueling operations are conducted only on the apron areas;
- No salt or chemicals are used on the runways or taxiways; and

- Post-construction stormwater management best management practices will be implemented as described Section 5.12.3 below.

No short- or long-term impacts on groundwater or water supply are anticipated as a result of the Preferred Alternative. Construction period stormwater management would ensure protection of adjacent surface waters and wetlands as described below.

5.12.2 Surface Water and Wetlands

The environmental consequences of the Preferred Alternative include unavoidable wetland resource area impacts associated with the permanent fill from the relocation of Taxiway C and associated grading. Due to site constraints and FAA design requirements for airport geometry, certain Project activities cannot be designed to fully comply with the WPA performance standards for Bordering Vegetated Wetlands (BVW). Permanent fill of approximately 31,045 square feet (sf) of BVW, 123 Land Under Water (LUW), 8 linear feet of Inland Bank, 386,972 sf of Bordering Land Subject to Flooding (BLSF), and 86,484 sf of Riverfront Area (RFA) will occur as a result of the realignment of Taxiway C. Permanent fill of approximately 4,399 cubic yards (cy) of Bordering Land Subject to Flooding (BLSF) will also occur associated with Taxiway C and the RSAs. These unavoidable impacts have been avoided and minimized to the maximum extent practicable. Because alterations of BVW exceed the 5,000 sf general performance standard referenced under 310 CMR 10.55(4)(b), work is within the Fowl Meadow and Ponkapoag Bog Area of Critical Environmental Concern (ACEC), and the proposed activity does not meet the Limited Project criteria of the WPA regulations under 310 CMR 10.53 (3), a Variance from MassDEP is required under 310 CMR 10.05(10).

These permanent impacts are summarized on Table 5-1 below and detailed in Figures 5-2. Compliance with the specific performance standards of the Wetland Protection Act regulations is addressed in below for each of the applicable resource areas.

In addition to the proposed permanent impacts to BVW, temporary impacts of 3,610 sf of BVW generally involve a 5-foot horizontal area necessary for construction access and work associated with the Taxiway C work. The proposed construction would temporarily alter these areas by a variety of construction activities including temporary excavation and backfilling, staging and operating construction equipment, grading, and installing erosion controls. Once construction is complete, the altered wetland areas not permanently impacted by filling would be restored.

There would also be temporary impacts associated with the replacement fence associated with the use of mats, if necessary. The fence replacement is being designed such that access for fence installation would be conducted from upland areas to the maximum extent feasible and is committed to maintaining temporary mat impacts to under 5,000 sf.

Table 5-1 Summary of Permanent Wetland Resource Area Impacts

Wetland ID	Total BVW Impacts (square feet)	Total LUW Impacts (square feet)	Total Inland Bank Impacts (linear feet)	Total RFA Impacts (square feet)	Proposed Work Component(s)
Wetland Series 6	31,045	0	0	0	Taxiway C removal, culvert removal, new Taxiway C construction, wetland mitigation area construction
Bank Series 6B	0	123	8	86,241[(b)]	Taxiway Realignment
TOTAL					

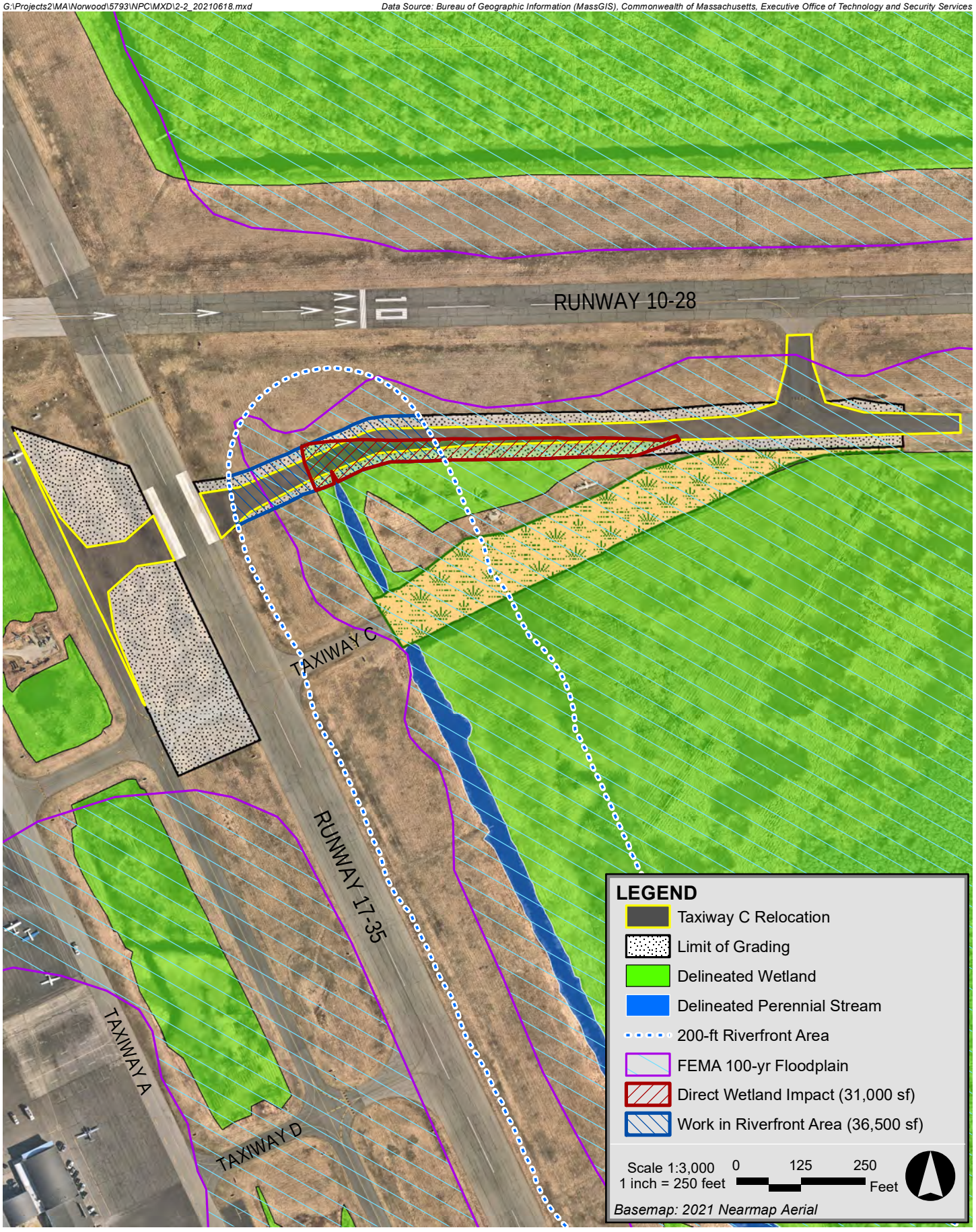
(a) Some of the wetland resource areas identified in this table overlap (e.g., Riverfront Area and Bordering Vegetated Wetlands). The impact estimates provided in this table are specific to each affected wetland resource area.

(b) Current Taxiway C within RFA totals 50,243 sf so this number represents a reduction in impacts by 14,002 sf.

Mitigation for the Preferred Alternative's unavoidable impacts to BVW and BLSF would be provided in accordance with local and state wetlands regulations and performance standards. For permanent impacts resulting from filling BVW, the altered BVW would be replaced (replicated) in-kind proximate to the water body or reach of the waterway area lost to meet mitigation requirements under the Norwood Wetlands Protection Bylaw and the WPA (see 310 CMR 10.55(4)(b)). The proposed ratio of replacement area to BVW loss is 2:1, and a total of 1.42 acres of BVW replication would be provided on Airport property proximate to the impact location(s). This section provides a detailed overview of the selection of the proposed wetland replication area associated with the Preferred Alternative. In summary, the wetland replication area would be designed and constructed as per MassDEP's *Massachusetts Inland Wetland Replication Guidelines* (March 1, 2002).

The Proponent has the unique opportunity to restore historically filled wetlands. The existing segment of Taxiway C that would be relocated by this Preferred Alternative would be removed, creating up to 94,000 sf of available area to mitigate impacts (see Figure 5-3). This area is composed of pavement, grassed shoulders, and fill material. Recent test pits indicate a buried A-horizon and seasonal high groundwater approximately two to three feet below existing ground elevation in this area, consistent with long-term groundwater monitoring data collected to the south at the Taxiway A wetland replication area.

Additionally, with the configuration of the current preferred alternative, there is a unique opportunity to restore additional wetland north of the current Taxiway C and reconnect it hydrologically with the existing marsh system. A 110-foot segment of culverted perennial stream would be also daylighted, a fringe wetland habitat created and riverfront area restored. This area has more than adequate area to provide a 2:1 wetland mitigation ratio of 62,090 sf.

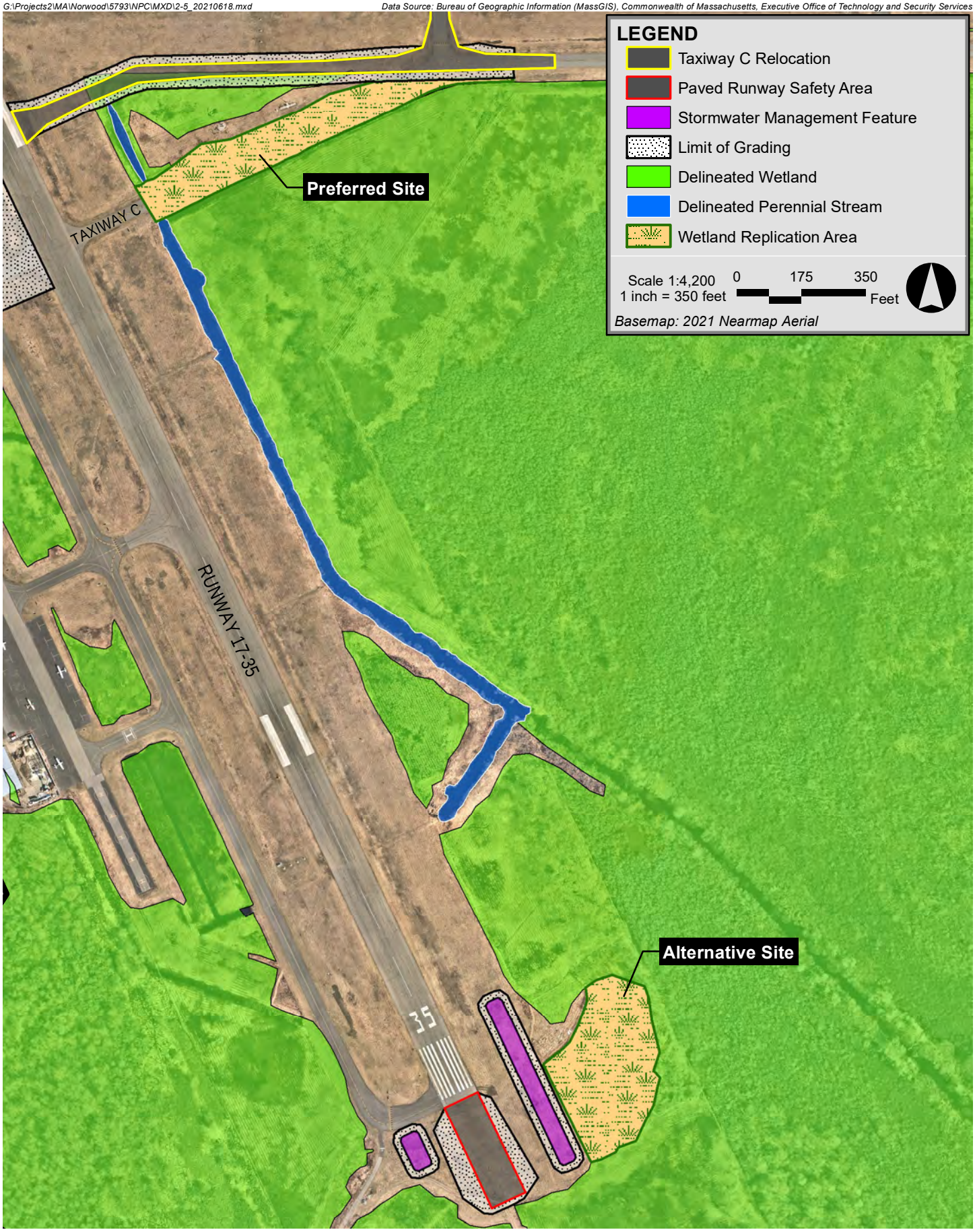


Norwood Memorial Airport Environmental Assessment Norwood, Massachusetts

Epsilon Associates Inc.

Figure 5-2
Wetland Impact Locations

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



Norwood Memorial Airport Environmental Assessment Norwood, Massachusetts

Epsilon Associates Inc.

Figure 5-2

Preferred and Alternative On-Site Wetland Replication Sites

Constraints are minimal and limited to providing an adequate buffer to the meteorological instruments.

5.12.2.1 Potential Wetland Replication Areas

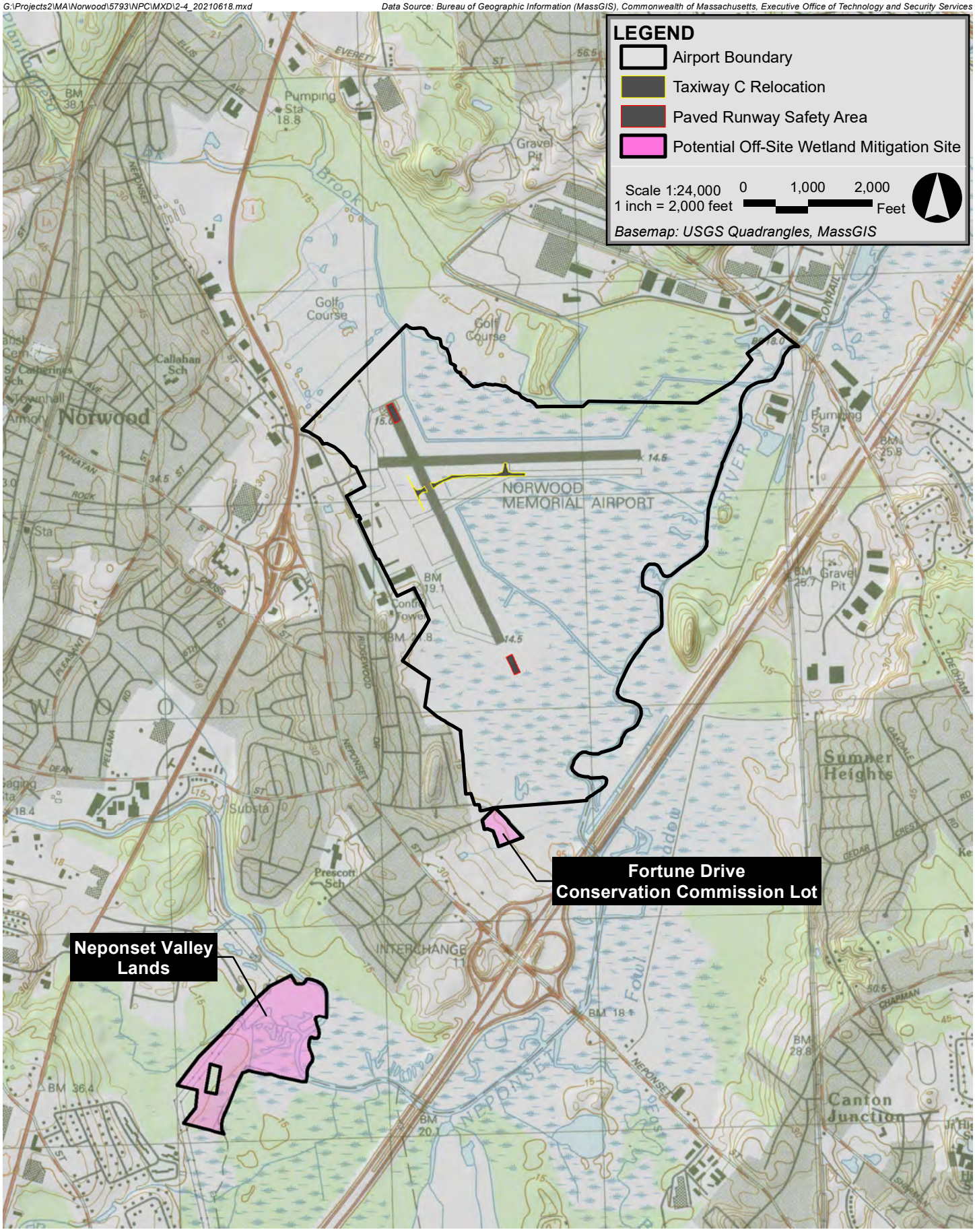
Several potential replication sites were evaluated during the 2015-2016 MEPA/NEPA review process for the Taxiway A realignment project. The Preferred Alternative builds upon that evaluation. In 2018, a 0.4-acre wetland replication site was constructed to serve as mitigation for the Taxiway A realignment wetland impacts. This replication site is located just east of Runway 17-35, at its southern extent. The Proponent considered expanding the wetland replication site that served Taxiway A as additional upland remains in this area that could be converted to wetland. However, the required size mitigation area would take almost all of the remaining upland island in this area, which serves as valuable wildlife habitat. Furthermore, a significant portion of this area is exposed ledge and boulders. As a result, a more limited area would be available for wetland replication and would not be sufficient in area to meet a 2:1 mitigation ratio requirement.

In 2020, in consultation with the Norwood Conservation Commission, the Proponent identified potential additional off-airport properties for the development of a wetland replication or restoration area within the Neponset River watershed. Based on these efforts, two additional potential sites were identified within the watershed, Fortune Conservation Commission and Neponset Valley Lands. Figure 5-4 identifies these off-airport properties that were evaluated for acquisition or for use as a replication area. Both areas are considered protected land in the Town of Norwood. These areas were evaluated in terms of their location within the watershed, proximity to Neponset River floodplains, proximity to impact area, potential for adequate replication areas, potential for replication success and maintenance, potential to recreate lost functions and values, cost of acquisition, and other factors.

The Fortune Road Conservation Commission parcel is 3.96 acres with approximately 3.3 acres of potential available upland to utilize for a wetland creation area. The parcel can be accessed from a gate at the intersection of Fortune Drive and Meadow Street. This site directly borders the Airport property and contains upland surrounded by wetlands hydrologically connected to the Neponset River. The upland is dominated by white pine (*Pinus strobus*), oaks (*Quercus spp.*), and multiflora rose (*Rosa multiflora*) with a low slope topography. Constraints for this parcel include existing wetlands, site access through a neighborhood and potentially opposed abutters.

The Neponset Valley Lands site is 74.77 acres with approximately 3.4 acres of potential available upland. The parcel can be accessed from a gate at the end of Plymouth Drive Rear, east of Norwood Garden Apartments. The site directly borders the Neponset Valley Lands on the eastern side of I-95 and Fowl Meadow ACEC. There is a utility right-of-way on its western border. This lot contains potential upland surrounded by wetlands hydrologically connected to the Neponset River and Traphole Brook. However, these wetlands appear to be dominated by invasive species such as common reed (*Phragmites australis*) and it would be challenging to develop a replication

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



Norwood Memorial Airport Environmental Assessment Norwood, Massachusetts

Epsilon Associates Inc.

Figure 5-4

Potential Off-Site Wetland Mitigation Sites

area free of invasive species in such a disturbed area nearby to a highway. The uplands, however, were vegetated by predominately oak, maple, and other deciduous trees. Constraints associated with this parcel include existing wetlands with invasive species and utility right-of-way proximity.

5.12.2.2 Preferred Wetland Replication Area

The preferred wetland replication area site selected is the Taxiway C removal area described above. A 1.42-acre replication area is proposed to be created along the northern boundary of the existing wetland area proximate to Taxiway C, expanding the existing emergent wetland. A portion of this replication area would be within existing BLSF. Emergent wetlands would be created by removing pavement and fill associated with the existing paved Taxiway C and shoulders. The area would be excavated to elevations between 39 and 44 feet, NAVD 88 such that wetland hydrology would be established with the primary sources being ground water and rainfall. Additional wetland soil would be added, along with an appropriate seed mix, and shrub plantings along the outer fringe. To the extent feasible, any wetland soil that is excavated in association with the new construction would be utilized in the replication area. The proposed replication site is directly adjacent to the expansive marsh system bordering the Airport, creating a direct hydrologic connection. Additionally, it is directly bordering a perennial stream which drains to the Neponset River.

The wetland replication plan would also incorporate important wildlife habitat features into the design including burrowable soils for small mammals, flowering herbs for pollinator species, and dense herbaceous cover.

5.12.2.3 Compliance with Wetlands Protection Act Regulations and Performance Standards

Work in BVW consists of grading and fill associated with the relocation of Taxiway C totaling 31,045 sf associated with Wetland Series 6 along the northern edge. This wetland is surrounded by runway and taxiway embankment and is hydrologically connected to the remainder of the Airport's wetland via twin corrugated pipe culverts.

- ***Bordering Vegetated Wetlands***

310 CMR 10.55(4)(a) – Where the presumption set forth in 310 CMR 10.55(3) is not overcome, any proposed work in a Bordering Vegetated Wetland shall not destroy or otherwise impair any portion of said area.

See 310 CMR 10.55(4)(b) below.

310 CMR 10.55(4)(b) - Notwithstanding the provisions of 310 CMR 10.55(4)(a), the issuing authority may issue an Order of Conditions permitting work which results in the loss of up to 5,000 square feet of Bordering Vegetated Wetland when said area is replaced in accordance

with the following general conditions and any additional, specific conditions the issuing authority deems necessary to ensure that the replacement area will function in a manner similar to the area that will be lost:

1. **The surface of the replacement area to be created (the replacement area) shall be equal to that of the area that will be lost (the lost area);**

The proposed wetland replication area is 1.42 acres, a ratio of replication of 2:1. The BVW replication plan described above shares additional details on meeting this performance standard.

2. **The ground water and surface elevation of the replacement area shall be approximately equal to that of the lost area;**

The proposed replication area has been designed so that the ground water and surface elevations are approximately equal to those of the lost area.

The overall horizontal configuration and location of the replacement area with respect to the bank shall be similar to that of the lost area;

The replication area is located within the same wetland complex and hydrologic system as the impacted wetland resource. The site was selected to provide on-Airport, in-kind wetland mitigation. The horizontal configuration of the wetland mitigation area has been designed to approximate that of the BVW impact area to the extent feasible. The impact area is a linear strip along the shoulder of the existing runway. It is located bordering the same perennial stream as the impact area which serves as a drainage ditch for the Airport.

3. **The replacement area shall have an unrestricted hydraulic connection to the same waterbody or waterway associated with the lost area;**

The proposed wetland replication area would have an unrestricted hydraulic connection to the contiguous BVW system on the Airport. The impact area is constrained within the infield between Runway 10-28 and Taxiway C and connected via culvert to surrounding wetlands. The primary hydrologic input to the wetland replication area would be derived from the same existing groundwater and rainfall sources that currently contribute to the BVW impact area.

4. **The replacement area shall be located within the same general area of the water body or reach of the waterway as the lost area;**

The proposed wetland replication area is located within the same general area of the perennial stream as the lost area, adjacent to wetlands associated with both the stream and the Neponset River downstream. The replication area is located within the footprint of the portion of Taxiway C to be relocated, as well as just north of the taxiway.

At least 75% of the surface of the replacement area shall be reestablished with indigenous wetland plant species within two growing seasons, and prior to said vegetative reestablishment any exposed soil in the replacement area shall be temporarily stabilized to prevent erosion in accordance with standard U.S. Soil Conservation Service methods;

The wetland replication plan proposes to create an emergent habitat with a shrub fringe within two growing seasons, providing a minimum of 75 percent surface coverage with indigenous wetland plant species. Exposed substrates would be protected against erosion until re-establishment of wetland vegetation occurs. Exposed soils would be temporarily stabilized using straw mulch or other appropriate erosion control measures in the event that seasonal conditions result in a delay in seeding. Following final grading, an entrenched staked haybale and silt fence barrier would be installed around the outside perimeter of the wetland replication area, as necessary. In addition, the replication area would be monitored during five complete growing seasons by a qualified Wetland Scientist as is typically required by a Variance Order of Conditions.

7. **The replacement area shall be provided in a manner which is consistent with all other General Performance Standards for each resource area in Part III of 310 CMR 10.00**.

The proposed replacement area is being provided in a manner that is consistent with all other General Performance Standards. More specifically, construction of the replacement area would occur in the buffer zone to BVW and would not place additional fill within BLSF.

310 CMR 10.55(4)(d) - Notwithstanding the provisions of 310 CMR 10.55(4)(a),(b) and (c), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59.

This standard is not applicable. The Preferred Alternative site is not located in Estimated Habitat.

310 CMR 10.55(4)(e) Any proposed work shall not destroy or otherwise impair any portion of a Bordering Vegetated Wetland that is within an Area of Critical Environmental Concern designated by the Secretary of Energy and Environmental Affairs under M.G.L. c. 21A, § 2(7) and 301 CMR 12.00: Areas of Critical Environmental Concern. 310 CMR 10.55(4)(e):

1. supersedes the provisions of 310 CMR 10.55(4)(b) and (c);

2. shall not apply if the presumption set forth at 310 CMR 10.55(3) is overcome;

3. shall not apply to work proposed under 310 CMR 10.53(3)(l); and

4. shall not apply to maintenance of stormwater detention, retention, or sedimentation ponds, or to maintenance of stormwater energy dissipating structures, that have been constructed in accordance with a valid order of conditions.

This Preferred Alternative cannot comply with this standard as the entire Airport property is located within the Fowl Meadow and Ponkapoag Bog ACEC and is requesting a Variance from this Standard.

- ***Bordering Land Subject to Flooding***

According to the applicable Federal Emergency Management Agency - Flood Insurance Rate Map (FEMA-FIRM), Community Panel Numbers #25021C0019E and 25021CO0183E, Revision Date July 17, 2012, the majority of the Proposed Action and the Airport is within the 100-year Flood Zone A (El. 47.1 feet NAVD 88) associated with the Neponset River. Except for a portion of the RSA work at the Runway 17-end, the proposed action components are located entirely within the floodplain.

310 CMR 10.57(4)(a)(1) - Compensatory storage shall be provided for all flood storage volume that will be lost as the result of a proposed project within Bordering Land Subject to Flooding, when in the judgment of the issuing authority said loss will cause an increase or will contribute incrementally to an increase in the horizontal extent and level of flood waters during peak flows.

Compensatory storage would be provided for flood storage volume that would be lost associated with Taxiway C between contour elevations 43 and 46 feet NAVD 88 totaling 4,098 cy of fill. An additional 301 cy would be filled between elevations 43 feet and 47.1 feet for the Runway Safety Areas.

No flood storage volume would be lost with the construction of the wetland replication area and there would be additional storage volume gained within the replication area.

Table 5-2 BLSF Compensatory Flood Storage Calculations

	Proposed Floodplain Impacts - Taxiway 'C'	Proposed Floodplain Impacts- Runway Safety Areas	Total Floodplain Impacts	Compensatory Storage Area 1	Compensatory Storage Area 2	Total Compensatory Storage	Net Preferred Alternative Impacts
Contour Elevation	**Fill (CY)**	**Fill (CY)**	**Fill (CY)**	**Compensatory Storage (CY)**	**Compensatory Storage (CY)**	**Compensatory Storage (CY)**	**Positive Number: Fill Negative Number: Cut (CY)**
42-43							
43-44	1,747	6	1,754	2,234	-	2,234	(480)
44-45	1,999	63	2,062	1,592	470	2,062	(0)
45-46	352	108	460	950		950	(490)
46-47	-	113	113	-	113	113	(0)
47-47.1	-	11	11	-	11	11	(0)
TOTAL	**4,098**	**301**	**4,399**	**4,776**	**594**	**5,370**	**(971)**

310 CMR 10.57(4)(a)(2) - Work within Bordering Land Subject to Flooding, including that work required to provide the above-specified compensatory storage, shall not restrict flows so as to cause an increase in flood stage or velocity.

Work within BLSF would not restrict flows to cause an increase in flood stage or velocity because a direct hydraulic connection would remain to the surrounding floodplain. Provided compensatory storage areas are also directly connected to the impacted floodplain. The impacted floodplain is restricted hydraulically via culverts.

310 CMR 10.57(4)(a)(3) - Work in those portions of bordering land subject to flooding found to be significant to the protection of wildlife habitat shall not impair its capacity to provide important wildlife habitat functions. Except for work which would adversely affect vernal pool habitat, a project or projects on a single lot, for which Notice(s) of Intent is filed on or after November 1, 1987, that (cumulatively) alter(s) up to 10% or 5,000 square feet (whichever is less) of land in this resource area found to be significant to the protection of wildlife habitat, shall not be deemed to impair its capacity to provide important wildlife habitat functions. Additional alterations beyond the above threshold, or altering vernal pool habitat, may be permitted if they will have no adverse effects on wildlife habitat, as determined by procedures contained in 310 CMR 10.60.

Approximately 26,996 sf of the 10-year floodplain (elevation 44.6 feet NAVD 88) on the Proposed Action site would be altered by fill activities outside of BVW for Taxiway C. Of this number, 2,850 sf is previously disturbed and consists of pavement, mowed shoulders or gravel areas and meets the description of "altered", i.e., currently comprised of runways/taxiways or mowed and graded shoulders [310 CMR 10.57 (3)(a)(1)]. An additional 66,700 sf of BLSF within 100 feet of BVW is comprised of runways/taxiways or mowed and graded shoulders. The wetland replication area is predominantly located within BLSF as well.

Proposed BLSF alterations would have a negligible effect on important wildlife habitat functions, mainly due to the altered status of the BLSF as described above. A wetland replication plan at a 2:1 replication-to-impact ratio that incorporates important wildlife habitat features has been developed to mitigate potential impacts to important wildlife habitat in BLSF. Mitigation in the form of wildlife habitat features of burrowable soils, seasonal pockets of standing water, densely planted herbs is included in the replication plans for both the compensatory storage areas and wetland replication area.

- ***Land Under Water***

According to 310 CMR 10.56 (4)(a), *"any proposed work within LUW shall not impair the following:*

(1) The water carrying capacity within the defined channel, which is provided by said land in conjunction with the banks;

The Preferred Alternative would not reduce the water carrying capacity of the stream. In fact, it would be improved through the removal of 113 linear feet of culvert and restoration of the channel to the bankfull width.

(2) Ground and surface water quality

Appropriate sediment control methods would be utilized during the removal of the culvert — excavation, dewatering, culvert installation and scour mat placement processes.

(3) The capacity of said land to provide breeding habitat, escape cover and food for fisheries;

The Proposed Action would provide increased capacity for breeding habitat, escape cover, and food for fisheries through the removal of the culvert.

(4) The capacity of said land to provide important wildlife habitat functions.

The Proposed Action would permanently impact 123 sf of LUW, and removal of the culvert and restoration of the stream channel would improve greatly increased area of LUW of approximately 12,000 sf in this section of the Airport. Therefore, this Proposed Action would not significantly alter the habitat available in this area.

(b) Notwithstanding the provisions of 310 CMR 10.56(4)(a), the issuing authority may issue an Order in accordance with M.G.L. c.131, §40 to maintain or improve boat channels within Land Under Water Bodies and Waterways when said work is designed and carried out using the best practical measures so as to minimize adverse effects such as the suspension or transport of pollutants, increases in turbidity, the smothering of bottom organisms, the accumulation of pollutants by organisms or the destruction of fisheries habitat or nutrient source areas.

The Proposed Action does not involve maintenance or improvement of boat channels; therefore, this standard does not apply.

(*c) Notwithstanding the provisions of 310 CMR 10.56(4)(a) or (b), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59.*

According to current mapped habitat identified by the NHESP, no Estimated habitats exist within the Preferred Alternative area. Therefore, the Preferred Alternative would comply with this standard.

- ***Inland Bank***

The Preferred Alternative's impacts to Inland Bank are limited to 8 lf of Flag Series 6B, a perennially-mapped stream which serves as a drainage ditch to the Airport.

WPA Regulations (310 CMR 10.54(4)(a) stipulate that *"any proposed work on a Bank shall not impair the following:"*

1. the physical stability of the Bank;

This Preferred Alternative would not create any permanent impacts to bank during culvert removal. All temporary impacts would be restored in place. The Preferred Alternative proposes to restore 220 lf of Inland Bank through the daylighting of the perennial stream.

2. the water carrying capacity of the existing channel within the Bank;

The Preferred Alternative would have an improvement on the water carrying capacity of the existing channel by daylighting the culverted portion of the stream channel.

3. ground water and surface water quality;

The Preferred Alternative would serve to improve ground and surface water quality by improving stormwater management facilities within the Proposed Action area to the extent feasible.

4. the capacity of the bank to provide breeding habitat, escape cover and food for fisheries;

The Preferred Alternative would not impair the capacity of the Bank to provide breeding habitat, escape cover, and food for fisheries. Bank restoration in kind would occur upon the completion of construction and will provide a wider variety of native species and plantings than currently exist.

5. the capacity of the Bank to provide important wildlife habitat functions. A project or projects on a single lot, for which Notice(s) of Intent is filed on or after November 1, 1987, that (cumulatively) alter(s) up to 10% or 50 feet (whichever is less) of the length of the bank found to be significant to the protection of wildlife habitat, shall not be deemed to impair its capacity to provide important wildlife habitat functions. Additional alterations beyond the above thresholds may be permitted if they will have no adverse effects on wildlife habitat, as determined by procedures contained in 310 CMR 10.60.

Approximately 8 lf of Bank would be altered; less than the 50 feet noted in the performance standard. The Preferred Alternative would not impair the capacity of the Bank to provide important wildlife habitat functions.

310 CMR 10.54(4)(b)

WPA Regulations (310 CMR 10.54(4)(b)) state that *"Notwithstanding the provisions of 310 CMR 10.54(4)(a), structures may be permitted in or on a bank when required to prevent flood damage to facilities, buildings and roads constructed prior to the effective date of 310 CMR 10.51 through 10.60 or constructed pursuant to a Notice of Intent filed prior to the effective date of 310 CMR*

10.51 through 10.60 (April 1, 1983), including the renovation or reconstruction (but not substantial enlargement) of such facilities, buildings and roads, provided that the following requirements are met:

1. The proposed protective structure, renovation or reconstruction is designed and constructed using best practical measures so as to minimize adverse effects on the characteristics and functions of the resource area;

The Preferred Alternative does not propose any structures on the Bank. This standard is not applicable.

2. The applicant demonstrates that there is no reasonable method of protecting, renovating or re-building the facility in question other than the one proposed.

The Preferred Alternative does not propose any structures on the Bank. This standard is not applicable.

310 CMR 10.54(4)(c)

Notwithstanding the provisions of 310 CMR 10.54(a) or (b), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59.

This standard is not applicable. There are no mapped Estimated Habitat of Rare Species on the Preferred Alternative site (NHESP, 2017).

- ***Riverfront Area***

It is important to note that the Preferred Alternative site contains a combination of grassy and previously developed RFA. The total RFA associated with this stream at the Airport is 760,000 sf. Of this total, approximately 14,241 sf (1.9%) is previously developed, while the remaining 745,759 sf (98.1%) is currently grassy or wetland areas. Activities proposed in RFA to the unnamed perennial stream include the realignment of Taxiway C and a portion of the wetland replication area. Most of these activities would occur in previously developed RFA currently occupied by paved surfaces and gravel taxiway shoulders. The total amount of new impervious surface within RFA throughout the Airport is 4,353 sf, an increase of 0.5 %.

310 CMR 10.58(5)(a) – At a minimum, proposed work shall result in an improvement over existing conditions of the capacity of the riverfront area to protect the interests identified in M.G.L. c. 131, section 40.

The Preferred Alternative would result in an improvement of the capacity of the RFA to provide protection of groundwater and to prevent pollution through improvement and upgrades to the existing stormwater management system. See 310 CMR 10.54(5)(b) for more details.

310 CMR 10.58(5)(b) – Stormwater Management is provided according to standards established by the Department.

The Preferred Alternative would involve improvements and upgrades to the existing stormwater management system associated with Taxiway C. In summary, the Preferred Alternative consists of a combination of both redevelopment and new development areas. Stormwater runoff associated with the new development areas would meet all applicable stormwater standards. Stormwater runoff from areas of the Proposed Action that qualify as redevelopment per Standard 7 of the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards has been designed to comply to the maximum extent practicable with MassDEP's Stormwater Management Standards relative to previously developed areas, while improving upon existing conditions.

310 CMR 10.58(5)(c) – Within 200-foot riverfront areas, proposed work shall not be located closer to the river than existing conditions or 100-feet, whichever is less, or not closer than existing conditions within 25-foot riverfront areas, except in accordance with 310 CMR 10.58(5)(f) or (g).

Portions of the Preferred Alternative are not located closer to the river than existing conditions.

310 CMR 10.58(5)(d) – Proposed work, including expansion of existing structures, shall be located outside the riverfront area or toward the riverfront area boundary and away from the river, except in accordance with 310 CMR 10.58(5)(f) or (g).

The Preferred Alternative is not located closer to the river than existing conditions as the stream is presently culverted beneath Taxiway C.

5.12.2.4 Compliance with Variance Order of Conditions Standards

The Preferred Alternative would require a Variance under the Massachusetts Wetlands Protection Act for impacts to BVW that exceed 5,000 square feet (permanent fill associated with the taxiway realignment). A Variance from MassDEP would also be sought for alteration to BVW within the Ponkapoag Bog and Fowl Meadow ACEC as per 310 CMR 10.55(4)(e) (no destruction or impairment" standard). The Preferred Alternative complies with the performance standards for Inland Bank, RFA, and LUW, as well as for fill within BLSF, and a Variance from those standards is not requested or required.

The following sections demonstrate that the proposed work has been designed to conform to the maximum extent practicable with the performance standards for BVW and to fully comply with the performance standards for BLSF.

The WPA Regulations establish performance standards for work proposed within each of the state wetland resource areas and require review of work proposed within 100 feet of a wetland resource area to determine if that work would alter the resource area. The proposed realignment of Taxiway C will not meet the performance standards for BVW under 310 CMR 10.55(4)(b) and

10.55(4)(4) because the proposed activities will result in the loss or alteration of more than 5,000 sf of BVW within an ACEC. Construction of the Preferred Alternative described herein would require that the Commissioner of MassDEP issue a Variance from the Regulations specific to these performance standards.

For the Commissioner to waive the regulations in Part III of 310 CMR 10.00, and issue a Variance, the following findings must be made:

1. There are no reasonable conditions or alternatives that would allow the project to proceed in compliance with the regulations;
2. Mitigation measures are proposed that would allow the project to be conditioned so as to contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act; and
3. The Variance is necessary to accommodate an overriding community, regional, state or national public interest.

The following paragraphs discuss these criteria.

1. There are no reasonable conditions or alternatives that would allow the project to proceed in compliance with 310 CMR 10.21 through 10.60.

An additional alternatives analysis was undertaken for the Preferred Alternative as part of the MEPA's NPC and Single Environmental Impact Report (SEIR) processes. The alternatives analysis found that there were no practicable alternatives at the Airport that would meet the Proposed Action's Purpose and Need and the needs of the community and that could be constructed in compliance with the WPA regulatory standards. Wetland fill impacts have been minimized to the greatest extent practicable.

2. Mitigating measures are proposed that will allow the project to be conditioned so as to contribute to the protection of the interests identified in M.G.L. c.131, §40.

The loss of BVW from filling would be mitigated via replication at a 2:1 ratio. The proposed BVW replication area has been designed in accordance with the performance standards found at 310 CMR 10.55(4)(b) and would therefore function in a manner similar to the area that would be lost.

3. The Variance is necessary to accommodate an overriding community, regional, state or national public interest; or that it is necessary to avoid an Order that so restricts the use of the property as to constitute an unconstitutional taking without compensation.

Safety at Norwood Memorial Airport is an overriding concern to the community, region, state, and national public interest. The Preferred Alternative addresses the operational safety condition by relocating Taxiway C to eliminate the direct connection from an apron area to a runway,

reducing the risk of incursions. The Proposed Action's Purpose and Need is documented in Section 2.0. The Airport is tasked with providing safe, FAA-compliant facilities for public and private aircraft.

5.12.2.5 Post-Construction Stormwater Management

The Preferred Alternative would slightly increase impervious surface area at Taxiway C. The anticipated increase in stormwater runoff due to the increase in impervious surface area would be mitigated by directing stormwater runoff through vegetated filter strips and wet swales. The collection system would be sized to handle the increase in runoff from the 2-year and 5-year storm events.

Due to the proximity of active Airport operations areas, the use of open water treatment systems is prohibited. Stormwater treatment systems with open surface water attract birds, which are a hazard to aircraft. As such, for stormwater management, the use of extended detention basins, wet ponds, and infiltration basins have been eliminated.

- Stormwater management systems would be designed to remove approximately 50 percent of TSS.
- Increase in peak runoff for Runway 35 RSA and Taxiway 'C' Realignment would be mitigated by off-site stormwater mitigation so that the Preferred Alternative results in a reduction in annual stormwater pollutant loads to the watershed as a whole.
- A new subsurface collection system at the Taxiway 'C' section between Runway 17-35 and Taxiway 'A' would be added that meets MassDEP standards to the extent practicable.

5.12.3 Stormwater

The proposed stormwater design will treat stormwater using a combination of BMPs. The existing drainage system predates the Standards and does not meet contemporary goals for stormwater management systems. Compliance with these Standards will protect the downstream receiving wetlands and water courses. BMPs included in the Project are deep sump catch basins and extended dry detention ponds. These measures not only improve the quality of the runoff entering streams and rivers but the quantity as well. Interim and post-development peak discharge rates will not exceed pre-development peak discharge rates for the 2-year, 10-year, 100-year storm events to the maximum extent practicable.

Offsite mitigation at the Cleveland School in Norwood is proposed by use of a subsurface infiltration basin and a bioretention basis to provide treatment for the impervious areas in lieu of providing direct treatment on the airfield due to lack of space and high groundwater table.

A portion of the Project is considered a "redevelopment of a previously developed site" as defined in the Massachusetts Wetlands Act Protection Regulations (310 CMR 10.00). The requirement of the Massachusetts Stormwater Standards for a redevelopment Project is that *"A redevelopment*

Project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment Project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions." For more information, please refer to the Stormwater Report in Attachment J.

The total Project impervious area (Locations 1-4) is 152,114 sf (3.49 acres). The proposed construction Project includes new impervious areas. The total increase in impervious area is approximately 85,288 sf (1.96 acres). The total area within the Project limits that was previously impervious area at Locations 3, 4 (Taxiway 'C') is considered "redevelopment". The redevelopment total area is 66,826 sf (1.53 acres).

5.12.3.1 Construction Period Stormwater Management

The Proposed Action would disturb approximately 12 acres of the Airport's 675-acre watershed; therefore, the Airport would require coverage under the National Pollutant Discharge and Elimination System Construction General Permit (CGP) and would develop a Stormwater Pollution Prevention Plan (SWPPP). The contractor would prepare a Stormwater Pollution Prevention Plan (SWPPP) to comply with the EPA construction general permit for stormwater discharges. Construction phasing (discussed above in Section 3.1.4) will be sequenced so that the BVW replication and compensatory flood storage measures are constructed prior to the taxiway realignment project impacting BVW or BLSF. In addition, construction will be phased so that disturbed areas are minimized to the extent feasible. The Stormwater Pollution Prevention Plan (SWPPP) and selected BMPs will be finalized as construction methods and schedule are determined by the selected contractor. The Airport will work with the resource agencies to ensure that the proposed BMPs will satisfy permit conditions.

The SWPPP would implement EPA and MassDEP BMPs for controlling and reducing sediments and dust in stormwater discharges to the extent feasible. Grading associated with taxiway construction, construction access, storage and laydown areas have the potential to cause short-term erosion and sedimentation in the vicinity of sensitive areas such as wetlands. The existing gravel maintenance access road would be used for construction access as much as possible. Sideslopes would be stabilized and re-vegetated as soon as practicable.

The Preferred Alternative would incorporate sedimentation and erosion controls into design and construction practices. Means and methods utilized during the Taxiway A construction that were successful would be re-implemented for the Preferred Alternative including:

Non-Structural Controls

Non-structural practices that would be used during construction include temporary stabilization, temporary seeding, permanent seeding, pavement sweeping, and dust control. These practices would be initiated as soon as practicable in appropriate areas of the site.

- Temporary Stabilization
- Temporary Seeding
- Permanent Seeding
- Dust Control

Structural Practices

Structural erosion and sedimentation controls would include barriers, stabilized construction exits, temporary sediment basins, temporary diversion swales, temporary check dams, catch basin inlet protection and dewatering filters.

- Sediment Control Barriers
- Temporary Sediment Basin
- Diversion Swale
- Temporary Check Dams
- Catch Basin Inlet Protection
- Dewatering Filters

5.12.4 Floodplain

As described above in Section 5.13.2, there would be about 26,996 sf of fill placed within the 100-year floodplain of the Neponset River. Compensatory flood storage would be provided for all fill activities, thus there would be no alteration to the flood storage capacity of the mapped 100-year floodplain on the Airport property.

5.13 Construction Impacts

Construction management and scheduling practices including plans for construction worker commuting and parking, routing plans and scheduling for trucking and deliveries, protection of existing utilities, maintenance of fire access, and control of noise and dust would be employed to minimize impacts on the surrounding environment. In addition, construction methodologies that ensure public safety and protect nearby airport businesses would be employed. Techniques such

as barricades, flaggers, and signage would be used as necessary. Specific measures proposed to mitigate construction impacts to air quality, waste management, noise, and stormwater are discussed in Sections 5.1, 5.5, 5.9, and 5.12 respectively.

Section 6.0

Mitigation

6.0 MITIGATION

This EA demonstrates that although the Preferred Alternative would result in some unavoidable impacts, those impacts have been minimized and mitigated to the greatest extent practicable, such that project implementation would have no long-term negative effects to natural resources, or airport facilities and operations. Table 6-1, describes, by resource category, the impacts anticipated and associated mitigation measures.

Table 6-1 Summary of Impacts and Mitigation Measures

Subject Matter	Impact	Mitigation Measure	Schedule
Air Quality	No impacts are anticipated	Aircraft operations would maintain their existing levels and forecast growth. Therefore, air quality impacts from operations would be unaffected. See below for construction period impacts	During and Post-construction
Noise	No impact to noise contours is anticipated	Noise impacts anticipated would be minimal and temporary due to demolition and construction activities. See below for construction period impacts.	N/A
Water Quality	No impacts are anticipated, NPDES permit required for construction	Stormwater Pollution Prevention Plan (SWPPP) would be generated for construction-related activities. During construction, structural and non-structural controls to minimize erosion and sedimentation, including temporary stabilization, temporary seeding, permanent seeding, dust control, temporary sediment basins and check dams, diversion swales, catch basin inlet protection, and dewatering filters. During operation, consistency with MassDEP's Stormwater Regulations through measures including infiltration, peak runoff rate and volume control, and total suspended solids removal.	During and post-construction
Surface Water and Wetlands	Fill: 0.71 acre (31,045 sf) of BVW Fill: 8.9 acre (386,972 sf) of BLSF (of which 33,074 consists of lower floodplain) Alter: 1.99 acre (86,484 sf) of RFA Fill: 123 sf LUW	Construction of an approximately 1.42-acre (62,090 sf) BVW replication area and compensatory flood storage (volume TBD). Daylight 110 lf of culverted perennial stream Wetland resource areas would be protected from direct impacts, including erosion and sedimentation, during construction.	Prior to and during construction
Energy Supply, Natural Resources and Sustainable Development	Minor increase in use of energy resources.	Norwood is committed to implementing programs aimed at sustainable development relative to energy usage and natural resources	Design, During and post-construction
Hazardous Materials	No known measures	If any hazardous materials encountered during demolition of Hangars at the Pine Hill Area would be removed or would be managed pursuant to the Utility-related Abatement Measure (URAM) provisions of the Massachusetts Contingency Plan and removed BMPs would be implemented in accordance with local, state and federal regulations to ensure compliance.	Prior to and during construction

Table 6-1 Summary of Impacts and Mitigation Measures (Continued)

Subject Matter	Impact	Mitigation Measure	Schedule
Construction	Temporary impacts on traffic, air quality, noise, water quality	Implementation of measures to avoid or minimize environmental impacts during Project construction, including: ♦ Compliance with the SWPPP; ♦ Implementation of MassDEP and EPA Best Management Practices; ♦ Equipment maintenance to minimize noise; ♦ Low sulfur or ultra-low sulfur diesel fuel use by contractors; ♦ Designated truck routing; ♦ Limit truck idling; ♦ Site housekeeping, such as water use for dust suppression, and interim stabilization of surfaces not being worked; and ♦ Recycling and asphalt reclamation where possible.	During construction
Light Emissions and Visual Effects	No increase in light emissions	Taxiway lights will be relocated. No changes to light emissions are anticipated.	Design, During and post-construction
Wildlife Habitat	No impact to rare species habitat	General wildlife habitat features will be incorporated into the wetland mitigation and compensatory floodplain areas.	During construction
Stormwater	1.93 acres of new impervious area 1.53 acres of redeveloped impervious area	Construction: ♦ Compliance with the SWPPP; ♦ Implementation of MassDEP and EPA Best Management Practices including structural and non-structural controls to minimize erosion and sedimentation, including temporary stabilization, temporary seeding, permanent seeding, dust control, temporary sediment basins and check dams, diversion swales, catch basin inlet protection, and dewatering filters. Post-Construction: ♦ Stormwater management systems on site would be designed to remove approximately 50 percent of TSS. Off site mitigation will provide full compliance for SMS and EPA MS4 requirements. ♦ Increase in peak runoff for Runway 17 and Runway 35 RSAs would be mitigated by off-site stormwater mitigation so that the Project results in a reduction in annual stormwater pollutant loads to the watershed as a whole. ♦ A new subsurface collection system at the Taxiway 'C' section between Runway 17-35 and Taxiway 'A' would be added that meets MassDEP standards to the extent practicable. ♦ Vegetative Filter Strips, drainage swales, deep sump catch basin all in series would be used where practicable to maximize the amount of TSS removal.	During construction and post construction
Greenhouse Gas Emissions	Temporary impacts on air quality	During construction, implement asphalt recycling where feasible and encourage low sulfur diesel fuel use by contractors.	During construction and post construction

Section 7.0

List of Agencies Contacted, Persons Consulted, EA Preparers and Distribution List

7.0 LIST OF AGENCIES CONTACTED, PERSONS CONSULTED, EA PREPARERS, AND DISTRIBUTION LIST

EA Preparers

Alyssa Jacobs, PWS, Associate, Epsilon Associates, Inc. 3 Mill & Main Place, Suite 250, Maynard, MA 01754

Hiromi Hashimoto, LEED AP, Planner, Epsilon Associates, Inc. 3 Mill & Main Place, Suite 250, Maynard, MA 01754

Ross Tsantoulis, P.E., Project Engineer, Dubois and King, Inc. 15 Constitution Drive, Suite IL Bedford, NH 03110

Agencies Contacted/Consulted

The Proponent has met with review agencies to discuss key aspects of the Proposed Action.

Federal Aviation Administration. New England Region, Airports Division (ANE-600), 1200 District Avenue Burlington, MA 01803.

Massachusetts Environmental Policy Act, Executive Office of Energy and Environmental Affairs (MEPA). 100 Cambridge Street, #900, Boston, MA 02114.

Massachusetts Department of Environmental Protection Wetlands Program Chief and staff: A meeting was held on January 19, 2021 with regarding the Variance Order of Condition submittal requirements and preliminary stormwater design. This meeting was followed up with a submittal of details regarding the proposed design for preliminary review and ongoing communications.

Massachusetts Historical Commission/SHPO. 220 Morrissey Boulevard, Boston, MA 02125.

Massachusetts Natural Heritage and Endangered Species Program, 1 Rabbit Hill Road, Westborough, MA 01581: A consultation with was held on February 4, 2021 regarding the evaluation of potential impacts to the listed species of concern.

Norwood Conservation Commission. A site visit was held on July 31 to review the project site and proposed work areas.

Circulation List

Massachusetts Department of
Environmental Protection – Boston
Attn: Variance Coordinator
One Winter Street
Boston, MA 02108

Massachusetts Department of
Environmental Protection – Southeast
Regional Office
Attn: MEPA Coordinator
20 Riverside Drive
Lakeville, MA 02347

Massachusetts Historical Commission
The Massachusetts Archives Building
220 Morrissey Boulevard
Boston, MA 02125

Massachusetts Department of
Transportation – Aeronautics Division
Logan Office Center
Attn: Environmental Reviewer
One Harborside Drive
Suite 205N
Boston, MA 02128

Federal Aviation Administration
Attn: Richard Doucette
1200 District Avenue
Burlington, MA 01803

Army Corps of Engineers
Regulatory Division
696 Virginia Road
Concord, MA 01742

Neponset River Watershed Association
Attn: Kerry Snyder
2173 Washington Street
Canton, MA 02021

Norwood Board of Selectmen
566 Washington Street, Second Floor
Norwood, MA 02062

Norwood Community Planning and
Economic Development Department
566 Washington Street
Norwood, MA 02062

Norwood Conservation Commission
566 Washington Street, Room 1
Norwood, MA 02062

Natural Heritage and Endangered
Species Program
Massachusetts Division of Fisheries &
Wildlife
1 Rabbit Hill Road,
Westborough, MA 01581

Wampanoag Tribe of Gay Head
(Aquinnah)
ATTN: Bettina Washington
Tribal Historic Preservation Officer
20 Black Brook Road
Aquinnah, MA 02535

Narragansett Tribe
ATTN: John Brown
Tribal Historic Preservation Officer
PO Box 700
Wyoming, RI 02898

Massachusetts Commission on Indian
Affairs
ATTN: Jim Peters
Executive Director
100 Cambridge Street, Suite 300
Boston, MA 02114

Section 8.0

References

8.0 REFERENCES

DuBois & King. 2020. Norwood Memorial Airport Technical Master Plan Update. Retrieved from http://cms5.revize.com/revize/norwoodma/document_center/Airport/FINAL%20--%20Norwood%20Memorial%20Airport%20Technical%20Master%20Plan%20Update%202020.pdf

Executive Office of Energy and Environmental. 2021. Massachusetts 2020 Environmental Justice Populations. Retrieved from https://mass-eoeea.maps.arcgis.com/apps/webappviewer/index.html?id=1d6f63e7762a48e5930de84ed4849212

Executive Office of Energy and Environmental, Massachusetts Department of Environmental Protection, Bureau of Water Resources. 2020. https://www.mass.gov/files/documents/2020/01/07/16ilwplist.pdf Massachusetts Year 2016 Integrated List of Waters

Natural Resources Conservation Service. 2021. Retrieved from https://websoilsurvey.sc.egov.usda.gov/WssProduct/zldtmnlwmjsjiiyy4yuflc5v/zldtmnlwmjsjiiyy4yuflc5v/20210708_11495611142_8_Soil_Map.pdf

Town of Norwood Hazard Mitigation Plan 2018 Update. Metropolitan Area Planning Council.

Appendix A

Wetland Delineation Memo

MEMORANDUM

Date: March 30, 2020

To: File

From: Carolyn Gorss, PWS

Subject: Wetland Delineation at Norwood Airport

Wetland Resource Areas

On March 18, 2020, wetland scientists from Epsilon Associates delineated wetland resource areas within the vicinity of the project site. Jurisdictional state and federal resources and waters of the U.S. delineated by Epsilon include Bordering Vegetated Wetland and Inland Bank associated with perennial streams and the Neponset River were identified and delineated within the Project Area. The site also contains Riverfront Area (RFA), Bordering Land Subject to Flooding (BLSF) associated with the Neponset River, and Land Under Water associated with the delineated waterways.

Wetlands were delineated in accordance with the U.S. Army Corps of Engineer's "1987 Wetland Delineation Manual" (USACE, 1987) and the "Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region" (USACE, 2012); the Act and Regulations (310 CMR 10.00); and the MassDEP handbook entitled "Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act" (MassDEP, 1995), and the Norwood Wetland Protection Bylaw (Article XXV).

Refer to the Wetland Delineation Figure in Attachment A and the related permit drawings for the location of wetland resource areas and buffer zones. Resource areas in and adjacent to the Project Area are described below. Wetland delineation data forms are provided in Attachment B and Site photographs are provided in Attachment C. See Table 1 below for a detailed description of each flagging series.

Inland Bank and Riverfront Area

According to 310 CMR 10.54, a Bank is the portion of the land surface which normally abuts and confines a water body. It occurs between a water body and a BVW and adjacent flood plain, or, in the absence of these, it occurs between a water body and upland. The upper boundary of Bank is the first observable break in slope or the mean annual flood level, whichever is lower. The lower boundary of a Bank is the

mean annual low flow level. Under the Act, Bank has a 100-foot buffer zone extending from its edge. . Under the Bylaw, there is a 25 foot Undisturbed Buffer Area and a No Build Area from 25 feet to 50 feet.

Additionally, according to 310 CMR 10.58, a Riverfront Area is the area of land between a river's mean annual high-water line and a parallel line measured horizontally. The riverfront area may include or overlap other resource areas or their buffer zones. The riverfront area does not have a buffer zone. Riverfront areas are likely to be significant to protect the private or public water supply; to protect groundwater; to provide flood control; to prevent storm damage; to prevent pollution; to protect land containing shellfish; to protect wildlife habitat; and to protect the fisheries.

There is bank and riverfront area associated with an unnamed ditch located south of Runway 10-28 and Purgatory Brook to the northeast of Runway 17-35.

Bordering Vegetated Wetlands

BVW is defined at 310 CMR 10.55 and, BVWs generally include freshwater wetlands that border on creeks, rivers, streams, ponds, and lakes. Types of freshwater wetlands include wet meadows, marshes, swamps, and bogs. BVWs are areas where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants. The ground and surface water regime and the plant community that occur in each type of freshwater wetland are specified in the Act. The boundary of BVW is the line within which 50 percent or more of the plant community, based on visual inspection, consists of wetland indicator plants and saturated and inundated conditions exist. There is a 100-foot Buffer Zone associated with BVW under the WPA. Under the Bylaw, there is a 25 foot Undisturbed Buffer Area and a No Build Area from 25 feet to 50 feet.

Seven wetland systems were identified and delineated within and adjacent to the Project Area associated with Purgatory Brook, drainage ditches and the Neponset River.

Bordering Land Subject to Flooding (BLSF)

According to 310 CMR 10.57, BLSF is an area with low, flat topography adjacent to and inundated by flood waters rising from creeks, rivers, streams, ponds, or lakes. It extends from the banks of these waterways and water bodies; where a BVW occurs, it extends from said wetland. The boundary of BLSF is the estimated maximum lateral extent of flood water which will theoretically result from the statistical 100-year frequency storm. Such areas are likely to be significant to flood control and storm damage prevention.

According to the applicable Federal Emergency Management Agency - Flood Insurance Rate Map (FEMA-FIRM), Community Panel Number #25021C0019E, Revision Date July 17, 2012, the majority of the Project and the Airport is within the 100-year Flood Zone A (El. 47.1 feet NAVD 88) associated with the Neponset River.

Table 1 Description of Wetland Resource Areas Delineated or Present within the Project Area

Wetland Flag Series	Bank	Land Under Water	BVW	RFA	Notes
A-1 to A-36 open/end			✓		Wetland series A (Flags A-1 through A-36 open/end) delineates a palustrine emergent wetland located south of Runway 35-end. Wetland series A consisted of mowed vegetation and standing water. Dominant species consisted of broadleaf cattails, soft rush (*Juncus effusus*), cranberry sedges (*Vaccinium oxycoccos*), tussocks sedge, elderberry, deer tongue (*Dichanthelium clandestinum*) and tearthumb (*Polygonum perfoliatum)*.
1-1 through 1-38			✓		Wetland series 1 delineates a palustrine emergent wetland located north of Runway 17-end. Wetland series 1 ties into the bank of Purgatory Brook at flags 1-16 through 1-38. Dominant species consisted of sedges (*Carex spp.)*, sensitive fern, soft rush, and broadleaf cattail. This wetland is actively mowed throughout the growing season as it is within the direct approach of Runway 17 end.
2-1 through 2-18			✓		Wetland series 2 delineates a BVW located west of taxiway A. Wetland Series 2 is hydrologically connected to Wetland series 4 by a culvert at flags 2-11 and 2-12. Additionally, a culvert was located at flags 2-14. Dominant species consisted of broadleaf cattail, soft rush, phragmites, purple loosestrife, skunk cabbage (*Symplocarpus foetidus*), deer tongue and sedges
3-1 through 3-21			✓		Wetland series 3 delineates a BVW located west of Taxiway A. Wetland series 3 begins and ends at a culvert. Dominant species includes mowed phragmites, tearthumb, multiflora rose (*Rosa multiflora*) and soft rush.
4-1 through 4-30	✓	✓	✓		Wetland series 4 delineates a drainage ditch and wetland located west of taxiway A. Wetland series 4 locates a culvert between flags 4-8 and 4-9. Dominant species include silky dogwood, soft rush, wool grass (*Scirpus cyperinus*) , skunk cabbage, and tussock sedge.
5-1 through 5-33 open			✓		Wetland series 5 delineates a BVW located south of Taxiway C. Dominant species include blue joint (Calamagrostis canadensis), cattail, soft rush, sensitive fern, and meadowsweet (Spiraea alba).
6-1 through 6-40			✓		Wetland series 6 delineates an infield BVW located adjacent to the ditch described by Series 6B. It is surrounded by both runways and Taxiways C and F. This wetland appears to receive runoff from these paved surfaces and is mowed on a regular basis. Dominant species include Carex sp., soft rush, meadowsweet, and blue joint.

Table 1 Description of Wetland Resource Areas Delineated or Present within the Study Area (Continued)

Wetland Flag Series	Bank	Land Under Water	BVW	RFA	Notes
PB-1 to PB-10	✓	✓		✓	Bank series 1 delineates the northern bank of a perennial stream, Purgatory Brook. The stream is located east of Runway 17-35. Dominant bank species include silky dogwood (*Cornus amomum)*, sensitive fern (*Onoclea sensibilis),* multiflora rose (*Rosa Multiflora),* Glossy buckthorn (*Frangula alnus*), and purple loosestrife (*Lythrum salicaria).* The stream ranges from approximately 20 feet to 25 feet wide along this stretch. Field observations confirmed that the stream flows in a southerly direction towards Runway 18-25 and then turns easternly towards the Neponset River. Substrate consisted of sand and bank erosion was present.
5B-1 to 5B-5 open	✓	✓		✓	Bank Series 5 delineates the northern bank of an unamed perennial ditch that flows parallel to the east of Runway 17-35 and south of Taxiway C. Dominant species include tussock sedge (*Carex stricta)*, elderberry (*Sambucus nigra*), and broadleaf cattail (*Typha latifolia*) within the stream. The stream was approximately 25 feet wide along this stretch.
6B 1 through 6B-12	✓	✓		✓	Bank series 6 delineates the bank of the infield ditch north of Taxiway C. A culvert was identified between flags 6B-6 and 6B-7 which passes the waterway to the south, into Series 5 described above. Vegetation includes arrowwood, buttonbush and herbaceous vegetation along the bank.

Attachment A

Wetland Delineation Figure

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Norwood Memorial Airport Norwood, Massachusetts

Epsilon Associates Inc.

Figure 1
Wetland Delineation Map

Attachment B

U.S. Army Corps of Engineers Wetland Determination Data Forms

Norwood Municipal Airport — Norwood — 03/18/2029

Norwood Municipal Airport — MA — DP-6W

A. Jacobs & R. Sommers — NAD 83

Flood Plain — Concave

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DUXYNĀ ĀĀĀ 0 ĀĀĀ 42.190987 ĀĀĀ -71.174370 ĀĀ8J]^V0 MA State Plane

DXRUĀ?JYĀFWR]Ā@J]N0 Udorthents, wet substratum ĀĀĀĀ@H=ĀLUJ\\RORLJ]RXW0 PEM

5[NĀLURVJ]RLĀ/ QRQPRLĀLXWMR]RXW\ĀXWĀ]QN\Ā\R]NĀ]aYRLJUĀOX[Ā]QR\Ā]RVNĀXOĀaNJ[4 ✓ ĀĀ@ ĀĀĀ NXĀRWĀCNVJ[T\$!Ā

5[NĀGNPN]J]R ĀĀDXRU ĀĀQaM[XUXPa ĀĀ\RPWROR"JW]Ā^[KNM4ĀĀĀĀĀĀ5[NĀ"@X[VJUĀ9R[L^V\]JWLN\"ĀY[N\NW]4ĀĀĀ ✓ ĀĀ@

5[NĀGNPN]J]R ĀĀDXRU ĀĀQaM[XUXPa ĀĀWJ]^[JUUaĀY[XKUNVJ]RL4ĀĀĀĀĀĀ =OĀWNNMNMĀNaYUJRWĀJWa ĀJW\`N[\ĀRWĀCNVJ[T\$!Ā

:<55+9?Ā 7/Ā/26-2 60 :ĀWĀĀ+QQ@BGKDHNĀPGMFĀP@KNLHĀNMHLC@QHMLP@LDQBDP!ĀHKNMOQ@LQĀEDQRODP

<bM[XYQ]RLĀGNPN]J]RXWĀB[N\NW]4 I N\Ā ✓ <bM[RLĀDXRUĀB[N\NW]4ĀĀ I N\Ā ✓ HN]UJWMĀQaM[XUXPaĀB[N\NW]4 I N\Ā ✓	2PĀQGDĀ@CĀD@Ā THQGHLĀ@Ā>DQJ@LC*ĀĀĀĀ ✓ =OĀaN\"ĀXY]RXWJUĀHN]UJWMĀDR]NĀ=80ĀĀĀĀĀ
CNVJ[T\0ĀĀ 9aYUJRWĀJU]N[WJ]R_NĀY[XLNM^[N\ĀQN[NĀX[ĀRWĀJĀ\NYJ[J]NĀ[NYX[]$!Ā	

1?-974 7 0?Ā

>DQJ@LĀCVCOMJMFVĀLCHB@QMP		DNLXWMJ[aĀ=WMRLJ]X[\Ā VRWRV^VĀXOĀ]`XĀ[NZ^R[NM
B[RVJ[aĀ=WMRLJ]X[\Ā VRWRV^VĀXOĀXWNĀR\Ā[NZ^R[NMĀLQNLTĀJUUĀ]QJ]ĀJYYUa		___ĀĀD^[OJLNĀDXRUĀ7[JLT\Ā 6,!Ā
___ĀĀD^[OJLNĀHJ]N[Ā 5'!Ā	___ĀĀHJ]N[#D]JRWNMĀ>NJ_N\Ā 6/!Ā	___ĀĀ8[JRWJPNĀBJ]]N[W\Ā 6'&!Ā
___ĀĀ<RPQĀHJ]N[ĀEJKUNĀ 5(!Ā	___ĀĀ5Z^J]RLĀ:J^WJĀ 6')!Ā	___ĀĀ?X\\ĀE[RVĀ>RWN\Ā 6',!Ā
___ĀĀDJ]^[J]RXWĀ 5)!Ā	___ĀĀ?J[UĀ8NYX\R]\Ā 6'+!Ā	___ĀĀ8[a#DNJ\XWĀHJ]N[ĀEJKUNĀ 7(!Ā
___ĀĀHJ]N[Ā?J[T\Ā 6'!Ā	___ĀĀ<aM[XPNWĀD^UORMNĀAMX[Ā 7'!Ā	___ĀĀ7[JaOR\QĀ6^[[X`\Ā 7 .!Ā
___ĀĀDNMRVNW]Ā8NYX\R]\Ā 6(!Ā	___ĀĀAaRMRcNMĀCQRcX\YQN[N\ĀXWĀ>R_RWPĀCXX]\Ā 7)!Ā	___ĀĀDJ]^[J]RXWĀGR\RKUNĀXWĀ5N[RJUĀ=VJPN[aĀ 7.!Ā
___ĀĀ8[RO]Ā8NYX\R]\Ā 6)!Ā	___ĀĀB[N\NWLNĀXOĀCNM^LNMĀ=[XWĀ 7*!Ā	___ĀĀD]^W]NMĀX[ĀD][N\\NMĀB\JW]\Ā 8
___ĀĀ5UPJUĀ?J]ĀX[ĀR[^\]Ā 6*!Ā	___ĀĀCNLNW]Ā=[XWĀCNM^L]RXWĀRWĀERUUNMĀDXRU\Ā 7+!Ā	___ĀĀ;NXVX[YQRLĀBX\R]RXWĀ 8(!Ā
___ĀĀ=[XWĀ8NYX\R]\Ā 6+!Ā	___ĀĀEQRWĀ?^LTĀD^[OJLNĀ 7-	___ĀĀDQJUUX`Ā5Z^R]J[MĀ 8)
___ĀĀ=W^WMJ]RXWĀGR\RKUNĀXWĀ5N[RJUĀ=VJPN[aĀ 6-!Ā	___ĀĀA]QN[Ā 9aYUJRWĀRWĀCNVJ[T\!Ā	___ĀĀ?RL[X]XYXP[JYQRLĀCNURNOĀ 8*!Ā
___ĀĀDYJ[\NUaĀGNPN]J]NMĀ7XWLJ_NĀD^[OJLNĀ 6.		___ĀĀ:57#@N^][JUĀEN\]Ā 8+

/HDJC7ĀPDO@QHMLP)Ā D^[OJLNĀHJ]N[ĀB[N\NW]4ĀĀ I N\Ā ĀĀ@X ✓ ĀĀ8NY]Q RWLQN\!0 HJ]N[ĀEJKUNĀB[N\NW]4ĀĀ I N\Ā ĀĀ@X ✓ ĀĀ8NY]Q RWLQN\!0 DJ]^[J]RXWĀB[N\NW]4ĀĀĀĀ I N\Ā ĀĀ@X ✓ ĀĀ8NY]Q RWLQN\!0 RWLU^MN\ĀLJYRUUJ[aĀO[RWPN	**>DQJ@LĀCVCOMJMFVĀ8ODPDLQ*ĀĀ2DP** ĀĀ@X ✓
8N\L[RKNĀCNLX[MNMĀ8J]JĀ \][NJVĀPJ^PN"ĀVXWR]X[RWPĀ`NUU"ĀJN[RJUĀYQX]X\"ĀY[N_RX^\ĀRW\YNL]RXW\!"ĀROĀJ_JRUJKUN0Ā	
CNVJ[T\0ĀĀ	

5K\XU^]NĀĀĀĀ8XVRWJW]ĀĀ=WMRLJ]X[Ā

E[NNĀD[J]^V ĀĀĀ UX]Ā\RcN0 30' Ā!ĀĀĀ ĀAY\XU^]NĀ DYNLRN\Ā ?ĀD]J]^\

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($			
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+$			
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	Ā2ĀEX]JUĀ7X_N[Ā		

DJYURWP%DQ[^K ĀD]J]ĀĀĀ BUX]Ā\RcN0 15' Ā!Ā

'$			
($			
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*$			
+$			
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	Ā2ĀEX]JUĀ7X_N[Ā		

<N[KĀD][J]^VĀĀĀ BUX]Ā\RcN0 5'

'$ Poa sp. 1	80	Y	FACU
($ Poa sp. 2	15	N	FACU
)$ Rosa Multiflora	5	N	FACU
*$ Rubus Idaeus	2	N	FACU
+$ Solidago Rugosa	T		FAC
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'&$			
"$			
'($			
102 Ā2ĀEX]JUĀ7X_N[Ā			

HXXMbĀGRWNĀD]J]ĀĀĀ BUX]Ā\RcN0 30' Ā!Ā

'$			
($			
)$			
*$			
	Ā2ĀEX]JUĀ7X_N[Ā		

MKHL@BDĀ;DGT MOIPGDDQ)Ā

@^VKN[ĀXOĀ8XVRWJW]ĀDYNLRN\ĀĀĀ EQJ]Ā5[NĀ6>"Ā 57H"ĀX[Ā:570Ā 0 ĀĀ 5!Ā

EX]JUĀ@^VKN[ĀXOĀ8XVRWJW]ĀĀĀ DYNLRN\Ā5L[X\\ĀJUUĀD][J]J0ĀĀ 1 ĀĀ 6!Ā

BN[LNW]ĀXOĀ8XVRWJW]ĀDYNLRN\Ā EQJ]Ā5[NĀ6>"Ā 57H"ĀX[Ā:570Ā 0 ĀĀ 5%6!Ā

8ODS@JLBDĀ2CLUĀ MOIPGDDQ)Ā

ĀĀĀĀĀĀĀEX]JUĀ7XĀXO0ĀĀĀĀĀĀ ĀAYUJRYUb0ĀĀĀĀĀĀ

A6>Ā\YNLRN\Ā	0	Āa'Ā2Ā
:57HĀ\YNLRN\Ā	0	Āa(Ā2Ā
:57Ā\YNLRN\Ā	0	Āa)Ā2Ā
:57FĀ\YNLRN\Ā	102	Āa*Ā2Ā 408
FB>Ā\YNLRN\Ā	0	Āa+Ā2Ā
7XU^VWĀEX]JU\0ĀĀ	102	5Ā 5Ā

ĀĀĀĀĀĀĀĀĀB[N_JUNWLNĀ=WMNaĀĀ2Ā6%5Ā2ĀĀĀ 4

1 VCOMNGVOQBĀ=DDQ@HM2LGH@DP)Ā

__ĀĀCJYRMĀEN[]ĀXOM[XYbLRLĀGNPN]J]RXWĀ

__ĀĀ8XVRWJWLNĀEN]ĀR\Ā3+&ĀĀ

✓ ĀĀB[N_JUNWLNĀ=WMNaĀR\Ā

__ĀĀ?X[YQXUXPRLJUĀ5MJY]J]RXW\ĀB[X_RMNĀ\^YYX[]RWPĀ ĀĀĀĀĀĀĀĀĀĀĀMJ]JĀRWĀGNVJ[Z\ĀX[ĀXWĀJĀ\NYJ[J]NĀ\QNN]

__ĀĀB[XKUNVJ]RLĀAYM[XYbLRLĀGNPN]J]RXWĀ5NaYUJRW!Ā

=WMRLJ]X[\ĀXOĀQbM[RLĀ\XRUĀJWMĀāN]UJWMĀQbM[XUXPbĀV^\]Ā KNĀY[N\NW]"Ā^WUN\\ĀM\]^[KNMĀX[ĀY[XKUNVJ]RL$Ā

-DEHLQGHLPĀ=DFDQ@MLĀ:QO@Q

;ODD ĀdĀHXXMbĀYUJW]\Ā)ĀRW$Ā -$!ĀLVĀ Ā\NLĀRWĀMRJVN]N[Ā J]ĀK[NJ\]ĀQNRPQ]Ā5"Ā[NPJ[MUN\\ĀXOĀQNRPQ]$Ā

:@NJHL#PGOR ĀdĀHXXMbĀYUJW]\ĀUN\\Ā]QJWĀ)ĀRW$Ā86<Ā JWMĀP[NJ]N[Ā]QJWĀ)$(.ĀO]Ā '!Ā]JUU$Ā

1DOA ĀdĀ5UUĀQN[KJLNX^\ĀWXW%āXXMbĀYUJW]\"ĀRN[MUN\\Ā XOĀ\RcN"ĀJWMĀāXXMbĀYUJW]\ĀUN\\Ā]QJWĀ)$(.ĀO]ĀJUU$Ā

> MMOVĀSHLDP ĀdĀ5UUĀāXXMbĀ_RWN\ĀP[NJ]N[Ā]QJWĀ)$(.ĀO]ĀRWĀ QNRPQ]$Ā

1VCOMNGVOQHB =DFDQ@HLĀ 8ODPDLQ*ĀĀĀ ______ ĀĀĀ6Ā ✓

CNVJ[T\0ĀĀ =WLUMNĀYQX]XĀW^VKN[\ĀQN[NĀX[ĀXWĀJĀ\NYJ[J]NĀ\QNN]$

0-8	10YR 2/1	100					S. Loam	
8-13	2.5Y 3/3	100					S. Loam	
13-20	2.5Y 5/3	98	2.5Y 6/6	2	C	M	L. Sand	

>.;4 +6-Ā-.;.9526+;2 7 6Ā-+; +Ā/795Ā WĀMOQBDLQ@UĀ@6LMĀOQGPD@Ā9DHMLĀ

B[XSNL]%DR]\0 Norwood Airport ĀĀ7DJX^Wb0ĀĀĀ Norwood ĀDJVYURWPĀ8J]N0ĀĀ 3/18/2020

5YYURLJW]%AN[0 Norwood Municipal Airport ĀĀD]J]N0 MA ĀĀDVYURWPĀBXRW0 A-19

=W_N\]RPJ]X[\0ĀĀ R. Sommers & A. Jacobs ĀĀDNL]RXW"ĀCJWPN0 NAD 83

>JWMOX[VQRUX\N"Ā]N[[JLN"ĀN]L$!0 Flood Plain ĀĀ>XUĀ[NURNOĀ LXWLJ_N"ĀLXW_N"ĀWXWN0 Concave

DUXYNĀ Ā0 0 42.194344 -71.179479 ĀĀ8J]^V0 MA State Plane

DXRUĀ?JYĀFWR]Ā@JVN0 Urban land, wet substratum, 0 to 3 percent slope ĀĀĀĀ@H=ĀLUJ\\RORLJ]RXW0

5[NĀLURVJ]RLĀ ... ✓ ĀĀ@ ... ĀWRWĀCNVJ[T\$!Ā

5[NĀGNPN]J]R ... ĀĀ ✓ ĀĀ@

5[NĀGNPN]J]R ... ĀWJ]^[JUUĀ ... ĀWĀCNVJ[T\$!Ā

:<55+9?Ā 7/Ā/26-2 60 :ĀWĀĀ+QQ@BGKĀNĀPGHLFĀP@KNLFHĀNMHLMQ@LQHML@LQBQP!ĀHKNMOQ@LQĀED@QROODP

<bM[XYQ]RLĀGNPN]J]RXWĀB[N\NW]4 I NĀ ✓ ĀĀ@
<bM[RLĀDXRUĀB[N\NW]4 I NĀ ✓ ĀĀ@
HN]UJWMĀM[XUXPbĀB[N\NW]4 I NĀ ✓ ĀĀ@
2PĀQGDĀN@DCĀD@Ā T.HQGHLĀ@Ā>DQJ@LC*ĀĀĀĀ ✓
Ā6N\"ĀXY]RXWJUĀ=NUJWMĀDR]NĀ=80 Wetland Series A

CNVJ[T\0ĀĀ 9aYUJRWĀJU]N[WJ]R_NĀY[XLNM^[N\ĀQN[NĀX[ĀRWĀJĀ\NYJ[J]NĀ[NYX[]$!Ā

1?-974 7 0?Ā

>DQJ@LĀCVCOMLFVĀLCHB@MQR

DNLXWMJ[bĀ=WMRLJ]X[\Ā VRWRV^VĀXOĀ]QX[NZ^R[NM

B[RVJ[bĀ=WMRLJ]X[\Ā VRWRV^VĀXOĀXWNĀR\Ā[NZ^R[NMĀLQNLTĀJUUĀ]QJ]ĀJYYUb

✓ ĀĀD^[OJLNĀHJ]N[Ā 5'!Ā
✓ ĀĀ<RPQĀHJ]N[ĀEJKUNĀ 5!Ā
✓ ĀĀDJ]^[J]RXWĀ 7!Ā
__ĀĀHJ]N[Ā?J[T\Ā 6'!Ā
__ĀĀDNMRVNW]Ā8NYX\R]\Ā 6(!Ā
__ĀĀ8[RO]Ā8NYX\R]\Ā 6)!Ā
__ĀĀ5UPJUĀ?J]ĀX[Ā6*!Ā
__ĀĀ=[XWĀ8NYX\R]\Ā 6+!Ā
__ĀĀ=W^WMJ]RXWĀFR\RKUNĀXWĀ5N[RJUĀ=VJPN[bĀ 6-!Ā
__ĀĀDYJ[\NUbĀGNPN]J]NMĀ7XWLJ_NĀD^[OJLNĀ 6Ā
__ĀĀHJ]N[Ā#D]JRWNMĀ>NJ_N\Ā 6/!Ā
__ĀĀ5Z^J]RLĀ:J^WJĀ 6')!Ā
__ĀĀ?J[UĀ8NYX\R]\Ā 6'+!Ā
__ĀĀ<bM[XPNWĀDQORMNĀAMX[Ā 7'!Ā
__ĀĀAaRMRcNMĀCQRcX\YQN[N\ĀXWĀ>R_RWPĀCXX]\Ā 7)!Ā
__ĀĀB[N\NWLNĀXOĀCNM^LNMĀ=[XWĀ 7*!Ā
__ĀĀCNLNW]Ā=[XWĀCNM^L]RXWĀRWĀERUUNMĀDXRU\Ā 7+!Ā
__ĀĀEQRWĀ?^LTĀD^[OJLNĀ 7-
__ĀĀA]QN[Ā 9aYUJRWĀRWĀCNVJ[T\!Ā
__ĀĀD^[OJLNĀDXRUĀ7[JLT\Ā 6,!Ā
__ĀĀ8[JRWJPNĀBJ]]N[W\Ā 6'&!Ā
__ĀĀ?X\\ĀE[RVĀ>RWN\Ā 6',!Ā
__ĀĀ8[b#DNJ\XWĀHJ]N[ĀEJKUNĀ 7(!Ā
__ĀĀ7[JbOR\QĀ6^[[X`\Ā 7 .!Ā
__ĀĀDJ]^[J]RXWĀGR\RKUNĀXWĀ5N[RJUĀ=VJPN[bĀ 7/!Ā
__ĀĀD]^W]NMĀX[ĀD][N\\NMĀBUJW]\Ā 8'!Ā
__ĀĀ;NXVX[YQRLĀBX\R]RXWĀ 8(!Ā
__ĀĀDQJUUX`Ā5ZmRLRĀ8)!Ā
__ĀĀ?RL[X]XYXP[JYQRLĀCNURNOĀ 8*!Ā
__ĀĀ:57#@N^][JUĀEN\]Ā 8+

/HDJC7ĀPDG@QMLP)Ā

D^[OJLNĀHJ]N[ĀB[N\NW]4Ā I NĀ ✓ ĀĀ@ ĀĀ8NY]Q0 0
HJ]N[ĀEJKUNĀB[N\NW]4Ā I NĀ ✓ ĀĀ@ ĀĀ8NY]Q0 2"
DJ]^[J]RXWĀB[N\NW]4Ā I NĀ ✓ ĀĀ@ ĀĀ8NY]Q0 0
RWLU^MN\ĀLJYRUUJ[bĀO[RWPN

>DQJ@LĀCVCOMLFVĀ8ODPLD*ĀĀDĀ ✓

8N\L[RKNĀCNLX[MNMĀ8J]JĀ \][NJVĀPJ^PN"ĀVXWR]X[RWPĀ`NUU"ĀJN[RJUĀYQX]X\"ĀY[N_RX^\ĀRW\YNL]RXW\!"ĀROĀJ_JRUJKUN0Ā

CNVJ[T\0ĀĀ

E[NNĀD]J]^V ĀĀĀUBX]Ā\RcN0 30'	5K\XU^]NĀ 8XVRWJW]Ā =WMRLJ]X[Ā		
'$			
($			
)$			
*$			
+$			
,$			
-$			
Ā2ĀEX]JUĀ7X_N[Ā			

DJYURWP%DQ[^Q/ĀD]J ĀĀĀ BUX]Ā\RcN0 15'			
'$ Rubus idaeus	3	Y	FACU
($ Acer rubrum	3	Y	FAC
)$			
*$			
+$			
,$			
-$			
Ā2ĀEX]JUĀ7X_N[Ā	6		

<N[KĀD][J]^VĀĀĀ BUX]Ā\RcN0 5'			
'$ Carex stricta	50	Y	OBL
($ Typha latifolia	30	N	OBL
)$ Onoclea sensibilis	2	N	FACW
*$ Polygonum perfoliatum	5	N	FAC
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"$			
'($			
Ā2ĀEX]JUĀ7X_N[Ā	87		

HXXMbĀGRWNĀD]J ĀĀĀ BUX]Ā\RcN0 30'			
'$			
($			
)$			
*$			
Ā2ĀEX]JUĀ7X_N[Ā			

MKHL@IBDĀ;DQ MOIPGDDQ)Ā

@^VKN[ĀXOĀ8XVRWJW]ĀDYNLRN\ĀEQJ]Ā5[NĀ6>"Ā57H"ĀX[Ā:570Ā: 2 (5!)

EX]JUĀ@^VKN[ĀXOĀ8XVRWJW]ĀDYNLRN\Ā5L[X\\ĀUUĀD][J]J0Ā: 3 (6!)

BN[LNW]ĀXOĀ8XVRWJW]ĀDYNLRN\ĀEQJ]Ā5[NĀ6>"Ā57H"ĀX[Ā:570Ā: 66 (5%6!)

8OD@JLBDĀ2CDUĀMOIPGDDQ)Ā

EX]JUĀ%ĀXOĀ		7^U]RYUb
A6>Ā\YNLRN\	80	aĀ'Ā2Ā 80
:57HĀ\YNLRN\	2	aĀ(Ā2Ā 4
:57Ā\YNLRN\	8	aĀ)Ā2Ā 24
:57FĀ\YNLRN\	3	aĀ*Ā2Ā
FB>Ā\YNLRN\	0	aĀ+Ā2Ā
7XU^VWĀEX]JU\0	93 (5)	108 (6)

B[N_JUNWLNĀ=WMNaĀ2Ā6%5Ā2 1.16

1VCOMNGVQBĀ=DDQ@HMĀ2LG@MODP)Ā

__ ĀCJYRMĀENV]ĀOX[ĀQbM[XYQbURLĀ_NPN]J]RXWĀ
✓ Ā8XVRWJWLNĀ]N\]ĀR\Ā3+&Ā
__ ĀB[N_JUNWLNĀ=WMNaĀR\Ā
__ Ā?X[YQXUXPRLJUĀJMJY]J]RXW\ĀAYYX[]RWPĀMJ]JĀRWĀANVJ[T\ĀX[ĀXWĀJĀ\NYJ[J]NĀ\QNN]
__ ĀB[XKUNVJ]RLĀQbM[XYQbURLĀGNPN]J]RXWĀ5NaYUJRW!Ā

=WMRLJ]X[\ĀXOĀQbM[RLĀ\XRUĀJWMĀVN]UJWMĀQbM[XUXPbĀV^\]ĀKNĀY[N\NW]"Ā^WUN\\ĀM\][^KNMĀX[ĀY[XKUNVJ]RL$Ā

-DEHLQĀ=DFDQ@OHLĀ:QO@Q

;ODDĀdĀHXXMbĀYUJW]\ĀNaLU^MRWPĀ_RWN\"Ā)ĀRW$Ā -$.ĀLVĀX[ĀVX[NĀRWĀMRJVN]N[ĀJ]ĀK[NJ\]ĀQNRPQ]Ā5819Ā"Ā[NPJ[MUN\\ĀXOĀQNRPQ]$Ā

:@NJHLFĀ=DGĀdĀHXXMbĀYUJW]\ĀUN\\Ā]QJWĀ)ĀRW$Ā86<ĀJWMĀP[NJ]N[Ā]QJWĀ)$(.ĀO]Ā'ĀVĀ]JUU$Ā

1DOAĀdĀ5UUĀQN[KJLNX^\Ā5WXWdHXXMb!ĀYUJW]\"Ā[NPJ[MUN\\ĀXOĀ\RcN"ĀJWMĀHXXMbĀYUJW]\ĀUN\\Ā]QJWĀ)$(.ĀO]Ā]JUU$Ā

> MMOVĀGHLDĀdĀ5UUĀHXXMbĀ_RWN\ĀP[NJ]N[Ā]QJWĀ)$(.ĀO]ĀRWĀQNRPQ]$Ā

1VCOMNGVQHBĀ=DFDQ@HMĀ8ODPDLQ* ✓ ĀAN\ ______ Ā@X ______

CNVJ[T\0ĀĀ=WLU^MNĀYQX]XĀW^VKN[\ĀQN[NĀX[ĀXWĀJĀ\NYJ[J]NĀ\QNN]$

0-10	10 YR 2/1	100					Muck	
10-18	10 YR 2/2	100					Muck	

>.;4 +6-Ā-.;.9526+;2 7 6Ā-+; +Ā/795Ā W6MOQGDL@QUĀ@6LMĀQGP@Ā9DHMLĀ

B[XSNL]%DR]N0 Norwood Airport ĀĀ7KX^Wb0ĀĀĀ Norwood ĀDJVYURWPĀ8J]N0ĀĀ 3/18/2020

5YYURLJW]%AN[0 Norwood Municipal Airport ĀĀD]J]N0ĀĀĀĀĀĀĀĀVYURWPĀBXRW]0 MA A-19

=W_N\]RPJ]X[\0ĀĀĀ R. Sommers & A. Jacobs ĀĀDNL]RXW'\EQRY"ĀCJWP]N0ĀĀĀĀĀ NAD 83

>JWMOX[VQRUUX\N]N[[JLN"ĀN]L$!0 Flood Plain ĀĀ>LXUĀ[NURNOĀ LXWLJ_N"ĀLXW_N]"ĀWXWN 0 Concave

DUXYNĀ Ā0 42.182964 71.172492 ĀĀ8J]^V0 MA State Plane

DXRUĀ?JYĀFWR]Ā@JVN0 Urban land, wet substratum, 0 to 3 percent slope ĀĀĀĀ@H=ĀLUJ\\RORLJ]RXW0

5[NĀLURVJ]RLĀMXĀQRLĀLXWMR]RXW\ĀXWĀ]QN\ĀRPNĀOX[Ā]QR\Ā]RVNĀXOĀNJ[2 ✓ ĀĀ@ ĀĀĀ (NOKJOĀRWĀCNVJ[T\$!Ā)

5[NĀGNPN]J]R ĀĀDXRUĀ ĀX[ĀQTM[XUXPTĀ\RPWROĀLJW]UTĀM]^[KNM4ĀĀĀĀĀĀ5[NĀ=X[VJUĀLR[L^V\]JWLN\ĀY[N\NW]4 ĀĀĀ ✓ ĀĀ@ ĀĀĀĀĀĀ

5[NĀGNPN]J]R ĀĀDXRUĀ ĀX[ĀQTM[XUXPTĀWJ]^[JUUTĀY[XKUNVJ]RL4ĀĀĀĀĀĀĀ =OĀWNNMNM"ĀNSYUJRWĀJWT ĀJW\ N[\ĀRWĀCNVJ[T\$!Ā

:<55+9?Ā 7/Ā/26-2 60 :ĀWĀĀ+QQ@DGĀK@HNĀPGMFĀP@KNJHĀNMHLMF@QHMLP@LNDQP!ĀHKNMOQ@LQĀEDQ@SQRDP

<bM[XYQ]RLĀGNPN]J]RXWĀB[N\NW]4 I N\Ā ✓ ĀĀĀĀĀĀĀĀ <bM[RLĀDXRUĀB[N\NW]4 I N\Ā ✓ ĀĀĀĀĀĀĀĀ HN]UJWMĀ<bM[XUXPTĀB[N\NW]4 I N\Ā ✓ ĀĀĀĀĀĀĀĀ	2PĀQGDĀ@CĀ@Ā T-QGHLĀ@Ā>DQJ@LC*ĀĀĀĀĀĀĀ ✓ =OĀTN\"ĀXY]RXWJUĀHN]UJWMĀDR]NĀ=80ĀĀĀĀĀ
CNVJ[T\0ĀĀ 9aYUJRWĀJU]N[WJ]R_NĀY[XLNM^[N\ĀQN[NĀX[ĀRWĀJĀ\NYJ[J]NĀ[NYX[]$!Ā	

1?-974 7 0?Ā

>DQJ@LĀCVCOMJMFVĀLCHB@MOP		DNLXWMJ[TĀHWMRLJ]X[\Ā VRWRV^VĀXOĀ]ZXĀ[NZ^R[NM
B[RVJ[TĀ=WMRLJ]X[\ĀVRWRV^VĀXOĀXWNĀR\Ā[NZ^R[NMĀLQNLTĀJUUĀ]QJ]ĀJYYUT		___ĀĀD^[OJLNĀDXRUĀ7[JLT\Ā 6,!Ā
___ĀĀD^[OJLNĀHJ]N[Ā 5'!Ā	___ĀĀHJ]N[#D]JRWNMĀ>NJ_N\Ā 6/!Ā	___ĀĀ8[JRWJPNĀBJ]]N[W\Ā 6'&!Ā
___ĀĀ<RPQĀHJ]N[Ā7JKUNĀ 5(!Ā	___ĀĀ5Z^J]RLĀ:J^WJĀ 6')!Ā	___ĀĀ?X\\ĀE[RVĀ>RWN\Ā 6',!Ā
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___ĀĀHJ]N[Ā?J[T\Ā 6'!Ā	___ĀĀ<TM[XPNWĀD^UORMNĀAMX[Ā 7'!Ā	___ĀĀ7[JTOR\QĀ6^[[X`\Ā 7.!Ā
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Attachment C

Site Photographs

Photo 1: View looking north at wetland series 1, just north of the Runway 17 Runway Safety Area.

Photo 2: Wetland delineation edge (Series A) along grassed Runway 35-end Safety Area.

Photo 3: View looking southwest at Wetland Series 6.

Photo 4: View looking easterly along Wetland Series 6.

Photo 5: View looking west along southern edge of existing Taxiway C along wetland boundary (Series 5).

Photo 6: Similar view as photo above during growing season..

Photo 7: Looking east nor along Bank Series 6B.

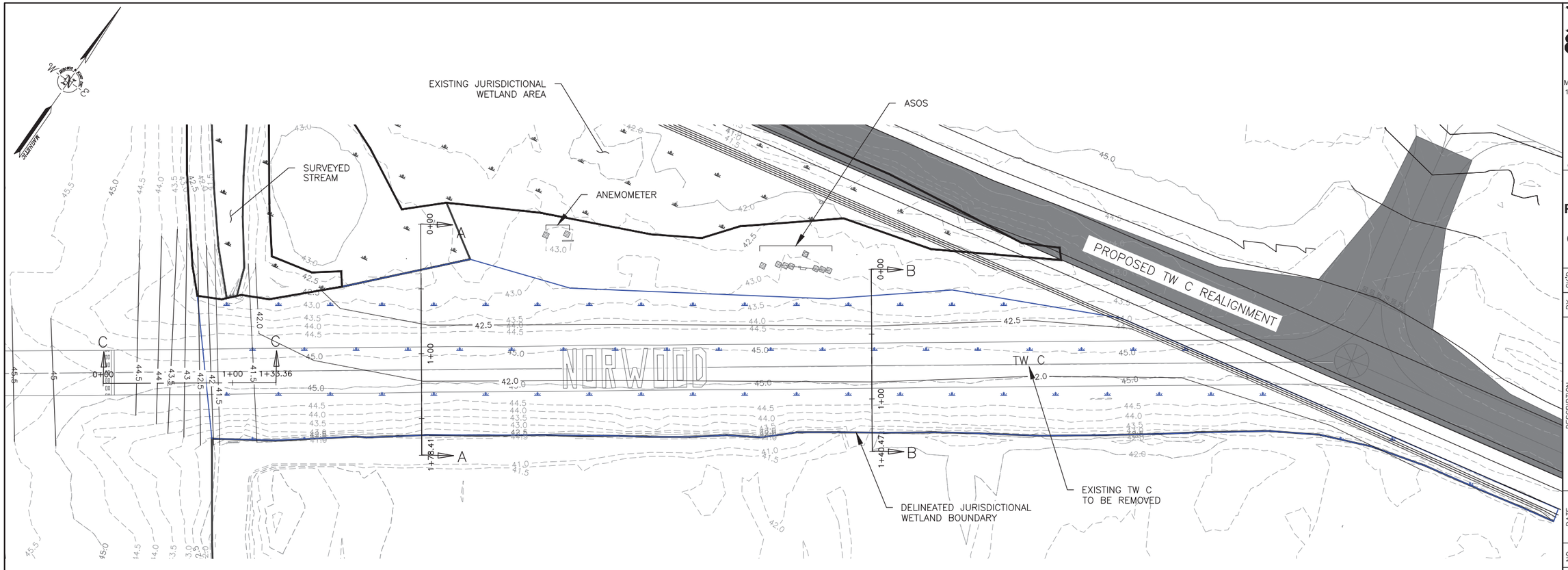
Photo 8: View looking south along Bank Series 6B.

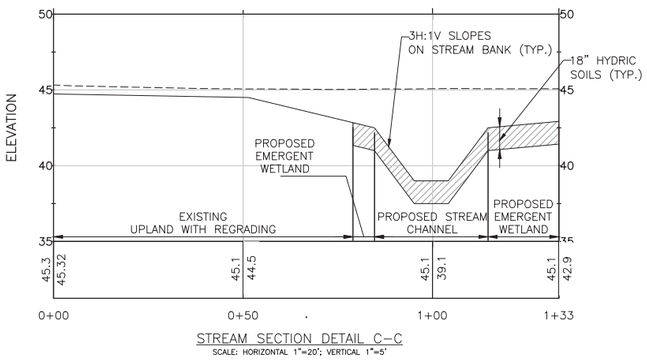
Photo 9: Purgatory Brook Bank (PB) series looking east.

Photo 10: Wetland/Bank Series 4

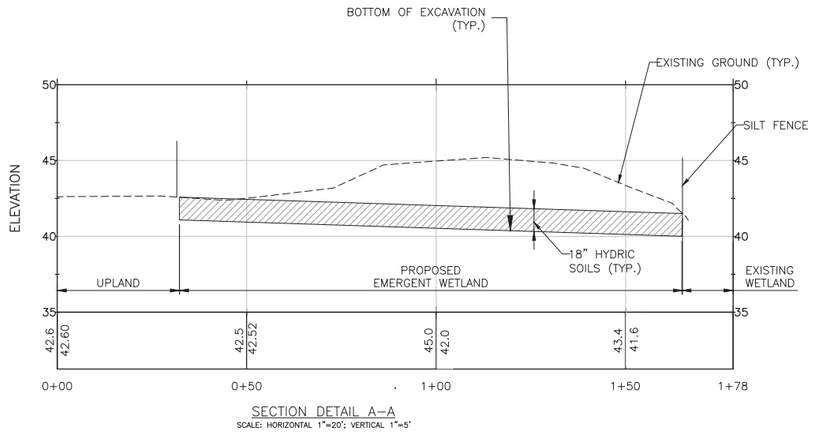
Appendix B

Draft Wetland Replication Plan

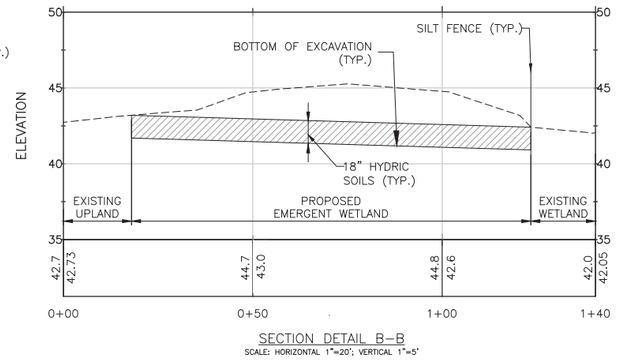




STREAM SECTION DETAIL C–C
SCALE: HORIZONTAL 1"=20'; VERTICAL 1"=5'



SECTION DETAIL A–A
SCALE: HORIZONTAL 1"=20'; VERTICAL 1"=5'



SECTION DETAIL B–B
SCALE: HORIZONTAL 1"=20'; VERTICAL 1"=5'

LEGEND

RFA (RIVER FRONT AREA)

WETLAND DELINEATION LINE

PROPOSED WETLAND REPLICATION AREA

HORIZONTAL SCALE
0 20 40 80
1"=40'

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PROFESSIONAL SEAL

PERMITTING SET NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	BY	CK'D

NORWOOD MEMORIAL AIRPORT NORWOOD, MA

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREA

SHEET TITLE

WETLAND REPLICATION AREA LAYOUT PLAN

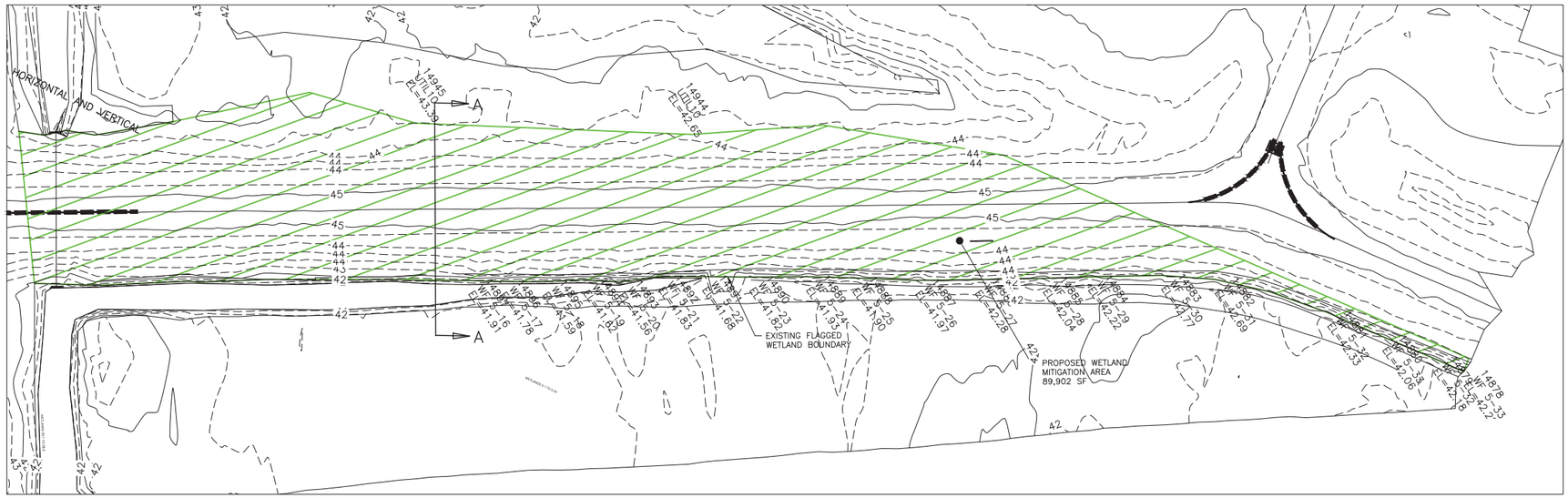
DRAWN BY	DATE
DK	JUNE 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

C4.2

SHEET 25 OF 44

I:\3\326165 Norwood Airport EA - 2020\Drawings\24-25_C4.1-C4.2_Wetland Replication Plan-Rev1.dwg APRIL 2021

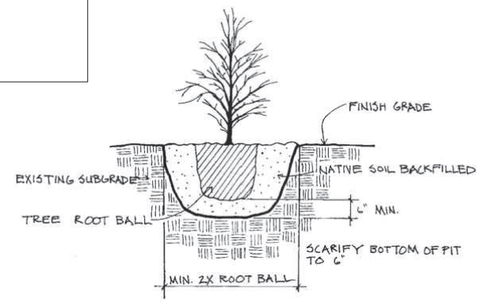


PLANTING PLAN

SCALE: 1"=50'

PLANTING NOTES:

1. PLANT MATERIAL SHALL BE FURNISHED AND INSTALLED AS INDICATED; INCLUDING ALL LABOR, MATERIALS, PLANTS, EQUIPMENT, INCIDENTALS, WARRANTEES, AND CLEAN–UP. PLANTS SHALL BE TYPICAL OF THEIR SPECIES AND VARIETY; HAVE NORMAL GROWTH HABITS; WELL DEVELOPED BRANCHES, DENSELY FOLIATED, VIGOROUS ROOT SYSTEMS AND BE FREE FROM DEFECTS AND INJURIES. CONTRACTOR SHALL REPORT ANY SOIL OR DRAINAGE CONDITIONS CONSIDERED DETRIMENTAL TO THE GROWTH OF PLAN MATERIAL TO THE WETLAND SPECIALIST AND ENGINEER.
2. ALL PLANT MATERIAL SHALL BE PURCHASED FROM A NEW ENGLAND WETLAND PLANT NURSERY AND GUARANTEED BY THE CONTRACTOR TO BE IN VIGOROUS GROWING CONDITION. PROVISIONS SHALL BE MADE FOR A GROWTH GUARANTEE OF AT LEAST ONE (1) CALENDAR YEAR FROM THE DATE OF PROJECT SUBSTANTIALLY COMPLETE FOR TREES AND SHRUBS. REPLACEMENTS SHALL BE MADE AT THE BEGINNING OF THE FIRST SUCCEEDING PLANTING SEASON. ALL REPLACEMENTS SHALL HAVE A GUARANTEE EQUAL TO THAT STATED ABOVE.
3. PRIOR TO THE PLANTING STOCK DELIVERY TO THE SITE, THE WETLAND SCIENTIST WILL VISIT THE NURSERY PROVIDING THE PLANTING STOCK TO ENSURE THAT THE SPECIMENS ARE HEALTHY, FREE OF DISEASE AND PESTS, CONTAIN A WELL DEVELOPED ROOT SYSTEM, AND ARE SUITABLE FOR USE WITHIN THE REPLACEMENT AREAS. UNSUITABLE SPECIMENS WILL BE REJECTED AND REPLACED WITH SUITABLE SPECIMENS. THE WS MAY PROPOSE SUBSTITUTIONS RELATIVE TO SPECIES, SIZE AND QUANTITIES TO THE RE, EM AND MASSDEP FOR REVIEW AND APPROVAL IF THERE IS LIMITED AVAILABILITY OF PLANT STOCK AT THE TIME OF PLANTING. THE ENVIRONMENTAL MONITOR AND ENGINEER MUST APPROVE ANY PLANTING–SUBSTITUTIONS. ALL WOODY PLANT STOCK WILL EITHER BE BARE–ROOT OR CONTAINER–GROWN.
4. INSOFAR AS IT IS PRACTICABLE, PLANT MATERIAL SHALL BE PLANTED ON THE DAY OF DELIVERY. IN THE EVENT THIS IS NOT POSSIBLE, THE CONTRACTOR SHALL PROTECT STOCK NOT PLANTED. PLANTS SHALL NOT REMAIN UNPLANTED FOR LONGER THAN A THREE DAY CALENDAR PERIOD AFTER DELIVERY. ANY PLANTS NOT INSTALLED DURING THIS PERIOD MAY BE REJECTED BY THE ENGINEER.
5. QUALITY AND SIZE OF PLANTS, SPREAD OF ROOTS, AND SIZE OF BALLS SHALL BE IN ACCORDANCE WITH ANSI 260 (REV. 1980) "AMERICAN STANDARD FOR NURSERY STOCK" AS PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, INC.
6. ALL PLANTS SHALL BE PLANTED IN TRANSPORTED TOPSOIL THAT IS THOROUGHLY WATERED AND TAMPED AS BACK FILLING PROGRESSES. PLANTING MIX TO BE AS SHOWN ON PLANTING DETAILS. RAISE AND REPLANT ANY PLANT WHICH SETTLES MORE THAN 2" AFTER PLANTING AND WATERING.
7. FERTILIZER FOR WOODY PLANTS SHALL BE SLOW RELEASE, PELLITIZED AND SUITABLE FOR RELEASE UNDER SATURATED SOIL CONDITIONS. FERTILIZER SHALL BE OSMOCOATE 18–5–11, 12–14 MONTH RELEASE OR APPROVED EQUAL.
8. PLANTS SHALL NOT BE BOUND WITH WIRE OR ROPE AT ANY TIME SO AS TO DAMAGE THE BARK OR BREAK BRANCHES. PLANTS SHALL BE HANDLED FROM THE BOTTOM OF THE BALL ONLY.
9. PLANTING OPERATIONS SHALL BE PERFORMED DURING PERIODS WITHIN THE PLANTING SEASON WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE AS DETERMINED BY THE ENVIRONMENTAL MONITOR AND ENGINEER. THIS IS TYPICALLY BETWEEN APRIL 15 – JUNE 15 AND SEPTEMBER 15 – NOVEMBER 15. PLANTS SHALL NOT BE INSTALLED IN TOPSOIL THAT IS IN A MUDDY OR FROZEN CONDITION. THE SITE CONTRACTOR SHALL BE RESPONSIBLE FOR RE–SETTING ANY PLANTS THAT BECOME DISLODGED OR UPROOTED AS A RESULT OF FROST HEAVES OR OTHER ENVIRONMENTAL FACTORS DURING THE FIRST TWO GROWING SEASONS.
10. THE SPECIES, SIZE, AND QUANTITY OF THE PLANTINGS SHALL FOLLOW THE APPROVED PLANTING SCHEDULE AND SPECIFICATIONS DEPICTED.
11. ALL PLANTINGS WILL BE ARRANGED BY THE SITE CONTRACTOR'S WETLAND SPECIALIST IN VARIABLY SHAPED CLUSTERS OF MULTIPLE SPECIES TO SIMULATE NATURAL GROWTH PATTERNS, SUCH THAT THE WETLAND MITIGATION AREA WILL CONTAIN AN EQUAL NUMBER OF ALL SPECIES FOLLOWING PLANTING. SET ALL PLANTS PLUMB AND STRAIGHT.
12. PLANTS SHOULD BE INSTALLED IN AREAS BEST SUITED FOR THEIR GROWING PATTERNS AND CONDITIONS. PLANTS SHOULD BE PLACED IN LOCATIONS WITH SUITABLE HYDROLOGY AND SOILS AND WHERE APPROPRIATE STRUCTURAL CONTEXT WITH OTHER PLANTINGS CAN BE MAINTAINED IN CONSULTATION WITH THE EM.
13. NEW PLANTING AREAS SHALL BE ADEQUATELY IRRIGATED OR WATERED TO ESTABLISH THE PROPOSED PLANTS AND SEED AREAS IMMEDIATELY AFTER PLANTING. SEE ALSO NOTE 18.
14. THE EXPOSED SIDESLOPE SUBSTRATE SHALL BE PROTECTED AGAINST EROSION UNTIL RE–ESTABLISHEMENT OF HERBACEOUS VEGETATION OCCURS.
15. UPON COMPLETION OF PLANTING, AN AREA 2 TO 3 FEET WIDE FROM THE CENTRAL PLANT STALK SHALL BE MULCHED WITH A 2 TO 3–INCH THICK LAYER OF LEAF LITTER OR OTHER NATURAL ORGANIC MATERIAL TO ENSURE THE SHRUB WILL RECEIVE ADEQUATE SUN EXPOSURE AND WILL NOT COMPETE WITH LARGER HERBACEOUS SPECIES IN THE PLANT MIX.
16. ANY PORTION OF THE MITIGATION AREA NOT MEETING THE APPROVED STANDARDS OR REQUIREMENTS OF THE MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION, U.S. ARMY CORPS OF ENGINEERS, OR OTHER LOCAL, STATE, OR FEDERAL RESOURCE AGENCY SHALL BE PROMPTLY REMEDIATED AT NO COST/EXPENSE TO THE OWNER.
17. THE WETLAND SEED MIX SHALL BE SOWN ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.
18. DUE TO UNPREDICTABILITY OF SHORT TERM LOCAL HYDROLOGIC CONDITIONS AND THE NEED FOR ADDITIONAL CARE TO ESTABLISH NEW PLANTINGS THE SITE CONTRACTOR SHALL IRRIGATE THE PLANTINGS, AS NECESSARY AND AS DIRECTED BY THE RE, WS OR EM, DURING THE FIRST GROWING SEASON AFTER PLANTING. IRRIGATION SHALL BE PERFORMED WITH A WATER TRUCK.
19. THE SITE CONTRACTOR SHALL SUBMIT MANUFACTURER'S SHOP DRAWINGS FOR THE FERTILIZER AND CERTIFICATIONS FOR THE PLANTS.
20. FOR WETLAND CONSTRUCTION NOTES, SEE DWG NO. P1.2.



Typical Shrub Planting Detail

WETLAND SEED MIX SPECIFICATION:

ERNST FACW MEADOW MIX (TYP.) (OR EQUIVALENT) – CAREX VULPINOIDEA, PA ECOTYPE (FOX SEDGE, PA ECOTYPE) ELYMUS RIPARIUS, PA ECOTYPE (RIVERBANK WILDRYE, PA ECOTYPE) CAREX LURIDA, PA ECOTYPE (LURID (SHALLOW) SEDGE, PA ECOTYPE) CAREX LUPULINA, PA ECOTYPE (HOP SEDGE, PA ECOTYPE) VERBENA HASTATA, PA ECOTYPE (BLUE VERVAIN, PA ECOTYPE) CAREX SCOPARIA, PA ECOTYPE (BLUNT BROOM SEDGE, PA ECOTYPE) JUNCUS EFFUSUS (SOFT RUSH) CINNA ARUNDINACEA, PA ECOTYPE (WOOD REEDGRASS, PA ECOTYPE) ASCLEPIAS INCARNATA, PA ECOTYPE (SWAMP MILKWEED, PA ECOTYPE) ASTER NOVAE–ANGLIAE (SYMPHYOTRICHUM N.), PA ECOTYPE (NEW ENGLAND ASTER, PA ECOTYPE) GLYCERIA CANADENSIS, PA ECOTYPE (RATTLESNAKE GRASS, PA ECOTYPE) ONOCLEA SENSIBILIS (SENSITIVE FERN) SCIRPUS CYPERINUS, PA ECOTYPE (WOOLGRASS, PA ECOTYPE) HELENIUM AUTUMNALE, PA ECOTYPE (COMMON SNEEZEWEED, PA ECOTYPE) ALISMA SUBCORDATUM (A. PLANTAGO–AQUATICA), PA ECOTYPE (MUD PLANTAIN (WATER PLANTAIN), PA ECOTYPE) ASTER PUNICEUS (SYMPHYOTRICHUM PUNICEUM), PA ECOTYPE (PURPLESTEM ASTER, PA ECOTYPE) ASTER UMBELLATUS (DOELLINGERIA UMBELLATA), PA ECOTYPE (FLAT TOPPED WHITE ASTER, PA ECOTYPE) EUPATORIUM FISTULOSUM, PA ECOTYPE (JOE PYE WEED, PA ECOTYPE) EUPATORIUM PERFOLIATUM, PA ECOTYPE (BONESET, PA ECOTYPE) JUNCUS TENUIS, PA ECOTYPE (PATH RUSH, PA ECOTYPE) LUDWIGIA ALTERNIFOLIA, PA ECOTYPE (SEEDBOX, PA ECOTYPE) MIMULUS RINGENS, PA ECOTYPE (SQUARE STEMMED MONKEYFLOWER, PA ECOTYPE) SISYRINCHIUM ANGUSTIFOLIUM (NARROWLEAF BLUE EYED GRASS) CAREX INTUMESCENS, PA ECOTYPE (BLADDER (STAR) SEDGE, PA ECOTYPE) CHELONE GLABRA, PA ECOTYPE (TURTLEHEAD, PA ECOTYPE)

SLOPE SEED MIX SPECIFICATION:

NEW ENGLAND CONSERVATION / WILDLIFE MIX (TYP.) (OR EQUIVALENT) – VIRGINIA WILD RYE, (ELYMUS VIRGINICUS), LITTLE BLUESTEM, (SCHIZACHYRIUM SCOPARIUM), BIG BLUESTEM, (ANDROPOGON GERARDII), CREEPING RED FESCUE, (FESTUCA RUBRA), SWITCH GRASS, (PANICUM VIRGATUM), PARTRIDGE PEA, (CHAMAECRISTA FASCICULATA), DEER TONGUE, (PANICUM CLANDESTIUM,), INDIAN GRASS, (SORGHASTRUN NUTANS), OX EYE SUNFLOWER, (HELIOPSIS HELIANTHOIDES), COMMON MILKWEED, (ASCLEPIAS SYRIACA), SPOTTED JOE PYE WEED, (EUPATORIUM MACULATUM), GRASS LEAVED GOLDENROD, (EUTHAMIA GRAMINIFOLIA), BLUE VERVAIN, (VERBENA HASTATA), NEW ENGLAND ASTER, (ASTER NOVAE–ANGLIAE), EARLY GOLDENROD, (SOLIDAGO JUNCEA). (APPLICATION RATE = 1 LB PER 1,750 SQUARE FEET).

WETLAND REPLICATION AREA PLANTING SCHEDULE

BOTANICAL PLANT NAME	COMMON PLANT NAME	SIZE	QUANTITY	WETLAND INDICATOR STATUS
STEEPLEBUSH	SPIRAEA TOMENTOSA	3–4 FT	15	FACW
BUTTONBUSH	CEPHALANTHUS OCCIDENTALIS	3–4 FT	10	OBL
MEADOWSWEET	SPIRAEA ALBA	3–4 FT	15	FACW
NEW ENGLAND WETMIX (TM)		1 LB/2,500 SF	6 LBS	VARIED

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FAX: (866) 783-7101
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PROFESSIONAL SEAL

PERMITTING SET NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	BY	CK'D

NORWOOD MEMORIAL AIRPORT NORWOOD, MA

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREA

SHEET TITLE

PLANTING PLAN, NOTES, SCHEDULE AND DETAILS

DRAWN BY	DATE
DK	JUNE 2021
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MCG	326165
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SHEET NUMBER

C4.4

SHEET 27 OF 44

WETLAND REPLICATION AREA CONSTRUCTION NOTES:

1. CONSTRUCTION OF THE WETLAND REPLICATION AREA SHALL OCCUR UNDER THE DIRECT SUPERVISION OF AN EXPERIENCED AND QUALIFIED WETLAND SCIENTIST (THE "WETLAND SPECIALIST" OR "WS"), PRE-APPROVED IN WRITING BY MASSDEP AND HIRED FOR AND PAID BY THE SITE CONTRACTOR. THE WS SHALL BE ON-SITE FULL-TIME WHEN WORK IS OCCURRING IN WETLAND RESOURCE AREAS, THE 100 FOOT BUFFER ZONE, AND DURING CONSTRUCTION OF THE WETLAND REPLICATION AREA TO ENSURE COMPLIANCE WITH THE PERMITS PROVIDED IN THE TECHNICAL SPECIFICATIONS AND WETLAND REPLICATION AREA DESIGN PLANS. AS NECESSARY, THE WS SHALL MAKE FIELD ADJUSTMENTS DURING CONSTRUCTION OF THE WETLAND REPLICATION AREA IN ORDER TO MEET MITIGATION GOALS AND TO ENSURE THE DEVELOPMENT OF A FUNCTIONING PIT AND MOUND SCRUB-SHRUB WETLAND. FIELD ADJUSTMENTS MAY INCLUDE BUT ARE NOT NECESSARILY LIMITED TO MODIFICATIONS TO SUB-GRADES, FINAL GRADES, HYDROLOGIC INPUTS, MICRO-TOPOGRAPHY, EROSION CONTROLS, WOODY DEBRIS AND OTHER HABITAT FEATURES, AND PLANTINGS (SPECIES AND PLACEMENT) BASED ON SITE SPECIFIC CONDITIONS AT THE TIME OF CONSTRUCTION. ANY RECOMMENDED FIELD ADJUSTMENTS SHALL OCCUR IN CONSULTATION WITH THE RESIDENT ENGINEER ("RE") AND ENVIRONMENTAL MONITOR ("EM") AND, IF NECESSARY, WITH MASSDEP.
2. PROJECT SURVEYORS WORKING FOR THE SITE CONTRACTOR SHALL RE-ESTABLISH AND RE-LABEL WETLAND FLAGS AS PER PERMIT DRAWINGS USING WOODEN STAKES INSTALLED AROUND THE PERIMETER OF THE WETLAND REPLICATION AREA. PROJECT SURVEYORS SHALL ALSO STAKE OUT THE LIMITS OF THE PROPOSED WETLAND REPLICATION AREA. THE STAKES SHALL REMAIN IN PLACE UNTIL WETLAND VEGETATION HAS BECOME FULLY ESTABLISHED. THIS WORK SHALL OCCUR BEFORE CONSTRUCTION OF THE REPLICATION AREA COMMENCES.
3. TRENCHED SILTATION FENCE AND STAKED HAYBALE SHALL BE INSTALLED ALONG THE EXISTING WETLAND BOUNDARY APPROXIMATELY 2-FEET DOWN GRADIENT FROM THE RE-ESTABLISHED WETLAND FLAGS. THIS WORK SHALL OCCUR UNDER THE DIRECT SUPERVISION OF THE WS. INSTALLING EROSION CONTROLS IN THIS MANNER WILL ALLOW THE SITE CONTRACTOR TO PROPERLY TIE-IN PROPOSED CONTOURS TO THE ADJACENT WETLAND CONTOURS WITHOUT UNDERMINING THE TRENCHED SILT FENCE AND HAYBALES. THE INTERFACE / TIE-IN BETWEEN THE REPLICATION AREA AND ADJACENT WETLAND SHALL BE NATURAL USING GENTLE SLOPES
4. PRIOR TO INITIATING CONSTRUCTION OF THE WETLAND REPLICATION AREA THE SITE CONTRACTOR SHALL PROVIDE THE RE AND EM WITH A PROPOSED DEWATERING PROTOCOL FOR REVIEW AND APPROVAL. THE SITE CONTRACTOR SHALL CONSULT WITH THE WS WHEN DEVELOPING THE PROTOCOL TO ENSURE COMPLIANCE WITH APPLICABLE PERMITS INCLUDING BUT NOT LIMITED TO THE NPDES CONSTRUCTION GENERAL PERMIT AND VARIANCE ORDER. THIS INFORMATION SHALL BE PROVIDED TO THE RE AND EM AT LEAST 14 CALENDAR DAYS PRIOR TO THE START OF WORK.
5. THE WS SHALL PROVIDE MASSDEP AND THE NORWOOD CONSERVATION COMMISSION WITH A MINIMUM OF FIVE (5) CALENDAR DAYS ADVANCE WRITTEN NOTICE (VIA EMAIL) TO PROVIDE AN OPPORTUNITY FOR INSPECTIONS DURING EACH OF THE FOLLOWING REPLICATION AREA CONSTRUCTION MILESTONES: (1) PRIOR TO COMMENCEMENT OF EXCAVATION; (2) WHEN THE REPLICATION AREA HAS BEEN EXCAVATED TO SUB-GRADE WITH ROUGH GRADING; (3) WHEN THE REPLICATION AREA HAS BEEN GRADED TO FINAL ELEVATIONS; AND (4) DURING PLANTING AND PLACEMENT OF COARSE WOODY DEBRIS.
6. THE REPLICATION AREA SHALL BE GRUBBED AND INITIALLY EXCAVATED TO A DEPTH APPROXIMATELY 12 TO 18-INCHES BELOW THE FINAL DESIGN GRADE ELEVATIONS DEPICTED ON THE REFERENCED DRAWINGS TO ALLOW FOR PLACEMENT OF WETLAND TOPSOIL AND CONTINUOUS ROUGH GRADING. ROUGH GRADING SHALL OCCUR UNDER THE DIRECT SUPERVISION OF THE WS. ROCKS AND BOULDERS UNCOVERED DURING THE EXCAVATION MAY BE LEFT IN PLACE UPON APPROVAL FROM THE RE AND EM PROVIDED THAT THEY DO NOT SIGNIFICANTLY DECREASE THE PLANTABLE AREA OF THE MITIGATION AREA. THESE ROCKS AND BOULDERS, SHALL BE PLACED IN SUCH A WAY AS TO PROVIDE CREVICES AND CAVITIES SUITABLE FOR USE BY WILDLIFE.
7. THE WS SHALL INSPECT THE SUB-GRADE OF THE REPLICATION AREA TO ENSURE THAT THE PROPER HYDROLOGY HAS BEEN ESTABLISHED AS PER NOTE 1 ABOVE AND SHALL PROVIDE THE RE AND EM WITH WRITTEN CONFIRMATION AND PHOTOGRAPHS OF SAME WITHIN 72 HOURS OF COMPLETION OF THE SUBGRADE EXCAVATION WORK. WRITTEN CONFIRMATION FROM THE WS SHALL INCLUDE A DISCUSSION OF ANY RECOMMENDED FIELD ADJUSTMENTS BASED ON DIRECT FIELD OBSERVATIONS TO ACHIEVE THE DESIRED HYDROLOGY AND FUNCTIONING WETLAND ENVIRONMENT AND AN INTERIM AS-BUILT DRAWING SIGNED AND STAMPED BY A REGISTERED PROFESSIONAL LAND SURVEYOR OF THE COMMONWEALTH DEPICTING SUB-GRADE CONTOURS (1-FOOT CONTOUR INTERVALS WITH REPRESENTATIVE SPOT ELEVATIONS IN PLAN VIEW AND A MINIMUM OF THREE SECTION VIEWS) AND THE LIMITS OF THE GRADING. THE INTERIM AS-BUILT SHALL INCLUDE A SURFACE AREA CALCULATION CONFIRMING THAT SUFFICIENT ACREAGE HAS BEEN PROVIDED (EXCLUDING SIDE SLOPES), AS PER THE PERMITS. LOCATIONS OF CROSS-SECTIONS SHOULD BE INDICATED ON THE PLAN VIEW.
8. AFTER THE PROPOSED SUBGRADES AND ROUGH GRADING HAS BEEN VERIFIED BY PROJECT SURVEYORS APPROXIMATELY 12 TO 18 INCHES OF AN EVENLY MIXED ORGANIC/MINERAL SOIL WILL BE PLACED WITHIN THE REPLICATION AREA BRINGING GRADES TO THE FINAL DESIRED ELEVATIONS. IF FEASIBLE, THE APPLICANT WILL TRANSLOCATE SUITABLE HYDRIC SOILS FROM THE BVW IMPACT SITE TO THE REPLICATION SITE. SOIL AMENDMENTS FROM OFF-SITE SOURCES WILL BE NEEDED. ACCORDINGLY, APPROXIMATELY 12-18INCHES OF AN EVENLY MIXED ORGANIC/MINERAL SOIL ("WETLAND SOIL") SHALL BE IMPORTED TO THE SITE FROM AN OFF-SITE SOURCE AND PLACED WITHIN THE REPLICATION AREA BRINGING GRADES TO THE FINAL DESIRED ELEVATIONS. THE SITE CONTRACTOR SHALL PROVIDE THE RE AND EM WITH WRITTEN DOCUMENTATION IDENTIFYING THE SUPPLIER AND LOCATION OF THE SOURCE MATERIAL. SOIL CONSISTENCY SHALL BE LOOSE TO FRIABLE AND TEXTURE SHOULD BE LOAM TO SANDY LOAM. THE ORGANIC MATERIAL USED FOR MIXING SHALL BE WELL OR PARTIALLY DECOMPOSED. CLEAN LEAF COMPOST IS THE PREFERRED SOIL AMENDMENT TO ACHIEVE THESE STANDARDS THOUGH OTHER MATERIALS MAY BE USED IF APPROVED BY THE WS, RE AND EM. NOTE THAT "CLEAN" REFERS BOTH TO A NEGLIGIBLE AMOUNT (<1%) OF PHYSICAL CONTAMINANTS SUCH AS PLASTIC AND TO THE LACK OF CHEMICAL CONTAMINANTS THAT MIGHT POSE A HAZARD TO PLANTS OR ANIMALS. MINERAL MATERIALS SHALL BE PREDOMINANTLY IN THE LOAM TO LOAMY SAND TEXTURE RANGE (AS DEFINED BY USDA TEXTURAL SOIL CLASSIFICATION SYSTEM OR SOIL SCIENCE SOCIETY OF AMERICAN GLOSSARY OF SOIL SCIENCE TERMS), WITH MINIMAL QUANTITIES OF GRAVEL OR ROCK. A MINIMUM ORGANIC CARBON CONTENT OF 12% (21 PERCENT ORGANIC MATTER) ON A DRY WEIGHT BASIS FOR SOILS SHALL BE USED IN THE WETLAND REPLICATION AREA. THE WS SHALL FORWARD ONE (1) REPRESENTATIVE SAMPLE OF THE WETLAND TOP SOIL MIX THAT WILL BE USED ON THE SITE TO THE UNIVERSITY OF MASSACHUSETTS SOIL AND TISSUE PLANT TESTING LABORATORY (OR EQUIVALENT QUALIFIED LABORATORY) FOR ANALYSIS CONFIRMING THAT THIS SPECIFICATION HAS BEEN MET. THE ANALYSIS SHALL INCLUDE A ROUTINE SOIL ANALYSIS [PH, BUFFER PH, EXTRACTABLE NUTRIENTS (P, K, CA, MG, FE, MN, ZN, CU, B, S), EXTRACTABLE ALUMINUM, CATION EXCHANGE CAPACITY, PERCENT BASE SATURATION, EXTRACTABLE (AND ESTIMATED TOTAL) LEAD] AND SOIL ORGANIC MATTER ANALYSIS [DETERMINATION OF PERCENT SOIL ORGANIC MATTER BY LOSS ON IGNITION]. THE REPRESENTATIVE GRAB SAMPLES SHALL BE COLLECTED BY THE WS FROM MULTIPLE LOCATIONS IN THE WETLAND TOP SOIL MIX FOLLOWING THE UMASS SOIL AND PLANT TISSUE TESTING LABORATORY SAMPLING AND COLLECTION PROTOCOLS. THE LAB ANALYSIS SHALL BE PROVIDED TO THE EM AND RE ALONG WITH WRITTEN CERTIFICATION FROM THE WS THAT THE WETLAND TOP SOIL WAS COLLECTED PER THE REFERENCED PROTOCOL AND MEETS THE DESIRED SPECIFICATION. THE ANALYSIS AND WRITTEN CERTIFICATION OF SAME SHALL BE PROVIDED TO THE EM AND RE PRIOR TO PLACING THE WETLAND TOP SOIL IN THE REPLICATION AREA.
9. WETLAND TOP SOIL SHALL BE DEPOSITED IN THE REPLICATION AREA IN A MANNER THAT MINIMIZES TRAVEL AND SUBSEQUENT COMPACTION OF THE PIT AND MOUND SUBGRADE. SHOULD SOILS BE COMPACTED, THEY SHALL BE LOOSENED BY A METHOD SUCH AS ROTOTILLING.
10. PRIOR TO PLANTING, THE WS SHALL INSPECT THE FINAL-GRADES OF THE REPLICATION AREA TO ENSURE THAT THE PROPER HYDROLOGY HAS BEEN ESTABLISHED AS PER NOTE 1 ABOVE AND SHALL PROVIDE THE RE AND EM WITH WRITTEN CONFIRMATION AND PHOTOGRAPHS OF SAME WITHIN 72 HOURS OF COMPLETION OF THE FINAL-GRADING WORK. WRITTEN CONFIRMATION FROM THE WS SHALL INCLUDE A DISCUSSION OF ANY RECOMMENDED FIELD ADJUSTMENTS TO ACHIEVE THE DESIRED HYDROLOGY AND SCRUB-SHRUB WETLAND ENVIRONMENT AND AN INTERIM AS-BUILT DRAWING SIGNED AND STAMPED BY A REGISTERED PROFESSIONAL LAND SURVEYOR OF THE COMMONWEALTH DEPICTING FINAL-GRADE CONTOURS (1-FOOT CONTOUR INTERVALS WITH REPRESENTATIVE SPOT ELEVATIONS IN PLAN VIEW AND A MINIMUM OF THREE SECTION VIEWS) AND THE LIMITS OF THE GRADING. THE INTERIM AS-BUILT SHALL INCLUDE A SURFACE AREA CALCULATION CONFIRMING THAT THE SPECIFIED WETLAND SQUARE FOOTAGE HAS BEEN PROVIDED (EXCLUDING SIDE SLOPES), AS PER THE PERMITS AND DESIGN DRAWINGS. THE CROSS-SECTION VIEWS SHALL DEPICT THE PROPOSED WETLAND SUB-GRADE, FINAL GRADE, PREDICTED HIGH AND LOW GROUND WATER ELEVATIONS (OR PERCHED GROUND WATER CONDITIONS AS THE CASE MAY BE), AND/OR OTHER INDICATORS OF SURFACE OR GROUND WATER HYDROLOGY INCLUDING DIRECT OBSERVATIONS AND SOIL CHARACTERISTICS. LOCATIONS OF CROSS-SECTIONS SHOULD BE INDICATED ON THE PLAN VIEW.
11. THE WS SHALL IDENTIFY ON BEHALF OF THE SITE CONTRACTOR SPECIFIC LOCATIONS IN THE WETLAND REPLICATION AREA WHERE EACH INDIVIDUAL PLANT SPECIES SPECIFIED HEREIN ARE TO BE INSTALLED BASED ON HYDROLOGY, TOPOGRAPHY, SOIL CONDITIONS AND OTHER RELEVANT FEATURES THAT WILL CONTRIBUTE TO THE SURVIVAL OF THE PLANTINGS. THE WS SHALL DIRECTLY SUPERVISE AND OVERSEE THE PLANTING WORK TO ENSURE CONFORMANCE WITH THIS SPECIFICATION. PLANTINGS SHALL BE CLUSTERED AND SPACED RANDOMLY AT THE DIRECTION OF THE SUPERVISING WS TO SIMULATE NATURAL GROWTH PATTERNS AND WHERE APPROPRIATE STRUCTURAL CONTEXT WITH OTHER PLANTINGS CAN BE MAINTAINED. THE USE OF MULCH AROUND WOODY PLANTINGS IS STRONGLY ENCOURAGED. NOTE THAT ORGANIC MULCH IS NOT CONSIDERED PART OF THE ORGANIC CONTENT OF THE WETLANDS SOIL. MULCH BALLED AND BURLAPPED OR CONTAINER-GROWN SHRUBS IN AN APPROXIMATELY 3-FOOT DIAMETER CIRCLE APPROXIMATELY 2-INCHES DEEP; MULCH BARE-ROOT WOODY PLANTINGS IN AN APPROXIMATELY 18-INCH DIAMETER CIRCLE APPROXIMATELY 2-INCHES DEEP.
12. THE REPLICATION AREA SIDE SLOPES SHALL BE STABILIZED WITH JUTE MATTING AND THE SLOPE SEED MIX SPECIFIED HEREIN.
13. IF CONSTRUCTION REQUIRES SHUT DOWN FOR THE WINTER SEASON THEN AN OVERWINTERING PLAN IS REQUIRED. THE WS SHALL PROVIDE A WRITTEN INTERIM OVERWINTERING STABILIZATION PLAN FOR REVIEW AND APPROVAL BY THE RE, EM AND MASSDEP.
14. WITHIN 30 CALENDAR DAYS FOLLOWING PLANTING OF THE REPLICATION AREA, THE WS SHALL CERTIFY IN WRITING TO MASSDEP, AND THE NORWOOD CONSERVATION COMMISSION THAT THE AREA HAS BEEN CONSTRUCTED IN COMPLIANCE WITH THE REFERENCED PERMITS AND RECORD DRAWINGS. SUCH CERTIFICATION SHALL BE ACCOMPANIED BY A WRITTEN REPORT AND THE AS-BUILT PLANS REQUIRED UNDER NOTES 7 AND 10 ABOVE. THE REPORT SHALL INCLUDE AT A MINIMUM REPRESENTATIVE SITE PHOTOGRAPHS DEPICTING EACH PHASE OF REPLICATION AREA CONSTRUCTION, RELEVANT WS FIELD NOTES AND INSPECTION REPORTS, A DISCUSSION OF HYDROLOGIC CONDITIONS, SOIL LABORATORY ANALYSIS, NUMBER AND TYPES OF PLANTS INSTALLED IN THE REPLICATION AREA AND RECEIPTS FROM THE PLANT NURSERY, AND A DISCUSSION OF ANY FIELD MODIFICATIONS DEEMED NECESSARY BY THE WS TO OBTAIN THE DESIRED HYDROLOGY AND WETLAND ENVIRONMENT.
15. AT LEAST 75% OF THE SURFACE AREA OF THE REPLICATION AREA SHALL BE ESTABLISHED WITH NATIVE WETLAND PLANT SPECIES WITHIN TWO (2) GROWING SEASONS AFTER ALL THE PLANTING IS COMPLETE.
16. THE EROSION CONTROL BARRIERS SHALL BE DISASSEMBLED AND PROPERLY DISPOSED OF BY THE SITE CONTRACTOR AFTER THE REPLICATION AREA IS DEEMED STABLE BY THE WS IN CONSULTATION WITH THE RE AND EM. SEDIMENT COLLECTED BY THESE DEVISES SHALL BE REMOVED AND DISPOSED OF IN A MANNER THAT PREVENTS EROSION AND TRANSPORT TO A WATERWAY OR WETLAND OR CONSTRUCTED WETLAND.

DuBois & King inc.
ENGINEERING • PLANNING • MANAGEMENT • DEVELOPMENT
15 CONSTITUTION DR. SUITE 1L
BEDFORD, NH 03110
TEL: (603) 637-1043
FAX: (866) 783-7101
www.dubois-king.com

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NORWOOD MEMORIAL AIRPORT NORWOOD, MA

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREA

SHEET TITLE

WETLAND CONSTRUCTION NOTES

DRAWN BY	DATE
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SHEET 26 OF 44

I:\3\326165 Norwood Airport EA - 2020\Drawings\26-27_C4.3-C4.4 Wetland Construction Notes and details.dwg APRIL 2021

Appendix C

Wildlife Habitat Evaluation

Taxiway C Realignment and Runway Safety Area Project

Wildlife Habitat Evaluation

Prepared for:

Norwood Airport Commission
111 Access Road
Norwood, MA 02062

Prepared by:

Epsilon Associates, Inc.
3 Mill & Main Place, Suite 250
Maynard, MA 01754

August 16, 2021

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WILDLIFE HABITAT EVALUATION

1.0 Executive Summary

This report provides the results of the Wildlife Habitat Evaluations ("WHE") completed for proposed impacts within wetland resource areas subject to protection under the Massachusetts Wetlands Protection Act associated with the Taxiway C Relocation Project ("the Project"), proposed by the Norwood Airport Commission ("Airport") in Norwood, Massachusetts. The WHE was completed as outlined in the Massachusetts Department of Environmental Protection's *Wildlife Habitat Protection Guidance for Inland Wetlands*[1] ("the Guidance"), Appendix B: Detailed Wildlife Habitat Evaluations ("WHE"). This WHE was completed by qualified wildlife specialists from Epsilon Associates, Inc. ("Epsilon").

The proposed Project includes the realignment of Taxiway C to remove a direct connection from the apron area to Runway 17/35 as well as the paving of runway safety areas to Runway 17-35.

1.1 Taxiway C Realignment

This Project would relocate the 1,350-foot-long segment of Taxiway C from Taxiway F to Taxiway A, by shifting the angle within the current Taxiway C configuration 800 linear-feet to the west. A new 800-foot by 35-foot segment of Taxiway C would extend west of Taxiway F parallel to Runway 10/28. A second 360-foot segment would be constructed from this new angle between Runway 17-35 and Taxiway A. The existing Taxiway C would be removed and the portion east of Runway 17/35 replaced with a wetland mitigation and floodplain compensation area. Taxiway F would also be reconstructed to meet current FAA design standards for taxiways, mainly associated with the fillets (i.e. curves) at the "T" intersection. There will be no vegetated wetland impacts associated with Taxiway F, nor with the segment of C between Taxiway A and Runway 17-35.

Construction of the Taxiway C realignment will require the permanent fill of approximately 31,045 sf (0.71 ac) of BVW and 4,098 cy of BLSF. A 110-foot long segment of culverted perennial stream would be daylighted and a fringe wetland habitat created and riverfront area restored.

1.2 Runway Safety Areas

The existing 100-foot by 300-foot RSAs at the 17-end and 35-end of the runway are proposed to be paved. These are currently level, grassed areas designed to support an aircraft in the case of overrun or undershoot on take off or landing. A total of an additional 60,000 sf of impervious surface would be added, along with associated stormwater vegetated filter strips. Work is proposed within the 100-foot Buffer Zone and BLSF. There are no vegetated wetland impacts associated with this proposed work.

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[1] Massachusetts Department of Environmental Protection. Wildlife Habitat Protection Guidance for Inland Wetlands (2006). http://umasscaps.org/pdf/wldhab.pdf.

Work will occur within other resource areas, including Bordering Land Subject to Flooding associated with the Neponset River, Inland Bank, Riverfront Area, and Land Under Water.

Table 1-1 below identifies the proposed temporary and permanent wetland resource area impacts from the Project.

Table 1-1 Summary of Impacts to Wetland Resource Areas

Wetland ID	Total BVW Impacts (square feet)	Total LUW Impacts (square feet)	Total Inland Bank Impacts (linear feet)	Total RFA Impacts (square feet)	Total BLSF	Proposed Work Component(s)
Wetland Series 6	31,045 (perm) 3,610 (temp)	0	0	0	n/a	Taxiway C removal, culvert removal, new Taxiway C **construction**, wetland mitigation area construction
Bank Series 6B	0	123	8	86,484[b)]	n/a	Taxiway Realignment
Floodplain Elevation 47.1 feet NAVD 88					8.9 acre (386,972 sf) of BLSF (of which 33,074 consists of lower floodplain)	Taxiway C removal, culvert removal, new Taxiway C **construction**, wetland mitigation area construction, RSA construction

1.3 Wildlife Habitat Evalution

The Wildlife Habitat Evaluation described herein was conducted by Epsilon to:

1) Assess and quantify the extent of impacts to wetland resource areas;

2) Identify important wildlife habitat features within the areas of proposed wetland resource area impacts, as defined by the WPA regulations;

3) Analyze the potential adverse effects to important wildlife habitat features that will result from the Project; and

4) To develop proposed mitigation measures to offset unavoidable impacts to important wildlife habitat features, as necessary.

In summary, important wildlife habitat features identified within proposed impact areas within the Project Area are generally limited to: common wetland food plants (aquatic food plants, hard and soft mast producing species), dense herbaceous cover, intermittent flooding for amphibians, and burrowable soils for small mammals. These important wildlife habitat features are very common throughout the adjacent wetlands and surrounding landscape, and the proposed alterations are insignificant when compared to the amount of similar important wildlife habitat

features that will remain upon completion of the Project. Additionally, the impacted wetlands are part of a wetland area that has been isolated via infrastructure from the larger, expansive wetland marsh system surrounding the Airport associated with the Neponset River. The wetland is also hydrologically restricted via culverts. In the case of impact areas located within this wetland, important wildlife habitat features that will be impacted are generally common throughout the remainder of the wetland complex surrounding the Airport, and as a result, the proposed impacts are likely to be negligible in these areas when the habitat value of the whole system is considered.

The WHE also identified areas of existing habitat degradation in the Project Area including disturbance from the adjacent runway, moderate amount of fill material and hydrological alteration.

On-site wildlife habitat mitigation associated with the wetland replication area is designed in such a manner as to inhibit the use of wildlife proximate to the taxiways and runways as it is currently managed throughout the Airport so as to avoid increasing wildlife hazard risks. Furthermore, the Wildlife Hazard Assessment WHA) funded by the FAA identified a significant waterfowl risk at the Airport. Mitigation was designed to limit both the compensatory flood storage and replication area attractiveness to waterfowl.

In conclusion, within the proposed limits of work associated with the Project, important wildlife habitat features have been identified and evaluated consistent with the approach detailed in the Regulations and Guidance. As presented in greater detail herein, the Project will not "substantially reduce" the important wildlife habitat functions of the altered resource areas. This "no substantial reduction" standard is met where "important wildlife habitat functions are substantially restored" during project construction, or it is otherwise demonstrated that "the proposed alterations will have no adverse effects on wildlife habitat" because the important features identified in a particular study area are very common to the site, so that the number of the habitat features lost is insignificant when compared to the amount of similar habitat that will remain.[2] The important wildlife habitat features documented in the proposed impact areas will be incorporated into the wetland replication plan to further contribute to the protection of the wildlife habitat interest of the WPA by meeting the general conditions of 310 CMR 10.60(3)[3] and

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[2] More specifically, MassDEP's guidance document states that it is improper to conclude that a project will result in an adverse effect merely because alterations to wildlife habitat features are proposed (paragraph 1, page 13). The alterations become "adverse" only when they substantially reduce the site's capacity to provide important wildlife habitat functions and, consequently, reduce the site's capacity to support wildlife. MassDEP's guidance document further explains that, by ensuring that important habitat features are identified, adverse impacts are avoided or minimized and mitigated, and the goal of no adverse effect will be met. Further, the standard of "no adverse effect" applies to alterations in certain resource areas only and not to activities proposed within the 100-foot Buffer Zone and in non-jurisdictional upland areas beyond the Buffer Zone.

[3] 310 CMR 10.60(3) contains general conditions for the restoration and replication of altered habitat to ensure that wildlife habitat replication areas, with features similar to the altered wildlife habitat, are incorporated into

other applicable performance standards relative to restoration or replication of altered resource areas. As such, the Project will not have an adverse effect on important wildlife habitat features either locally or in the region.

2.0 Regulatory Overview, Project-Related WHE Requirements, Evaluation Methodology

2.1 Regulatory Overview

In 1986, the Massachusetts Legislature established that wetlands can provide wildlife habitat and added "wildlife habitat" as an interest under the Massachusetts Wetlands Protection Act, M.G.L. c131 § 40[4], ("WPA" or "the Act"), and the Regulations at 310 CMR 10.00. In the Act, wildlife habitat is defined as "those areas subject to M.G.L. c 131 § 40 which due to their plant community composition and structure, hydrologic regime or other characteristics, provide important food, shelter, migratory or overwintering areas, or breeding areas for wildlife."

In 1987, MassDEP revised the Regulations to incorporate the protection of wildlife habitat as a wetlands interest protected by the Act. Accordingly, standards and procedures to protect important wildlife habitat functions in wetland resource areas were added to the Regulations at 310 CMR 10.60. MassDEP outlined the interpretation of the statutory language (especially the statutory definition of "wildlife habitat") as well as the legislative intent in the Preface to the 1987 Regulatory Revisions related to the Protection of Wildlife Habitat ("the Preface").[5] Key elements of the Preface explain important premises that helped form the basis for the regulatory changes. A summary of the premises that are important to consider when identifying and assessing important wildlife habitat value and possible adverse effects as part of a planned project are as follows:

- The mere presence of wildlife in a resource area is not enough to establish habitat value. Instead, it is the presence of plant community, hydrologic regime, or other characteristics that is determinative. The statute protects habitat value not wildlife per se.
- The presence of basic characteristics that can provide wildlife habitat does not establish that a wetland resource area is significant to wildlife habitat. As per the regulatory guidance from MassDEP in the Preface, for a wetland resource area to be considered

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the Project to the extent such replication or restoration is deemed necessary to demonstrate that there is no substantial reduction in the resource area's capacity to provide important wildlife habitat functions.

[4] Massachusetts Wetlands Protection Act (M.G.L. c. 131 §40).

https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXIX/Chapter131/Section40

[5] Preface to Wetlands Regulations Relative to the Protection of Wildlife Habitat 1987 Regulatory Revisions. Pages 14-22. https://www.mass.gov/files/documents/2016/08/ri/310cmr10b.pdf

significant to wildlife habitat, certain features must be present and they must "provide important food, shelter, migratory or overwintering areas or breeding areas for wildlife".

Wildlife habitat means those resource areas which provide important wildlife habitat functions (i.e., "important food, shelter, of migratory or overwintering areas, or breeding areas for wildlife") due to certain physical characteristics.

The Department believes the Legislature meant to protect wetland habitat which is important to wildlife from a regional or statewide perspective.

In 2006, MassDEP developed a guidance document that details the process by which WHEs are completed. According to the Guidance, the objectives of a WHE are to document the presence of "important wildlife habitat features" within wetland resource areas that will be affected by a project and identify potential adverse impacts to these specific "important wildlife habitat features" that could result from the construction and maintenance of a proposed project.

2.1.1 No Adverse Effect Standard

According to 310 CMR 10.60(1), to the extent that a proposed project will alter wildlife habitat beyond established thresholds for each respective wetland resource area, such alterations may be permitted only if they will have no adverse effects on wildlife habitat. Adverse effects on wildlife habitat are the alteration of any habitat characteristic listed in 310 CMR 10.60(2), "insofar as such alteration will, following two growing seasons of project completion and thereafter (or, if a project would eliminate trees, upon the maturity of replanted saplings) substantially reduce its capacity to provide the important wildlife habitat functions listed in 310 CMR 10.60(2)".

2.2 Project-Related Impacts and Wildlife Habitat Evaluation Requirements

The Project will comply with the performance standards and mitigation requirements of the WPA regulations to the maximum extent feasible pursuant to Variance Order of Condition requirements.

Table 2-1 below lists the regulatory threshold values below which impacts are deemed not to impair wildlife habitat and do not require completion of WHE, presents the proposed Project-related resource area impacts, and the corresponding type of wildlife habitat evaluation required. In conclusion, a detailed WHE ("Appendix B") was completed for each wetland impact area, which is the most detailed evaluation required by the Regulations and supporting Guidance.

Table 2-1 Wildlife Habitat Evaluation Thresholds per Wetland Resource Area

MWPA Resource Area	Regulatory Threshold for WHE	Proposed Temporary Project Impacts	Proposed Permanent Project Impacts	Type of Habitat Evaluation Required and Completed
Inland Bank	10% of the length of bank on a single lot or 50 linear feet (whichever is less)	**494 linear feet**	**1,280 linear feet**	Appendix B - Detailed
Land Under Waterbodies and Waterways	10% of the land in this resource area on a single lot or 5,000 square feet (whichever is less)	**3,549 square feet**	**5,920 square feet**	Appendix B - Detailed
Bordering Vegetated Wetland	No threshold - impacts must be replicated in a manner that will function like the area that will be lost*	**44,125 square feet**	**61,058 square feet**	Appendix B - Detailed
Bordering Land Subject to Flooding	10% of the land in this resource area on a single lot or 5,000 square feet (whichever is less) except for work that will adversely affect vernal pool habitat	**1,435 square feet**	**6,300 square feet**	Appendix B - Detailed
Riverfront Area	No threshold - however, different review requirements apply depending on whether the riverfront is undisturbed (310 CMR 10.58(4)) (and the size of impact), previously developed (310 CMR 10.58(5)) or if the activity is grandfathered or exempted from requirements for the riverfront area (310 CMR 10.58(6)).	**0 square feet**	**176,418 square feet**	Appendix B - Detailed

Sources:
* MassDEP's Wildlife Habitat Protection Guidance for Inland Wetlands, Table 1-1.

2.3 Wildlife Habitat Evaluation Methodology

The WHE for the Project was completed following the approach described in the Guidance and using Appendix B: Detailed Wildlife Habitat Evaluation Forms from that document. During the month of July 2021, field biologists visited the Project Area and surrounding environs to collect data and evaluate important wildlife habitat features within wetland resource areas that would be impacted by the Project. The personnel conducting the evaluation meet the qualifications criteria identified under 310 CMR 10.60(1)(b). Attachment B includes MassDEP field forms describing wildlife habitat data collected during the field survey work and a locus map identifying data collection points. Attachment C contains representative photographs of wetland resource areas at impact locations evaluated by Epsilon for the presence of important wildlife habitat.

Field investigations were primarily used to complete the following components of the Appendix B Detailed WHE Form:

- Part 2, I General Description;
- Part 2, II Site Description (excluding soils);
- Part 2, III Important Habitat Features; and
- Part 2, V Habitat Degradation.

Documented observations include wetland characteristics, important wildlife habitat features, vegetation including the presence of invasive species, biophysical characteristics, and habitat degradation. Photographs were taken at each impact area to document existing conditions.

Specific important wildlife habitat features and site contextual considerations that were evaluated at each impact area during the field investigations included the following:

- Food Availability;
- Shrub Thickets or Streambed with Abundant Earthworms;
- Shrub and/or Herbaceous Vegetation Suitable for Veery Nesting;
- Standing Dead Trees and Cavities;
- Small Mammal Burrows;
- Depressions that May Serve as Seasonal (Vernal/Autumnal) Pools;
- Standing Water Present At least Part of the Growing Season;
- Sphagnum Hummocks or Mats, Moss-Covered Logs or Saturated Logs, Overhanging or Directly Adjacent to Pools of Standing Water;
- Cover, Perches, Basking, Denning, and Nesting Habitat;
- Important Habitat Characteristics Associated with Streams;
- Wildlife Dens and Nests;
- Emergent Wetlands; and
- Habitat Degradation.

- The soil inventory on the Appendix B form (Part 2, II Site Description, C. Inventory (Soils)) was completed in part by reviewing the U.S. Department of Agriculture (USDA) Web Soil Survey[6] mapping for each impact area.

- Onsite observations were made to confirm, or update soil descriptors provided on the USDA web site.

In addition to the field visits, a desktop review of each impact area was undertaken to complete Part 2, Section IV, Landscape Context, of the Appendix B, Detailed WHE field form. In completing these reviews, available MassGIS data layers were employed. Landscape Context includes Habitat Continuity which identifies whether an individual impact area is part of:

- An emergent marsh, and if so, the size in acres;

- A wetland complex, and if so, the size in acres;

- Contiguous forested habitat that could serve as habitat for forest interior nesting birds, grassland nesting birds, or special habitat such as a gallery floodplain forest.

- Landscape Context also evaluates Habitat Connectivity. To characterize the connectivity relationship of the impact areas to surrounding habitats, five categories of habitat connectivity were considered based on the Guidance. These include:

    - No direct connections to adjacent areas of wildlife habitat (little connectivity function);

    - Connectors numerous or impact area is imbedded in a large area of natural habitat (limited connectivity function);

    - Impact area contributes to a limited number of connectors to adjacent areas of habitat (somewhat important for connectivity function);

    - Impact area serves as part of a sole connector to adjacent areas of habitat (important for connectivity function); and

    - Impact area serves as the only connector to adjacent areas of habitat (very important for connectivity function).

[6] USDA NRCS Web Soil Survey: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

In addition to information reviewed to complete Section IV for the field form, MassDEP's Important Habitat Map[7] for the Towns of Norwood and MassGIS Natural Heritage and Endangered Species Program Priority and Estimated Habitat maps were reviewed to determine if any of the impact areas occurred within "Habitat of Potential Regional or Statewide Importance" or mapped rare species habitat, respectively.

3.0 Existing Site Conditions

The Norwood Municipal Airport ("Airport") is located on approximately 688 acres in the Town of Norwood (see Figures 1 and 2). Approximately half of the site is developed and consists of paved runways and taxiways, hangars, an administration building, several office buildings, and other ancillary buildings. The remainder of the site consists of a mix of wetlands and upland grassland and forested areas. There are approximately 477 acres of wetland on the site as mapped by MassGIS on the Airport Property.

Wetland resource areas, as defined by the Massachusetts Wetlands Protection Act (MGL c.131 §40) (WPA), the Norwood Wetland Bylaw and Regulations (Article XXV) and U.S. Clean Water Act (33 U.S.C. 1344, waters of the U.S.), are depicted on Figure 3. The delineated wetland resource areas include Bordering Vegetated Wetlands, Inland Bank, and Land Under Water Bodies and Waterways. The entire Project area also contains mapped Bordering Land Subject to Flooding (i.e., FEMA-FIRM 100-year floodplain). Riverfront Area on the Project site is associated with the unnamed ditched perennial stream.

According to the Final MassDEP 2016 integrated List of Impaired Waters (305(b)/303(d))[8], a Total Maximum Daily Load (TMDL) was established for fecal coliform bacteria for the Neponset River in the vicinity of the Project in 2002 (TMDL Report 2592).

3.1 Wetland Resource Areas

Wetland resource areas, as defined by the WPA (MGL c.131 §40), are depicted on Figure 2. Table 3-1 on the following page presents a summary of the delineated wetland resource areas in the Project Area and their corresponding jurisdictional status under the Wetlands Protection Act. It is assumed that all of the delineated freshwater wetlands and streams are jurisdictional waters of the U.S. for the purposes of Sections 401 and 404 of the U.S. Clean Water Act.

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[7] MassDEP Important Habitat Maps: http://umasscaps.org/data_maps/massdep-maps.html

[8] Massachusetts Year 2016 Integrated List of Waters Proposed Listing of the Condition of Massachusetts' Waters Pursuant to Sections 305(b), 314 and 303(d) of the Clean Water Act. CN:470.0 June, 2017. https://www.mass.gov/files/documents/2017/08/zu/16ilwplist.pdf

Table 3-1 Description of Wetland Resource Areas Delineated or Present within the Project Area

Wetland Flag Series	Bank	Land Under Water	BVW	RFA	Notes
A-1 to A-36 open/end			✓		Wetland series A (Flags A-1 through A-36 open/end) delineates a palustrine emergent wetland located south of Runway 35-end. Wetland series A consisted of mowed vegetation and standing water. Dominant species consisted of broadleaf cattails, soft rush (*Juncus effusus*), cranberry sedges (*Vaccinium oxycoccos*), tussocks sedge, elderberry, deer tongue (*Dichanthelium clandestinum*) and tearthumb (*Polygonum perfoliatum)*.
1-1 through 1-38			✓		Wetland series 1 delineates a palustrine emergent wetland located north of Runway 17-end. Wetland series 1 ties into the bank of Purgatory Brook at flags 1-16 through 1-38. Dominant species consisted of sedges (*Carex spp.)*, sensitive fern, soft rush, and broadleaf cattail. This wetland is actively mowed throughout the growing season as it is within the direct approach of Runway 17 end.
2-1 through 2-18			✓		Wetland series 2 delineates a BVW located west of taxiway A. Wetland Series 2 is hydrologically connected to Wetland series 4 by a culvert at flags 2-11 and 2-12. Additionally, a culvert was located at flags 2-14. Dominant species consisted of broadleaf cattail, soft rush, phragmites, purple loosestrife, skunk cabbage (*Symplocarpus foetidus*), deer tongue and sedges
3-1 through 3-21			✓		Wetland series 3 delineates a BVW located west of Taxiway A. Wetland series 3 begins and ends at a culvert. Dominant species includes mowed phragmites, tearthumb, multiflora rose (*Rosa multiflora*) and soft rush.
4-1 through 4-30	✓	✓	✓		Wetland series 4 delineates a drainage ditch and wetland located west of taxiway A. Wetland series 4 locates a culvert between flags 4-8 and 4-9. Dominant species include silky dogwood, soft rush, wool grass (*Scirpus cyperinus*) , skunk cabbage, and tussock sedge.
5-1 through 5-33 open			✓		Wetland series 5 delineates a BVW located south of Taxiway C. Dominant species include blue joint (*Calamagrostis canadensis*), cattail, soft rush, sensitive fern, and meadowsweet (*Spiraea alba*).

Table 3-1 (cont'd) Description of Wetland Resource Areas Delineated or Present within the Study Area

Wetland Flag Series	Bank	Land Under Water	BVW	RFA	Notes
6-1 through 6-40			✓		Wetland series 6 delineates an infield BVW located adjacent to the ditch described by Series 6B. It is surrounded by both runways and Taxiways C and F. This wetland appears to receive runoff from these paved surfaces and is mowed on a regular basis. Dominant species include Carex sp., soft rush, meadowsweet, and blue joint.
PB-1 to PB-10	✓	✓		✓	Bank series 1 delineates the northern bank of a perennial stream, Purgatory Brook. The stream is located east of Runway 17-35. Dominant bank species include silky dogwood (*Cornus amomum)*, sensitive fern (*Onoclea sensibilis),* multiflora rose (*Rosa Multiflora),* Glossy buckthorn (*Frangula alnus*), and purple loosestrife (*Lythrum salicaria).* The stream ranges from approximately 20 feet to 25 feet wide along this stretch. Field observations confirmed that the stream flows in a southerly direction towards Runway 18-25 and then turns easternly towards the Neponset River. Substrate consisted of sand and bank erosion was present.
5B-1 to 5B-5 open	✓	✓		✓	Bank Series 5 delineates the northern bank of an unamed perennial ditch that flows parallel to the east of Runway 17-35 and south of Taxiway C. Dominant species include tussock sedge (*Carex stricta)*, elderberry (*Sambucus nigra*), and broadleaf cattail (*Typha latifolia*) within the stream. The stream was approximately 25 feet wide along this stretch.
6B 1 through 6B-12	✓	✓		✓	Bank series 6 delineates the bank of the infield ditch north of Taxiway C. A culvert was identified between flags 6B-6 and 6B-7 which passes the waterway to the south, into Series 5 described above. Vegetation includes arrowwood, buttonbush and herbaceous vegetation along the bank.

The WPA recognizes eight interests (i.e., functions and values) of wetland resource areas. These are identified in 310 CMR 10.01. The interests of the Act may be grouped into three general categories: water quality, water supply protection and pollution prevention; storm damage prevention and flood control; and wildlife habitat and fisheries protection.

Each of the WPA interests is identified on Table 3-2 below relative to the wetland resource areas delineated in the Project Area.

Table 3-2 Significance of the Wetland Resource Areas Under the WPA

Protected Interests of the Act	BVW	Inland Bank	Land Under Water	Bordering Land Subject to Flooding
Protection of Public and Private Water Supply	•	•	•	
Protection of Groundwater Supply	•	•	•	
Flood Control	•	•	•	•
Storm Damage Prevention	•	•	•	•
Prevention of Pollution	•	•	•	
Protection of Land Containing Shellfish				
Protection of Fisheries	•	•	•	
Protection of Wildlife Habitat	•	•	•	•

3.2 Threatened and Endangered Plant and Wildlife Species

3.2.1 Natural Heritage and Endangered Species Program

The Massachusetts Natural Heritage Atlas (MassGIS, 2021) (the "Atlas"), prepared by the Natural Heritage and Endangered Species Program, identifies one area of Priority Habitat (PH998) in the Project area as providing habitat for a state threatened plant species, Long's Bulrush. Recent surveys have pinpointed the location of these plants on Airport property in conjunction with the NHESP. The Project will not occur in these areas thus the proposed Project is not anticipated to impact Long's Bulrush or any other state listed species. The Airport will work with NHESP to develop appropriate protective measures for during construction. Also, the Airport is located within the Fowl Meadow/Ponkapoag Bog Area of Critical Environmental Concern ("ACEC").

3.2.2 Northern Long-Eared Bat

Due to declines caused by white-nose syndrome, the northern long-eared bat ("NLEB") (*Myotis septentrionalis*) received protection as a threatened species under the federal Endangered Species Act in May 2015. In Massachusetts, it has been listed as a protected species under MESA since 2008. It is a medium-sized bat approximately three to 3.7 inches long with a wingspan of nine to ten inches. It hibernates in caves and mines, called hibernacula, and swarms in surrounding wooded areas in autumn. From their hibernacula they fly to upland forests throughout their range. In summer, pregnant females roost in small colonies and give birth to a

single pup. Trees documented to provide maternity roosting habitat are considered "maternity roost trees." Also, during late spring and summer, the bat roosts and forages in upland forests.

The range of habitat for NLEB occurs throughout most of Massachusetts. It uses a wide range of forested habitats for its day-to-day activities, including foraging, roosting, and traveling. There are no known hibernacula or maternity roost trees within the Project Area according to NHESP's most recent map of known hibernacula within the state.

As there are no proposed tree cutting as part of this project, the project is consistent with the Programmatic Biological Opinion under the authority of Section 4(d) of the Endangered Species Act and the Final 4(d) Rule published in the Federal Register on January 14, 2016.

4.0 Wildlife Habitat Evaluation Impact Areas and Findings

The following sections provide details regarding the habitat evaluations completed at each data collection location, present the effects of the impacts on important wildlife habitat features, and provide a summary of proposed mitigation techniques to be implemented to demonstrate that the Project has been designed to meet the no adverse effect standard outlined at 310 CMR 10.60(2). For the purposes of this report the results are organized by wetland resource area. Attachment B contains a locus map identifying data collection points in the Project Area referenced in the following sections.

Wetland resource area impacts associated with the Project are due to the construction of Taxiway C relocation.

4.1 Bordering Vegetated Wetland

4.1.1 Review of Wildlife Habitat Interest of the WPA

According to the WPA regulations BVW is likely to be significant (in part) to the protection of wildlife habitat. The hydrologic regime, plant community composition and structure, soil composition and structure, topography, and water chemistry of BVWs can provide important food, shelter, migratory and overwintering areas, and breeding areas for many birds, mammals, amphibians and reptiles. A wide variety of vegetated wetland plants, the nature of which are determined in large part by the depth and duration of water, as well as soil and water composition, can be utilized by varied species as important areas for mating, nesting, brood rearing, shelter and food (directly and indirectly). The diversity and interspersion of the vegetative structure can also be important in determining the nature of its wildlife habitat. Different habitat characteristics are used by different wildlife species during summer, winter and migratory seasons.

4.1.2 Description of Proposed Alterations to BVW

Approximately 31,045 sf of BVW associated with a perennial drainage ditch in the infield would be impacted. In addition to the proposed permanent impacts to BVW, temporary impacts of 3,610 sf of BVW generally involve a 5-foot horizontal area necessary for construction access and work associated with the Taxiway C work. The proposed construction will temporarily alter these areas by a variety of construction activities including temporary excavation and backfilling, staging and operating construction equipment, grading, and installing erosion controls. Once construction is complete, the altered wetland areas not permanently impacted by filling will be restored as illustrated on various sheets of the Project Plans.

Wetland mitigation would be provided at a ratio of 2:1 on site, totaling 62,090 sf.

4.1.3 Effects of Proposed Activities to Important Wildlife Habitat Functions

All eleven of the Detailed Wildlife Habitat Evaluations that were conducted included impact areas in BVW.

Some of the features described above may be considered important to wildlife habitat and could potentially provide conditions that are suitable for sheltering or feeding, as an example. However, these important wildlife habitat features are very common to the overall Project Area and the surrounding landscape and the proposed alterations are insignificant when compared to the amount of similar habitat that will remain in the adjacent resource areas and environment upon completion of construction activities. This fact notwithstanding, the Airport proposes to construct BVW replication areas consistent with the provisions of 310 CMR 10.55. The replication areas will incorporate the important habitat features identified above food producing shrubs (e.g., elderberry), soft soils for burrowing, dense herbaceous cover (cover habitat), and seasonal high water.

4.2 Bordering Land Subject to Flooding

According to the applicable Federal Emergency Management Agency - Flood Insurance Rate Map (FEMA-FIRM), Community Panel Number #25021C0019E, Revision Date July 17, 2012, the majority of the Project and the Airport is within the 100-year Flood Zone A (El. 47.1 feet NAVD 88) associated with the Neponset River. Except for a portion of the RSA work at the Runway 17-end, the project components are located entirely within the floodplain.

4.2.1 Review of Wildlife Habitat Interest of the WPA

Approximately 26,996 sf of the 10-year floodplain (elevation 44.6 feet NAVD 88) on the Project site will be altered by fill activities outside of BVW for Taxiway C. Of this number, 2,850 sf is previously disturbed and consists of pavement, mowed shoulders or gravel areas and meets the description of "altered", i.e. currently comprised of runways/taxiways, or mowed and graded shoulders [310 CMR 10.57 (3)(a)(1)]. An additional 66,700 sf of BLSF within 100 feet of BVW is

comprised of runways/taxiways or mowed and graded shoulders. The wetland replication area is predominantly located within BLSF as well.

Proposed BLSF alterations will have a negligible effect on important wildlife habitat functions, mainly due to the altered status of the BLSF as described above. A wetland replication plan at a 2:1 replication-to-impact ratio that incorporates important wildlife habitat features has been developed to mitigate potential impacts to important wildlife habitat in BLSF. Mitigation in the form of wildlife habitat features of burrowable soils, seasonal pockets of standing water, densely planted herbs is included in the replication plans for both the compensatory storage areas and wetland replication area.

4.2.2 Description of Proposed Alterations to BLSF

. According to 310 CMR 10.57(1)(a)(3), certain portions of BLSF are likely to be significant to the protection of wildlife habitat. These include all areas on the ten year floodplain or within 100 feet of the Bank or BVW (whichever is further from the waterbody or waterway, so long as such an area is contained within the 100 year floodplain), and all vernal pool habitat on the 100 year floodplain, except for those portions of which have been so extensively altered by human activity that their important wildlife habitat functions have been effectively eliminated. Collectively these areas are referred to as the "lower floodplain." The hydrologic regime, plant community composition and structure, topography, soil composition and proximity to water bodies and BVW of these portions of BLSF can provide important food, shelter, migratory and overwintering areas, and breeding areas for wildlife. Nutrients from flood waters, as well as the inundation of floodplain soil, can create important wildlife habitat characteristics, such as richness and diversity of soil and vegetation. A great many species require or prefer habitat which is as close as possible to water and/or has moist conditions, characteristics generally present on lower floodplains. Similarly, lower floodplains, because of their proximity to water and vegetated wetlands, can provide important shelter for wildlife which needs to migrate between such areas, or between such areas and uplands. The "edge" where floodplain habitat borders vegetated wetlands or water bodies is frequently very high in wildlife richness and diversity. Similar "edges" may be found elsewhere within the lower floodplain, where differences in topography and frequency of flooding have created varied soil and plant community composition and structure.

Except for a portion of the RSA work at the Runway 17-end, the project components are located entirely within the floodplain. Approximately 26,996 sf of the 10-year floodplain (elevation 44.6 feet NAVD 88) on the Project site will be altered by fill activities outside of BVW for Taxiway C. Of this number, 2,850 sf is previously disturbed and consists of pavement, mowed shoulders or gravel areas and meets the description of "altered", i.e. currently comprised of runways/taxiways or mowed and graded shoulders [310 CMR 10.57 (3)(a)(1)]. An additional 66,700 sf of BLSF within 100 feet of BVW is comprised of runways/taxiways or mowed and graded shoulders. The wetland replication area is predominantly located within BLSF as well.

4.2.3 Effects of Proposed Activities to Important Wildlife Habitat Functions

The Detailed Wildlife Habitat Evaluation was conducted at the impact area which included areas of BVW, Bank, Riverfront Area, and Bordering Land Subject to Flooding associated with the stream. The lower floodplain at this location (i.e. all area within 100 feet of the delineated BVW) consists primarily of the runway and taxiway embankment. Dominant vegetation generally consists of mowed herbaceous vegetation. Small mammal burrows were not observed, and it is possible that soils are too compacted along the embankment to contain burrows.

As discussed above, although some work will occur in the lower floodplain of BLSF, a large portion of this BLSF is currently "altered", i.e. currently comprised of runways/taxiways or shoulders [310 CMR 10.57 (3)(a)(1)]. This altered area is located immediately adjacent to active taxiways and is generally not suitable for breeding areas for birds, mammals or reptiles. There is not enough standing water for long enough during the breeding season to be a suitable breeding area for reptiles. Birds, even red winged blackbirds were not noted to utilize the area adjacent to taxiways in either the lower floodplain or BVW areas adjacent to the taxiways. Mammals are not likely to utilize this discrete area for breeding. It is feasible that certain small mammals including short-tailed shrews and field jumping mice are present and utilize the lower floodplain and seasonally saturated BVW as suitable habitat, however this type of habitat is not exclusive to the impact area. The remaining portion of the 10-year floodplain overlaps with BVW.

4.3 Riverfront Area

There is Riverfront Area associated with the unnamed perennial stream. Activities proposed in RFA to the unnamed perennial stream include the realignment of Taxiway C and a portion of the wetland replication area. Most of these activities will occur in previously developed a RFA currently occupied by paved surfaces and gravel taxiway shoulders.

4.3.1 Review of Wildlife Habitat Interest

According to 310 CMR 10.58(1), RFA is important wildlife habitat, providing food, shelter, breeding, migratory, and overwintering areas. Some predominantly upland species use and may be seasonally dependent on riverfront areas. RFAs promote biological diversity by providing habitats for an unusually wide variety of upland and wetland species, including bald eagles, osprey, and kingfishers. Large dead trees provide nesting sites for bird species that typically use the same nest from year to year. Sandy areas along rivers may serve as nesting sites for turtles and water snakes. RFAs provide food for species such as wood turtles which feed and nest in uplands but use rivers as resting and overwintering areas. RFAs provide corridors for the migration of wildlife for feeding or breeding. Loss of this connective function, from activities that create barriers to wildlife movement within RFAs, results in habitat fragmentation and causes declines in wildlife populations. Wildlife must also be able to move across RFA, between uplands and the river.

In those portions so extensively altered by human activity that their important wildlife habitat functions have been effectively eliminated, RFAs are not significant to the protection of important wildlife habitat and vernal pool habitat.

4.3.2 Description of Proposed Alterations to RFA

4.3.3 Effects of Proposed Activities to Important Wildlife Habitat Functions

A Wildlife Habitat Evaluation was conducted at the most representative impact area within undeveloped RFA. The RFA associated with the unnamed perennial stream primarily consists of Wetland Series 5 and 6, paved taxiway and runway surfaces, and mowed grassy embankments. The total RFA associated with this stream at the Airport is 760,000 sf. Of this total, approximately 14,241 sf (1.9%) is previously developed, while the remaining 745,759 sf (98.1%) is currently grassy or wetland areas.

The Project will result in an improvement of the capacity of the RFA to protect the interests of the Act over existing conditions through the implementation of the wetland replication area within RFA. Additionally, outside the replication area, there will be an improvement to the protection of groundwater and pollution prevention via upgrades to the existing stormwater management system. The proposed alterations to RFA will not substantially reduce the important wildlife habitat functions of the altered resource area nor will the work have an adverse effect on wildlife habitat. The undisturbed portions of RFA far exceed the impact area. The undisturbed RFA areas generally includes the emergent marsh system bordering the perennial stream south of Taxiway C.

These important habitat features will remain. Soft mast food sources generally consisted of elderberry; aquatic food sources consisted of bulrush.

5.0 Restoration and Replication of Altered Habitat

As demonstrated above the alterations to BVW, Bank, LUW, RFA and BLSF (lower floodplain) associated with the Project will not substantially reduce the capacity of these resource areas to provide important wildlife habitat functions because the important features identified in the wildlife habitat study areas - a few standing dead trees, burrowable soils, dense herbaceous cover, certain food producing shrubs, and large woody debris on the ground surface - are very common within the Project Area and surrounding environs, so that the number of the habitat features lost is insignificant when compared to the number of similar habitat features that will remain. Nevertheless, taking a conservative approach, the Applicant is proposing to replicate for the limited alterations in accordance with the general replication conditions of 310 CMR 10.60(3), as follows.

(a) the surface of the replacement area to be created ("the replacement area") shall be equal to that of the area that will be lost ("the lost area");

The proposed BVW replication area and BLSF compensatory flood storage areas will be at least equal to that of the areas that will be lost consistent with the performance standards at 310 CMR 10.55 and 10.57. A total of 0.71 acres of BVW will be permanently altered by the project. The proposed wetland replication area is 1.42 acres, a ratio of impact-to-replication of 1:1. Activities involving temporary BVW, BLSF, RFA, Bank, or LUW alterations will be restored in-place following completion of the work.

(b) the elevation of groundwater relative to the surface of the replacement area shall be approximately equal to that of the lost area;

To the extent practicable the proposed BVW replication area will be designed so that the groundwater and surface elevations are approximately equal to those of the lost areas. The BVW replication area will have pit and mound micro-topography to mimic the impacted wetland surfaces.

(c) the replacement area shall be located within the same general area as the lost area. In the case of banks and land under water, the replacement area shall be located on the same water body or waterway if the latter has not been rechanneled or otherwise relocated. In the case of bordering land subject to flooding, the replacement area shall be located approximately the same distance from the water body or waterway as the lost area. In the case of vernal pool habitat, the replacement area shall be located in close proximity to the lost area;

The proposed wetland replication area is located directly adjacent to the impact area. Compensatory flood storage will be provided within two discrete compensatory storage areas. The storage volume will be created in areas not currently used for flood storage and will be incrementally equal to the theoretical volume of flood water lost at each elevation, up to and including the 100-year flood elevation.

(d) interspersion and diversity of vegetation, water and other wildlife habitat characteristics of the replacement area, as well as its location relative to neighboring wildlife habitats, shall be similar to that of the lost areas, insofar as necessary to maintain the wildlife habitat functions of the lost area;

(e) The wetland replication plan proposes to create an emergent habitat with a shrub fringe within two growing seasons, providing a minimum of 75 percent surface coverage with indigenous wetland plant species. Exposed substrates will be protected against erosion until re-establishment of wetland vegetation occurs. Exposed soils will be temporarily stabilized using straw mulch or other appropriate erosion control measures in the event that seasonal conditions result in a delay in seeding. Following final grading, an entrenched staked haybale and silt fence barrier will be installed around the outside perimeter of the wetland replication area, as necessary. In addition, the replication area will be monitored during five complete growing seasons by a qualified Wetland Scientist as is typically required by a Variance Order of Conditions.

(f) the project shall not alter ten or more acres of Land Subject to Flooding or Land Under Water found to be significant to the protection of wildlife habitat, or 2,000 feet or more of Bank found to be significant to the protection of wildlife habitat (in the case of a bank of a stream or river, this shall be measured on each side of said stream or river).

This standard is not applicable.

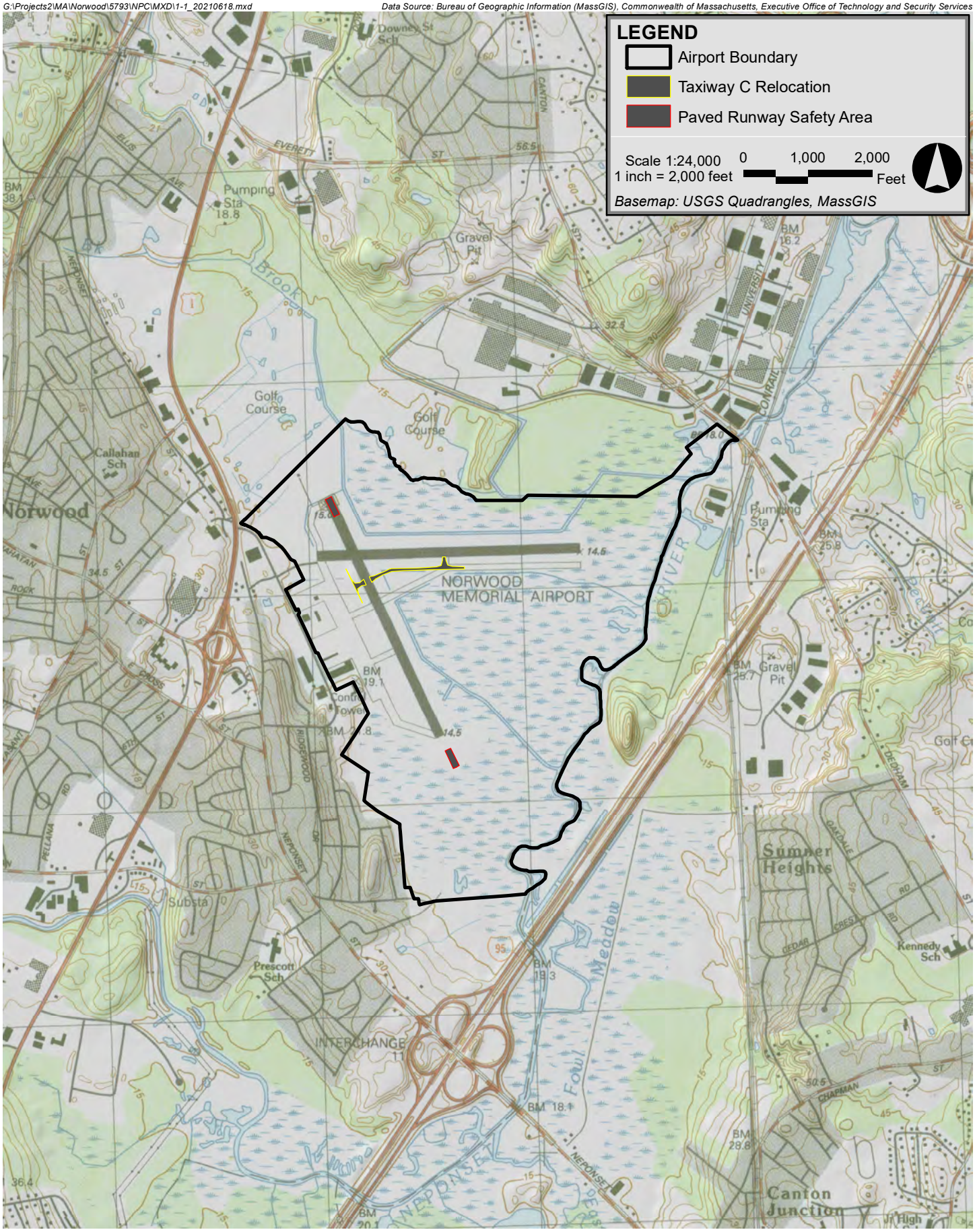
(g) if the replacement area is located in an area subject to M.G.L. c. 131, § 40, there shall be no adverse effect on the existing important wildlife habitat functions of said area as measured by the standards of 310 CMR 10.60;

The proposed wetland replication area is located within BLSF and RFA. The BLSF and RFA are previously developed and or disturbed and the replication area will serve to enhance the functions and values of these resource areas.

(h) the "thresholds" established in 310 CMR 10.54(4)(a)5., 10.56(4)(a)4., 10.57(4)(a)3. And 10.58(4)(d)1.c. (below which alterations of resource areas are not deemed to impair capacity to provide important wildlife habitat functions) shall not apply to any replacement area; and the replacement area shall be provided in a manner which is consistent with all other General Performance Standards for each resource area in 310 CMR 10.51 through 10.60.

The proposed BVW replication area and compensatory flood storage areas will be provided in a manner that is consistent with all other General Performance Standards for each resource area in 310 CMR 10.51 through 10.60.

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



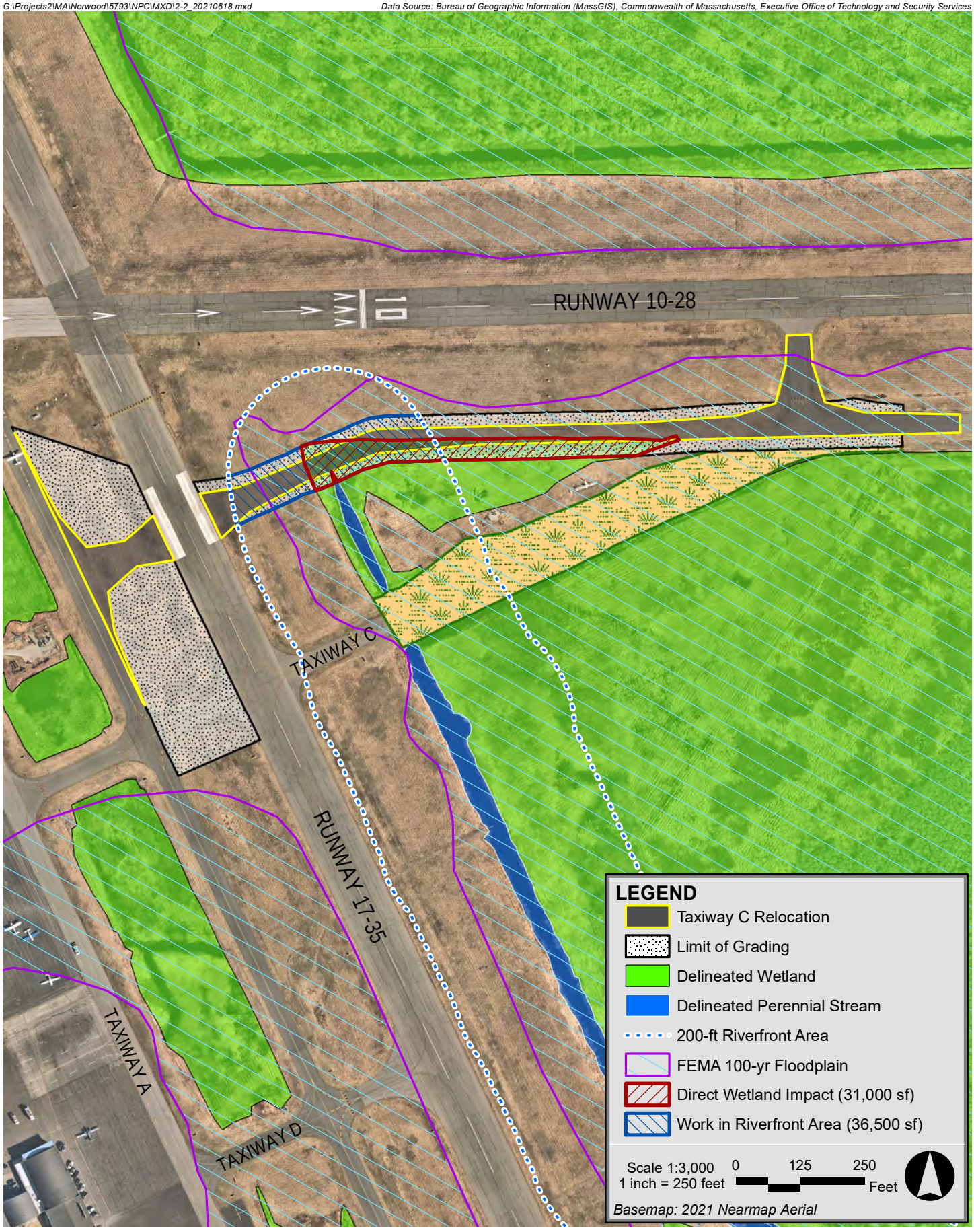
Taxiway C Realignment and Runway Safety Areas at Norwood Memorial Airport

Epsilon Associates Inc.

Figure 1

USGS Locus

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



Taxiway C Realignment and Runway Safety Areas at Norwood Memorial Airport

Epsilon Associates Inc.

Figure 2

Wetland Impact Locations

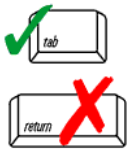
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 1. Summary Sheet

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Norwood Airport Taxiway C Relocation and RSA Paving
Project Name

Norwood, MA
Location

see below
Size of Area Being Impacted

July 31, 2021
Date

Impact Areas (linear feet, square feet, or acres for each of the impact areas within the site)

Name	Waterbody/ Waterway	Wetland	Upland*	Total Area
1. Wetland Series 6/6B	123 LUW	31,045 sf	8.9 ac BLSF	8.9 ac
2.	8 LF Bank		86,484 sf RFA	
3.				
4.				
5.				
6.				
7.				

*Riverfront Area/BLSF

Attach Sketch map and/or photos of the Impact Areas

Narrative Description of Site (attach separate page if necessary)

See attachment

Certification

I hereby certify that this project has been designed to avoid, minimize, and mitigate adverse effects on wildlife habitat, and that it will not, following two growing seasons of project completion and thereafter, substantially reduce its capacity to provide important wildlife habitat functions.

Signature of Wildlife Specialist (per 310 CMR 10.60 (1) (b))

Alyssa Jacobs, PWS
Typed or Printed Name

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (for each wetland or non-wetland resource area)

I. General Information

Norwood Memorial Airport 111 Accress Road, Norwood, MA
Project Location (from NOI page 1)

Wetland Series 6/6B
Impact Area (number/name)

July 29, 2021
Date(s) of Site Visit(s) and Data Collection

Sunny. ,
Weather Conditions During Site Visit (if snow cover, include depth)

Alyssa Jacobs, PWS — Person completing form per 310 CMR 10.60(1)(b)

07/31/2021 — Date this form was completed

The information on this data sheet is based on my observations unless otherwise indicated

Signature

II. Site Description (complete A or B under Classification - see instructions for full description)

A. Classification

1. For Wetland Resource Areas, complete the following:

System: Palustrine Subsystem:

Class: Emergent Subclass: Persistent

Hydrology/Water Regime

- ☐ Permanently flooded
- ☐ Saturated
- ☐ Intermittently exposed
- ☐ Temporarily flooded
- ☐ Semi-permanently flooded
- ☐ Intermittently flooded
- ☒ Seasonally flooded
- ☐ Artificially flooded

2. For Riverfront or Bordering Land Subject to Flooding Resource Areas, complete the following. Use a terrestrial classification system such as one of the two listed below:
   a. "Classification of the Natural Communities of Massachusetts (Draft)" by Patricia C. Swain and Jennifer B. Kearsley, MA DFW NHESP, Westborough, MA. July 2000. (Department of Fish & Game Website)
   b. "New England Wildlife: Habitat, Natural History, and Distribution" by Richard M. DeGraaf and Deborah D. Rudis, USDA Forest Service, Northeastern Forest Experiment Station. General Technical Report NE-108. August 1992. 491 pages.

Community Name

Vegetation Description

Physical Description

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

B. Inventory (Plant community)

% Cover:	Trees (> 20')	Shrubs (< 20')	Woody vines	Mosses	Herbaceous
	0	30		0	70

Plant Lists (species that comprise 10% or more of the vegetative cover in each strata; "*" designates a dominant plant species for the strata):

Strata	Plant Species	Strata	Plant Species
Herbaceous	*Calamagrostis canadensis	Shrub	*Cephalanthus occidentalis
	*Scirpus cyperinus		*Spirea latifolia
	Juncus effusus		Sambucus canadensis
	Persicaria saggittata		Salix sp.
	Leersia oryzoides		
	Onoclea sensiblis		

C. Inventory (Soils)

Udorthents, wet substratum	
Soil Survey Unit	Drainage Class
muck	
Texture (upper part)	Depth
at surface	
Depth to Water Table	

III. Important Habitat Features (complete for all resource areas)

If the following habitat characteristics are present, describe & quantify them on a separate sheet & attach.

Wildlife Food

Important Wetland/Aquatic Food Plants (smartweeds, pondweeds, wild rice, bulrush, wild celery)

☐ Abundant ☒ Present ☐ Absent

Important Upland/Wetland Food Plants (hard mast and fruit/berry producers)

☐ Abundant ☒ Present ☐ Absent

Shrub thickets or streambeds with abundant earthworms (American woodcock)

☐ Present ☒ Absent

Shrub and/or herbaceous vegetation suitable for veery nesting

☐ Present ☒ Absent

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Number of trees (live or dead) > 30" DBH: 0

Number (or density) of Standing Dead Trees (potential for cavities and perches):

6-12" dbh	12-18" dbh	18-24" dbh	> 24" dbh
0	0	0	0

Number of Tree Cavities in trunks or limbs of:

0
6-12" diameter (e.g., tree swallow, saw whet owl, screech owl, bluebird, other songbirds)

0
12-18" diameter (e.g., hooded merganser, wood duck, common goldeneye, mink)

0
>18" diameter (e.g., hooded merganser, wood duck, common goldeneye, common merganser, barred owl, mink, raccoon, fisher)

Small mammal burrows

☐ Abundant ☒ Present ☐ Absent

Cover/Perches/Basking/Denning/Nesting Habitat

☒ Dense herbaceous cover (voles, small mammals, amphibians & reptiles)

☐ Large woody debris on the ground (small mammals, mink, amphibians & reptiles)

☐ Rocks, crevices, logs, tree roots or hummocks under water's surface (turtles, snakes, frogs)

☐ Rocks, crevices, fallen logs, overhanging branches or hummocks at, or within 1m above the water's surface (turtles, snakes, frogs, wading birds, wood duck, mink, raccoon)

☐ Rock piles, crevices, or hollow logs suitable for:

☐ otter ☐ mink ☐ porcupine ☐ bear ☐ bobcat ☐ turkey vulture

☐ Live or dead standing vegetation overhanging water or offering good visibility of open water (e.g., osprey, kingfisher, flycatchers, cedar waxwings)

Depressions that may serve as seasonal (vernal/autumnal) pools

☐ Present ☒ Absent

Standing water present at least part of the growing season, suitable for use by

☒ Breeding amphibians ☒ Non-breeding amphibians (foraging, re-hydration)

☒ Turtles ☐ Foraging waterfowl

Sphagnum hummucks or mats, moss-covered logs or saturated logs, overhanging or directly adjacent to pools of standing water in spring (four-toed salamander)

☐ Present ☒ Absent

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Important habitat characteristics (if present, describe and quantify them on a separate sheet)

Medium to large (> 6"), flat rocks within a stream (cover for stream salamanders and nesting habitat for spring & two-lined salamanders)

☐ Present ☒ Absent

Flat rocks and logs on banks or within exposed portions of streambeds (cover for stream salamanders and nesting habitat for dusky salamanders)

☐ Present ☒ Absent

Underwater banks of fine silt and/or clay (beaver, muskrat, otter)

☐ Present ☒ Absent

Undercut or overhanging banks (small mammals, mink, weasels)

☐ Present ☒ Absent

Vertical sandy banks (bank swallow, kingfisher)

☐ Present ☒ Absent

Areas of ice-free open water in winter

☐ Present ☒ Absent

Mud flats

☐ Present ☒ Absent

Exposed areas of well-drained, sandy soil suitable for turtle nesting

☐ Present ☒ Absent

Wildlife dens/nests (if present, describe & quantify them on the back of this sheet)

Turtle nesting sites

☐ Present ☒ Absent

Bank swallow colony

☐ Present ☒ Absent

Nest(s) present of ☐ Bald Eagle ☐ Osprey ☐ Great Blue Heron

Den(s) present of ☐ Otter ☐ Mink ☐ Beaver

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Project area is within:

☐ 100' of beaver, mink or otter den, bank swallow colony or turtle nesting area

☐ 200' of Great Blue Heron or osprey nest(s)

☐ 1400' of a Bald Eagle nest[1]

Emergent Wetlands (if present, describe & quantify them on a separate sheet)

Emergent wetland vegetation at least seasonally flooded during the growing season (wood duck, green heron, black-crowned night heron, king rail, Virginia rail, coot, etc.)

Flooded > 5 cm	☒ Present	☐ Absent
Flooded > 25 cm (pied-billed grebe)	☒ Present	☐ Absent

Persistent emergent wetland vegetation at least seasonally flooded during the growing season (mallard, American bittern, sora, common snipe, red-winged blackbird, swamp sparrow, marsh wren)

Flooded > 5 cm	☒ Present	☐ Absent
Flooded > 25 cm (least bittern, common moorhen)	☒ Present	☐ Absent

Cattail emergent wetland vegetation at least seasonally flooded during the growing season

Flooded > 5 cm (marsh wren)	☒ Present	☐ Absent
Flooded > 25 cm (least bittern, common moorhen)	☒ Present	☐ Absent

Fine-leafed emergent vegetation (grasses and sedges) at least seasonally flooded during the growing season (common snipe, spotted sandpiper, sedge wren)

Flooded > 5 cm	☒ Present	☐ Absent
Flooded > 25 cm (least bittern, common moorhen)	☒ Present	☐ Absent

IV. Landscape Context

A. **Habitat Continuity** (if present, describe the landscape context on a separate sheet and its importance for area-sensitive species)

Is the impact area part of an emergent marsh at least	1.0 acre in size?	☐ Yes	☒ No
(marsh and waterbirds)	2.0 acres in size?	☐ Yes	☒ No
	5.0 acres in size?	☐ Yes	☒ No
	10.0 acres in size?	☐ Yes	☒ No

[1] 1400 feet is the distance used by NHESP for evaluating potential disturbance impacts on eagle nests under MESA. Keep in mind, however, that this doesn't give jurisdiction within 1400' of an eagle's nest; it only identifies it on the checklist so that adverse effects can be avoided if work in a resource area is within 1400 feet.

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Is the impact area part of a wetland complex at least	2.5 acres in size?	☐ Yes	☒ No
(turtles, frogs, waterfowl, mammals)	5.0 acres in size?	☐ Yes	☒ No
	10.0 acres in size?	☐ Yes	☒ No
	25.0 acres in size?	☐ Yes	☒ No

For upland resource areas is the impact area part of contiguous forested habitat at least

(forest interior nesting birds)	50 acres in size?	☐ Yes	☒ No
	100 acres in size?	☐ Yes	☒ No
	250 acres in size?	☐ Yes	☒ No
	500 acres in size?	☐ Yes	☒ No
(grassland nesting birds)	> 1.0 acre in size?	☐ Yes	☒ No
(special habitat such as gallery floodplain forest, alder thicket, etc.)	> 1.0 acre in size?	☐ Yes	☒ No

B. **Connectivity with adjoining natural habitats**

☒ No direct connections to adjacent areas of wildlife habitat (little connectivity function)

☐ Connectors numerous or impact area is embedded in a large area of natural habitat (limited connectivity function)

☐ Impact area contributes to a limited number of connectors to adjacent areas of habitat (somewhat important for connectivity function)

☐ Impact area serves as *part of* a sole connector to adjacent areas of habitat (important for connectivity function)

☐ Impact area serves as *only* connector to adjacent areas of habitat (very important for connectivity function)

V. Habitat Degradation (describe degradation and wildlife impacts on the back of the sheet)

☐ Evidence of significant chemical contamination

☐ Evidence of significant levels of dumping

☐ Evidence of significant erosion or sedimentation problems

☐ Significant invasion of exotic plants (e.g., purple loosestrife, *Phragmites*, glossy buckthorn)

☐ Disturbance from roads or highways ☒ Other human disturbance

☐ Is the site the only resource area in the vicinity of an otherwise developed area

Note: These are not the only important habitat features that may be observed on a site. If the wildlife specialist identifies other features they should be noted in the application.

Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

VI. Quantification Table for Important Habitat Characteristics

Habitat Characteristic	Amount Impacted in Impact Area	Current (entire site)	Post-Construction (entire site)
Example: standing dead trees 6-12” dbh	4	12	8
pockets of standing water	few	abundant	abundant
dense herbaceous vegetation	abundant	abundant	abundant
aquatic food sources (bulrush)	minor	abundant	abundant
emergent wetland seasonally flooded	moderate	abundant	abundant
wetland food plants	few	abundant	abundant

Photo 1: View looking southwest within Taxiway C's proposed new location. Wetland to be impacted in the foreground (Wetland Series 6).

Photo 2: View looking easterly along the new Taxiway C alignment.

Photo 3: View of pockets of standing water and bulrush..

Photo 4: Cattail and fruit bearing shrubs within and along bank of perennial drainage ditch.

Photo 5: Mowed embankment of area of impact for Taxiway C (BLSF and RFA) with wetlands in the foreground.

Photo 6: Muck soils within the impact area.

Photo 7: View looking north at wetland series 1, just north of the Runway 17 Runway Safety Area.

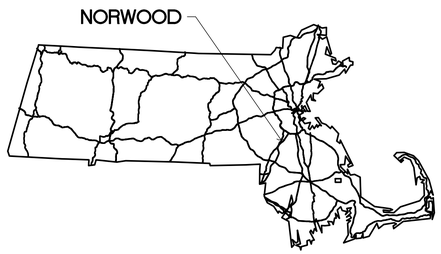
Photo 8: Runway 17 Runway Safety Area – existing conditions.

Photo 9: Runway 35 end Safety Area looking west existing conditions (BLSF impact area)..

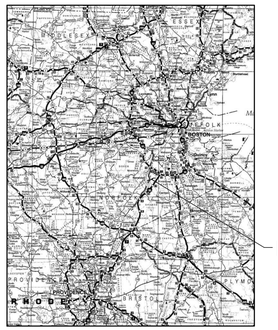
Photo 10: Wetland delineation edge along grassed Runway 35-end Safety Area.

Appendix D

Project Site Plans



VICINITY MAP
SCALE: NTS



LOCUS MAP
SCALE: NTS

NORWOOD MEMORIAL AIRPORT

111 ACCESS ROAD, BUILDING 9
NORWOOD, MASSACHUSETTS 02062

ENVIRONMENTAL PERMITTING
TW 'C' REALIGNMENT AND
RUNWAY 17-35 PAVED SAFETY AREAS

AIP NO. 3-25-0037-XX-2021

PERMITTING SET
NOT FOR CONSTRUCTION

INDEX		
SHEET NO.	DRAWING NO.	DESCRIPTION
1	G1.1	TITLE SHEET
2	G1.2	GENERAL PLAN
3	G1.4	GENERAL NOTES
4	G1.5	STAGING PLAN
5	E1.1	EXISTING CONDITIONS PLAN RW 17 PAVED SAFETY AREA (LOCATION 1)
6	E1.2	EXISTING CONDITIONS PLAN RW 35 PAVED SAFETY AREA (LOCATION 2)
7	E1.3	EXISTING CONDITIONS PLAN TAXIWAY 'C' STUB (LOCATION 3)
8	E1.4	EXISTING CONDITIONS PLAN TAXIWAY 'C' REALIGNMENT (1 OF 2) (LOCATION 4)
9	E1.5	EXISTING CONDITIONS PLAN TAXIWAY 'C' REALIGNMENT (2 OF 2) (LOCATION 4)
10	E1.6	EXISTING CONDITIONS PLAN STORMWATER MITIGATION AREA 1
11	E1.7	EXISTING CONDITIONS PLAN STORMWATER MITIGATION AREA 2
12	D1.1	DEMOLITION PLAN
13	C1.1	GEOMETRIC PLAN AND PROFILE RW 17 PAVED SAFETY AREA (LOCATION 1)
14	C1.2	GEOMETRIC PLAN AND PROFILE RW 35 PAVED SAFETY AREA (LOCATION 2)
15	C1.3	GEOMETRIC PLAN AND PROFILE TAXIWAY 'C' STUB (LOCATION 3)
16	C1.4	GEOMETRIC PLAN AND PROFILE TAXIWAY 'C' REALIGNMENT (1 OF 2) (LOCATION 4)
17	C1.5	GEOMETRIC PLAN AND PROFILE TAXIWAY 'C' REALIGNMENT (2 OF 2) (LOCATION 4)
18	C2.1	TYPICAL SECTIONS
19	C3.1	GRADING AND DRAINAGE PLAN RW 17 PAVED SAFETY AREA (LOCATION 1)
20	C3.2	GRADING AND DRAINAGE PLAN RW 35 PAVED SAFETY AREA (LOCATION 2)
21	C3.3	GRADING AND DRAINAGE PLAN TAXIWAY 'C' STUB (LOCATION 3)
22	C3.4	GRADING AND DRAINAGE PLAN TAXIWAY 'C' REALIGNMENT (1 OF 2) (LOCATION 4)
23	C3.5	GRADING AND DRAINAGE PLAN TAXIWAY 'C' REALIGNMENT (2 OF 2) (LOCATION 4)
24	C3.6	GRADING AND DRAINAGE PLAN STORMWATER MITIGATION AREA 1
25	C3.7	GRADING AND DRAINAGE PLAN STORMWATER MITIGATION AREA 2
26	C4.1	WETLAND REPLICATION AREA LAYOUT PLAN
27	C4.2	WETLAND CONSTRUCTION NOTES
28	C4.3	PLANTING PLAN, NOTES, SCHEDULE AND DETAILS
29	C5.2	100 YEAR FLOODPLAIN MITIGATION PLAN
30	C6.1	SEDIMENT AND EROSION CONTROL NOTES AND DETAILS
31	C7.1	DRAINAGE DETAILS (1 OF 5)
32	C7.2	DRAINAGE DETAILS (2 OF 5)
33	C7.3	DRAINAGE DETAILS (3 OF 5)
34	C7.4	DRAINAGE DETAILS (4 OF 5)
35	C7.5	DRAINAGE DETAILS (5 OF 5)
36	M1.1	MARKING PLAN RW 17 PAVED SAFETY AREA (LOCATION 1)
37	M1.2	MARKING PLAN RW 35 PAVED SAFETY AREA (LOCATION 2)
38	M1.3	MARKING PLAN TAXIWAY 'C' STUB (LOCATION 3)
39	M1.4	MARKING PLAN TAXIWAY 'C' REALIGNMENT (1 OF 2) (LOCATION 4)
40	M1.5	MARKING PLAN TAXIWAY 'C' REALIGNMENT (2 OF 2) (LOCATION 4)
41	M2.1	MARKING DETAILS

THESE PLANS AND SPECIFICATIONS ARE IN ACCORDANCE WITH CRITERIA IN CURRENT FAA ADVISORY CIRCULARS AS OF FEBRUARY 28, 2020

COMMONWEALTH OF MASSACHUSETTS
MARK C. GRONDIN
CIVIL
NO. 47199
REGISTERED PROFESSIONAL ENGINEER
8/13/2021

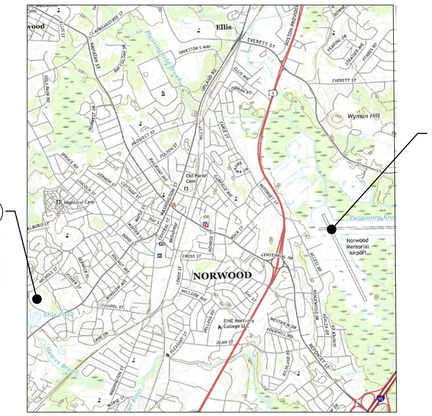
FEDERAL AVIATION ADMINISTRATION

MassDOT - AERONAUTICS DIVISION

NORWOOD AIRPORT COMMISSION
TOWN OF NORWOOD, MASSACHUSETTS

PREPARED BY:
DuBois & King inc.
15 CONSTITUTION DR. SUITE 1L
BEDFORD, NH 03110
TEL: (603) 637-1043
FAX: (866) 783-7101
www.dubois-king.com

DRAWN BY: DK	DATE: AUGUST 2021
CHECKED BY: MCG	PROJECT NO.: 326165
PROJECT ENG: RLT	DRAW NO.: G1.1



VICINITY MAP
NOT TO SCALE

NORWOOD MEMORIAL AIRPORT

6 CLEVELAND SCHOOL STORMWATER MITIGATION AREA 2

TBM 1

WIND CONE

TW 'G'

TW 'F'

4 TAXIWAY 'C' REALIGNMENT

RW 10–28

7 EXISTING TAXIWAY 'C'

1 RW 17 PAVED SAFETY AREA

3 TAXIWAY 'C' STUB RELOCATION

RW 17–35

PAPI

TW 'C'

TW 'A'

TW 'D'

TW 'E'

HELIPAD

TAXILANE 3

TAXILANE 2

TAXILANE 1

AIR TRAFFIC CONTROL TOWER

GATE 1

AIRPORT MANAGER'S OFFICE

ACCESS ROAD

5 STORMWATER MITIGATION AREA 1

8 COMPENSATORY STORAGE MITIGATION AREA

2 RW 35 PAVED SAFETY AREA

TBM 2

PROJECT WORK ELEMENTS

1. RW 17 PAVED SAFETY AREA
2. RW 35 PAVED SAFETY AREA
3. TW 'C' STUB RELOCATION
4. TW 'C' REALIGNMENT
5. STORMWATER MITIGATION AREA 1
6. STORMWATER MITIGATION AREA 2
7. WETLAND REPLICATION/ FLOOD COMPENSATORY STORAGE AREA 1
8. FLOOD COMPENSATORY STORAGE AREA 2

LEGEND

- EXISTING PAVEMENT EDGE
- AIRPORT PROPERTY LINE
- PROPOSED PAVEMENT LIMITS
- EXISTING PAVEMENT REMOVAL
- BENCHMARK AND DESIGNATION (1)

NOTE:
MASSACHUSETTS STATE PLANE COORDINATES

HORIZONTAL SCALE
0 150 300 600
1"=300'

DuBois & King inc.
ENGINEERING • PLANNING • MANAGEMENT • DEVELOPMENT
15 CONSTITUTION DR. SUITE 1L
BEDFORD, NH 03110
TEL: (603) 637-1043
FAX: (866) 783-7101
www.dubois-king.com

PROFESSIONAL SEAL

PERMITTING SET NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	BY	CK'D

NORWOOD MEMORIAL AIRPORT
111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

GENERAL PLAN

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

G1.2

SHEET 2 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\02_01.2_General Plan.dwg JUNE 2021

PROJECT NOTES:

GENERAL:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS, LICENSES, ETC. REQUIRED BY LOCAL, STATE, AND FEDERAL AGENCIES (NO SEPARATE PAY ITEM).
2. ANY LISTED MANUFACTURER'S EQUIPMENT SHALL MEAN THAT LISTED ITEM OR AN APPROVED EQUIVALENT.
3. TEST PIT LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE. TEST PITS WERE PERFORMED BY STONEY RIDGE ENVIRONMENTAL, 233 PROSPECT MOUNTAIN ROAD ALTON, NH 03809
4. FIELD SURVEY INFORMATION WAS PROVIDED BY:

   DUBOIS & KING, INC.

   MR. RANDALL OTIS

   15 CONSTITUTION DRIVE, SUITE 1L

   BEDFORD, NEW HAMPSHIRE 03110 PHONE: (603) 637-1043
5. THE APPROXIMATE LOCATION OF THE CONTRACTOR'S STAGING AREAS HAVE BEEN SHOWN ON THE PLANS.
6. CONTRACTOR EMPLOYEE(S) ARE PROHIBITED FROM RESIDING AT THE PROJECT SITE, ON AIRPORT PROPERTY, IN THE STAGING AREA, OR ANY OTHER TEMPORARY FACILITY.

SECURITY:

7. THE CONTRACTOR SHALL SUBMIT A SAFETY PLAN COMPLIANCE DOCUMENT (SPCD) IN ACCORDANCE WITH SECTION 80-04.1 "OPERATIONAL SAFETY ON AIRPORT DURING CONSTRUCTION" OF THE SPECIFICATIONS.
8. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL OF ITS EMPLOYEES AND SUBCONTRACTOR EMPLOYEES ONLY USE AUTHORIZED ACCESS POINT(S). EMPLOYEES SHALL VERIFY THAT THE ACCESS POINT(S) IS SECURE IMMEDIATELY AFTER USE. GATES THAT FAIL TO SECURE MUST BE IMMEDIATELY REPORTED TO THE ENGINEER OR OWNER.
9. THE CONTRACTOR SHALL ALWAYS MAINTAIN SEPARATION BETWEEN THE SECURE SIDE AND NON-SECURE SIDE OF THE AIRPORT. THE PERIMETER FENCE SHALL BE MAINTAINED ON A CONTINUOUS BASIS WITH ANY TEMPORARY OPENING BEING CONTINUOUSLY OBSERVED BY THE CONTRACTOR'S DESIGNATED EMPLOYEE. IF ORDERED BY THE ENGINEER OR OWNER, THE CONTRACTOR MAY BE REQUIRED TO PROVIDE GATE GUARDS. GATE GUARDS ARE INCIDENTAL TO THE COST OF THE PROJECT. ALL TEMPORARY OPENINGS AND CONSTRUCTION GATES SHALL BE SECURED AND LOCKED AT THE COMPLETION OF WORK EACH DAY.
10. ALL CONTRACTOR VEHICLES OPERATING INSIDE THE SECURITY FENCE SHALL BE CLEARLY LABELED WITH THE CONTRACTOR'S COMPANY NAME VISIBLE FROM 200 FEET.
11. THE CONTRACTOR SHALL MARK AND LIGHT AREAS UNDER CONSTRUCTION IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. AIRCRAFT AND PUBLIC SAFETY SHALL NOT BE COMPROMISED AND PROPER SEPARATION SHALL BE MAINTAINED AT ALL TIMES. REFERENCE IS DIRECTED TO SECTION 80-04.1 "OPERATIONAL SAFETY ON AIRPORT DURING CONSTRUCTION" OF THE SPECIFICATIONS. EQUIPMENT AND VEHICLES SHALL BE MARKED WITH 3' X 3' ORANGE AND WHITE CHECKER FLAGS (DAY ONLY) OR YELLOW FLASHING DOME TYPE LIGHT (DAY OR NIGHT).
12. THE CONTRACTOR SHALL BE REQUIRED TO RELOCATE THE CLOSED MARKERS AND AVIATION BARRICADES DURING THE PROJECT. MULTIPLE RELOCATION OF THE CLOSED MARKERS SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT. THE LOCATION OF THE CLOSED MARKERS AND BARRICADES, AS SHOWN ON THE PLANS, REPRESENTS THE MOST TYPICAL LOCATION.
13. PRIOR TO ENTERING ANY AIR OPERATIONS AREA (AOA) OR SAFETY AREA (AS SHOWN ON THE PLANS AND IDENTIFIED IN THE SPECIFICATIONS), THE CONTRACTOR SHALL COORDINATE WITH THE OWNER, ENGINEER, OR OFFICIAL DESIGNATED REPRESENTATIVE. TWO-WAY AVIATION BAND RADIO COMMUNICATIONS SHALL BE REQUIRED AT ALL TIMES. NO EQUIPMENT OR PERSONNEL SHALL ENTER AN OPEN RUNWAY OR TAXIWAY SAFETY AREA UNLESS PROPERLY COORDINATED. THE CONTRACTOR SHALL HAVE A TWO-WAY AVIATION BAND RADIO AT THE JOBSITE AT ALL TIMES WORK IS IN PROGRESS. THE CONTRACTOR SHALL MONITOR THE COMMON TRAFFIC ADVISORY FREQUENCY (126.0 MHZ) AT ALL TIMES.
14. RUNWAY AND/OR TAXIWAY LIGHTS SHALL BE DE-ENERGIZED OR PROPERLY COVERED ON CLOSED RUNWAY(S) AND ALL CLOSED SECTIONS OF TAXIWAYS IN A MANNER APPROVED BY THE ENGINEER (NO SEPARATE PAY ITEM). REMOVING THE LAMP FROM ITS FIXTURE IS NOT ALLOWED.
15. UPON NOTIFICATION FROM THE OWNER, ENGINEER, OR OFFICIAL DESIGNATED REPRESENTATIVE, THE CONTRACTOR SHALL IMMEDIATELY CLEAR THE RUNWAY AND/OR TAXIWAY SAFETY AREAS OF EQUIPMENT AND PERSONNEL IN THE EVENT OF A DECLARED AIRCRAFT EMERGENCY.

HAUL ROUTE:

16. THE CONTRACTOR SHALL INSTALL TEMPORARY CONSTRUCTION ENTRANCES AT ALL LOCATIONS WHERE HAUL ROUTES CROSS PAVEMENT. SEE THE SEDIMENT AND EROSION CONTROL NOTES SHEET FOR DETAILS AND "OVERALL GENERAL PLAN" SHEET FOR ANTICIPATED LOCATIONS. THE CONTRACTOR SHALL MAINTAIN THESE TEMPORARY CONSTRUCTION ENTRANCES SUCH THAT MUD AND DEBRIS ARE NOT TRACKED ONTO OPEN AREAS OF THE AIRCRAFT APRON OR VEHICLE ROADWAYS.
17. THE CONTRACTOR SHALL LINE THE HAUL ROUTE, ON THE DOWN SLOPE SIDE WITH SILT FENCE. THE CONTRACTOR SHALL MAINTAIN THE FENCE DURING CONSTRUCTION AND MAKE IMMEDIATE REPAIRS TO ALL DAMAGED FENCE.
18. ALL CONTRACTOR AND SUBCONTRACTOR PERSONNEL AND EQUIPMENT SHALL USE ONLY THE DESIGNATED HAUL ROUTES FOR INGRESS AND EGRESS TO THE CONSTRUCTION AREA AND FOR HAULING MATERIALS TO THE APPROVED WASTE AREA (AS APPLICABLE).
19. NO CONTRACTOR TRAFFIC SHALL USE ANY PORTION OF RUNWAY(S), TAXIWAY(S) OR APRON(S) THAT ARE NOT ON THE HAUL ROUTE OR WITHIN THE ACTIVE PROJECT AREA.
20. ANY CONSTRUCTION OR MAINTENANCE NECESSARY, INCLUDING ASSOCIATED LABOR AND MATERIALS, TO PRESERVE THE HAUL ROUTE FOR THE CONTRACTOR'S USE SHALL BE CONSIDERED INCIDENTAL PROJECT COSTS AND SHALL NOT BE A SEPARATE PAY ITEM.
21. UPON COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL REPAIR ANY PAVEMENTS DAMAGED BY THE CONTRACTOR'S OPERATIONS. NO SEPARATE PAYMENT WILL BE MADE FOR PAVEMENT REPAIR NECESSARY DUE TO CONTRACTOR'S HAULING OPERATIONS.
22. THE CONTRACTOR SHALL MAINTAIN ON SITE A VACUUM TRUCK TO REMOVE FOREIGN OBJECT DEBRIS (F.O.D.) FROM ACTIVE AIRFIELD PAVEMENT AREAS IMPACTED BY CONSTRUCTION OPERATIONS

CONSTRUCTION:

23. THE CONTRACTOR SHALL LOCATE AND PROTECT EXISTING UTILITIES AND FACILITIES (I.E., AIRPORT LIGHTING, NAVAIDS, ETC.) FROM DAMAGE BY EQUIPMENT OR PERSONNEL. THE CONTRACTOR SHALL CONTACT ALL UTILITY AND FACILITY AGENCIES FOR FIELD MARKING PRIOR TO BEGINNING CONSTRUCTION. 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. ALL UTILITIES AND FACILITIES ARE NOT NECESSARILY SHOWN. THE CONTRACTOR SHALL ADVISE THE ENGINEER, IN WRITING, OF ANY EXISTING DAMAGED UTILITIES PRIOR TO BEGINNING CONSTRUCTION.
24. ANY UTILITIES OR FACILITIES DAMAGED DURING THE PROJECT BY THE CONTRACTOR'S MEN OR EQUIPMENT SHALL BE PROMPTLY REPAIRED AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR SHALL HAND DIG WHEN WITHIN THREE (3) FEET OF ANY KNOWN OR SUSPECTED UNDERGROUND UTILITY.
25. THE CONTRACTOR SHALL FIELD STAKE ALL FIXTURES PRIOR TO INSTALLATION. ANY DISCREPANCIES IN THE ALIGNMENT LOCATION SHALL BE RESOLVED WITH THE ENGINEER PRIOR TO INSTALLATION.
26. ALL DISTURBED AREAS, INCLUDING THE CONTRACTORS STAGING AREA, HAUL ROUTES, GRADING LIMITS, ETC. SHALL BE RESTORED TO A SMOOTH LINE AND GRADE WITH POSITIVE DRAINAGE. THE CONTRACTOR SHALL SEED AND MULCH ALL DISTURBED AREAS. THERE WILL BE NO MEASUREMENT FOR PAYMENT OF SEEDING AND MULCHING REQUIRED OUTSIDE THE GRADING LIMITS, APPROVED STOCKPILE LIMITS, OR APPROVED HAUL LIMITS.
27. ALL BROKEN CONCRETE, ASPHALT, ETC. SHALL BE DISPOSED OF OFFSITE BY THE CONTRACTOR IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL GUIDELINES.
28. THE CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE FOR THE COMPLETE DURATION OF THE PROJECT. THE DRAINAGE SHALL BE OF EQUAL OR GREATER CAPACITY OF THE EXISTING DRAINAGE CONVEYANCES. THIS MAY REQUIRE TEMPORARY DITCHES, STRUCTURES OR PIPES, WHICH SHALL BE INCIDENTAL TO THE PROJECT.
29. THE CONTRACTOR IS ADVISED THAT AIRCRAFT OPERATIONS ARE CONDUCTED ADJACENT TO THE PROJECT. SPECIAL ATTENTION TO DUST CONTROL WILL BE REQUIRED DURING THE DURATION OF THE PROJECT. THE USE OF WATER OR A DUST REDUCING AGENT SHALL BE ANTICIPATED. THE RPR RESERVES THE RIGHT TO HALT WORK OR HAULING IN NON-CONFORMING AREAS, IF DUST CONTROL ACTIONS ARE NOT PROMPTLY TAKEN BY THE CONTRACTOR.
30. NO DEBRIS OF ANY NATURE SHALL BE ALLOWED IN ACTIVE AIRCRAFT OPERATIONS AREAS. ALL LOOSE MATERIALS (DIRT, STONE, PAVEMENT, FORMING, ETC.) MUST BE KEPT WITHIN THE LIMITS OF CONSTRUCTION. WHEN THE CONSTRUCTION BARRIERS ARE MOVED DURING CONSTRUCTION, THE CLEANUP OF THE AREAS OUTSIDE THE BARRIERS SHALL OCCUR IMMEDIATELY. IN ADDITION, NO LOOSE MATERIALS THAT COULD BLOW INTO AIRCRAFT OPERATIONS AREAS SHALL BE ALLOWED IN THE CONSTRUCTION AREA.
31. TOPSOIL SHALL BE STOCKPILED ONLY IN THE AREA SHOWN ON THE PLANS UNLESS OTHERWISE REQUESTED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER. THE STOCKPILE SHALL BE GRADED TO PROVIDE ADEQUATE DRAINAGE AND PROTECTED BY SILT FENCE OR OTHER SEDIMENT TRAPPING DEVICE AS ORDERED BY THE ENGINEER. THE STOCKPILE SHALL BE REMOVED AND THE AREA RESTORED TO A SMOOTH LINE AND GRADED, SEEDED, AND MULCHED. SILT FENCE, SEEDING, AND MULCHING ARE PAY ITEMS.

DRAINAGE:

32. ALL MANHOLE AND DROP INLET LOCATIONS AND TOP ELEVATIONS ARE GIVEN TO THE CENTER OF THE STRUCTURE UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL FIELD VERIFY THE INVERTS OF ALL CONNECTIONS TO EXISTING PIPES PRIOR TO FABRICATION OF PROPOSED STRUCTURES.
33. ALL MANHOLES, DROP INLETS, AND STRUCTURES WITHIN THE RUNWAY / TAXIWAY / SAFETY AREAS SHALL BE DESIGNED FOR 60K POINT LOAD. OUTSIDE SAFETY AREAS MAY BE HS-20 LOADING.
34. LENGTHS OF DRAINAGE PIPES ON THE PLANS ARE GIVEN FROM CENTER OF MANHOLE TO CENTER OF MANHOLE OR FROM OUTSIDE EDGE OF ENDWALL TO OUTSIDE EDGE OF ENDWALL. PIPE WILL BE MEASURED FOR PAYMENT FROM THE INTERIOR FACE OF THE DOWNSTREAM STRUCTURE TO THE INTERIOR FACE OF THE UPSTREAM STRUCTURE.
35. THE CONTRACTOR SHALL FIELD VERIFY EXISTING LOCATION, SIZE, INVERT AND TOP ELEVATION FOR EACH EXISTING PIPE AND/OR STRUCTURE WHICH IS BEING TIED-INTO WITH PROPOSED PIPE(S) AND/OR STRUCTURE. VERIFICATIONS SHALL BE COMPLETED AND SUBMITTED IN WRITING TO THE ENGINEER PRIOR TO STRUCTURE FABRICATION AND/OR DRAINAGE PIPE INSTALLATION (NO SEPARATE PAY ITEM).
36. WELLPOINTING AND/OR OTHER DEWATERING METHODS REQUIRED FOR THE INSTALLATION OF MANHOLES, DROP INLETS, ETC. SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.
37. THE CONTRACTOR SHALL CLEAN THE STORM SEWER SYSTEM OF ALL SEDIMENT UPON STABILIZATION OF THE UPSTREAM AREAS. NO SEPARATE PAY ITEM.

DEMOLITION NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY DRAINAGE DURING DEMOLITION AND CONSTRUCTION OPERATIONS FOR THE DURATION OF THE PROJECT. TEMPORARY DRAINAGE PROVISIONS SHALL HAVE SAME OR HIGHER CAPACITY THAN THAT OF THE EXISTING DRAINAGE SYSTEM. ALL WORK SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.
2. ANY INTERRUPTION TO SERVICE TO ACTIVE LIGHTING CIRCUITS SHALL BE IMMEDIATELY REPAIRED BY THE CONTRACTOR. ANY DAMAGE TO EXISTING AIRPORT CIRCUITS CAUSED BY THE CONTRACTOR'S EQUIPMENT OR PERSONNEL SHALL BE PROMPTLY REPAIRED AT THE CONTRACTOR'S EXPENSE. ALL ACTIVE LIGHTING SYSTEMS FOR OPEN AIRCRAFT OPERATIONAL AREAS SHALL BE OPERABLE FROM DUSK TO DAWN. THE USE OF TEMPORARY CABLES SHALL BE ANTICIPATED IN ORDER TO ACCOMMODATE CONSTRUCTION PHASING (NO PAY ITEM).
3. RESIDUAL MATERIALS FROM THE DEMOLITION SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM AIRPORT PROPERTY UNLESS OTHERWISE NOTED. ALL DISPOSALS SHALL BE COMPLETED BY THE CONTRACTOR IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS.
4. THE CONTRACTOR SHALL PROTECT AND RETAIN ALL ELECTRICAL DEMOLITION ITEMS WHICH THE OWNER CHOOSES TO MAINTAIN POSSESSION OF. THESE ITEMS INCLUDE, BUT ARE NOT LIMITED TO, REGULATORS, TRANSFORMERS, SIGNS, AND SIGN PANELS. THE CONTRACTOR SHALL DELIVER THE APPLICABLE ITEMS TO A DESIGNATED STORAGE LOCATION ON THE AIRPORT AS ORDERED BY THE OWNER.
5. ALL PAVEMENTS TO BE REMOVED SHALL BE NEATLY SAWCUT.
6. THE CONTRACTOR SHALL LAYOUT AND VERIFY WITH THE ENGINEER THE LIMITS OF PAVEMENT REMOVAL IN THE FIELD PRIOR TO BEGINNING WORK.
7. ALL DEMOLISHED, SURPLUS, OR WASTE MATERIALS SHALL BE DISPOSED OF OFF AIRPORT PROPERTY BY THE CONTRACTOR IN ACCORDANCE WITH FEDERAL, STATE, OR LOCAL REQUIREMENTS.
8. THE LOCATION OF EXISTING DUCTS SHOWN ON PLANS IS APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR.

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PROFESSIONAL SEAL

PERMITTING SET NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	BY	CK'D

NORWOOD MEMORIAL AIRPORT
111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

GENERAL NOTES

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

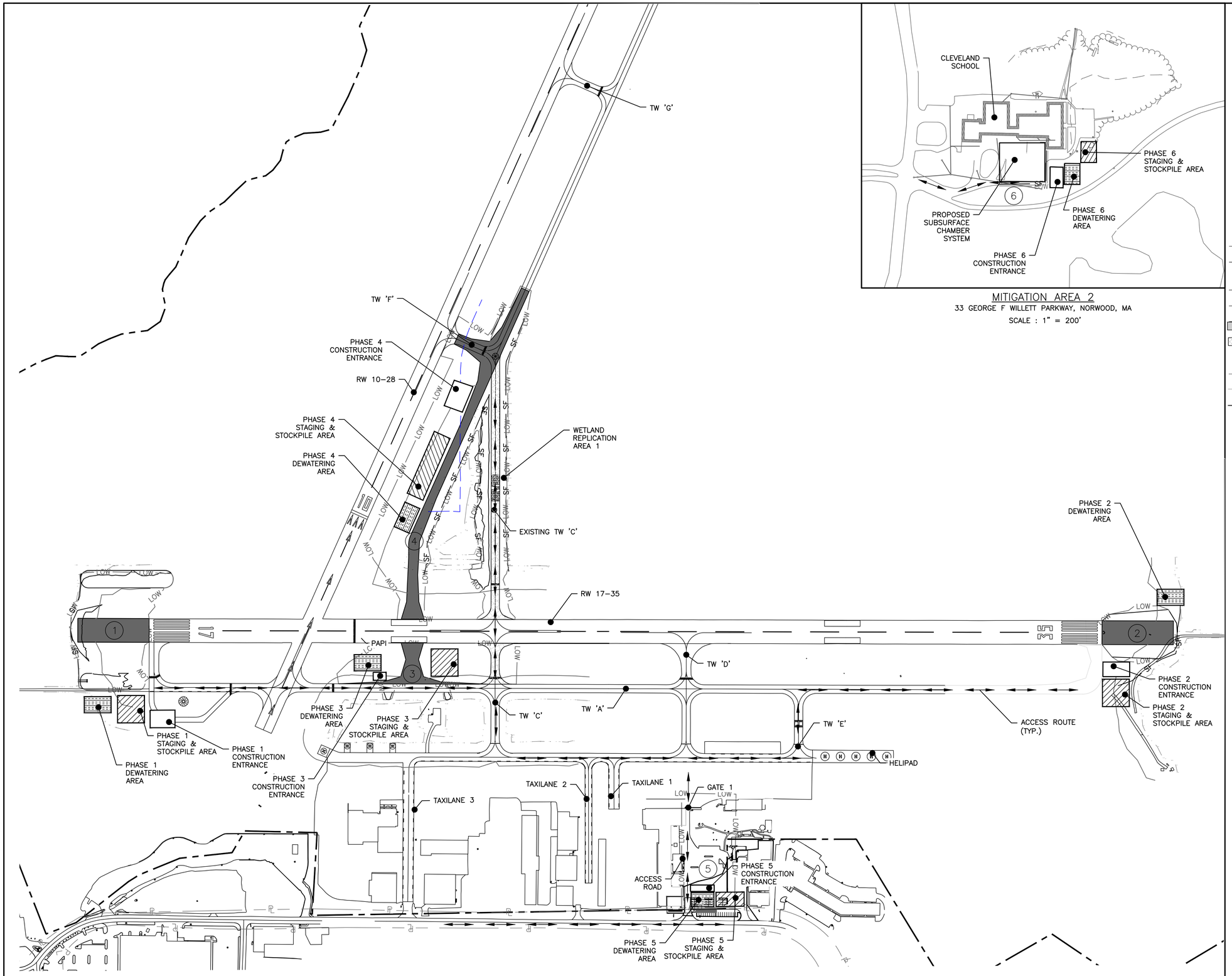
G1.4

SHEET 3 OF 41

MITIGATION AREA 2

33 GEORGE F WILLETT PARKWAY, NORWOOD, MA

SCALE : 1" = 200'



NOTE:
MASSACHUSETTS STATE PLANE COORDINATES

LEGEND

- EXISTING PAVEMENT EDGE
- AIRPORT PROPERTY LINE
- ROFA — EXISTING RUNWAY OBJECT FREE AREA
- RSA — EXISTING RUNWAY SAFETY AREA
- TSA — EXISTING TAXIWAY SAFETY AREA
- PROPOSED PAVEMENT LIMITS
- EXISTING PAVEMENT REMOVAL
- HAUL ROUTE
- LOW — LIMIT OF WORK
- EXISTING WETLANDS
- SF — SILT FENCE

PROJECT WORK AREAS

1. RW 17 PAVED SAFETY AREA
2. RW 35 PAVED SAFETY AREA
3. TW 'C' STUB RELOCATION
4. TW 'C' RELOCATION
5. MITIGATION AREA 1
6. MITIGATION AREA 2

HORIZONTAL SCALE
0 100 200 400
1"=200'

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ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

STAGING PLAN

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
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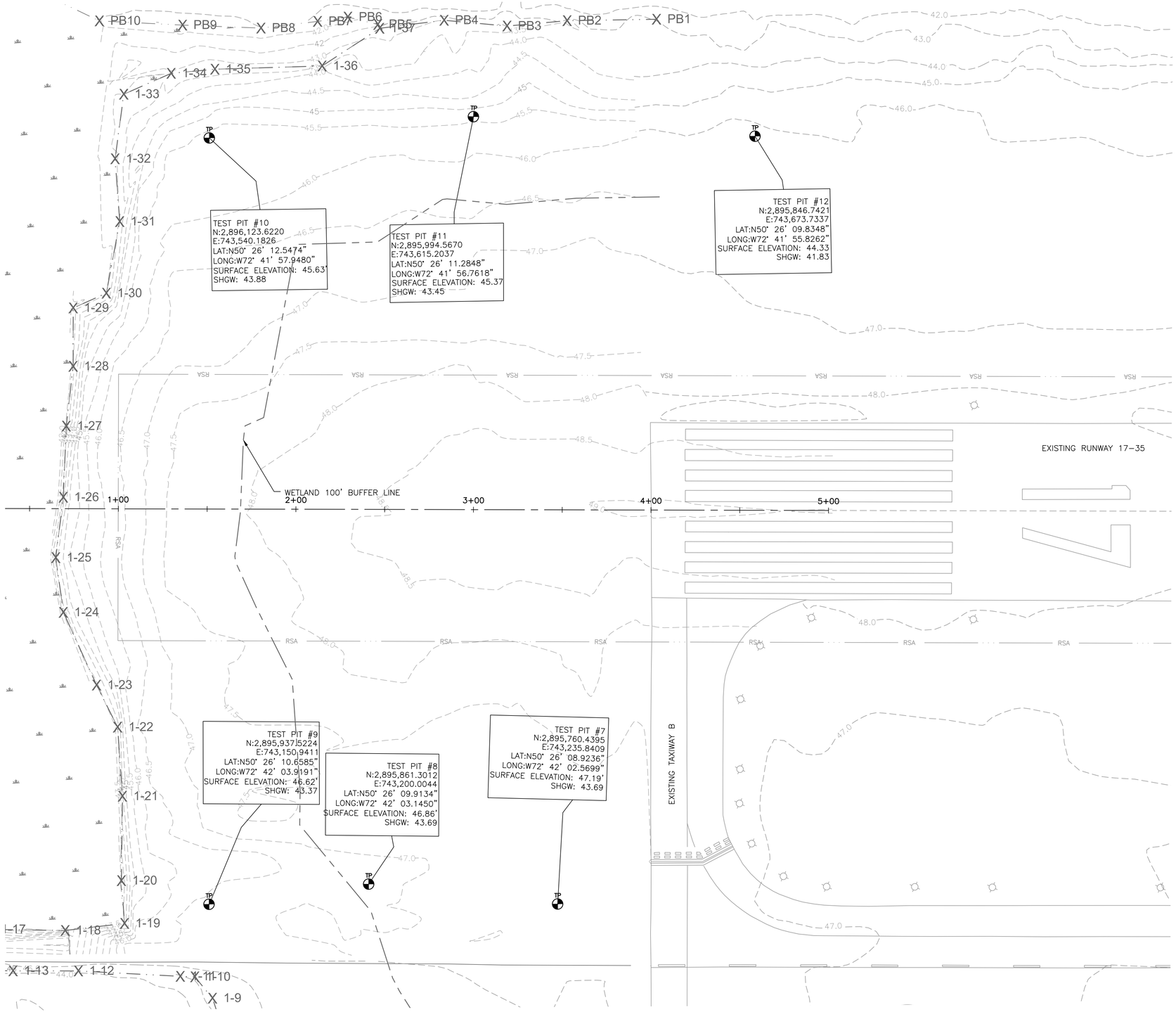
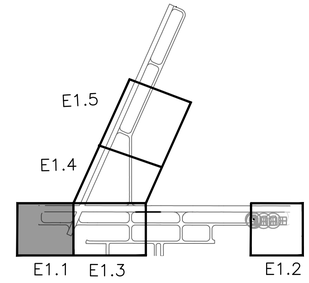
RLT	

SHEET NUMBER

G1.5

SHEET 4 OF 41





LEGEND

120	EXISTING CONTOUR LINE
	EXISTING PAVEMENT EDGE
D	EXISTING DRAIN PIPE
	EXISTING CATCH BASIN
D	EXISTING DRAINAGE MANHOLE
RSA	RUNWAY SAFETY AREA
	EXISTING WETLAND
	EXISTING TW/RW LIGHTING
X #-##	WETLAND FLAG
	WETLAND BOUNDARY
	100' WETLAND BUFFER LINE

HORIZONTAL SCALE
0 15 30 60
1"=30'

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NORWOOD MEMORIAL AIRPORT
111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

EXISTING CONDTIONS PLAN RW 17 PSA

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

E1.1

SHEET 5 OF 41

I:\326165 Norwood Airport EA - 2020\Drawings\E1.1-E1.2 RW 17 & 35 PSA Existing Conditions plan.dwg JUNE 2021

TEST PIT #6
N:2,892,437.2587
E:745,280.9584
LAT:N50° 25' 36.4262"
LONG:W72° 41' 30.2798"
SURFACE ELEVATION: 44.91'
SHGW: 42.58

TEST PIT #5
N:2,892,236.6736
E:745,344.4292
LAT:N50° 25' 34.4565"
LONG:W72° 41' 29.2571"
SURFACE ELEVATION: 46.29'
SHGW: 43.96

TEST PIT #4
N:2,892,053.0193
E:745,459.3445
LAT:N50° 25' 32.6607"
LONG:W72° 41' 27.4437"
SURFACE ELEVATION: 45.65
SHGW:

WETLAND 100' BUFFER LINE

EXISTING RUNWAY 17-35

TEST PIT #2
N:2,892,055.8595
E:745,068.6269
LAT:N50° 25' 32.6356"
LONG:W72° 41' 33.4768"
SURFACE ELEVATION: 46.23'
SHGW: 43.40

TEST PIT #1
N:2,892,072.2233
E:745,038.9418
LAT:N50° 25' 32.7929"
LONG:W72° 41' 33.9386"
SURFACE ELEVATION : 45.48'
SHGW: 41.98

EXISTING DMH V/N
STA:42+00, 55.69 LT.
RIM:44.54'
SE INV IN: 41.11 (12")
SW INV IN:41.11 (12")
NW INV OUT:41.09 (12")

EXISTING DSCB #7
STA:43+50, 52.78 LT.
RIM:44.21'
NW INV OUT:41.55 (12")

12" HDPE
145' @ 0.3%

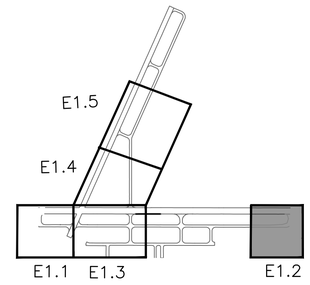
EXISTING DSCB #6
STA:42+00, 43.69 LT.
RIM:44.00'
NW INV OUT:41.18 (12")

EXISTING TAXIWAY A

TEST PIT #3
N:2,892,033.8256
E:745,061.6943
LAT:N50° 25' 32.4173"
LONG:W72° 41' 33.5792"
SURFACE ELEVATION: 46.02'
SHGW: 42.77

0+00 1+00 2+00 3+00 4+00 5+00

A34 A33 A32 A31 A30 A29 A28 A27 A26 A20 A19 A18 A17 A16 A15 A14 A13 A12 A11



LEGEND

- EXISTING CONTOUR LINE
- EXISTING PAVEMENT EDGE
- EXISTING DRAIN PIPE
- EXISTING CATCH BASIN
- EXISTING DRAINAGE MANHOLE
- RUNWAY SAFETY AREA
- EXISTING WETLAND
- EXISTING TW/RW LIGHTING
- WETLAND FLAG
- WETLAND BOUNDARY
- 100' WETLAND BUFFER LINE

HORIZONTAL SCALE
0 15 30 60
1"=30'

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NORWOOD MEMORIAL AIRPORT
111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

EXISTING CONDITIONS PLAN RW 35 PSA

DRAWN BY	DATE
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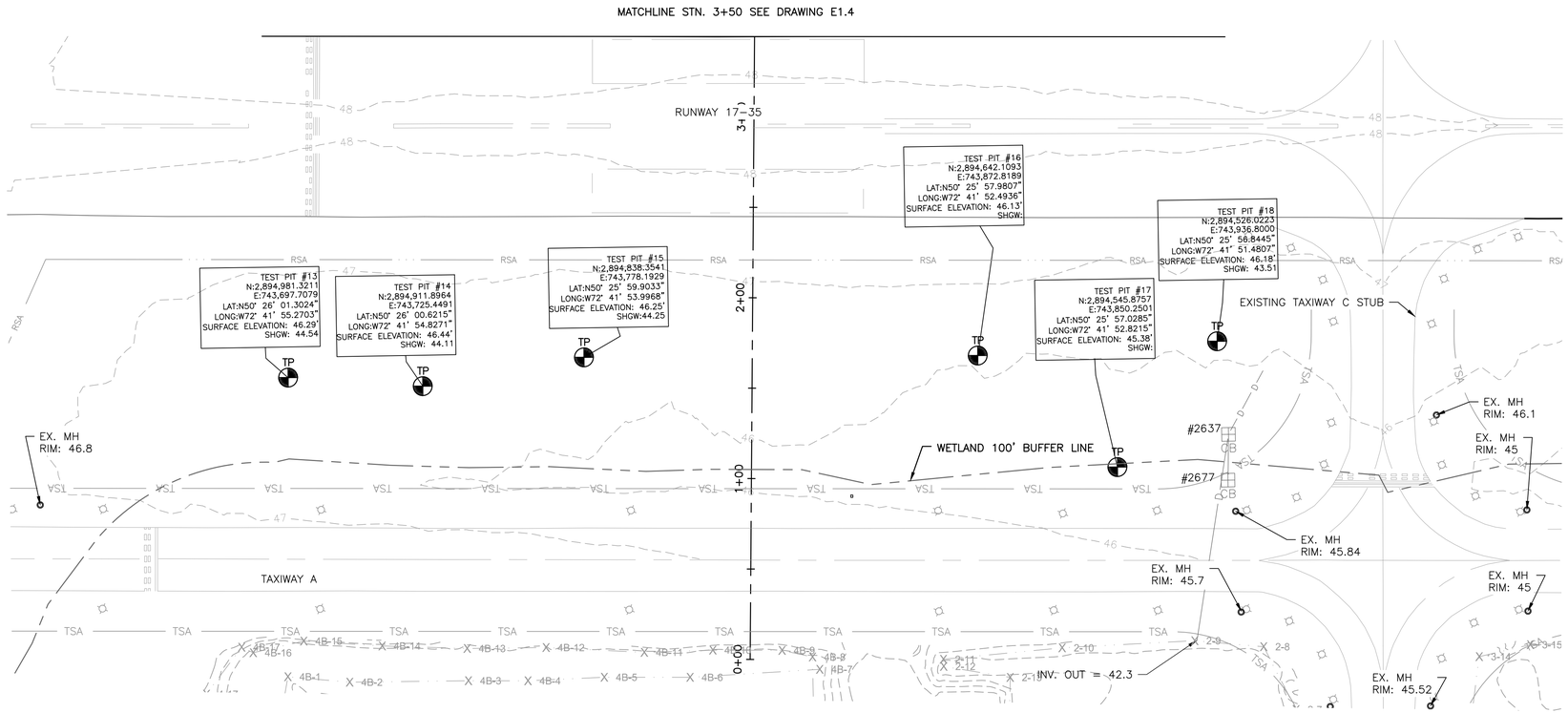
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

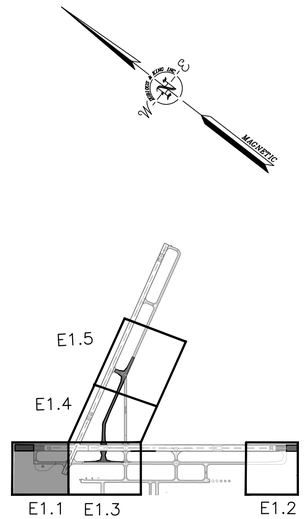
SHEET NUMBER

E1.2

SHEET 6 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\E1.1–E1.2 RW 17 & 35 PSA Existing Conditions plan.dwg JUNE 2021





LEGEND

- EXISTING CONTOUR LINE
- EXISTING PAVEMENT EDGE
- EXISTING DRAIN PIPE
- EXISTING CATCH BASIN
- EXISTING DRAINAGE MANHOLE
- RUNWAY SAFETY AREA
- TAXIWAY SAFETY AREA
- EXISTING WETLAND
- EXISTING TW/RW LIGHTING
- WETLAND FLAG
- WETLAND BOUNDARY
- 100' WETLAND BUFFER LINE

HORIZONTAL SCALE
0 20 40 80
1"=40'

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NORWOOD MEMORIAL AIRPORT
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NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

EXISTING CONDITIONS PLAN TW C STUB

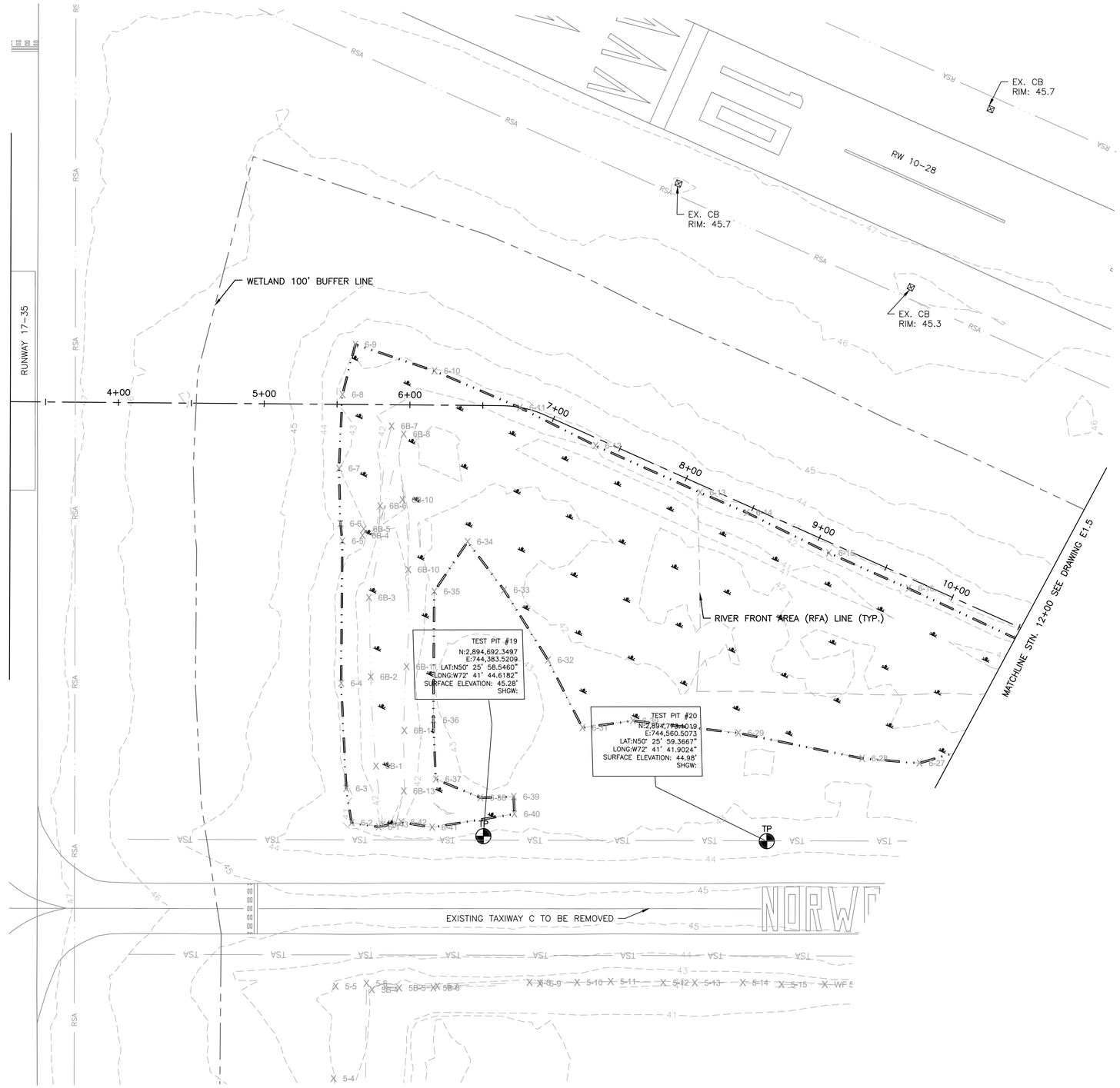
DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

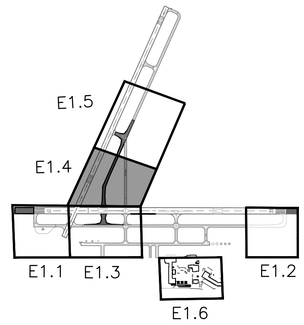
SHEET NUMBER

E1.3

SHEET 7 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\E1.3–E1.5 TW C & TW F Existing Conditions Plan.dwg JUNE 2021





LEGEND

- 120 — EXISTING CONTOUR LINE
- EXISTING PAVEMENT EDGE
- D — EXISTING DRAIN PIPE
- EXISTING CATCH BASIN
- (D) EXISTING DRAINAGE MANHOLE
- RSA — RUNWAY SAFETY AREA
- TSA — TAXIWAY SAFETY AREA
- EXISTING WETLAND
- EXISTING TW/RW LIGHTING
- X #-## WETLAND FLAG
- WETLAND BOUNDARY
- 100' WETLAND BUFFER LINE
- RFA

HORIZONTAL SCALE
0 20 40 80
1"=40'

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NORWOOD MEMORIAL AIRPORT
111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

EXISTING CONDITIONS PLAN TW C REALIGNMENT (1 OF 2)

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
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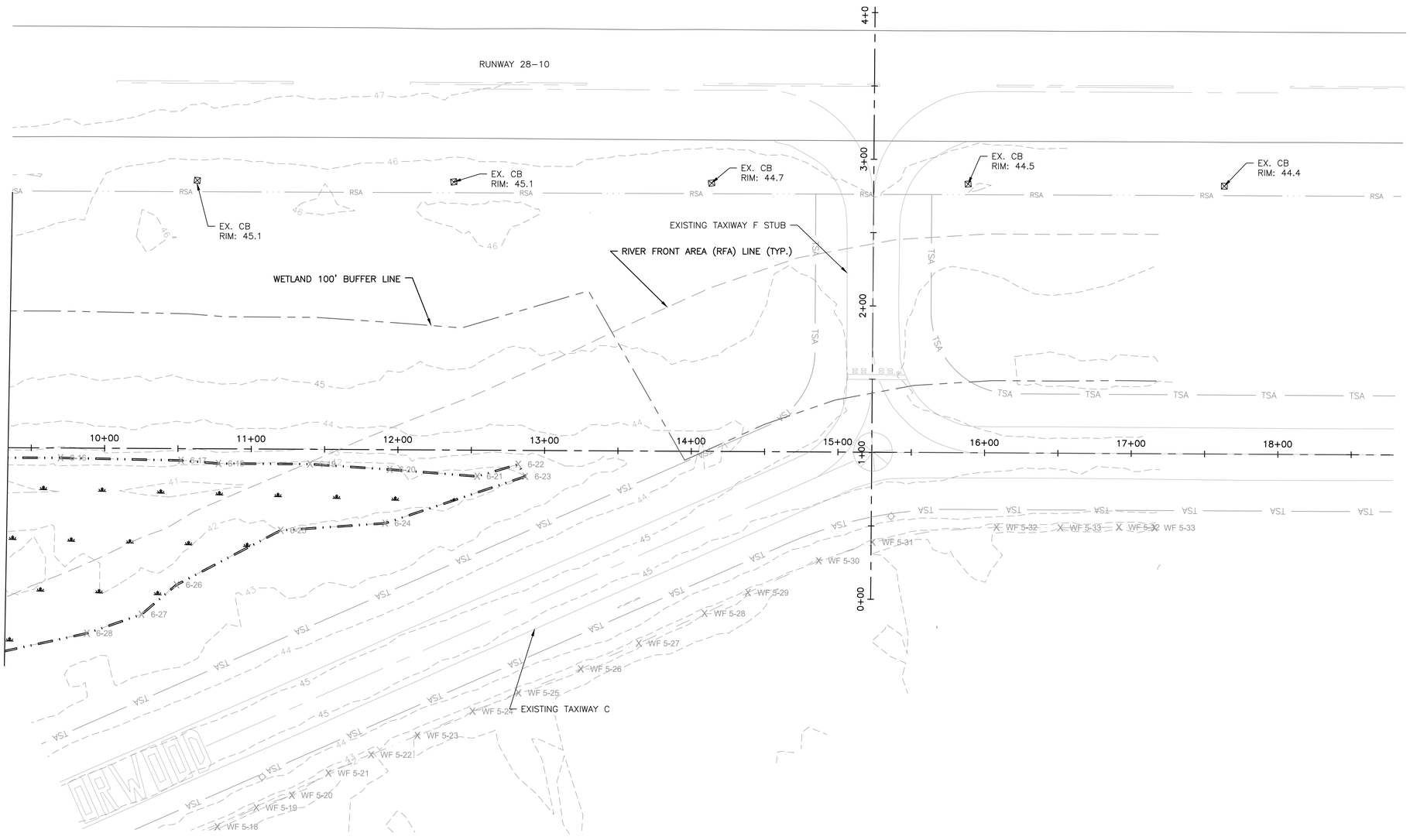
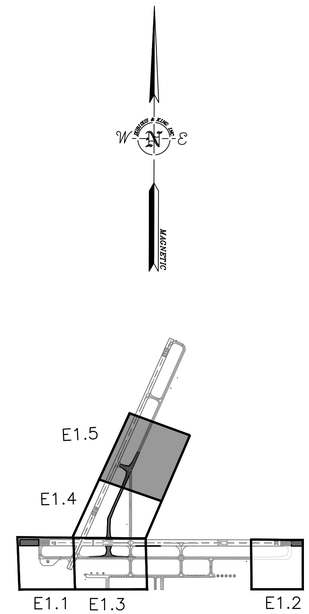
SHEET NUMBER

E1.4

SHEET 8 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\E1.3-E1.5 TW C & TW F Existing Conditions Plan.dwg JUNE 2021





LEGEND

- EXISTING CONTOUR LINE
- EXISTING PAVEMENT EDGE
- EXISTING DRAIN PIPE
- EXISTING CATCH BASIN
- EXISTING DRAINAGE MANHOLE
- RUNWAY SAFETY AREA
- TAXIWAY SAFETY AREA
- EXISTING WETLAND
- EXISTING TW/RW LIGHTING
- X #-## WETLAND FLAG
- WETLAND BOUNDARY
- 100' WETLAND BUFFER LINE
- RFA

HORIZONTAL SCALE
0 20 40 80
1"=40'

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PERMITTING SET NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	BY	CK'D

NORWOOD MEMORIAL AIRPORT
111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

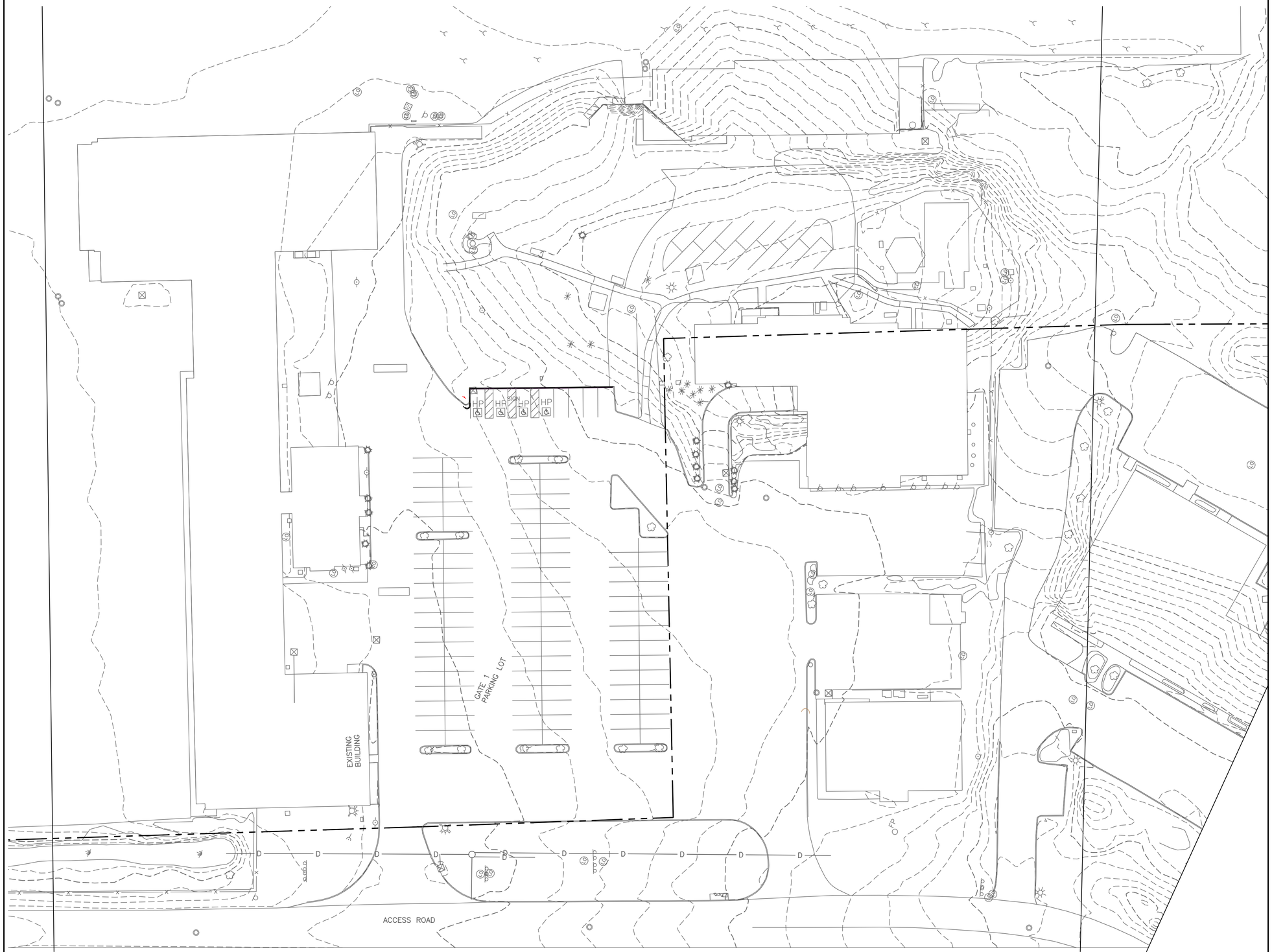
SHEET TITLE

EXISTING CONDITIONS PLAN TW C REALIGNMENT (2 OF 2)

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

E1.5



LEGEND

- 120 — EXISTING CONTOUR LINE
- EXISTING PAVEMENT EDGE
- D — EXISTING DRAIN PIPE
- EXISTING CATCH BASIN
- Ⓓ EXISTING DRAINAGE MANHOLE

HORIZONTAL SCALE

0 15 30 60

1" = 30 FT

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ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

EXISTING CONDITIONS PLAN STORMWATER MITIGATION AREA 1

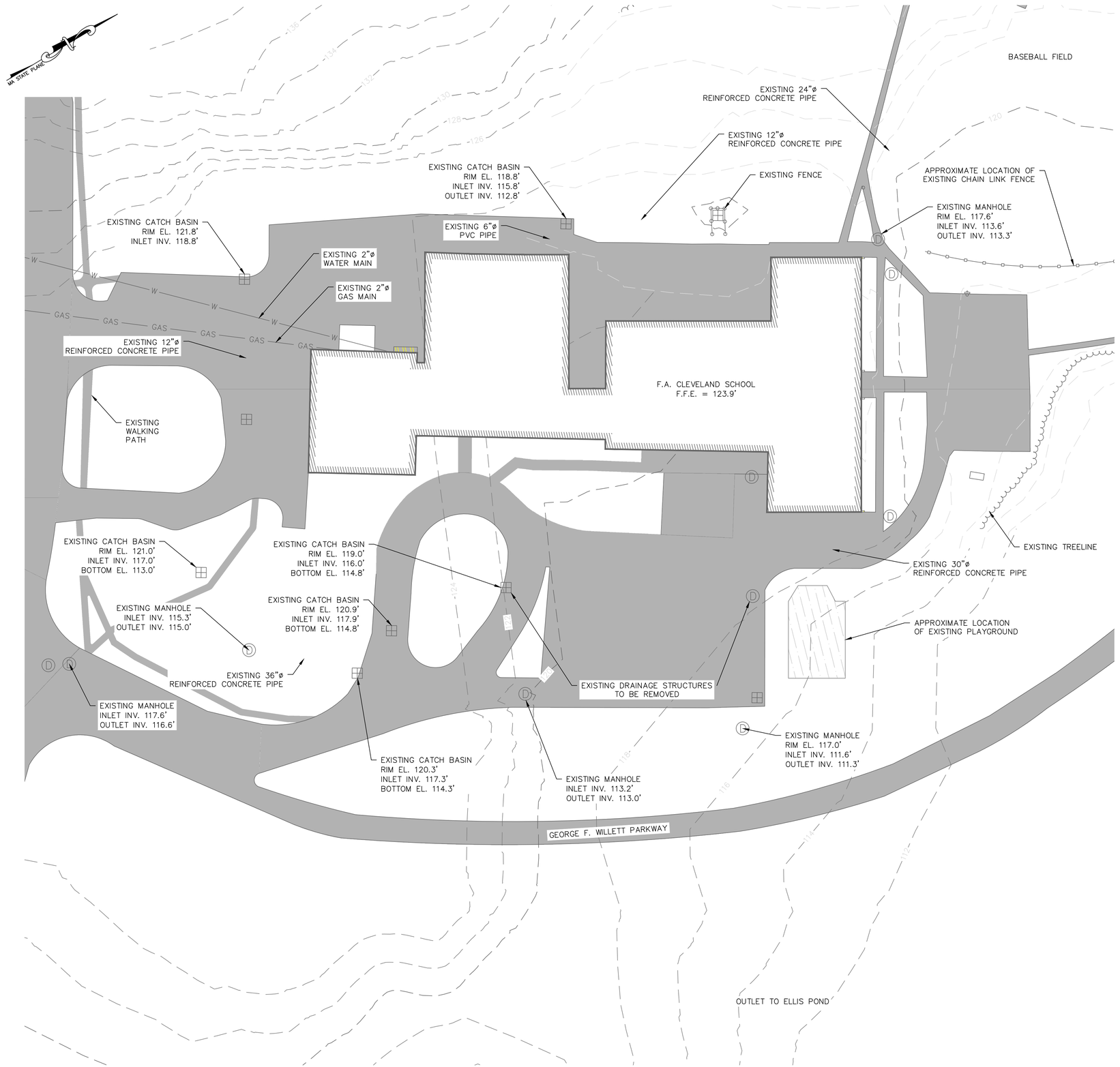
DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

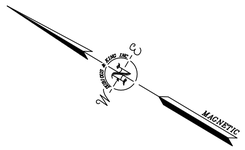
SHEET NUMBER

E1.6

SHEET 10 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\EXISTING CONDITIONS PLAN STORMWATER MITIGATION AREA 1.dwg JUNE 2021





LEGEND:

- 2-FT LIDAR CONTOUR
- 10-FT LIDAR CONTOUR
- 2-FT SURVEY CONTOUR
- 10-FT SURVEY CONTOUR
- APPROX. EDGE OF PAVEMENT
- APPROX. LOCATION OF EXISTING PATH
- APPROX. BUILDING FOOTPRINT
- EXISTING PLAYGROUND
- EXISTING IMPERVIOUS SURFACE
- EXISTING TREELINE
- EXISTING FENCE
- SD — EXISTING STORM DRAIN
- GAS — EXISTING GAS MAIN
- W — EXISTING WATER MAIN
- EXISTING DRAINAGE MANHOLE
- EXISTING CATCH BASIN

NOTES:

1. EXISTING LIDAR INFORMATION WAS DOWNLOADED FROM THE MASSACHUSETT'S GEOGRAPHIC INFORMATIONAL SYSTEMS MAPPING TOOL PROGRAM (OLIVER) IN JUNE OF 2021. SORUCE DATE 2011 (DERIVED FROM THE 2011 NORTHEAST SURVEY). LIDAR CONTOUR ELEVATIONS SHOULD BE CONSIDERED APPROXIMATE ONLY.
2. SURVEY INFORMATION WAS DELINEATED IN JUNE OF 2021 BASED ON A PLAN PREPARED BY THE NORFOLK COUNTY ENGINEERING DEPARTMENT TITLED, "EXISTING CONDITIONS PLAN OF CLEVELAND SCHOOL PLAY AREA". ORIGINAL DRAWING SOURCE DATE IS AUGUST 20, 2001.
3. THE SURVEY IS BASED ON THE VERTICAL DATUM OF NAVD88 IN U.S. SURVEY FEET.
4. LOCATIONS OF STORM DRAINS, DRAINAGE MANHOLES, AND CATCH BASINS WERE DELINEATED FROM THE SURVYED PLAN STATED IN NOTE 2. THE LOCATIONS OF DRAINAGE UTILITIES SHOULD BE CONSIDERED APPROXIMATE ONLY.

40 0 20 40 80
SCALE IN FEET

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ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

EXISTING CONDITIONS PLAN STORMWATER MITIGATION AREA 2

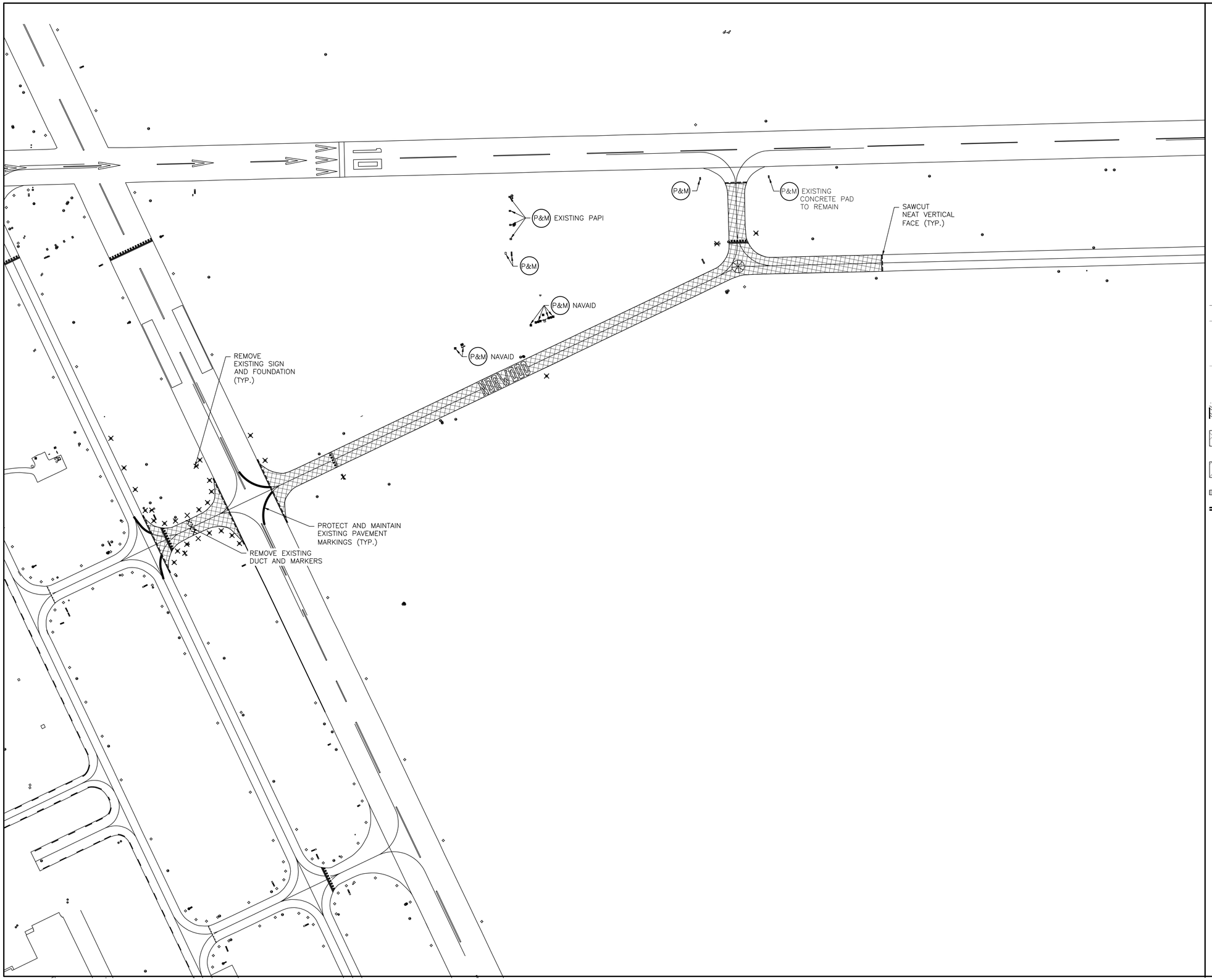
DRAWN BY	DATE
DSC	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

E1.7

SHEET 11 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\EXISTING CONDITIONS PLAN STORMWATER MITIGATION AREA 2.dwg JUNE 2021



LEGEND

- EXISTING PAVEMENT EDGE
- EXISTING DRAIN PIPE
- EXISTING CATCH BASIN
- EXISTING DRAINAGE MANHOLE
- FLAGGED WETLANDS
- INLET PROTECTION DEVICE
- CLEARING AND GRUBBING PROPOSED WETLAND REPLICATION AREA
- REMOVE EXISTING PAVEMENT
- PROPOSED PAVEMENT RECLAMATION
- REMOVE PAVEMENT MARKINGS
- PAVEMENT SAWCUT
- TO BE REMOVED
- PROTECT AND MAINTAIN
- EXISTING ELECTRIC HAND HOLE
- EXISTING DUCT MARKER

HORIZONTAL SCALE
0 50 100 200
1"=100'

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ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

DEMOLITION PLAN

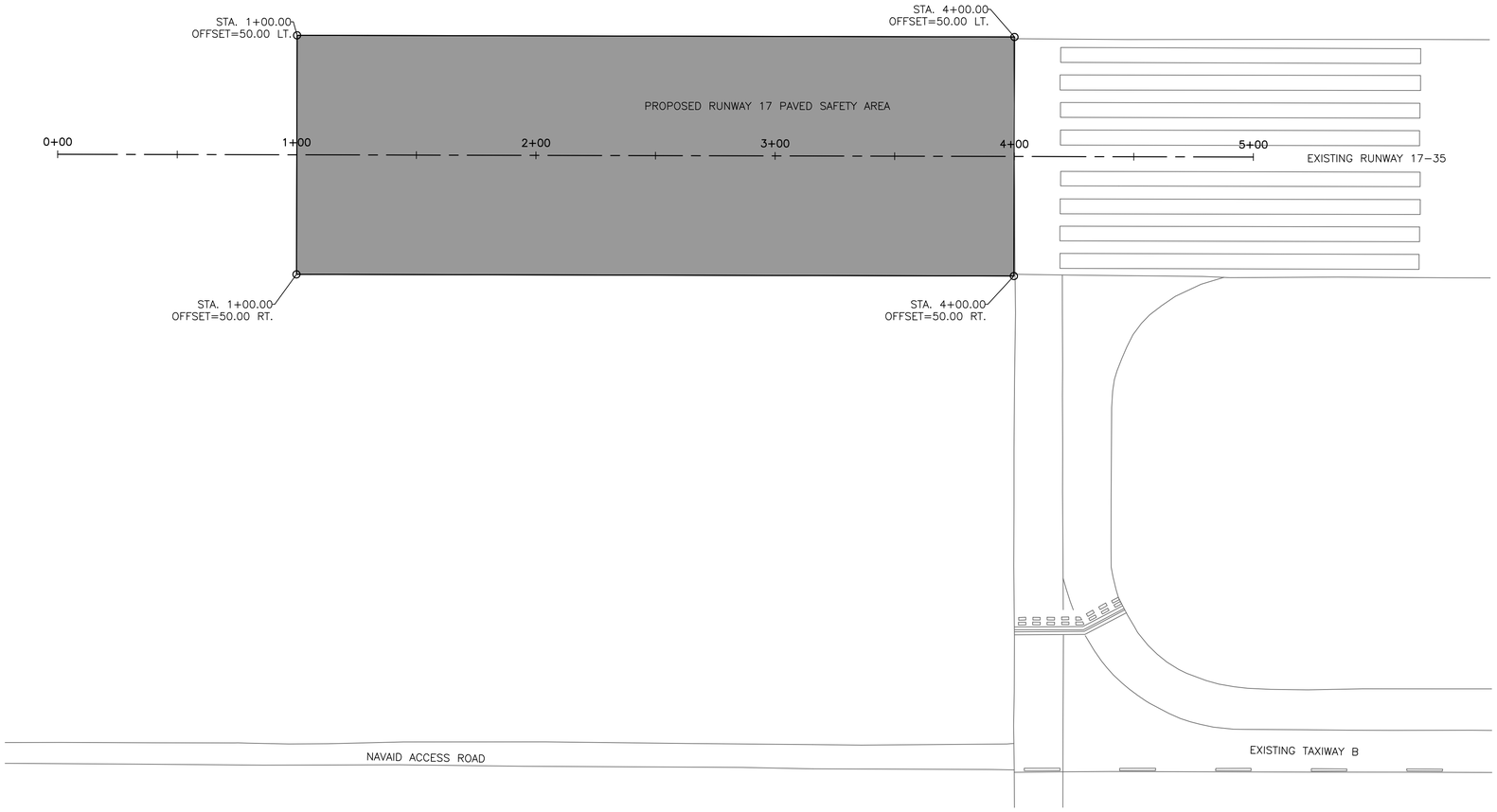
DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

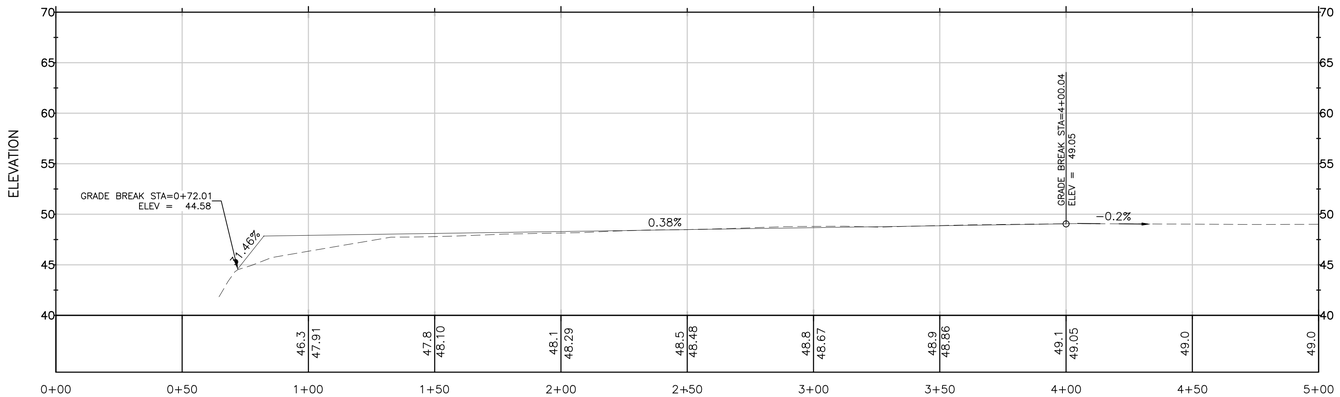
D1.1

SHEET 12 OF 41

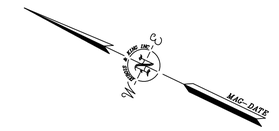
I:\326165 Norwood Airport EA - 2020\Drawings\DEMOLITION PLAN.dwg JUNE 2021

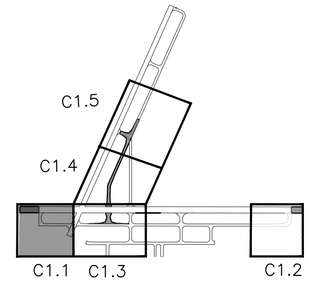


RW 17 PAVED SAFETY AREA PLAN



RW 17 PAVED SAFETY AREA PROFILE





LEGEND

PROPOSED PAVEMENT EDGE

EXISTING PAVEMENT EDGE

VERTICAL SCALE
0 4 8

HORIZONTAL SCALE
0 20 40 80
1"=40

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ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

GEOMETRIC PLAN AND PROFILE RW 17 PSA

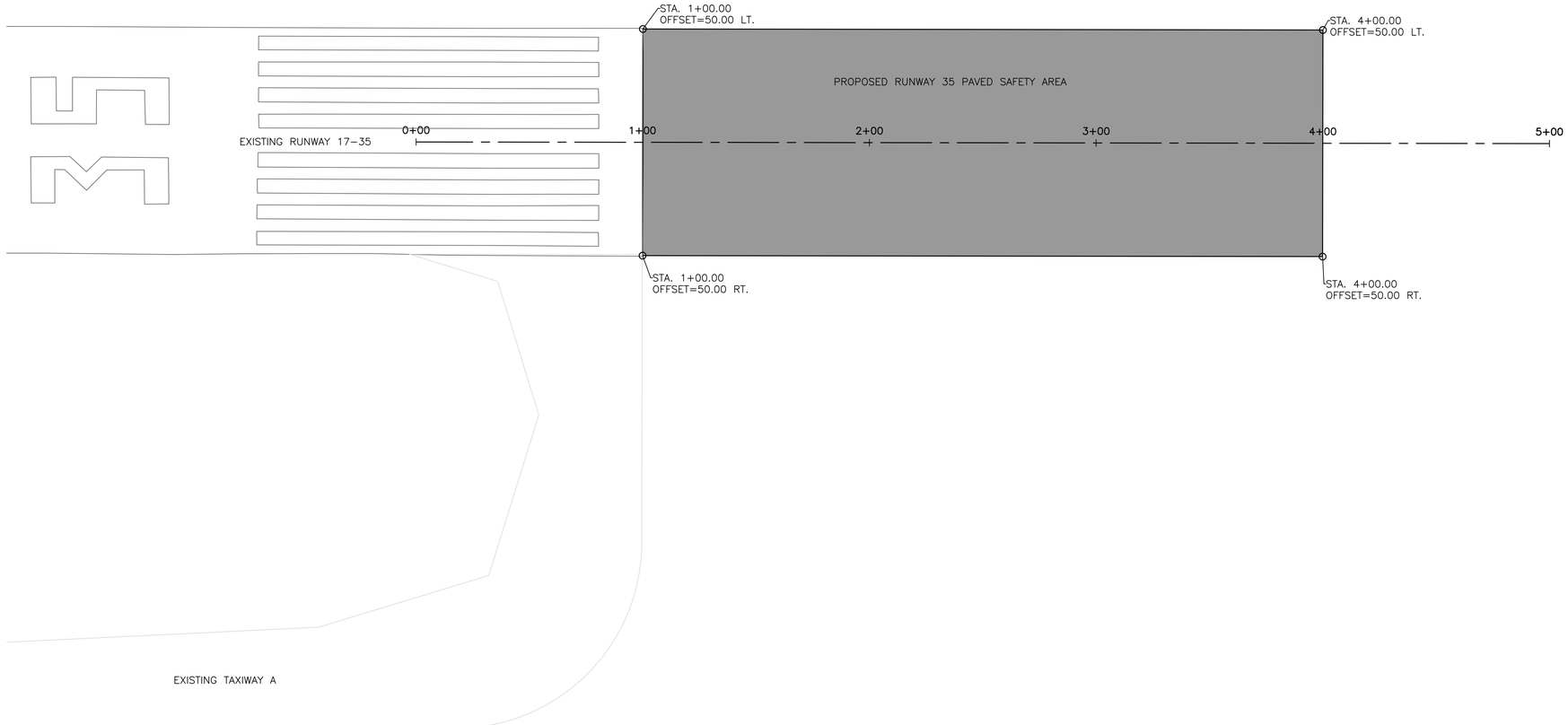
DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

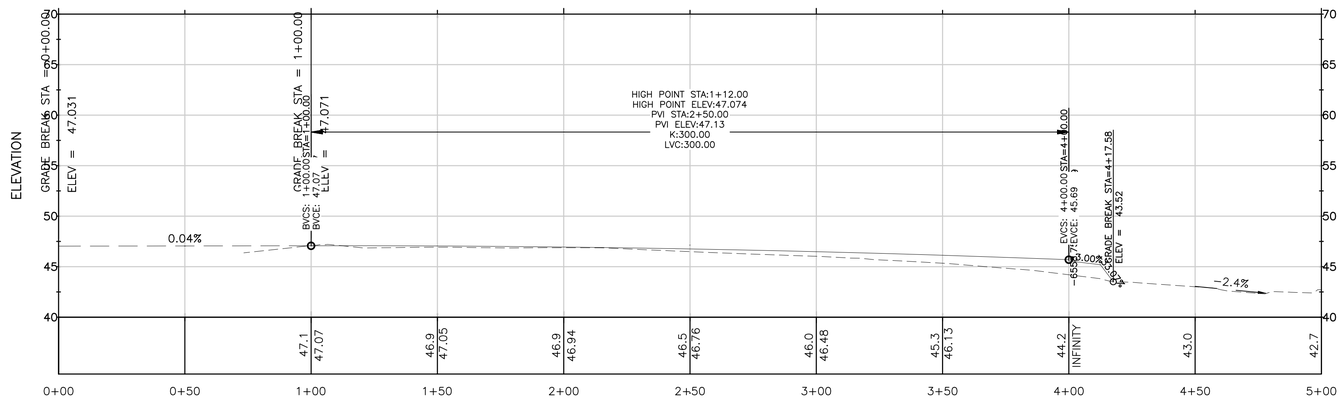
C1.1

SHEET 13 OF 41

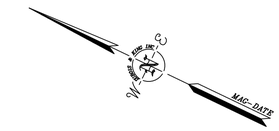
I:\3\326165 Norwood Airport EA – 2020\Drawings\Geometric Plan and Profile RW 35 PSA.dwg JUNE 2021

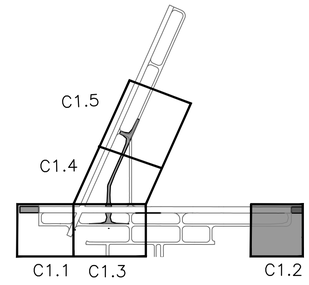


RW 35 PAVED SAFETY AREA PLAN



RW 35 PAVED SAFETY AREA PROFILE





LEGEND

PROPOSED PAVEMENT EDGE

EXISTING PAVEMENT EDGE

VERTICAL SCALE 0 4 8

HORIZONTAL SCALE 0 20 40 80

1"=40

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ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

GEOMETRIC PLAN AND PROFILE RW 35 PSA

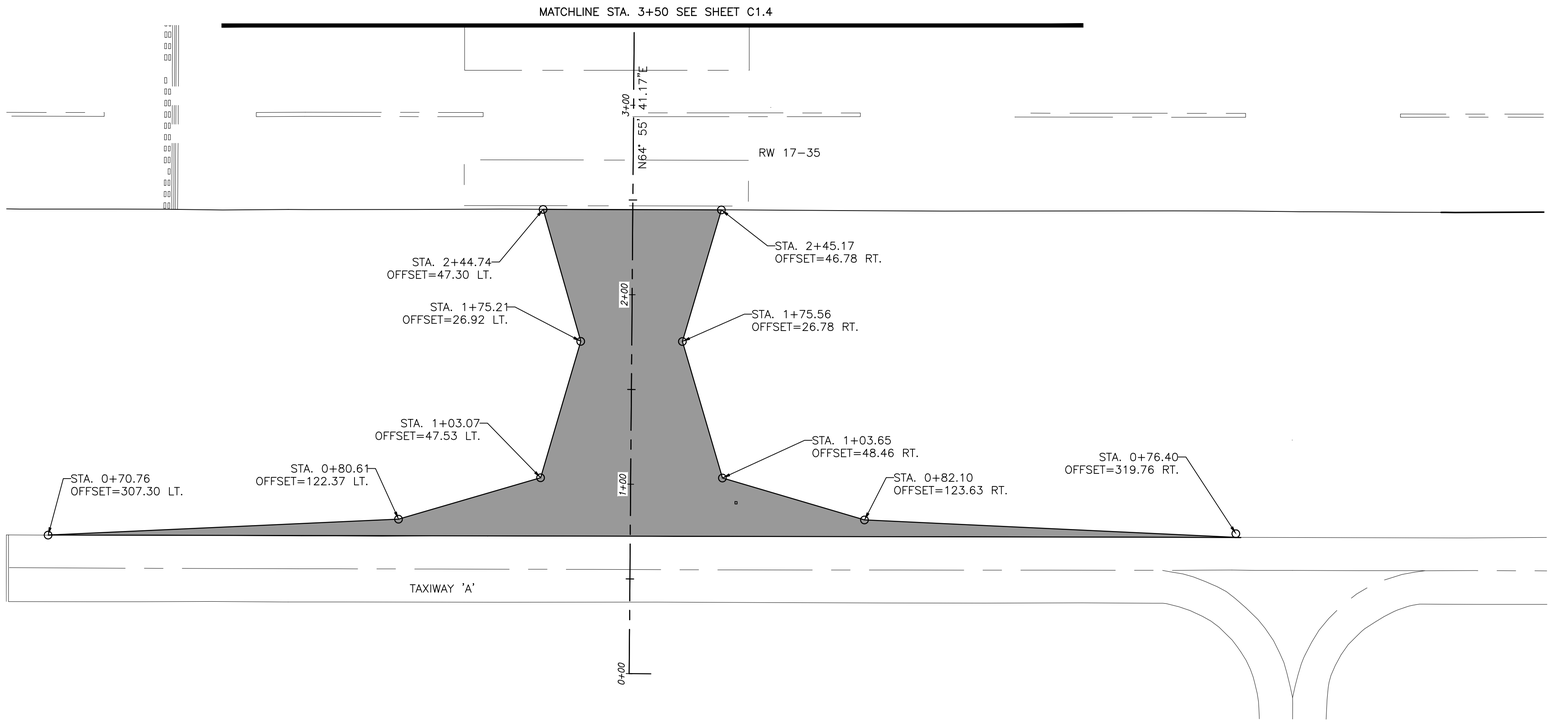
DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

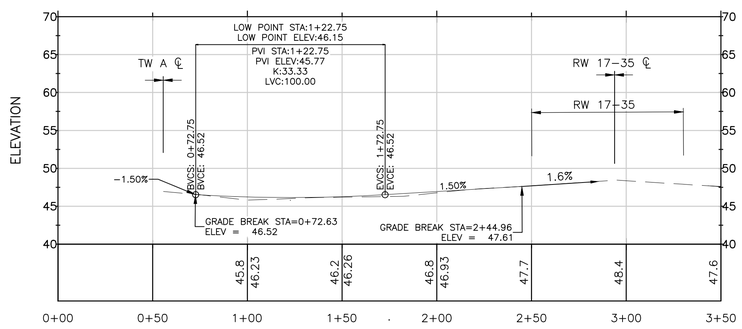
C1.2

SHEET 14 OF 41

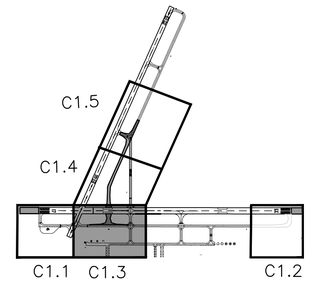
I:\3\326165 Norwood Airport EA – 2020\Drawings\Geometric Plan and Profile RW 35 PSA.dwg JUNE 2021



TW 'C' STUB PLAN



TW 'C' STUB PROFILE



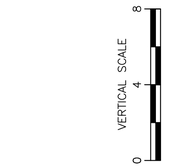
LEGEND

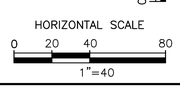
PROPOSED PAVEMENT EDGE

EXISTING PAVEMENT EDGE

NOTES:

1. REFER TO SHEET G1.4 FOR DEMOLITION NOTES.
2. REFER TO "GRADING AND DRAINAGE" SHEETS FOR EROSION CONTROL AND SEDIMENT CONTROL MEASURES.





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BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

GEOMETRIC PLAN AND PROFILE TW 'C' STUB

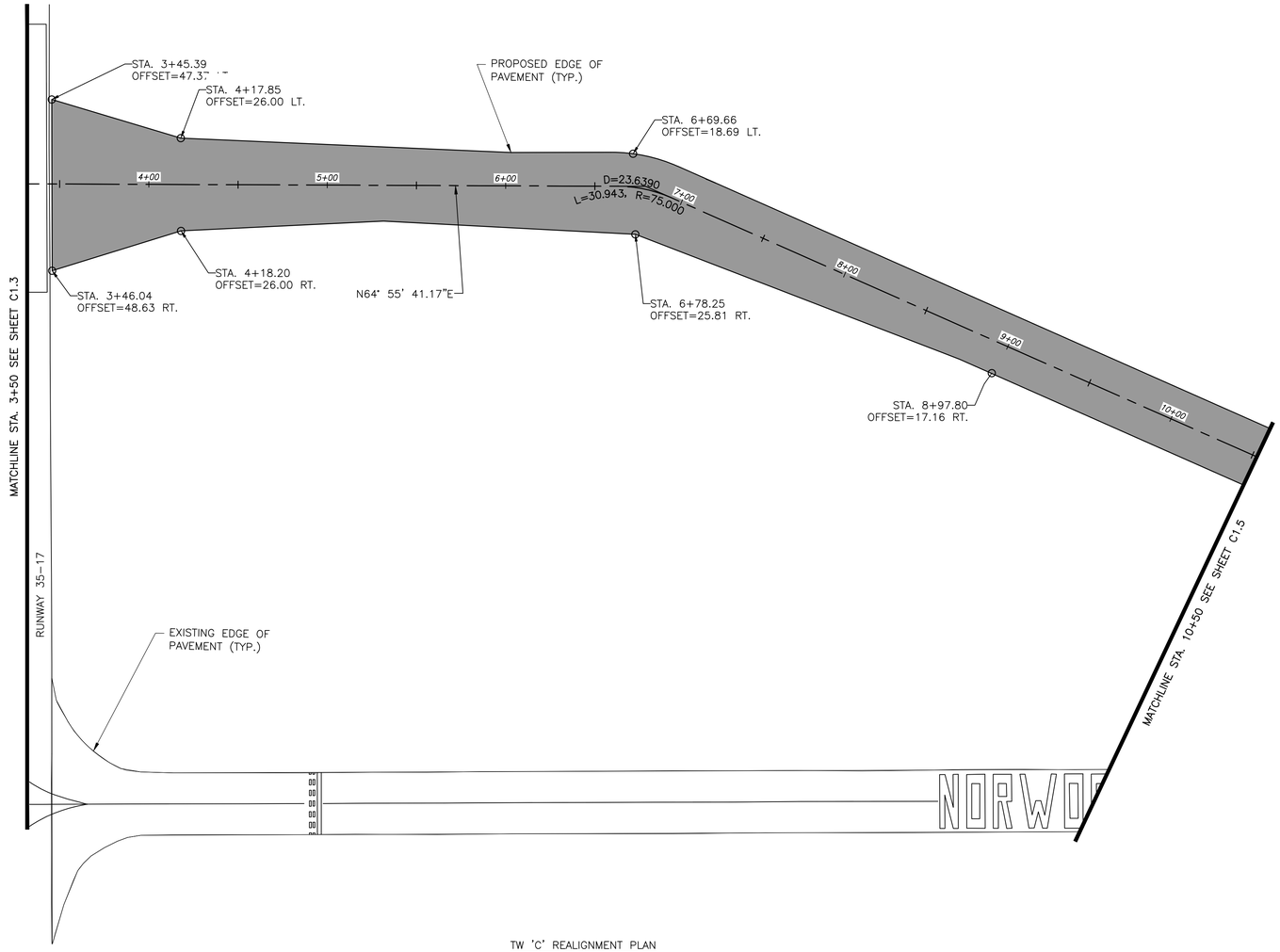
DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

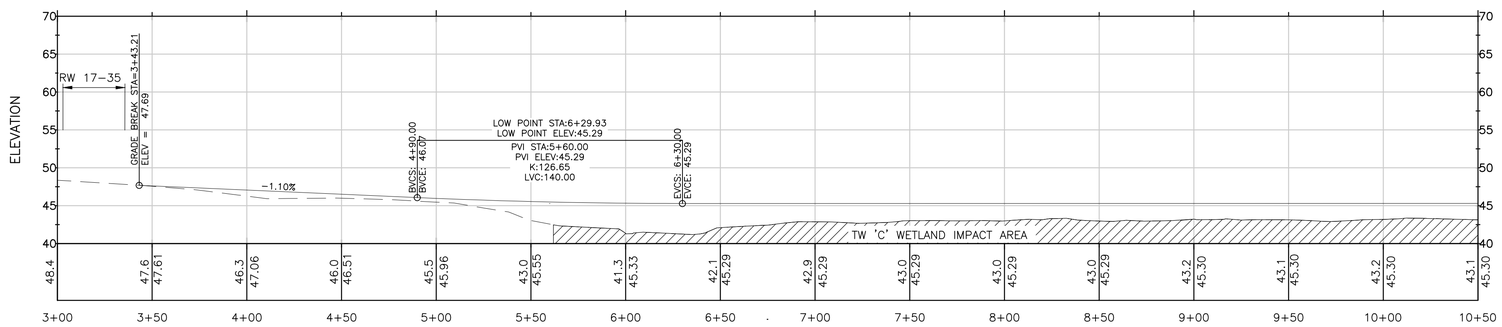
C1.3

SHEET 15 OF 41

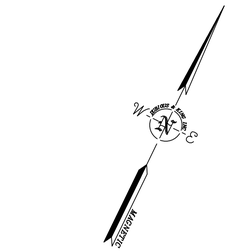
I:\3\326165 Norwood Airport EA – 2020\Drawings\13-15_C1.3-C1.5_Geometry Plan.dwg JUNE 2021

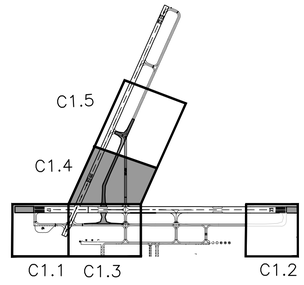


TW 'C' REALIGNMENT PLAN



TW 'C' REALIGNMENT PROFILE





LEGEND

PROPOSED PAVEMENT EDGE

EXISTING PAVEMENT EDGE

NOTES:

1. REFER TO SHEET G1.4 FOR DEMOLITION NOTES.
2. REFER TO "GRADING AND DRAINAGE" SHEETS FOR EROSION CONTROL AND SEDIMENT CONTROL MEASURES.

VERTICAL SCALE 0 4 8

HORIZONTAL SCALE 0 20 40 80 1"=40

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NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

GEOMETRIC PLAN AND PROFILE TW C REALIGNMENT (1 OF 2)

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
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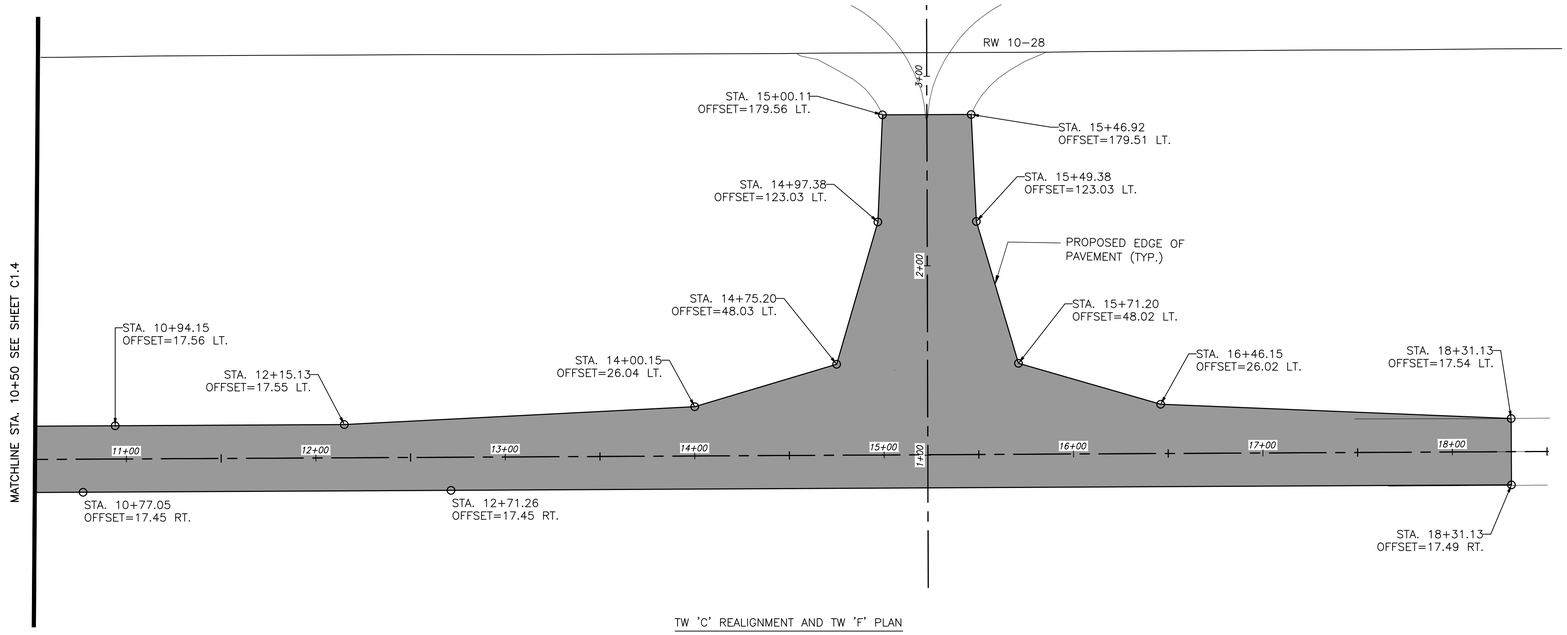
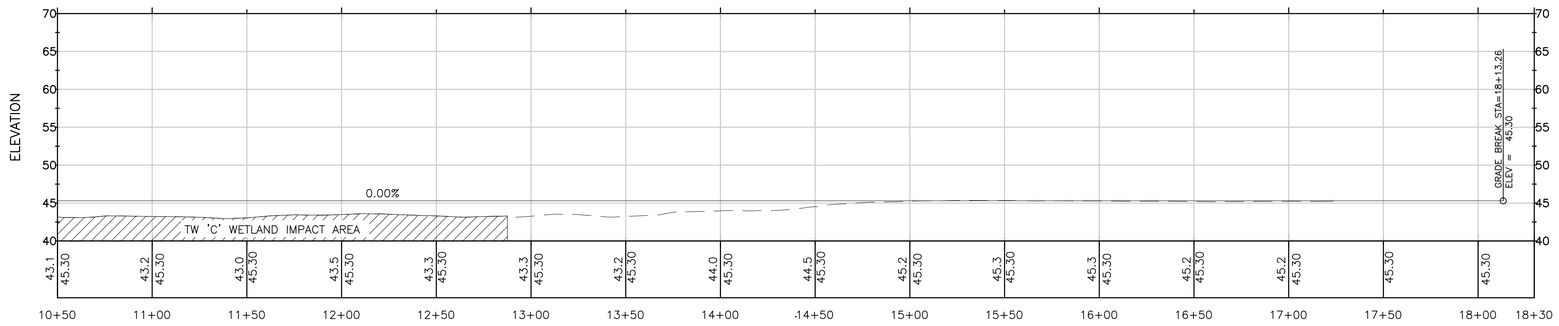
SHEET NUMBER

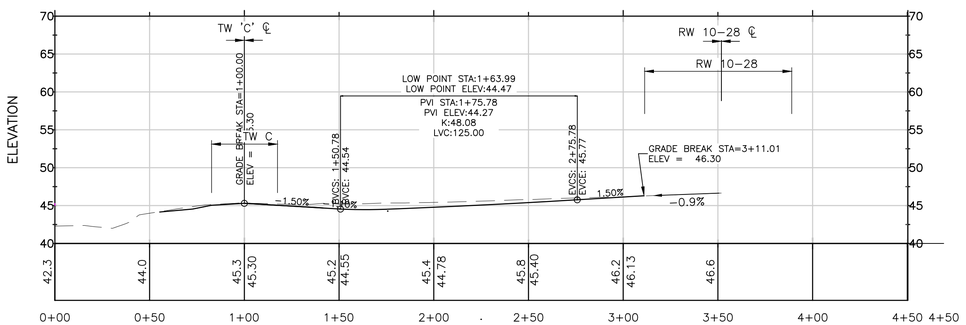
C1.4



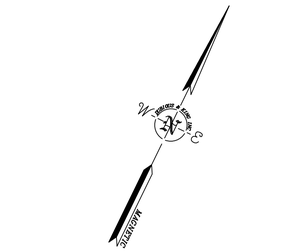
TW 'C' REALIGNMENT AND TW 'F' PLAN



TW 'C' REALIGNMENT PROFILE



TW 'F' PROFILE



LEGEND

PROPOSED PAVEMENT EDGE

EXISTING PAVEMENT EDGE

NOTES:

1. REFER TO SHEET G1.4 FOR DEMOLITION NOTES.
2. REFER TO "GRADING AND DRAINAGE" SHEETS FOR EROSION CONTROL AND SEDIMENT CONTROL MEASURES.

VERTICAL SCALE
0 4 8

HORIZONTAL SCALE
0 20 40 80
1"=40

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ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

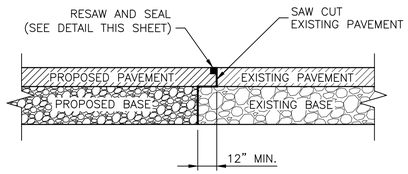
GEOMETRIC PLAN AND PROFILE TW C REALIGNMENT (2 OF 2)

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

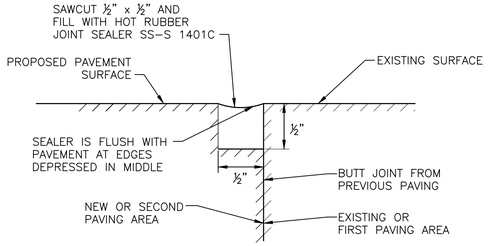
SHEET NUMBER

C1.5

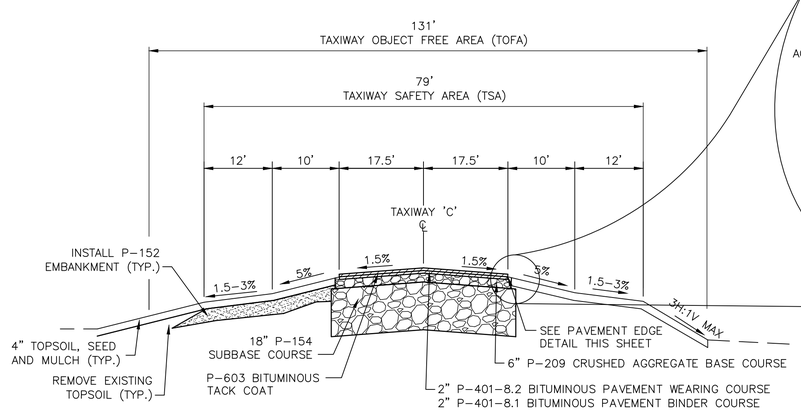
SHEET 17 OF 41



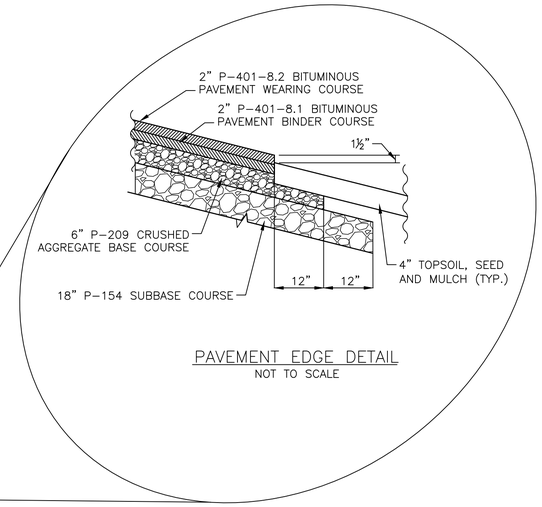
SAWCUTTING DETAIL
NOT TO SCALE



RESAW AND SEAL DETAIL
NOT TO SCALE

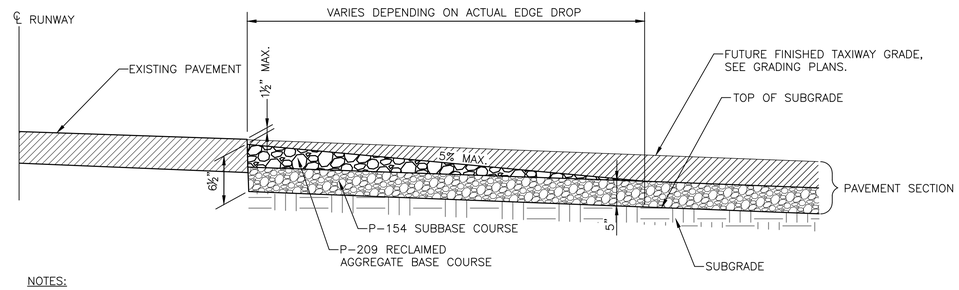


TW 'C' TYPICAL SECTION
NOT TO SCALE



PAVEMENT EDGE DETAIL
NOT TO SCALE

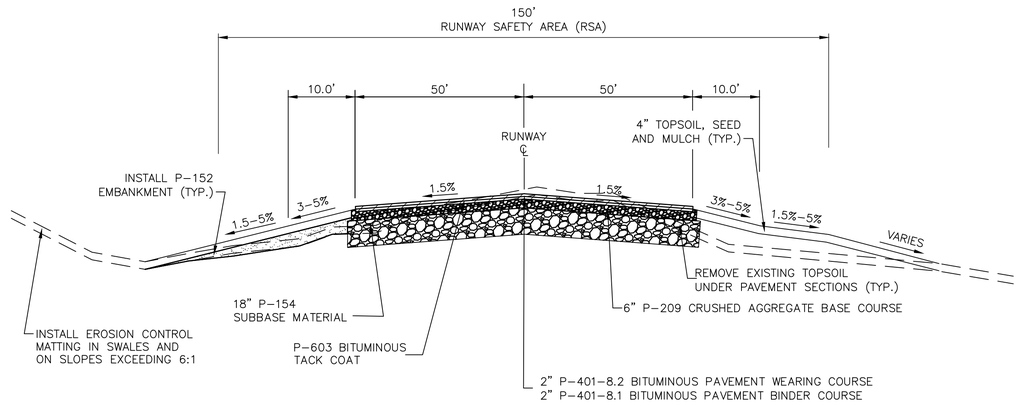
NOTES:
TAXIWAY DESIGN GROUP (TDG): 2
AIRPLANE DESIGN GROUP (ADG): C II
22' SHOULDERS 5% SLOPE FOR FIRST 10'



NOTES:

1. IN ORDER TO REOPEN CERTAIN AREAS OF PAVEMENT TO TRAFFIC, THE CONTRACTOR WILL BE REQUIRED TO PLACE A STONE TAPER SECTION AT THE EDGE OF PAVEMENT AS DETAILED ABOVE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE TAPER SECTIONS PRIOR TO PLACING THE ASPHALT SURFACE COURSE.
2. TAPER CONSTRUCTION MATERIAL – THIS MATERIAL USED FOR THE TAPER MAY BE REUSED IN OTHER AREAS OF THE TAXIWAY CONSTRUCTION. THE MATERIAL SHALL MEET THE REQUIREMENTS OF SPECIFICATION P-209.

TYPICAL TAPER SECTION – APPLICABLE AT RUNWAY EDGES
NOT TO SCALE



RUNWAY PAVED SAFETY AREA TYPICAL SECTION
NOT TO SCALE

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PROFESSIONAL SEAL

PERMITTING SET NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	BY	CK'D

NORWOOD MEMORIAL AIRPORT
111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

TYPICAL SECTIONS

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

C2.1

SHEET 18 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\17_C2.1_TW C Typical Sections.dwg JUNE 2021

PROPOSED EMERGENCY SPILLWAY

PROPOSED OUTLET STRUCTURE

PROPOSED EXTENDED DETENTION BASIN AREA 2 FLOOR BOTTOM : 44.50'

PROPOSED 12"ø HDPE CULVERT WITH FLARED END SECTION AND RIPRAP LINED SCOUR POOL. SEE DETAILS SHEET C7.1–C7.2

PROPOSED CHECK DAM/ STONE WEIR

PROPOSED SEDIMENT FOREBAY 2

PROPOSED RUNWAY 17 PAVED SAFETY AREA

EXISTING RUNWAY 17–35

EXISTING TAXIWAY B

PROPOSED EXTENDED DRY DETENTION BASIN AREA 1 FLOOR BOTTOM : 44.50'

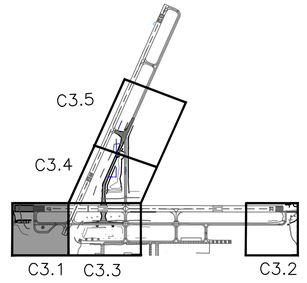
PROPOSED SEDIMENT FOREBAY 1

PROPOSED CHECK DAM/ STONE WEIR

PROPOSED 12"ø HDPE CULVERT WITH FLARED END SECTION AND RIPRAP LINED SCOUR POOL. SEE DETAILS SHEET C7.1–C7.2

PROPOSED GRASS–LINED SWALES

PROPOSED EMERGENCY SPILLWAY



LEGEND

120	PROPOSED CONTOUR LINE
	EXISTING CONTOUR LINE
	PROPOSED PAVEMENT EDGE
	EXISTING PAVEMENT EDGE
D	PROPOSED DRAIN PIPE
D	EXISTING DRAIN PIPE
	PROPOSED CATCH BASIN
	EXISTING CATCH BASIN
	PROPOSED LEACHING MANHOLE
D	EXISTING DRAINAGE MANHOLE
SF	SILT FENCE
	FLAGGED WETLANDS
RSA	RUNWAY SAFETY AREA
TSA	TAXIWAY SAFETY AREA
LOW	LIMIT OF WORK
	INLET PROTECTION DEVICE
	STRAW WATTLE
	EXISTING WETLAND
	STONE WEIR
X 1-21	WETLAND FLAG

HORIZONTAL SCALE
0 15 30 60
1"=30'

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ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

GRADING AND DRAINAGE PLAN RW 17 PSA

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

C3.1

SHEET 19 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\06–07_C3.1–C3.2 RW 17 & 35 RSA.dwg, JUNE 2021

PROPOSED RUNWAY 35 PAVED SAFETY AREA

EXISTING RUNWAY 17–35

EXISTING TAXIWAY A

EXISTING DMH V/N
STA:42+00, 55.69 LT.
RIM:44.54'
SE INV IN: 41.11 (12")
SW INV IN:41.11 (12")
NW INV OUT:41.09 (12")

EXISTING DSCB #7
STA:43+50, 52.78 LT.
RIM:44.21'
NW INV OUT:41.55 (12")

12" HDPE
145' @ 0.3%

0+00 1+00 2+00 3+00 4+00 5+00

A34 A33 A32 A31 A30 A29 A28 A27 A26 A20 A19 A18 A17 A16 A15 A14 A13 A12 A11

LEGEND

- 120 — PROPOSED CONTOUR LINE
- EXISTING CONTOUR LINE
- PROPOSED PAVEMENT EDGE
- EXISTING PAVEMENT EDGE
- D — PROPOSED DRAIN PIPE
- D — EXISTING DRAIN PIPE
- PROPOSED CATCH BASIN
- EXISTING CATCH BASIN
- PROPOSED LEACHING MANHOLE
- EXISTING DRAINAGE MANHOLE
- SF — SILT FENCE
- FLAGGED WETLANDS
- RSA — RUNWAY SAFETY AREA
- TSA — TAXIWAY SAFETY AREA
- LOW — LIMIT OF WORK
- INLET PROTECTION DEVICE
- STRAW WATTLE
- EXISTING WETLAND
- X A15 — WETLAND FLAG

HORIZONTAL SCALE
0 15 30 60
1"=30'

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ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

GRADING AND DRAINAGE PLAN RW 35 PSA

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

C3.2

SHEET 20 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\06–07_C3.1–C3.2 RW 17 & 35 RSA.dwg JUNE 2021

MATCHLINE STN. 3+50 SEE DRAWING C3.4

RUNWAY 17-35

3+00

2+00

1+00

0+00

EXISTING TAXIWAY C STUB TO BE REMOVED

PROPOSED TAXIWAY C STUB

PROPOSED PAVEMENT EDGE

PROPOSED DEEP SUMP CATCH BASIN
RIM: 45.30'
INV. OUT: 42.44' (12"ø RCP)

EXISTING CB
RIM = 45.28
INV. OUT. = 44.2

#2677

#2637

PROPOSED DEEP SUMP CB
RIM : 45.2'
12" INV. OUT = 43'

TAXIWAY A

PROPOSED 12"ø RCP
L = 102'
S = 0.003

PROPOSED 12"ø RCP
L = 96'
S = 0.003'

EXISTING CB
RIM = 45.18
INV OUT. = 42.3

EXISTING 12"ø RCP
S: 0.005
INV. OUT 43.08'

INV. OUT = 42.3

EXISTING FLARED END SECTION

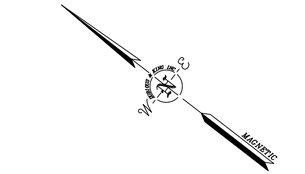
EX. MH
RIM: 45.84

TOFA TSA LOW SF D

4B-1 4B-2 4B-3 4B-4 4B-5 4B-6 4B-7 4B-8 4B-9 4B-10 4B-11 4B-12 4B-13 4B-14 4B-15 4B-16 4B-17

2-8 2-9 2-10 2-11 2-12 2-13

3-14 3-15 3-16 3-17



LEGEND

- PROPOSED CONTOUR LINE
- EXISTING CONTOUR LINE
- PROPOSED PAVEMENT EDGE
- EXISTING PAVEMENT EDGE
- PROPOSED DRAIN PIPE
- EXISTING DRAIN PIPE
- PROPOSED CATCH BASIN
- EXISTING CATCH BASIN
- PROPOSED LEACHING MANHOLE
- EXISTING DRAINAGE MANHOLE
- SILT FENCE
- FLAGGED WETLANDS
- RUNWAY SAFETY AREA
- TAXIWAY SAFETY AREA
- LIMIT OF WORK
- INLET PROTECTION DEVICE
- STRAW WATTLE
- EXISTING WETLAND
- X 3-15 WETLAND FLAG
- WETLAND BOUNDARY

HORIZONTAL SCALE
0 20 40 80
1"=40'

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TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

GRADING AND DRAINAGE PLAN TW C STUB

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
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PROJ. ENG.	D&K ARCHIVE #
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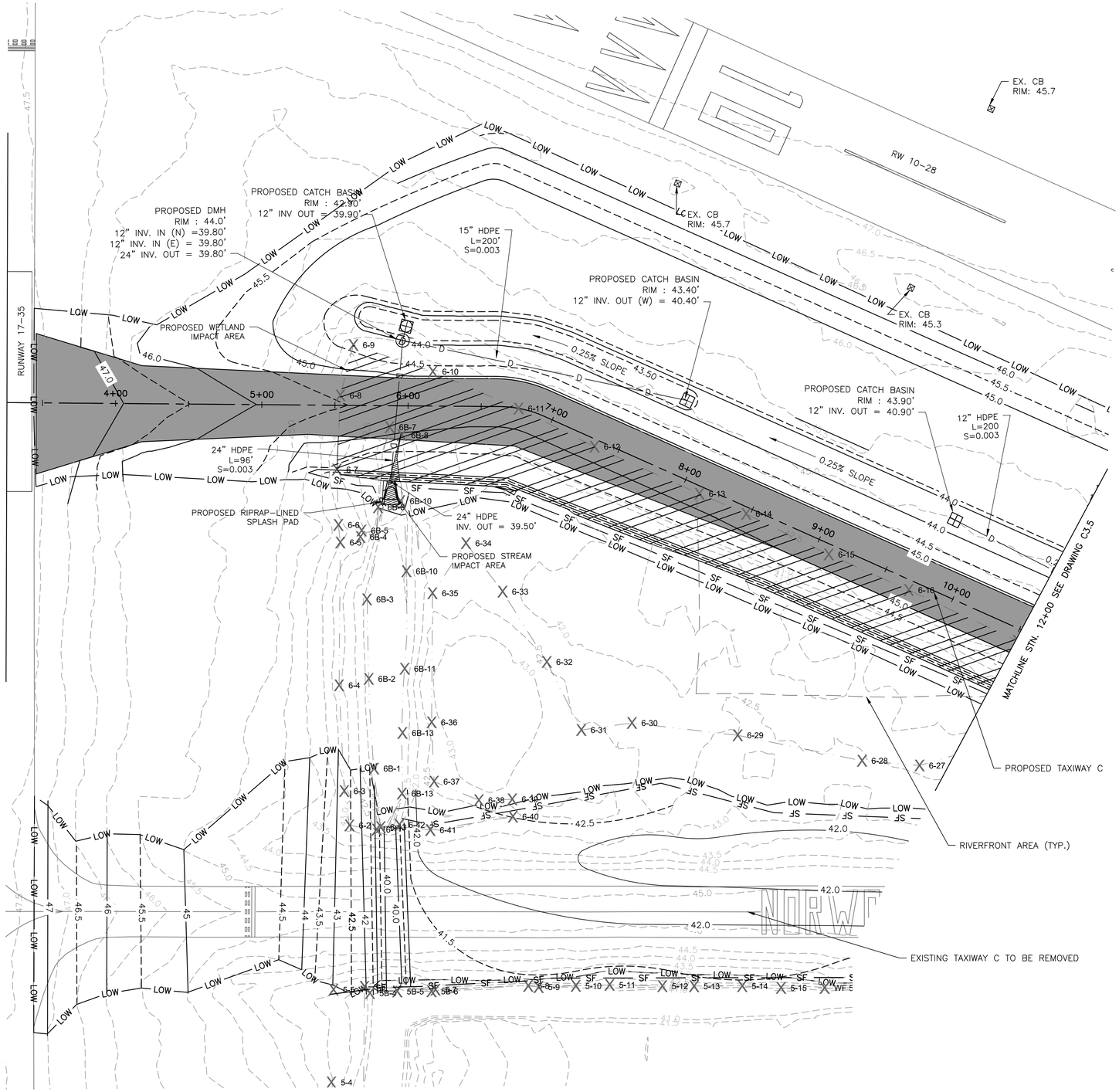
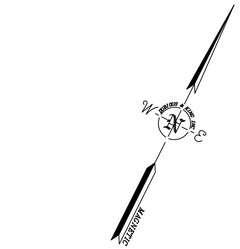
SHEET NUMBER

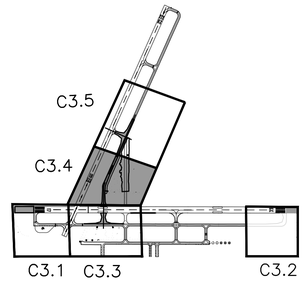
C3.3

SHEET 21 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\20-22_c3.3-C3.5 TW C Grading Plan.dwg JUNE 2021







LEGEND

- PROPOSED CONTOUR LINE
- EXISTING CONTOUR LINE
- PROPOSED PAVEMENT EDGE
- EXISTING PAVEMENT EDGE
- PROPOSED DRAIN PIPE
- EXISTING DRAIN PIPE
- PROPOSED CATCH BASIN
- EXISTING CATCH BASIN
- PROPOSED LEACHING MANHOLE
- EXISTING DRAINAGE MANHOLE
- SILT FENCE
- FLAGGED WETLANDS
- RUNWAY SAFETY AREA
- TAXIWAY SAFETY AREA
- INLET PROTECTION DEVICE
- STRAW WATTLE
- EXISTING WETLAND
- X 6-30 WETLAND FLAG

HORIZONTAL SCALE
0 20 40 80
1"=40'

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TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

GRADING AND DRAINAGE PLAN TW C REALIGNMENT

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
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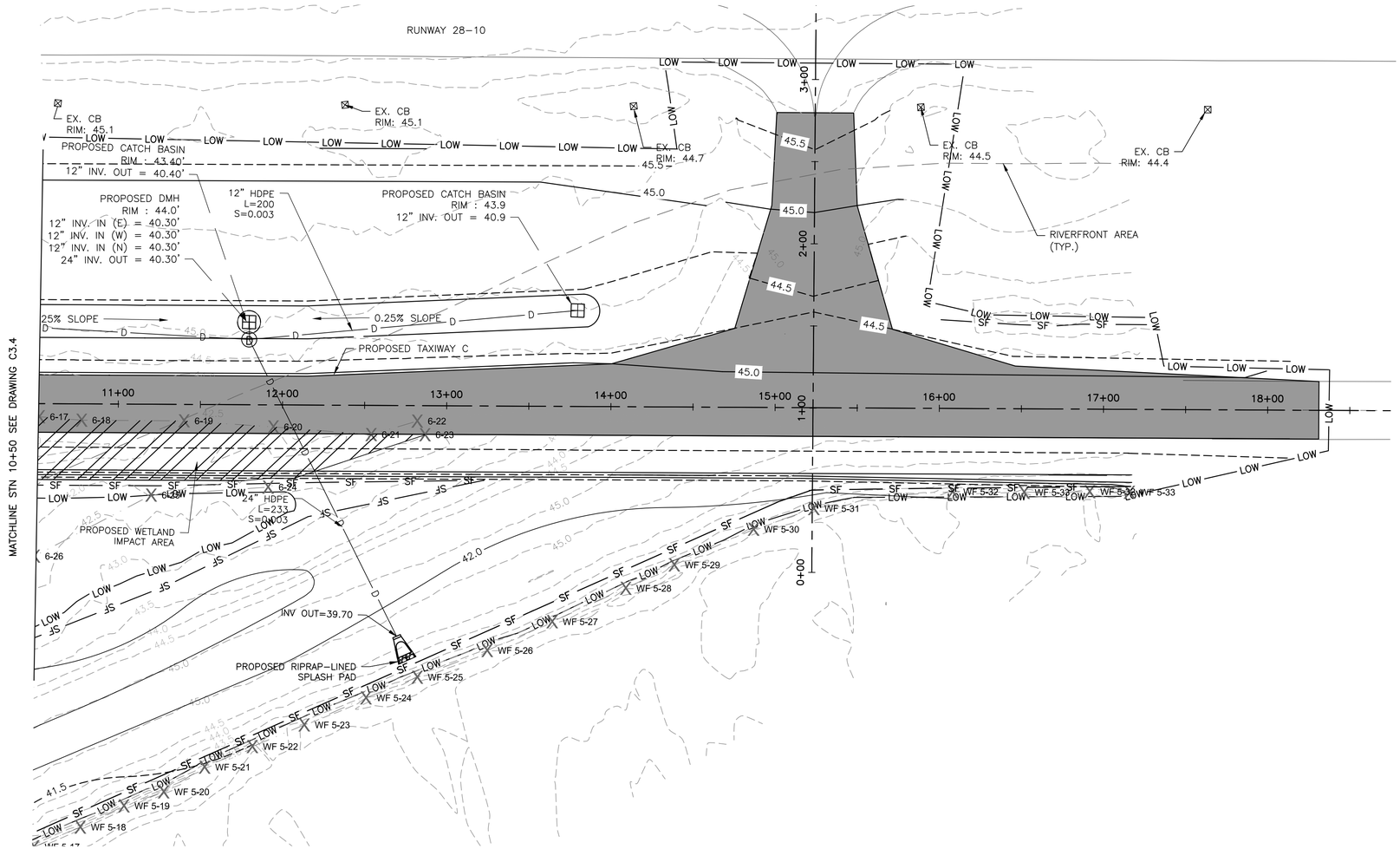
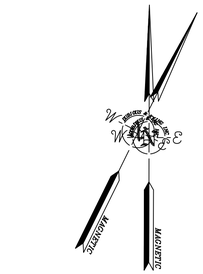
SHEET NUMBER

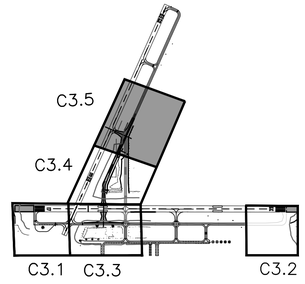
C3.4

SHEET 22 OF 41

I:\326165 Norwood Airport EA - 2020\Drawings\20-22_C3.3-C3.5 TW C Grading Plan.dwg JUNE 2021







LEGEND

- PROPOSED CONTOUR LINE
- EXISTING CONTOUR LINE
- PROPOSED PAVEMENT EDGE
- EXISTING PAVEMENT EDGE
- PROPOSED DRAIN PIPE
- EXISTING DRAIN PIPE
- PROPOSED CATCH BASIN
- EXISTING CATCH BASIN
- PROPOSED LEACHING MANHOLE
- EXISTING DRAINAGE MANHOLE
- SILT FENCE
- FLAGGED WETLANDS
- RUNWAY SAFETY AREA
- TAXIWAY SAFETY AREA
- INLET PROTECTION DEVICE
- STRAW WATTLE
- EXISTING WETLAND
- WETLAND FLAG

HORIZONTAL SCALE
0 20 40 80
1"=40'

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TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE
GRADING AND DRAINAGE PLAN TW C REALIGNMENT (2 OF 2) (LOCATION 4)

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
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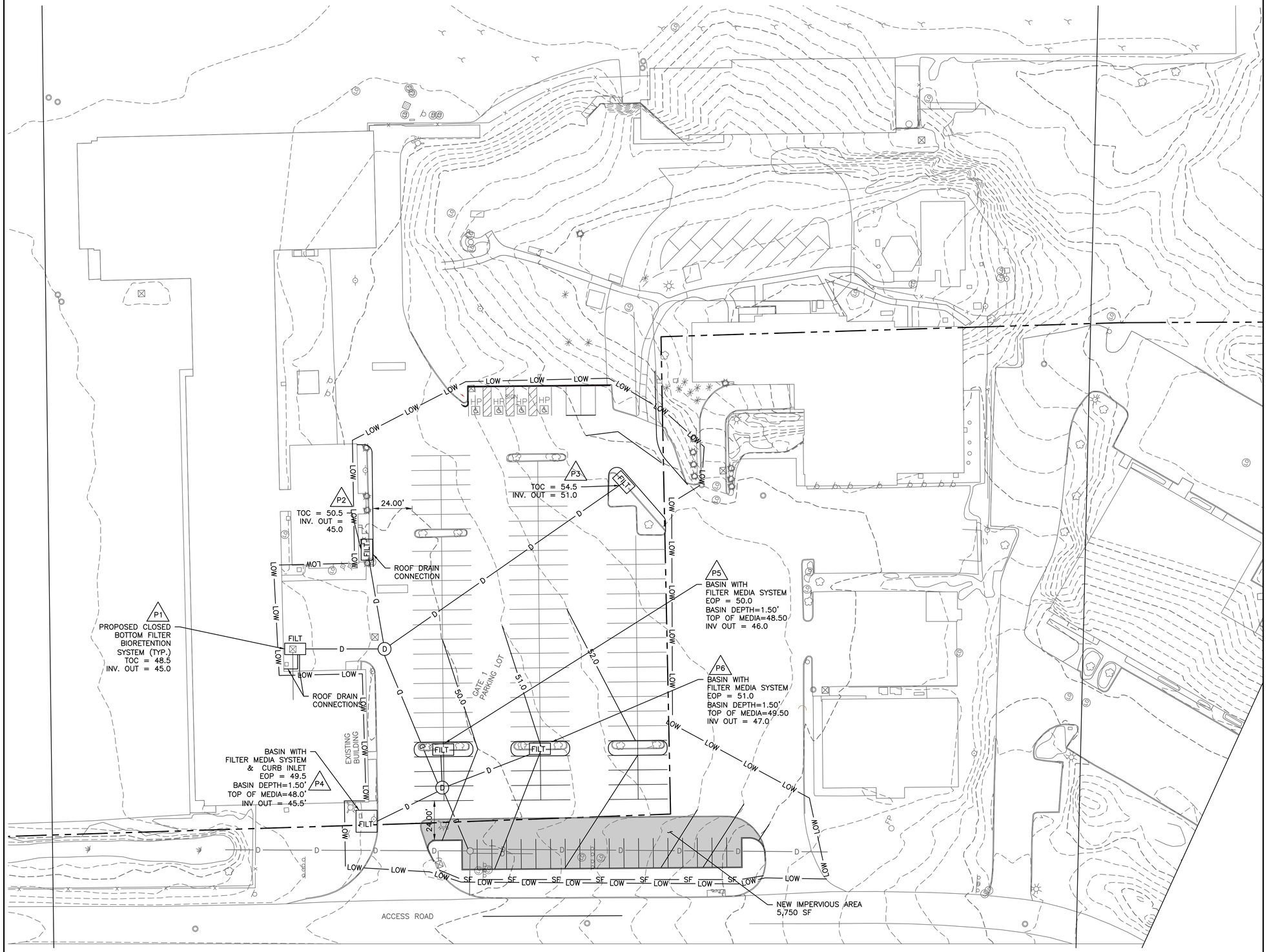
SHEET NUMBER

C3.5

SHEET 23 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\20–22_C3.3–C3.5 TW C Grading Plan.dwg JUNE 2021



LEGEND

- PROPOSED CONTOUR LINE
- EXISTING CONTOUR LINE
- PROPOSED PAVEMENT EDGE
- EXISTING PAVEMENT EDGE
- PROPOSED DRAIN PIPE
- EXISTING DRAIN PIPE
- PROPOSED CATCH BASIN
- EXISTING CATCH BASIN
- PROPOSED DRAINAGE MANHOLE
- EXISTING DRAINAGE MANHOLE
- SILT FENCE
- LIMIT OF WORK
- INLET PROTECTION DEVICE

HORIZONTAL SCALE
0 15 30 60
1" = 30 FT

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TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

GRADING AND DRAINAGE PLAN STORMWATER MITIGATION AREA 1

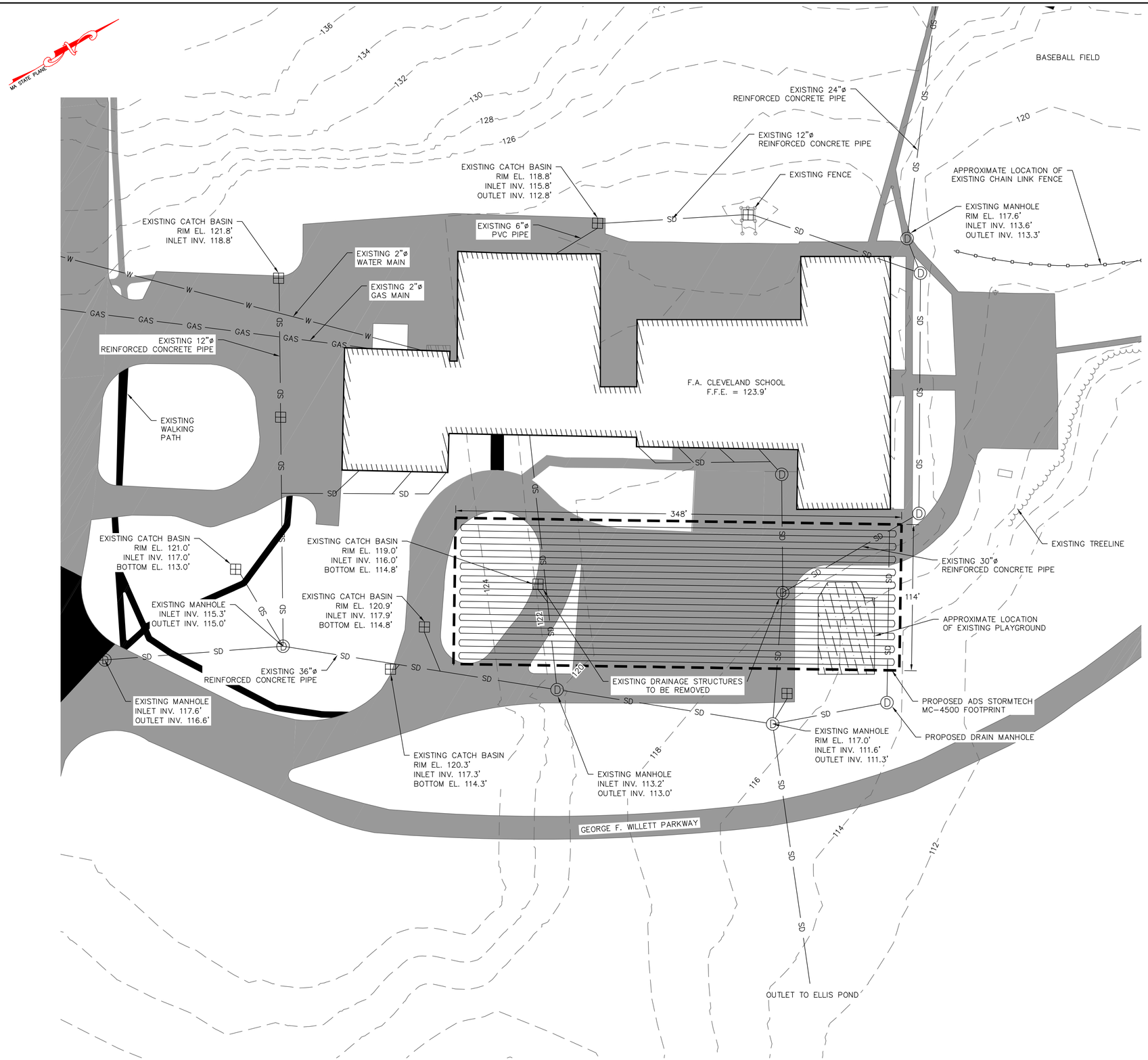
DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

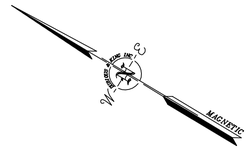
SHEET NUMBER

C3.6

SHEET 24 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\C3.6 Mitigation 1.dwg JUNE 2021





LEGEND:

- 2-FT LIDAR CONTOUR
- 10-FT LIDAR CONTOUR
- 2-FT SURVEY CONTOUR
- 10-FT SURVEY CONTOUR
- APPROX. EDGE OF PAVEMENT
- APPROX. LOCATION OF EXISTING PATH
- APPROX. BUILDING FOOTPRINT
- EXISTING PLAYGROUND
- EXISTING IMPERVIOUS SURFACE
- EXISTING TREELINE
- EXISTING FENCE
- SD — EXISTING STORM DRAIN
- GAS — EXISTING GAS MAIN
- W — EXISTING WATER MAIN
- EXISTING DRAINAGE MANHOLE
- EXISTING CATCH BASIN
- PROPOSED STORMTECH FOOTPRINT
- SD — PROPOSED STORM DRAIN
- PROPOSED DRAINAGE MANHOLE

NOTES:

1. EXISTING LIDAR INFORMATION IS FROM THE MASSACHUSETT'S GEOGRAPHIC INFORMATIONAL SYSTEMS MAPPING TOOL PROGRAM (OLIVER), JUNE OF 2021. SORUCE DATE 2011 (DERIVED FROM THE 2011 NORTHEAST SURVEY). LIDAR CONTOUR ELEVATIONS SHOULD BE CONSIDERED APPROXIMATE ONLY.
2. SURVEY INFORMATION WAS DELINEATED IN JUNE OF 2021 BASED ON A PLAN PREPARED BY THE NORFOLK COUNTY ENGINEERING DEPARTMENT TITLED, "EXISTING CONDITIONS PLAN OF CLEVELAND SCHOOL PLAY AREA". ORIGINAL DRAWING SOURCE DATE IS AUGUST 20, 2001.
3. THE SURVEY IS BASED ON THE VERTICAL DATUM OF NAVD88 IN U.S. SURVEY FEET.
4. LOCATIONS OF STORM DRAINS, DRAINAGE MANHOLES, AND CATCH BASINS WERE DELINEATED FROM THE SURVYED PLAN STATED IN NOTE 2. THE LOCATIONS OF DRAINAGE UTILITIES SHOULD BE CONSIDERED APPROXIMATE ONLY.

40 0 20 40 80
SCALE IN FEET

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TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

GRADING AND DRAINAGE STORMWATER MITIGATION AREA 2

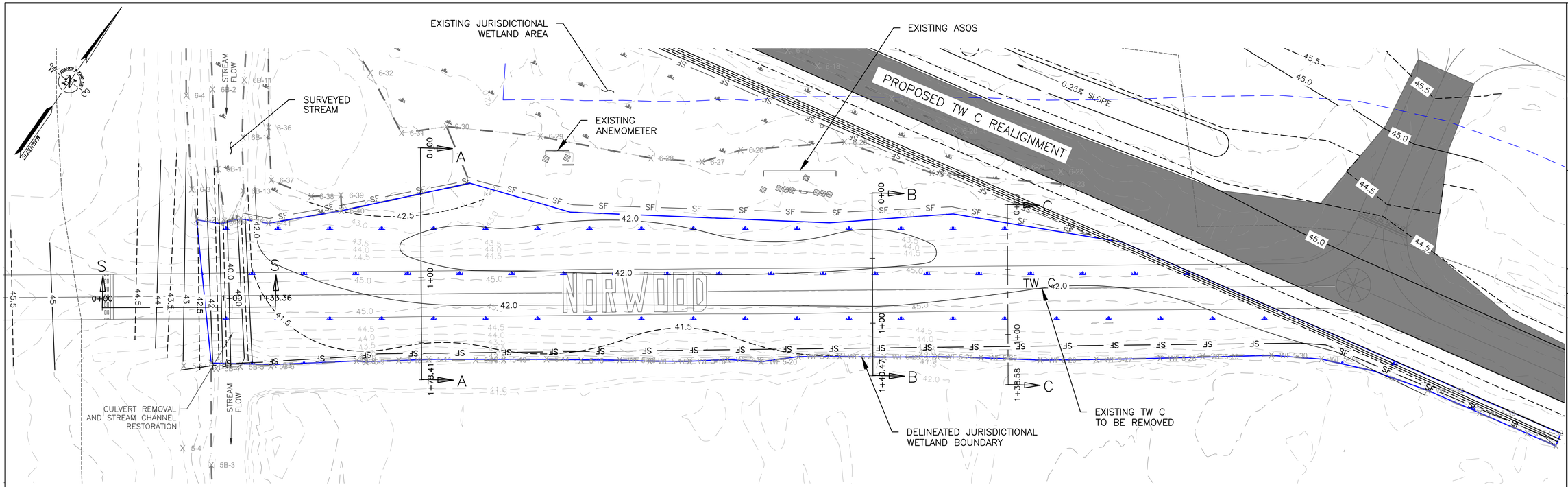
DRAWN BY	DATE
DSC	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

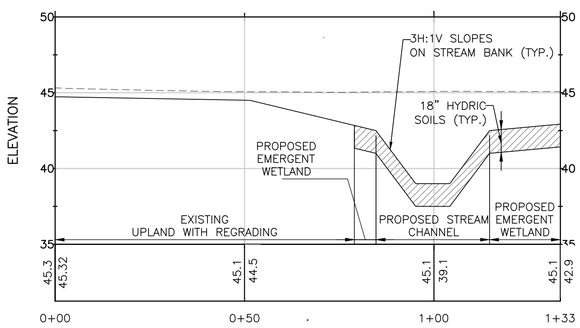
SHEET NUMBER

C3.7

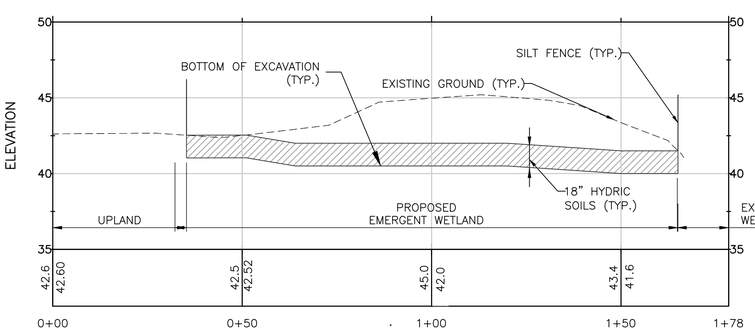
SHEET 25 OF 41

I:\3\326165 Norwood Airport EA - 2020\Drawings\GRADING AND DRAINAGE STORMWATER MITIGATION AREA 2.dwg JUNE 2021

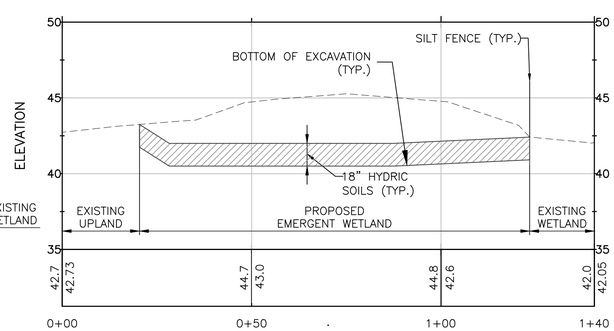




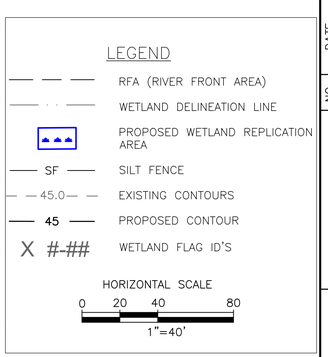
STREAM SECTION DETAIL S–S
SCALE: HORIZONTAL 1"=20'; VERTICAL 1"=5'

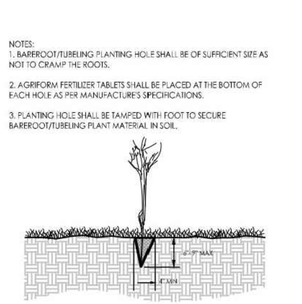


SECTION DETAIL A–A
SCALE: HORIZONTAL 1"=20'; VERTICAL 1"=5'

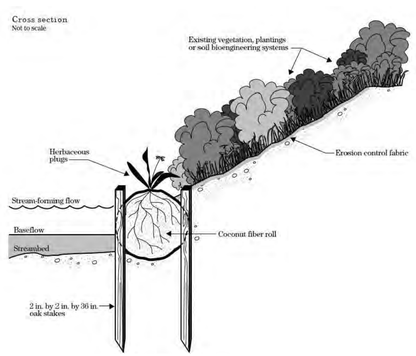


SECTION DETAIL B–B
SCALE: HORIZONTAL 1"=20'; VERTICAL 1"=5'

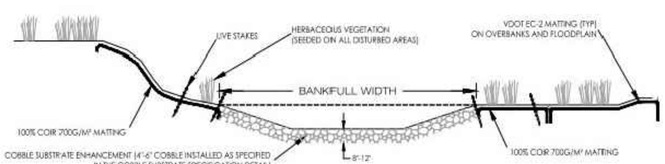




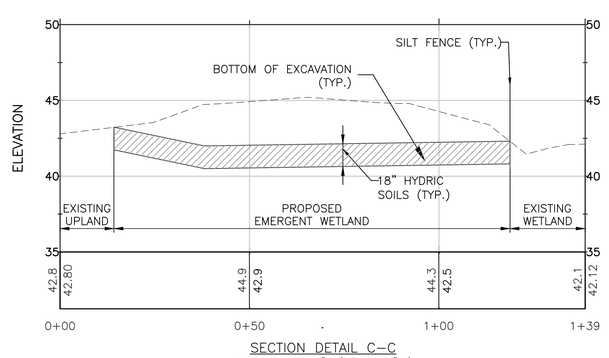
BAREROOT/TUBELING INSTALLATION DETAIL
NOT TO SCALE



COCONUT FIBER ROLL DETAIL
N.T.S



TYPICAL MATTING DETAIL WITH COBBLE SUBSTRATE
NOT TO SCALE



SECTION DETAIL C–C
SCALE: HORIZONTAL 1"=20'; VERTICAL 1"=5'

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ENGINEERING • PLANNING • MANAGEMENT • DEVELOPMENT
15 CONSTITUTION DR. SUITE 1L
BEDFORD, NH 03110
TEL: (603) 637-1043
FAX: (866) 783-7101
www.dubois-king.com

PROFESSIONAL SEAL

PERMITTING SET NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	BY	CK'D

NORWOOD MEMORIAL AIRPORT
111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

WETLAND REPLICATION AREA LAYOUT PLAN

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

C4.1

WETLAND REPLICATION AREA CONSTRUCTION NOTES:

1. CONSTRUCTION OF THE WETLAND REPLICATION AREA SHALL OCCUR UNDER THE DIRECT SUPERVISION OF AN EXPERIENCED AND QUALIFIED WETLAND SCIENTIST (THE "WETLAND SPECIALIST" OR "WS"), PRE-APPROVED IN WRITING BY MASSDEP AND HIRED FOR AND PAID BY THE SITE CONTRACTOR. THE WS SHALL BE ON-SITE FULL-TIME WHEN WORK IS OCCURRING IN WETLAND RESOURCE AREAS, THE 100 FOOT BUFFER ZONE, AND DURING CONSTRUCTION OF THE WETLAND REPLICATION AREA TO ENSURE COMPLIANCE WITH THE PERMITS PROVIDED IN THE TECHNICAL SPECIFICATIONS AND WETLAND REPLICATION AREA DESIGN PLANS. AS NECESSARY, THE WS SHALL MAKE FIELD ADJUSTMENTS DURING CONSTRUCTION OF THE WETLAND REPLICATION AREA IN ORDER TO MEET MITIGATION GOALS AND TO ENSURE THE DEVELOPMENT OF A FUNCTIONING PIT AND MOUND SCRUB-SHRUB WETLAND. FIELD ADJUSTMENTS MAY INCLUDE BUT ARE NOT NECESSARILY LIMITED TO MODIFICATIONS TO SUB-GRADES, FINAL GRADES, HYDROLOGIC INPUTS, MICRO-TOPOGRAPHY, EROSION CONTROLS, WOODY DEBRIS AND OTHER HABITAT FEATURES, AND PLANTINGS (SPECIES AND PLACEMENT) BASED ON SITE SPECIFIC CONDITIONS AT THE TIME OF CONSTRUCTION. ANY RECOMMENDED FIELD ADJUSTMENTS SHALL OCCUR IN CONSULTATION WITH THE RESIDENT ENGINEER ("RE") AND ENVIRONMENTAL MONITOR ("EM") AND, IF NECESSARY, WITH MASSDEP.
2. PROJECT SURVEYORS WORKING FOR THE SITE CONTRACTOR SHALL RE-ESTABLISH AND RE-LABEL WETLAND FLAGS AS PER PERMIT DRAWINGS USING WOODEN STAKES INSTALLED AROUND THE PERIMETER OF THE WETLAND REPLICATION AREA. PROJECT SURVEYORS SHALL ALSO STAKE OUT THE LIMITS OF THE PROPOSED WETLAND REPLICATION AREA. THE STAKES SHALL REMAIN IN PLACE UNTIL WETLAND VEGETATION HAS BECOME FULLY ESTABLISHED. THIS WORK SHALL OCCUR BEFORE CONSTRUCTION OF THE REPLICATION AREA COMMENCES.
3. TRENCHED SILTATION FENCE AND STAKED HAYBALE SHALL BE INSTALLED ALONG THE EXISTING WETLAND BOUNDARY APPROXIMATELY 2-FEET DOWN GRADIENT FROM THE RE-ESTABLISHED WETLAND FLAGS. THIS WORK SHALL OCCUR UNDER THE DIRECT SUPERVISION OF THE WS. INSTALLING EROSION CONTROLS IN THIS MANNER WILL ALLOW THE SITE CONTRACTOR TO PROPERLY TIE-IN PROPOSED CONTOURS TO THE ADJACENT WETLAND CONTOURS WITHOUT UNDERMINING THE TRENCHED SILT FENCE AND HAYBALES. THE INTERFACE / TIE-IN BETWEEN THE REPLICATION AREA AND ADJACENT WETLAND SHALL BE NATURAL USING GENTLE SLOPES
4. PRIOR TO INITIATING CONSTRUCTION OF THE WETLAND REPLICATION AREA THE SITE CONTRACTOR SHALL PROVIDE THE RE AND EM WITH A PROPOSED DEWATERING PROTOCOL FOR REVIEW AND APPROVAL. THE SITE CONTRACTOR SHALL CONSULT WITH THE WS WHEN DEVELOPING THE PROTOCOL TO ENSURE COMPLIANCE WITH APPLICABLE PERMITS INCLUDING BUT NOT LIMITED TO THE NPDES CONSTRUCTION GENERAL PERMIT AND VARIANCE ORDER. THIS INFORMATION SHALL BE PROVIDED TO THE RE AND EM AT LEAST 14 CALENDAR DAYS PRIOR TO THE START OF WORK.
5. THE WS SHALL PROVIDE MASSDEP AND THE NORWOOD CONSERVATION COMMISSION WITH A MINIMUM OF FIVE (5) CALENDAR DAYS ADVANCE WRITTEN NOTICE (VIA EMAIL) TO PROVIDE AN OPPORTUNITY FOR INSPECTIONS DURING EACH OF THE FOLLOWING REPLICATION AREA CONSTRUCTION MILESTONES: (1) PRIOR TO COMMENCEMENT OF EXCAVATION; (2) WHEN THE REPLICATION AREA HAS BEEN EXCAVATED TO SUB-GRADE WITH ROUGH GRADING; (3) WHEN THE REPLICATION AREA HAS BEEN GRADED TO FINAL ELEVATIONS; AND (4) DURING PLANTING AND PLACEMENT OF COARSE WOODY DEBRIS.
6. THE REPLICATION AREA SHALL BE GRUBBED AND INITIALLY EXCAVATED TO A DEPTH APPROXIMATELY 12 TO 18-INCHES BELOW THE FINAL DESIGN GRADE ELEVATIONS DEPICTED ON THE REFERENCED DRAWINGS TO ALLOW FOR PLACEMENT OF WETLAND TOPSOIL AND CONTINUOUS ROUGH GRADING. ROUGH GRADING SHALL OCCUR UNDER THE DIRECT SUPERVISION OF THE WS. ROCKS AND BOULDERS UNCOVERED DURING THE EXCAVATION MAY BE LEFT IN PLACE UPON APPROVAL FROM THE RE AND EM PROVIDED THAT THEY DO NOT SIGNIFICANTLY DECREASE THE PLANTABLE AREA OF THE MITIGATION AREA. THESE ROCKS AND BOULDERS, SHALL BE PLACED IN SUCH A WAY AS TO PROVIDE CREVICES AND CAVITIES SUITABLE FOR USE BY WILDLIFE.
7. THE WS SHALL INSPECT THE SUB-GRADE OF THE REPLICATION AREA TO ENSURE THAT THE PROPER HYDROLOGY HAS BEEN ESTABLISHED AS PER NOTE 1 ABOVE AND SHALL PROVIDE THE RE AND EM WITH WRITTEN CONFIRMATION AND PHOTOGRAPHS OF SAME WITHIN 72 HOURS OF COMPLETION OF THE SUBGRADE EXCAVATION WORK. WRITTEN CONFIRMATION FROM THE WS SHALL INCLUDE A DISCUSSION OF ANY RECOMMENDED FIELD ADJUSTMENTS BASED ON DIRECT FIELD OBSERVATIONS TO ACHIEVE THE DESIRED HYDROLOGY AND FUNCTIONING WETLAND ENVIRONMENT AND AN INTERIM AS-BUILT DRAWING SIGNED AND STAMPED BY A REGISTERED PROFESSIONAL LAND SURVEYOR OF THE COMMONWEALTH DEPICTING SUB-GRADE CONTOURS (1-FOOT CONTOUR INTERVALS WITH REPRESENTATIVE SPOT ELEVATIONS IN PLAN VIEW AND A MINIMUM OF THREE SECTION VIEWS) AND THE LIMITS OF THE GRADING. THE INTERIM AS-BUILT SHALL INCLUDE A SURFACE AREA CALCULATION CONFIRMING THAT SUFFICIENT ACREAGE HAS BEEN PROVIDED (EXCLUDING SIDE SLOPES), AS PER THE PERMITS. LOCATIONS OF CROSS-SECTIONS SHOULD BE INDICATED ON THE PLAN VIEW.
8. AFTER THE PROPOSED SUBGRADES AND ROUGH GRADING HAS BEEN VERIFIED BY PROJECT SURVEYORS APPROXIMATELY 12 TO 18 INCHES OF AN EVENLY MIXED ORGANIC/MINERAL SOIL WILL BE PLACED WITHIN THE REPLICATION AREA BRINGING GRADES TO THE FINAL DESIRED ELEVATIONS. IF FEASIBLE, THE APPLICANT WILL TRANSLOCATE SUITABLE HYDRIC SOILS FROM THE BVW IMPACT SITE TO THE REPLICATION SITE. SOIL AMENDMENTS FROM OFF-SITE SOURCES WILL BE NEEDED. ACCORDINGLY, APPROXIMATELY 12-18INCHES OF AN EVENLY MIXED ORGANIC/MINERAL SOIL ("WETLAND SOIL") SHALL BE IMPORTED TO THE SITE FROM AN OFF-SITE SOURCE AND PLACED WITHIN THE REPLICATION AREA BRINGING GRADES TO THE FINAL DESIRED ELEVATIONS. THE SITE CONTRACTOR SHALL PROVIDE THE RE AND EM WITH WRITTEN DOCUMENTATION IDENTIFYING THE SUPPLIER AND LOCATION OF THE SOURCE MATERIAL. SOIL CONSISTENCY SHALL BE LOOSE TO FRIABLE AND TEXTURE SHOULD BE LOAM TO SANDY LOAM. THE ORGANIC MATERIAL USED FOR MIXING SHALL BE WELL OR PARTIALLY DECOMPOSED. CLEAN LEAF COMPOST IS THE PREFERRED SOIL AMENDMENT TO ACHIEVE THESE STANDARDS THOUGH OTHER MATERIALS MAY BE USED IF APPROVED BY THE WS, RE AND EM. NOTE THAT "CLEAN" REFERS BOTH TO A NEGLIGIBLE AMOUNT (<1%) OF PHYSICAL CONTAMINANTS SUCH AS PLASTIC AND TO THE LACK OF CHEMICAL CONTAMINANTS THAT MIGHT POSE A HAZARD TO PLANTS OR ANIMALS. MINERAL MATERIALS SHALL BE PREDOMINANTLY IN THE LOAM TO LOAMY SAND TEXTURE RANGE (AS DEFINED BY USDA TEXTURAL SOIL CLASSIFICATION SYSTEM OR SOIL SCIENCE SOCIETY OF AMERICAN GLOSSARY OF SOIL SCIENCE TERMS), WITH MINIMAL QUANTITIES OF GRAVEL OR ROCK. A MINIMUM ORGANIC CARBON CONTENT OF 12% (21 PERCENT ORGANIC MATTER) ON A DRY WEIGHT BASIS FOR SOILS SHALL BE USED IN THE WETLAND REPLICATION AREA. THE WS SHALL FORWARD ONE (1) REPRESENTATIVE SAMPLE OF THE WETLAND TOP SOIL MIX THAT WILL BE USED ON THE SITE TO THE UNIVERSITY OF MASSACHUSETTS SOIL AND TISSUE PLANT TESTING LABORATORY (OR EQUIVALENT QUALIFIED LABORATORY) FOR ANALYSIS CONFIRMING THAT THIS SPECIFICATION HAS BEEN MET. THE ANALYSIS SHALL INCLUDE A ROUTINE SOIL ANALYSIS [PH, BUFFER PH, EXTRACTABLE NUTRIENTS (P, K, CA, MG, FE, MN, ZN, CU, B, S), EXTRACTABLE ALUMINUM, CATION EXCHANGE CAPACITY, PERCENT BASE SATURATION, EXTRACTABLE (AND ESTIMATED TOTAL) LEAD] AND SOIL ORGANIC MATTER ANALYSIS [DETERMINATION OF PERCENT SOIL ORGANIC MATTER BY LOSS ON IGNITION]. THE REPRESENTATIVE GRAB SAMPLES SHALL BE COLLECTED BY THE WS FROM MULTIPLE LOCATIONS IN THE WETLAND TOP SOIL MIX FOLLOWING THE UMASS SOIL AND PLANT TISSUE TESTING LABORATORY SAMPLING AND COLLECTION PROTOCOLS. THE LAB ANALYSIS SHALL BE PROVIDED TO THE EM AND RE ALONG WITH WRITTEN CERTIFICATION FROM THE WS THAT THE WETLAND TOP SOIL WAS COLLECTED PER THE REFERENCED PROTOCOL AND MEETS THE DESIRED SPECIFICATION. THE ANALYSIS AND WRITTEN CERTIFICATION OF SAME SHALL BE PROVIDED TO THE EM AND RE PRIOR TO PLACING THE WETLAND TOP SOIL IN THE REPLICATION AREA.
9. WETLAND TOP SOIL SHALL BE DEPOSITED IN THE REPLICATION AREA IN A MANNER THAT MINIMIZES TRAVEL AND SUBSEQUENT COMPACTION OF THE PIT AND MOUND SUBGRADE. SHOULD SOILS BE COMPACTED, THEY SHALL BE LOOSENED BY A METHOD SUCH AS ROTOTILLING.
10. PRIOR TO PLANTING, THE WS SHALL INSPECT THE FINAL-GRADES OF THE REPLICATION AREA TO ENSURE THAT THE PROPER HYDROLOGY HAS BEEN ESTABLISHED AS PER NOTE 1 ABOVE AND SHALL PROVIDE THE RE AND EM WITH WRITTEN CONFIRMATION AND PHOTOGRAPHS OF SAME WITHIN 72 HOURS OF COMPLETION OF THE FINAL-GRADING WORK. WRITTEN CONFIRMATION FROM THE WS SHALL INCLUDE A DISCUSSION OF ANY RECOMMENDED FIELD ADJUSTMENTS TO ACHIEVE THE DESIRED HYDROLOGY AND SCRUB-SHRUB WETLAND ENVIRONMENT AND AN INTERIM AS-BUILT DRAWING SIGNED AND STAMPED BY A REGISTERED PROFESSIONAL LAND SURVEYOR OF THE COMMONWEALTH DEPICTING FINAL-GRADE CONTOURS (1-FOOT CONTOUR INTERVALS WITH REPRESENTATIVE SPOT ELEVATIONS IN PLAN VIEW AND A MINIMUM OF THREE SECTION VIEWS) AND THE LIMITS OF THE GRADING. THE INTERIM AS-BUILT SHALL INCLUDE A SURFACE AREA CALCULATION CONFIRMING THAT THE SPECIFIED WETLAND SQUARE FOOTAGE HAS BEEN PROVIDED (EXCLUDING SIDE SLOPES), AS PER THE PERMITS AND DESIGN DRAWINGS. THE CROSS-SECTION VIEWS SHALL DEPICT THE PROPOSED WETLAND SUB-GRADE, FINAL GRADE, PREDICTED HIGH AND LOW GROUND WATER ELEVATIONS (OR PERCHED GROUND WATER CONDITIONS AS THE CASE MAY BE), AND/OR OTHER INDICATORS OF SURFACE OR GROUND WATER HYDROLOGY INCLUDING DIRECT OBSERVATIONS AND SOIL CHARACTERISTICS. LOCATIONS OF CROSS-SECTIONS SHOULD BE INDICATED ON THE PLAN VIEW.
11. THE WS SHALL IDENTIFY ON BEHALF OF THE SITE CONTRACTOR SPECIFIC LOCATIONS IN THE WETLAND REPLICATION AREA WHERE EACH INDIVIDUAL PLANT SPECIES SPECIFIED HEREIN ARE TO BE INSTALLED BASED ON HYDROLOGY, TOPOGRAPHY, SOIL CONDITIONS AND OTHER RELEVANT FEATURES THAT WILL CONTRIBUTE TO THE SURVIVAL OF THE PLANTINGS. THE WS SHALL DIRECTLY SUPERVISE AND OVERSEE THE PLANTING WORK TO ENSURE CONFORMANCE WITH THIS SPECIFICATION. PLANTINGS SHALL BE CLUSTERED AND SPACED RANDOMLY AT THE DIRECTION OF THE SUPERVISING WS TO SIMULATE NATURAL GROWTH PATTERNS AND WHERE APPROPRIATE STRUCTURAL CONTEXT WITH OTHER PLANTINGS CAN BE MAINTAINED. THE USE OF MULCH AROUND WOODY PLANTINGS IS STRONGLY ENCOURAGED. NOTE THAT ORGANIC MULCH IS NOT CONSIDERED PART OF THE ORGANIC CONTENT OF THE WETLANDS SOIL. MULCH BALLED AND BURLAPPED OR CONTAINER-GROWN SHRUBS IN AN APPROXIMATELY 3-FOOT DIAMETER CIRCLE APPROXIMATELY 2-INCHES DEEP; MULCH BARE-ROOT WOODY PLANTINGS IN AN APPROXIMATELY 18-INCH DIAMETER CIRCLE APPROXIMATELY 2-INCHES DEEP.
12. THE REPLICATION AREA SIDE SLOPES SHALL BE STABILIZED WITH JUTE MATTING AND THE SLOPE SEED MIX SPECIFIED HEREIN.
13. IF CONSTRUCTION REQUIRES SHUT DOWN FOR THE WINTER SEASON THEN AN OVERWINTERING PLAN IS REQUIRED. THE WS SHALL PROVIDE A WRITTEN INTERIM OVERWINTERING STABILIZATION PLAN FOR REVIEW AND APPROVAL BY THE RE, EM AND MASSDEP.
14. WITHIN 30 CALENDAR DAYS FOLLOWING PLANTING OF THE REPLICATION AREA, THE WS SHALL CERTIFY IN WRITING TO MASSDEP, AND THE NORWOOD CONSERVATION COMMISSION THAT THE AREA HAS BEEN CONSTRUCTED IN COMPLIANCE WITH THE REFERENCED PERMITS AND RECORD DRAWINGS. SUCH CERTIFICATION SHALL BE ACCOMPANIED BY A WRITTEN REPORT AND THE AS-BUILT PLANS REQUIRED UNDER NOTES 7 AND 10 ABOVE. THE REPORT SHALL INCLUDE AT A MINIMUM REPRESENTATIVE SITE PHOTOGRAPHS DEPICTING EACH PHASE OF REPLICATION AREA CONSTRUCTION, RELEVANT WS FIELD NOTES AND INSPECTION REPORTS, A DISCUSSION OF HYDROLOGIC CONDITIONS, SOIL LABORATORY ANALYSIS, NUMBER AND TYPES OF PLANTS INSTALLED IN THE REPLICATION AREA AND RECEIPTS FROM THE PLANT NURSERY, AND A DISCUSSION OF ANY FIELD MODIFICATIONS DEEMED NECESSARY BY THE WS TO OBTAIN THE DESIRED HYDROLOGY AND WETLAND ENVIRONMENT.
15. AT LEAST 75% OF THE SURFACE AREA OF THE REPLICATION AREA SHALL BE ESTABLISHED WITH NATIVE WETLAND PLANT SPECIES WITHIN TWO (2) GROWING SEASONS AFTER ALL THE PLANTING IS COMPLETE.
16. THE EROSION CONTROL BARRIERS SHALL BE DISASSEMBLED AND PROPERLY DISPOSED OF BY THE SITE CONTRACTOR AFTER THE REPLICATION AREA IS DEEMED STABLE BY THE WS IN CONSULTATION WITH THE RE AND EM. SEDIMENT COLLECTED BY THESE DEVISES SHALL BE REMOVED AND DISPOSED OF IN A MANNER THAT PREVENTS EROSION AND TRANSPORT TO A WATERWAY OR WETLAND OR CONSTRUCTED WETLAND.

DuBois & King inc.
ENGINEERING • PLANNING • MANAGEMENT • DEVELOPMENT
15 CONSTITUTION DR. SUITE 1L
BEDFORD, NH 03110
TEL: (603) 637-1043
FAX: (866) 783-7101
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PROFESSIONAL SEAL

PERMITTING SET NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	BY	CK'D

NORWOOD MEMORIAL AIRPORT
111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

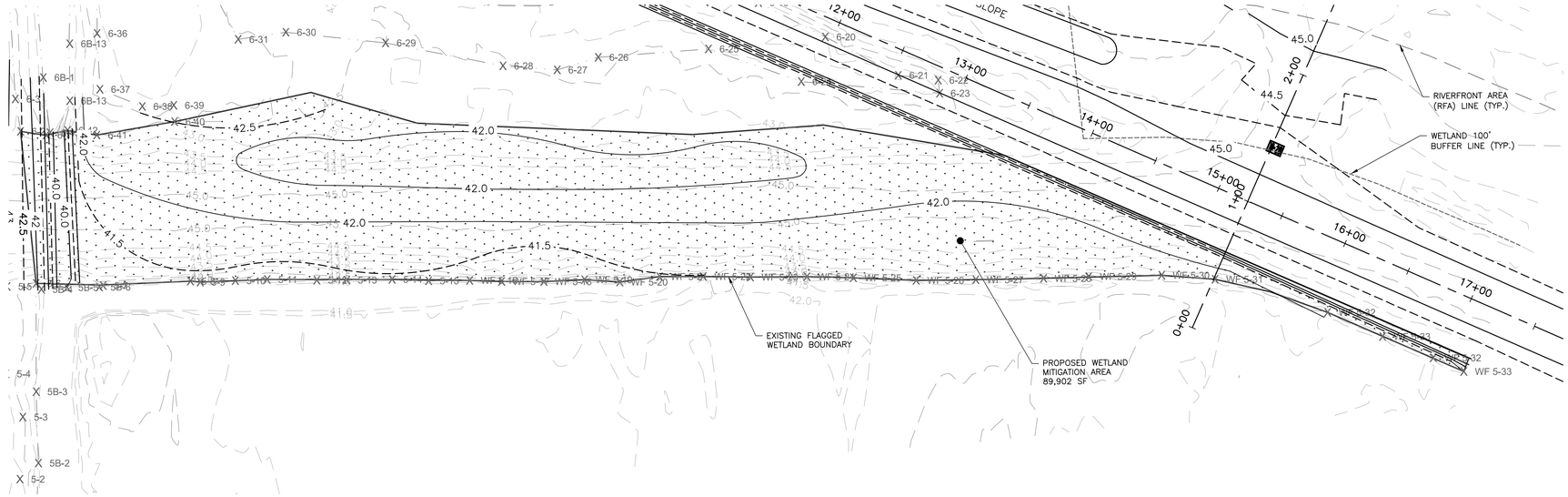
SHEET TITLE

WETLAND CONSTRUCTION NOTES

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

C4.2



LEGEND

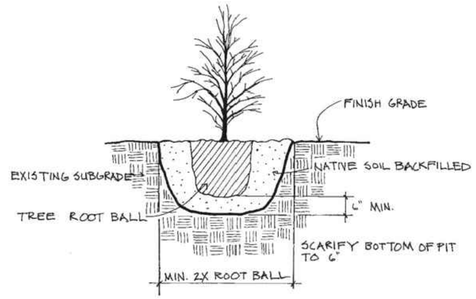
45.0	PROPOSED CONTOUR LINE
45.0	EXISTING CONTOUR LINE
SF	SILT FENCE
X WF #-##	WETLAND FLAGS

PLANTING PLAN

SCALE: 1"=50'

PLANTING NOTES:

1. PLANT MATERIAL SHALL BE FURNISHED AND INSTALLED AS INDICATED; INCLUDING ALL LABOR, MATERIALS, PLANTS, EQUIPMENT, INCIDENTALS, WARRANTEES, AND CLEAN–UP. PLANTS SHALL BE TYPICAL OF THEIR SPECIES AND VARIETY; HAVE NORMAL GROWTH HABITS; WELL DEVELOPED BRANCHES, DENSELY FOLIATED, VIGOROUS ROOT SYSTEMS AND BE FREE FROM DEFECTS AND INJURIES. CONTRACTOR SHALL REPORT ANY SOIL OR DRAINAGE CONDITIONS CONSIDERED DETRIMENTAL TO THE GROWTH OF PLAN MATERIAL TO THE WETLAND SPECIALIST AND ENGINEER.
2. ALL PLANT MATERIAL SHALL BE PURCHASED FROM A NEW ENGLAND WETLAND PLANT NURSERY AND GUARANTEED BY THE CONTRACTOR TO BE IN VIGOROUS GROWING CONDITION. PROVISIONS SHALL BE MADE FOR A GROWTH GUARANTEE OF AT LEAST ONE (1) CALENDAR YEAR FROM THE DATE OF PROJECT SUBSTANTIALLY COMPLETE FOR TREES AND SHRUBS. REPLACEMENTS SHALL BE MADE AT THE BEGINNING OF THE FIRST SUCCEEDING PLANTING SEASON. ALL REPLACEMENTS SHALL HAVE A GUARANTEE EQUAL TO THAT STATED ABOVE.
3. PRIOR TO THE PLANTING STOCK DELIVERY TO THE SITE, THE WETLAND SCIENTIST WILL VISIT THE NURSERY PROVIDING THE PLANTING STOCK TO ENSURE THAT THE SPECIMENS ARE HEALTHY, FREE OF DISEASE AND PESTS, CONTAIN A WELL DEVELOPED ROOT SYSTEM, AND ARE SUITABLE FOR USE WITHIN THE REPLACEMENT AREAS. UNSUITABLE SPECIMENS WILL BE REJECTED AND REPLACED WITH SUITABLE SPECIMENS. THE WS MAY PROPOSE SUBSTITUTIONS RELATIVE TO SPECIES, SIZE AND QUANTITIES TO THE RE, EM AND MASSDEP FOR REVIEW AND APPROVAL IF THERE IS LIMITED AVAILABILITY OF PLANT STOCK AT THE TIME OF PLANTING. THE ENVIRONMENTAL MONITOR AND ENGINEER MUST APPROVE ANY PLANTING–SUBSTITUTIONS. ALL WOODY PLANT STOCK WILL EITHER BE BARE–ROOT OR CONTAINER–GROWN.
4. INSOFAR AS IT IS PRACTICABLE, PLANT MATERIAL SHALL BE PLANTED ON THE DAY OF DELIVERY. IN THE EVENT THIS IS NOT POSSIBLE, THE CONTRACTOR SHALL PROTECT STOCK NOT PLANTED. PLANTS SHALL NOT REMAIN UNPLANTED FOR LONGER THAN A THREE DAY CALENDAR PERIOD AFTER DELIVERY. ANY PLANTS NOT INSTALLED DURING THIS PERIOD MAY BE REJECTED BY THE ENGINEER.
5. QUALITY AND SIZE OF PLANTS, SPREAD OF ROOTS, AND SIZE OF BALLS SHALL BE IN ACCORDANCE WITH ANSI 260 (REV. 1980) "AMERICAN STANDARD FOR NURSERY STOCK" AS PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, INC.
6. ALL PLANTS SHALL BE PLANTED IN TRANSPORTED TOPSOIL THAT IS THOROUGHLY WATERED AND TAMPED AS BACK FILLING PROGRESSES. PLANTING MIX TO BE AS SHOWN ON PLANTING DETAILS. RAISE AND REPLANT ANY PLANT WHICH SETTLES MORE THAN 2" AFTER PLANTING AND WATERING.
7. FERTILIZER FOR WOODY PLANTS SHALL BE SLOW RELEASE, PELLITIZED AND SUITABLE FOR RELEASE UNDER SATURATED SOIL CONDITIONS. FERTILIZER SHALL BE OSMOCOATE 18–5–11, 12–14 MONTH RELEASE OR APPROVED EQUAL.
8. PLANTS SHALL NOT BE BOUND WITH WIRE OR ROPE AT ANY TIME SO AS TO DAMAGE THE BARK OR BREAK BRANCHES. PLANTS SHALL BE HANDLED FROM THE BOTTOM OF THE BALL ONLY.
9. PLANTING OPERATIONS SHALL BE PERFORMED DURING PERIODS WITHIN THE PLANTING SEASON WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE AS DETERMINED BY THE ENVIRONMENTAL MONITOR AND ENGINEER. THIS IS TYPICALLY BETWEEN APRIL 15 – JUNE 15 AND SEPTEMBER 15 – NOVEMBER 15. PLANTS SHALL NOT BE INSTALLED IN TOPSOIL THAT IS IN A MUDDY OR FROZEN CONDITION. THE SITE CONTRACTOR SHALL BE RESPONSIBLE FOR RE–SETTING ANY PLANTS THAT BECOME DISLODGED OR UPROOTED AS A RESULT OF FROST HEAVES OR OTHER ENVIRONMENTAL FACTORS DURING THE FIRST TWO GROWING SEASONS.
10. THE SPECIES, SIZE, AND QUANTITY OF THE PLANTINGS SHALL FOLLOW THE APPROVED PLANTING SCHEDULE AND SPECIFICATIONS DEPICTED.
11. ALL PLANTINGS WILL BE ARRANGED BY THE SITE CONTRACTOR'S WETLAND SPECIALIST IN VARIABLY SHAPED CLUSTERS OF MULTIPLE SPECIES TO SIMULATE NATURAL GROWTH PATTERNS, SUCH THAT THE WETLAND MITIGATION AREA WILL CONTAIN AN EQUAL NUMBER OF ALL SPECIES FOLLOWING PLANTING. SET ALL PLANTS PLUMB AND STRAIGHT.
12. PLANTS SHOULD BE INSTALLED IN AREAS BEST SUITED FOR THEIR GROWING PATTERNS AND CONDITIONS. PLANTS SHOULD BE PLACED IN LOCATIONS WITH SUITABLE HYDROLOGY AND SOILS AND WHERE APPROPRIATE STRUCTURAL CONTEXT WITH OTHER PLANTINGS CAN BE MAINTAINED IN CONSULTATION WITH THE EM.
13. NEW PLANTING AREAS SHALL BE ADEQUATELY IRRIGATED OR WATERED TO ESTABLISH THE PROPOSED PLANTS AND SEED AREAS IMMEDIATELY AFTER PLANTING. SEE ALSO NOTE 18.
14. THE EXPOSED SIDESLOPE SUBSTRATE SHALL BE PROTECTED AGAINST EROSION UNTIL RE–ESTABLISHEMENT OF HERBACEOUS VEGETATION OCCURS.
15. UPON COMPLETION OF PLANTING, AN AREA 2 TO 3 FEET WIDE FROM THE CENTRAL PLANT STALK SHALL BE MULCHED WITH A 2 TO 3–INCH THICK LAYER OF LEAF LITTER OR OTHER NATURAL ORGANIC MATERIAL TO ENSURE THE SHRUB WILL RECEIVE ADEQUATE SUN EXPOSURE AND WILL NOT COMPETE WITH LARGER HERBACEOUS SPECIES IN THE PLANT MIX.
16. ANY PORTION OF THE MITIGATION AREA NOT MEETING THE APPROVED STANDARDS OR REQUIREMENTS OF THE MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION, U.S. ARMY CORPS OF ENGINEERS, OR OTHER LOCAL, STATE, OR FEDERAL RESOURCE AGENCY SHALL BE PROMPTLY REMEDIATED AT NO COST/EXPENSE TO THE OWNER.
17. THE WETLAND SEED MIX SHALL BE SOWN ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.
18. DUE TO UNPREDICTABILITY OF SHORT TERM LOCAL HYDROLOGIC CONDITIONS AND THE NEED FOR ADDITIONAL CARE TO ESTABLISH NEW PLANTINGS THE SITE CONTRACTOR SHALL IRRIGATE THE PLANTINGS, AS NECESSARY AND AS DIRECTED BY THE RE, WS OR EM, DURING THE FIRST GROWING SEASON AFTER PLANTING. IRRIGATION SHALL BE PERFORMED WITH A WATER TRUCK.
19. THE SITE CONTRACTOR SHALL SUBMIT MANUFACTURER'S SHOP DRAWINGS FOR THE FERTILIZER AND CERTIFICATIONS FOR THE PLANTS.
20. FOR WETLAND CONSTRUCTION NOTES, SEE DWG NO. P1.2.



Typical Shrub Planting Detail

WETLAND SEED MIX SPECIFICATION:

ERNST FACW MEADOW MIX (TYP.) (OR EQUIVALENT) – CAREX VULPINOIDEA, PA ECOTYPE (FOX SEDGE, PA ECOTYPE) ELYMUS RIPARIUS, PA ECOTYPE (RIVERBANK WILDRYE, PA ECOTYPE) CAREX LURIDA, PA ECOTYPE (LURID (SHALLOW) SEDGE, PA ECOTYPE) CAREX LUPULINA, PA ECOTYPE (HOP SEDGE, PA ECOTYPE) VERBENA HASTATA, PA ECOTYPE (BLUE VERVAIN, PA ECOTYPE) CAREX SCOPARIA, PA ECOTYPE (BLUNT BROOM SEDGE, PA ECOTYPE) JUNCUS EFFUSUS (SOFT RUSH) CINNA ARUNDINACEA, PA ECOTYPE (WOOD REEDGRASS, PA ECOTYPE) ASCLEPIAS INCARNATA, PA ECOTYPE (SWAMP MILKWEED, PA ECOTYPE) ASTER NOVAE–ANGLIAE (SYMPHYOTRICHUM N.), PA ECOTYPE (NEW ENGLAND ASTER, PA ECOTYPE) GLYCERIA CANADENSIS, PA ECOTYPE (RATTLESNAKE GRASS, PA ECOTYPE) ONOCLEA SENSIBILIS (SENSITIVE FERN) SCIRPUS CYPERINUS, PA ECOTYPE (WOOLGRASS, PA ECOTYPE) HELENIUM AUTUMNALE, PA ECOTYPE (COMMON SNEEZEWEED, PA ECOTYPE) ALISMA SUBCORDATUM (A. PLANTAGO–AQUATICA), PA ECOTYPE (MUD PLANTAIN (WATER PLANTAIN), PA ECOTYPE) ASTER PUNICEUS (SYMPHYOTRICHUM PUNICEUM), PA ECOTYPE (PURPLESTEM ASTER, PA ECOTYPE) ASTER UMBELLATUS (DOELLINGERIA UMBELLATA), PA ECOTYPE (FLAT TOPPED WHITE ASTER, PA ECOTYPE) EUPATORIUM FISTULOSUM, PA ECOTYPE (JOE PYE WEED, PA ECOTYPE) EUPATORIUM PERFOLIATUM, PA ECOTYPE (BONESET, PA ECOTYPE) JUNCUS TENUIS, PA ECOTYPE (PATH RUSH, PA ECOTYPE) LUDWIGIA ALTERNIFOLIA, PA ECOTYPE (SEEDBOX, PA ECOTYPE) MIMULUS RINGENS, PA ECOTYPE (SQUARE STEMMED MONKEYFLOWER, PA ECOTYPE) SISYRINCHIUM ANGUSTIFOLIUM (NARROWLEAF BLUE EYED GRASS) CAREX INTUMESCENS, PA ECOTYPE (BLADDER (STAR) SEDGE, PA ECOTYPE) CHELONE GLABRA, PA ECOTYPE (TURTLEHEAD, PA ECOTYPE)

SLOPE SEED MIX SPECIFICATION:

NEW ENGLAND CONSERVATION / WILDLIFE MIX (TYP.) (OR EQUIVALENT) – VIRGINIA WILD RYE, (ELYMUS VIRGINICUS), LITTLE BLUESTEM, (SCHIZACHYRIUM SCOPARIUM), BIG BLUESTEM, (ANDROPOGON GERARDII), CREEPING RED FESCUE, (FESTUCA RUBRA), SWITCH GRASS, (PANICUM VIRGATUM), PARTRIDGE PEA, (CHAMAECRISTA FASCICULATA), DEER TONGUE, (PANICUM CLANDESTIUM,), INDIAN GRASS, (SORGHASTRUN NUTANS), OX EYE SUNFLOWER, (HELIOPSIS HELIANTHOIDES), COMMON MILKWEED, (ASCLEPIAS SYRIACA), SPOTTED JOE PYE WEED, (EUPATORIUM MACULATUM), GRASS LEAVED GOLDENROD, (EUTHAMIA GRAMINIFOLIA), BLUE VERVAIN, (VERBENA HASTATA), NEW ENGLAND ASTER, (ASTER NOVAE–ANGLIAE), EARLY GOLDENROD, (SOLIDAGO JUNCEA). (APPLICATION RATE = 1 LB PER 1,750 SQUARE FEET).

WETLAND REPLICATION AREA PLANTING SCHEDULE

BOTANICAL PLANT NAME	COMMON PLANT NAME	SIZE	QUANTITY	WETLAND INDICATOR STATUS
STEEPLEBUSH	SPIRAEA TOMENTOSA	3–4 FT	15	FACW
BUTTONBUSH	CEPHALANTHUS OCCIDENTALIS	3–4 FT	10	OBL
MEADOWSWEET	SPIRAEA ALBA	3–4 FT	15	FACW
NEW ENGLAND WETMIX (TM)		1 LB/2,500 SF	6 LBS	VARIED

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PROFESSIONAL SEAL

PERMITTING SET NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	BY	CK'D

NORWOOD MEMORIAL AIRPORT
111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

PLANTING PLAN, NOTES, SCHEDULE AND DETAILS

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

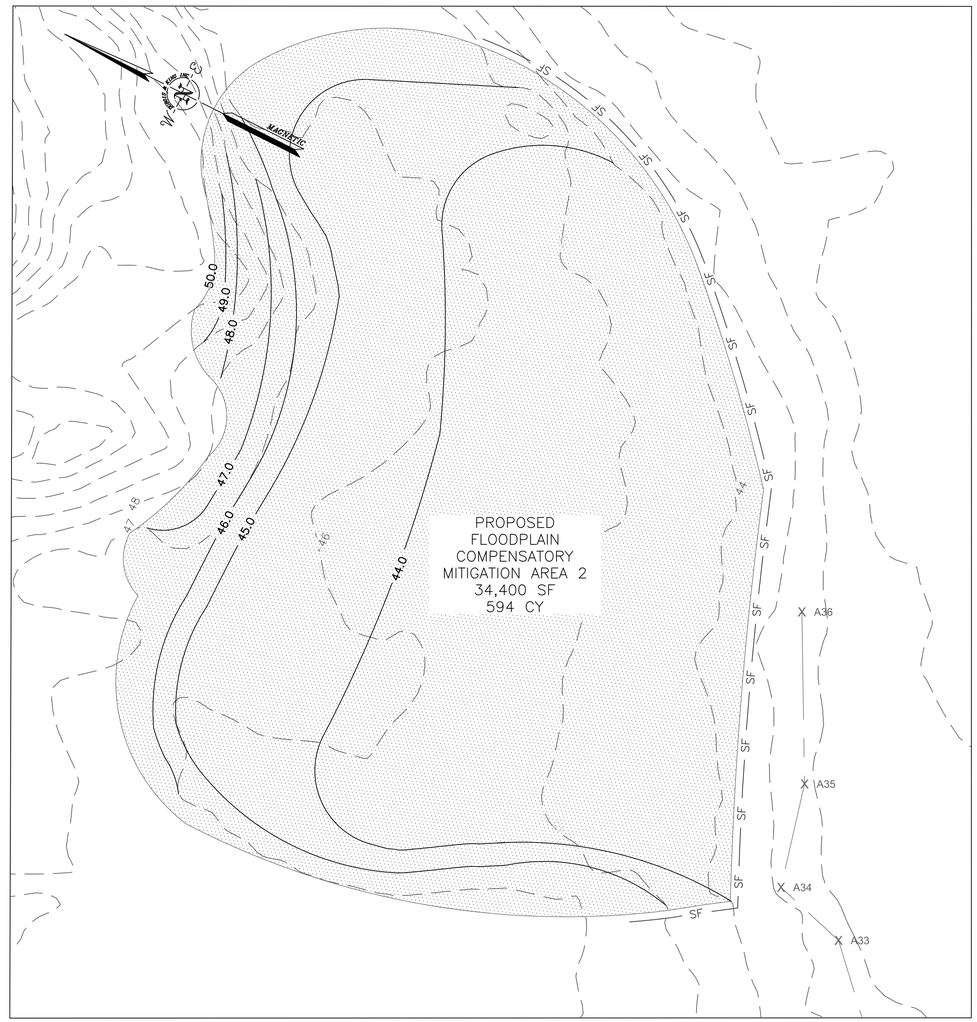
C4.3

SHEET 28 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\26-27_C4.3-C4.4 Wetland Construction Notes and details.dwg JUNE 2021

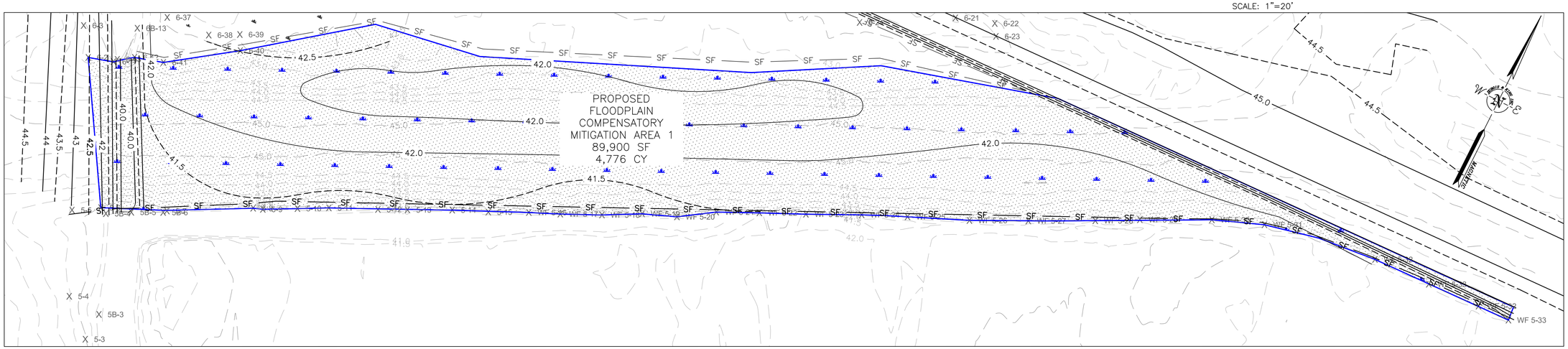
100-YEAR FLOODPLAIN IMPACTS AND MITIGATION SUMMARY

	PROPOSED FLOODPLAIN IMPACTS- TW'C'	PROPOSED FLOODPLAIN IMPACTS- RUNWAY SAFETY AREAS	TOTAL FLOODPLAIN IMPACTS	COMPENSATORY STORAGE AREA 1	COMPENSATORY STORAGE AREA 2	TOTAL COMPENSATORY STORAGE
CONTOUR ELEVATION	FILL (CY)	FILL (CY)	FILL (CY)	COMPENSATORY STORAGE (CY)	COMPENSATORY STORAGE (CY)	COMPENSATORY STORAGE (CY)
43–44	1,747	6	1,754	2,234	–	2,234
44–45	1,999	63	2,062	1,592	470	2,062
45–46	352	108	460	950	–	950
46–47	–	113	113	–	113	113
47–47.1	–	11	11	–	11	11
TOTAL	4,098	301	4,399	4,776	594	5,370



COMPENSATORY STORAGE AREA 2

SCALE: 1"=20'



COMPENSATORY STORAGE AREA 1

SCALE: 1"=40'

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ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

100 YEAR FLOODPLAIN MITIGATION PLAN

DRAWN BY	DATE
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CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
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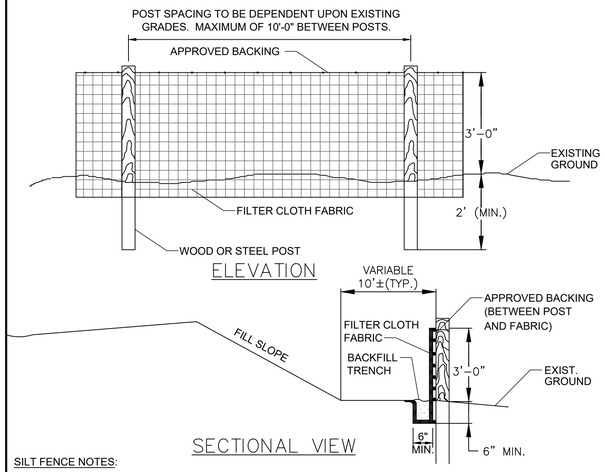
C5.1

SHEET 29 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\100 YEAR FLOODPLAIN MITIGATION PLAN.dwg JUNE 2021

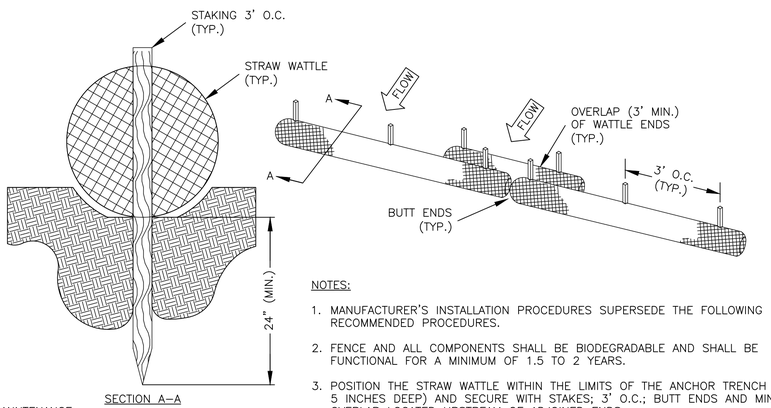


SILT FENCE NOTES:

1. PREASSEMBLED SILT FENCING AS MANUFACTURED FOR THIS PURPOSE IS ACCEPTABLE IN LIEU OF A FIELD CONSTRUCTED SILT FENCE UPON APPROVAL BY THE ENGINEER.
2. FILTER CLOTH SHALL HAVE APPROVED BACKING OR A BUILT-IN REINFORCED STRUCTURE, AS RECOMMENDED BY THE MANUFACTURER TO SUPPORT THE FILTER CLOTH.
3. SILT FENCE SHALL BE CONSTRUCTED AT LOCATIONS AS SHOWN ON PLANS OR WHERE DIRECTED BY THE ENGINEER.
4. THE CONTRACTOR SHALL MAINTAIN THE SILT FENCES DURING THE LIFE OF THE CONTRACT. SILT ACCUMULATIONS SHALL BE REMOVED AND THE FENCES SHALL REMAIN IN PLACE.
5. THE CONTRACTOR SHALL BE REQUIRED TO PREVENT SOIL EROSION FROM LEAVING THE CONSTRUCTION AREA.
6. AFTER AN ACCEPTABLE STAND OF TURF HAS BEEN ESTABLISHED, THE CONTRACTOR SHALL REMOVE AND DISPOSE OF THE SILT FENCE TO AN ACCEPTABLE LOCATION OFF OF AIRPORT PROPERTY.

STANDARD TEMPORARY SILT FENCE

NOT TO SCALE



NOTES:

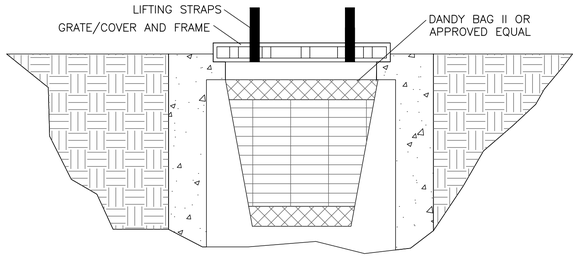
1. MANUFACTURER'S INSTALLATION PROCEDURES SUPERSEDE THE FOLLOWING RECOMMENDED PROCEDURES.
2. FENCE AND ALL COMPONENTS SHALL BE BIODEGRADABLE AND SHALL BE FUNCTIONAL FOR A MINIMUM OF 1.5 TO 2 YEARS.
3. POSITION THE STRAW WATTLE WITHIN THE LIMITS OF THE ANCHOR TRENCH (3 TO 5 INCHES DEEP) AND SECURE WITH STAKES; 3' O.C.; BUTT ENDS AND MIN. 3' OVERLAP LOCATED UPSTREAM OF ADJOINED ENDS

MAINTENANCE:

1. STRAW WATTLES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAILFALL AND AT LEAST DAILY DURING PROLONGED RAILFALL EVENTS. ALL REPAIRS, INCLUDING EVIDENCE OF FABRIC DECOMPOSITION OR INEFFECTIVENESS DURING THE EXPECTED LIFE OF THE WATTLE, SHALL BE MADE IMMEDIATELY.
2. SEDIMENT DEPOSITS LOCATED ALONG THE UP-HILL SIDE SHALL BE REMOVED AFTER EACH STORM EVENT OR WHEN DEPOSITS REACH APPROXIMATELY ONE HALF THE HEIGHT OF THE UP-HILL ORIGINAL INSTALLED BARRIER'S REVEAL. SEDIMENT CONTROL DEVICES SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL AREAS UPSLOPE ARE PERMANENTLY STABILIZED.
3. SEDIMENT DEPOSITS THAT ARE REMOVED SHALL BE GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATED.

STRAW WATTLE DETAIL

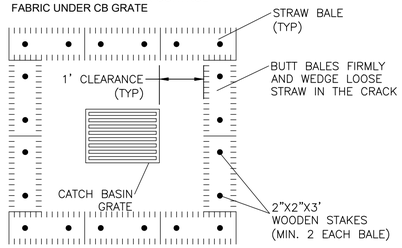
NOT TO SCALE



CATCH BASIN INLET PROTECTION

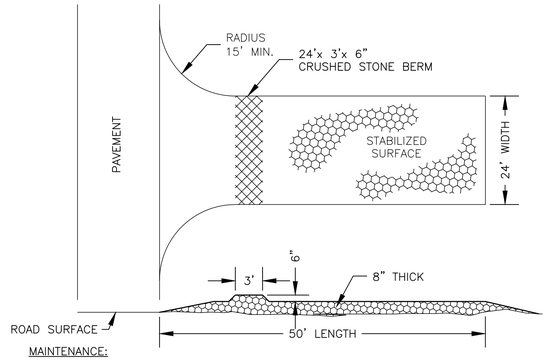
NOT TO SCALE

NOTE:
CONTRACTOR WILL NOT BE PERMITTED TO SUBSTITUTE SILTATION CONTROL FABRIC UNDER CB GRATE



INLET PROTECTION

NOT TO SCALE

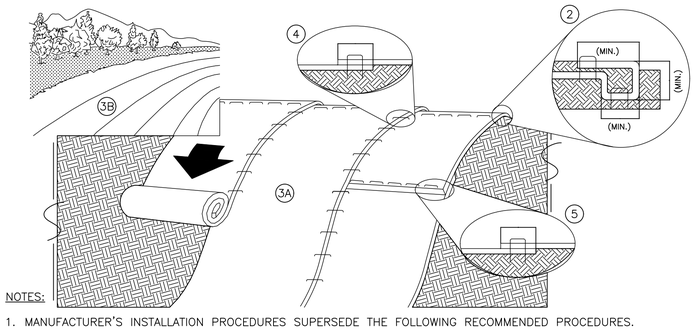


MAINTENANCE:

1. IN THE EVENT THAT MUD OR SOIL PARTICLES CLOG THE VOIDS OF THE CONSTRUCTION ENTRANCE, THE CONSTRUCTION ENTRANCE SHOULD BE TOPDRESSED WITH NEW STONE. COMPLETE REPLACEMENT OF THE CONSTRUCTION ENTRANCE MAY BE REQUIRED.
2. IF WASH FACILITIES ARE USED, SEDIMENTATION TRAPS SHOULD BE CLEANED AS OFTEN AS NECESSARY TO ASSURE THAT ADEQUATE PERFORMANCE OF SEDIMENTATION COLLECTION AND STORAGE IS AVAILABLE.

STABILIZED CONSTRUCTION ENTRANCE

(TEMPORARY, TO BE REMOVED PRIOR TO FINAL PAVING)
NOT TO SCALE



NOTES:

1. MANUFACTURER'S INSTALLATION PROCEDURES SUPERSEDE THE FOLLOWING RECOMMENDED PROCEDURES.
2. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP)
3. BEGIN INSTALLATION OF MATTING AT THE TOP OF THE SLOPE BY ANCHORING THE RECP IN A 6" DEEP X 6" WIDE TRENCH WITH 12" (APPROX.) OF RECP EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP WITH A ROW OF STAPLES/STAKES 12" (APPROX.) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED 12" (APPROX.) APART ACROSS THE WIDTH OF THE RECP.
4. ROLL THE RECP (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. ALL RECP MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS
5. THE EDGES OF PARALLEL RECP's SHALL BE STAPLED WITH A 2" TO 5" (APPROX.) OVERLAP.
6. CONSECUTIVE RECP SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH A 3" (APPROX.) OVERLAP. STAPLE THROUGH OVERLAPPED AREA 12" (APPROX.) APART ACROSS ENTIRE RECP WIDTH.
7. IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE RECP.

SLOPE STABILIZATION MATTING DETAIL

NOT TO SCALE

GENERAL EROSION AND SEDIMENTATION CONTROL NOTES:

THIS PLAN HAS BEEN DEVELOPED AS A STRATEGY TO CONTROL SOIL EROSION AND SEDIMENTATION DURING AND AFTER CONSTRUCTION. THIS PLAN IS BASED ON THE STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION IN DEVELOPING AREAS AS CONTAINED IN THE MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION (MASSDEP) STORMWATER HANDBOOK. THE PROPOSED LOCATIONS OF EROSION CONTROL BEST MANAGEMENT PRACTICES (TO BE INSTALLED AT A MINIMUM) ARE SHOWN ON THE PLAN SET HEREIN.

1. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE DONE IN ACCORDANCE WITH THE "MASSACHUSETTS STORMWATER HANDBOOK", PUBLISHED BY THE MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION (MASSDEP); DATED JANUARY 2, 2008 (OR CURRENT EDITION).
2. THOSE AREAS UNDERGOING ACTUAL CONSTRUCTION SHALL BE MAINTAINED IN AN UNTREATED OR UNVEGETATED CONDITION FOR THE MINIMUM TIME REQUIRED. IN GENERAL, ALL DISTURBED AREAS SHALL NOT BE LEFT BARE FOR MORE THAN 30 DAYS, SHALL BE STABILIZED IN A MANNER TO MITIGATE EROSION OR SEDIMENTATION FROM EXITING THE LIMIT OF WORK AND SHALL BE RESTORED IN-KIND UPON COMPLETION OF THE PROJECT. THE MAXIMUM AREA ALLOWED TO BE DISTURBED AND LEFT UNSTABILIZED IS TWO (2) ACRES AT ANY ONE TIME
3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSPECT, MONITOR AND MAINTAIN ALL EROSION CONTROL STRUCTURES.
4. SEDIMENT BARRIERS (SILT FENCE, STONE CHECK DAMS, STABILIZED CONSTRUCTION ENTRANCES, ETC.) SHALL BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE OF UP-GRADIENT DRAINAGE AREAS.
5. ALL EXISTING STORM DRAINAGE INLETS SHALL BE PROTECTED BY STRAW BALE FILTERS AND CATCH BASIN FILTER BASKETS TO PREVENT ENTRY OF SEDIMENT FROM RUNOFF WATERS INTO THE STORM DRAIN SYSTEM.
6. NO TREES ARE TO BE REMOVED FROM AREAS OUTSIDE THE LIMITS OF PROPOSED CLEARING. IF TREES DESIGNATED TO BE SAVED ARE DAMAGED, CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING THEM AT NO COST TO THE OWNER OR OWNER'S REPRESENTATIVE.
7. SLOPES, EITHER PERMANENT OR TEMPORARY, BETWEEN SLOPES 3 HORIZONTAL TO ONE VERTICAL (3:1) TO TWO HORIZONTAL TO ONE VERTICAL (2:1) SHALL BE STABILIZED WITH EROSION CONTROL BLANKETS AND ANCHORED MULCH NETTING (100% BIODEGRADABLE – PLASTIC NETTING WILL NOT BE ALLOWED – AND BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS). SLOPES STEEPER THAN ONE HORIZONTAL TO ONE VERTICAL (1:1) SHALL BE STABILIZED WITH RIPRAP.
8. CUT AND FILL AREAS ARE TO BE PERMANENTLY STABILIZED AS SOON AS PRACTICABLE BUT NO LATER THAN 72 HOURS FOLLOWING FINAL GRADING.
9. ALL AREAS OF EXPOSED OR DISTURBED SOIL TO BE STABILIZED AS SOON AS PRACTICABLE BUT NO LATER THAN 45 DAYS FROM THE TIME OF INITIAL DISTURBANCE, UNLESS A SHORTER TIME IS SPECIFIED BY LOCAL AUTHORITIES, THE CONSTRUCTION SEQUENCE APPROVED AS PART OF THE ISSUED PERMIT, OR AN INDEPENDENT MONITOR.
10. PERMANENT OR TEMPORARY COVER MUST BE IN PLACE BEFORE THE GROWING SEASON ENDS. WHEN SEEDED AREAS ARE MULCHED, PLANTINGS MAY BE MADE FROM EARLY SPRING TO EARLY OCTOBER. WHEN SEEDED AREAS ARE NOT MULCHED, SEED SHOULD BE PLACED FROM EARLY SPRING TO MAY 20 OR FROM AUGUST 15 TO SEPTEMBER 15. NO DISTURBED AREA SHALL BE LEFT EXPOSED DURING WINTER MONTHS (NOVEMBER THROUGH MARCH). SEE WINTER CONSTRUCTION NOTES. PLANT ANNUAL RYE GRASS PRIOR TO OCTOBER 15TH.
11. AFTER OCTOBER 15TH: WHERE MULCH IS USED, IT SHALL BE APPLIED AT TWICE THE RATE AS DURING REGULAR CONSTRUCTION SEASON TO PROVIDE ADDITIONAL PROTECTION. SNOW AND ICE SHALL BE REMOVED TO A THICKNESS LESS THAN ONE INCH BEFORE APPLYING MULCH (IF APPLICABLE) TO DISTURBED SOILS. WHERE FINISHED GRADE IS ACHIEVED, OR BEFORE FORECASTED THAW OR SPRING MELT, MULCH MUST BE SECURED WITH EROSION CONTROL NETTING, TRACKING, OR OTHER METHOD. DIVERSION SWALES OR DITCHES WITHOUT STABILIZED VEGETATION BY OCTOBER 15TH SHALL BE STABILIZED WITH STONE FILL OR EROSION CONTROL NETTING AS APPROVED BY OWNER OR OWNER'S DESIGNATED REPRESENTATIVE.
12. ONCE DISTURBED AREAS HAVE BEEN STABILIZED AND VEGETATION IS ESTABLISHED, ALL TEMPORARY EROSION CONTROL MEASURES SUCH AS SILT FENCE SHALL BE REMOVED. AREAS DISTURBED BY REMOVAL OF THESE MEASURES SHALL BE IMMEDIATELY SEEDED ACCORDING TO SEEDING SPECIFICATIONS ON THESE DRAWINGS.
13. SPECIES CONSIDERED LOCALLY INVASIVE OR NOXIOUS MAY NOT BE USED.
14. USE ONLY NON-PHOSPHATE FERTILIZERS WITHIN 20' OF SURFACE WATERS.
15. DURING THE CONSTRUCTION PHASE, INTERCEPTED SEDIMENT WILL BE RETURNED TO THE SITE AND RE-GRADED ONTO OPEN AREAS. POST SEEDING SEDIMENT, IF ANY, WILL BE DISPOSED OF IN AN ACCEPTABLE MANNER.
16. RE-VEGETATION MEASURES WILL COMMENCE UPON COMPLETION OF CONSTRUCTION EXCEPT AS NOTED ABOVE. ALL DISTURBED AREAS NOT OTHERWISE STABILIZED WILL BE GRADED, SMOOTHED, AND RE-VEGETATED AS FOLLOWS:
    - 16.1. A MINIMUM OF FOUR (4) INCHES OF LOAM WILL BE SPREAD OVER DISTURBED AREAS AND SMOOTHED TO A UNIFORM SURFACE.
    - 16.2. APPLY LIMESTONE AND FERTILIZER ACCORDING TO SOIL TEST. IF SOIL TESTING IS NOT DEEMED FEASIBLE ON SMALL OR VARIABLE SITES, OR WHERE TIMING IS CRITICAL, FERTILIZER MAY BE APPLIED AT THE RATE OF 800 POUNDS PER ACRE OR 18.4 POUNDS PER 1,000 SQUARE FEET USING 10-20-20 (N-P205-K20) OR EQUIVALENT. APPLY GROUND LIMESTONE (EQUIVALENT TO 50% CALCIUM PLUS MAGNESIUM OXIDE) AT A RATE OF 3 TONS PER ACRE (138 LB PER 1,000 SQ. FT.).
    - 16.3. FOLLOWING SEED BED PREPARATION, DITCHES AND BACK SLOPES WILL BE SEEDED WITH A MIXTURE OF 47% CREEPING RED FESCUE, 5% REDTOP, AND 48% TALL FESCUE. THE LAWN AREAS WILL BE SEEDED WITH A PREMIUM TURF MIXTURE OF 44% KENTUCKY BLUEGRASS, 44% CREEPING RED FESCUE, AND 12% PERENNIAL RYE GRASS: SEEDING RATE IS 1.03 LBS PER 1000 SQ. FT. LAWN QUALITY SOD MAY BE SUBSTITUTED FOR SEED.
    - 16.4. HAY MULCH AT THE RATE OF 70-90 LBS PER 1000 SQUARE FEET OR A HYDRO- APPLICATION OF CELLULOSE FIBER SHALL BE APPLIED FOLLOWING SEEDING. A SUITABLE BINDER WILL BE USED ON HAY MULCH FOR WIND CONTROL.
17. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED ONCE THE SITE IS STABILIZED.
18. AN AREA IS CONSIDERED "STABLE" IF ONE OF THE FOLLOWING HAS OCCURRED: BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED; A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED; A MINIMUM OF 3" OF NON-EROSIVE MATERIAL (SUCH AS STONE RIP RAP OR A CERTIFIED COMPOST BLANKET) HAS BEEN INSTALLED; OR EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
19. WETLANDS WILL BE PROTECTED WITH SILT FENCE INSTALLED AT THE EDGE OF THE WETLAND OR THE BOUNDARY OF WETLAND DISTURBANCE.
20. IN GENERAL, AREAS WITHIN 100 FEET OF DELINEATED WETLANDS OR STREAMS SHALL HAVE A MAXIMUM PERIOD OF EXPOSURE OF NOT MORE THAN 15 DAYS.
21. FOLLOW APPROPRIATE EROSION CONTROL MEASURES PRIOR TO EACH STORM IN ALL AREAS WITHIN 100 FEET OF DELINEATED WETLANDS OR STREAMS.
22. THE DETENTION POND SHALL NOT HAVE WATER DIRECTED TO IT UNTIL THE SLOPES HAVE ESTABLISHED A 75% VEGETATIVE GROWTH.

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NO.	DESCRIPTION	DATE	BY	CK'D

NORWOOD MEMORIAL AIRPORT
111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

SEDIMENT AND EROSION CONTROL NOTES AND DETAILS

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
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SHEET NUMBER

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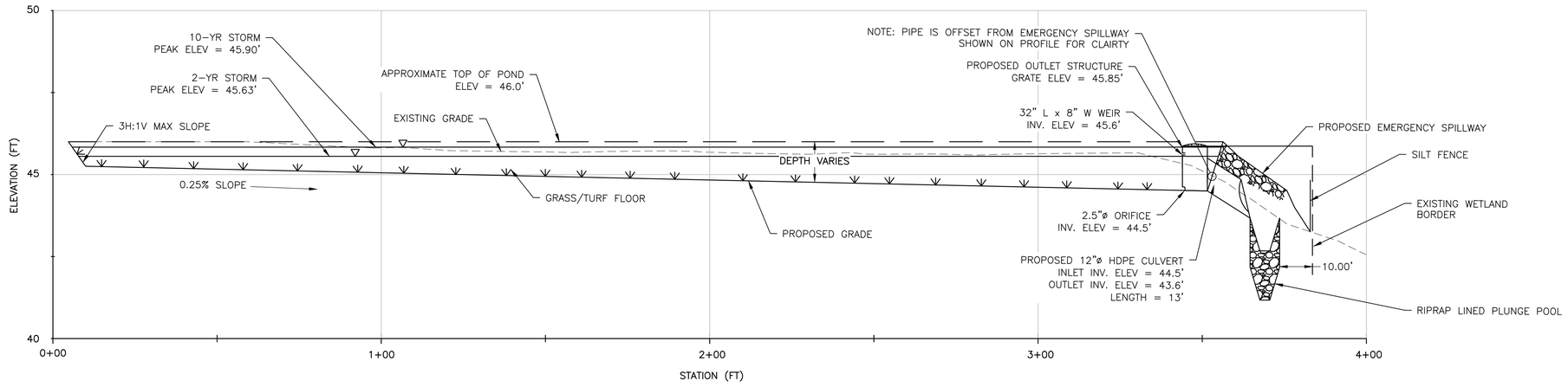
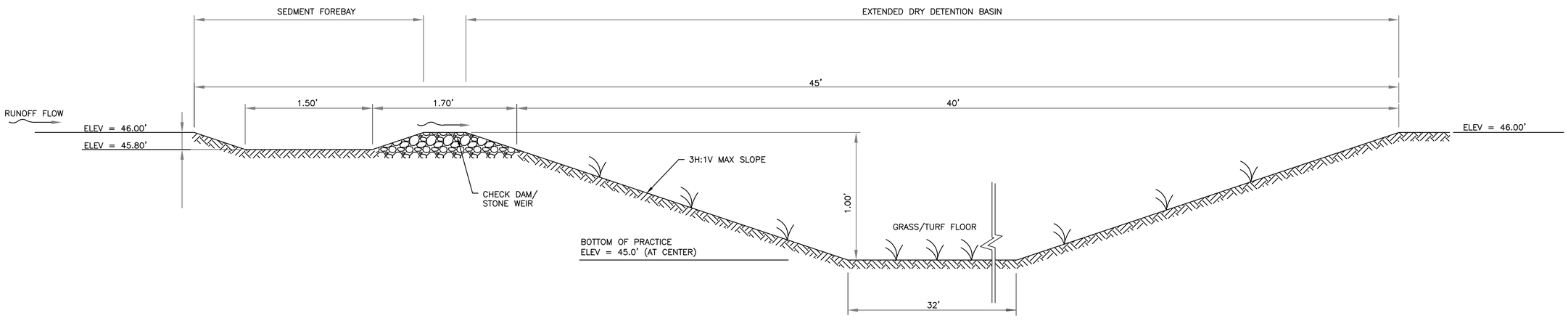
SHEET 30 OF 41

I:\3\326165 Norwood Airport EA - 2020\Drawings\15_E1_Erosion Control Details.dwg JUNE 2021



RUNWAY 17 EAST EXTENDED DRY DETENTION BASIN PROFILE (C–C')

NOT TO SCALE



RUNWAY 17 EAST EXTENDED DRY DETENTION BASIN CROSS SECTION (D–D')

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NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

DRAINAGE DETAILS (1 OF 4)

DRAWN BY	DATE
DSC	AUG. 2021
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MCG	326165
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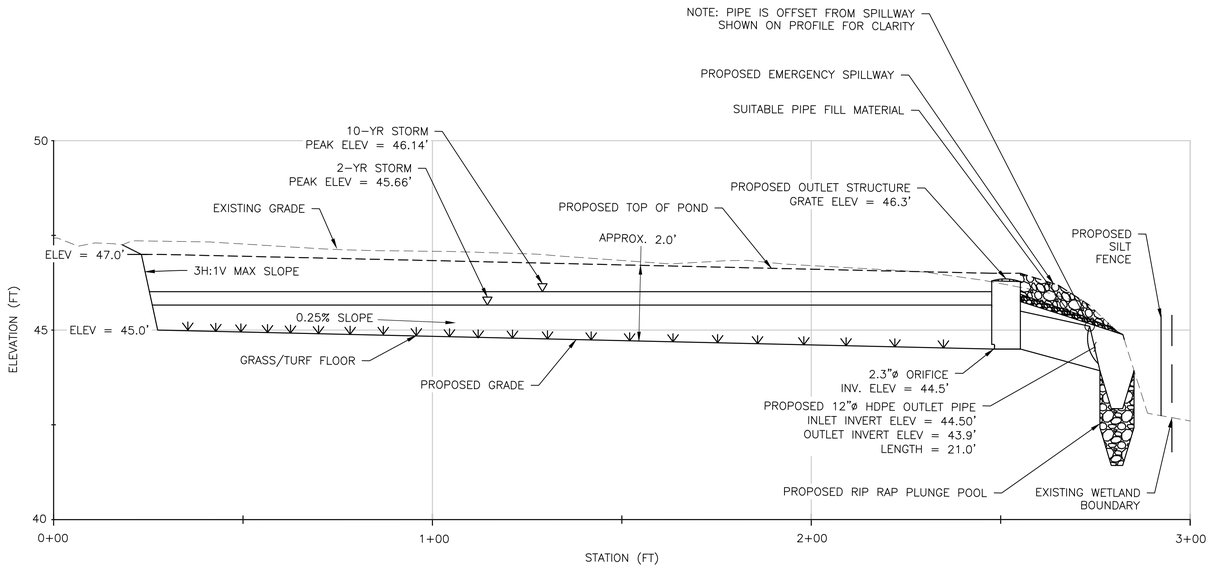
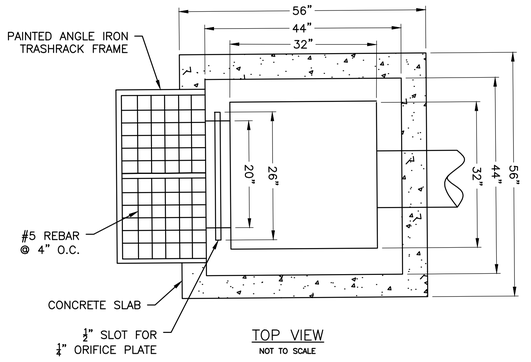
SHEET NUMBER

C7.1

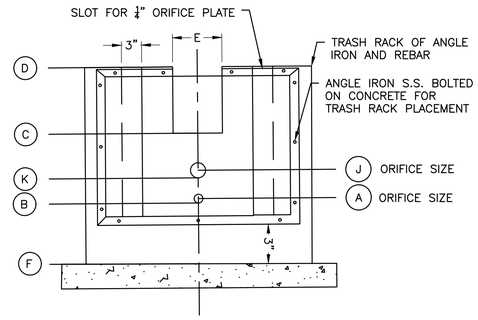
SHEET 31 OF 41



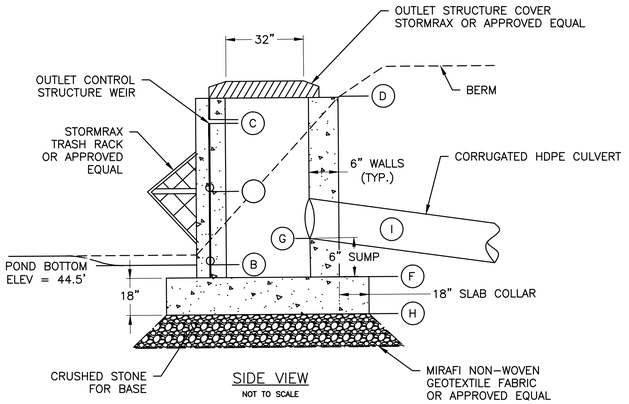
RUNWAY 17 WEST EXTENDED DRY DETENTION BASIN PROFILE (A–A')



TOP VIEW
NOT TO SCALE



FRONT VIEW
NOT TO SCALE



SIDE VIEW
NOT TO SCALE

	WESTERN POND O.C.S.	EASTERN POND O.C.S.
A	2.3"ø	2.5"ø
B	44.5'	44.5'
C	46.0'	45.6'
D	46.3'	45.7'
E	32"	32"
F	44.2'	44.2'
G	44.50'	44.50'
H	42.7'	42.7'
I	12"ø	12"ø
J	N/A	2"ø
K	N/A	45.0'

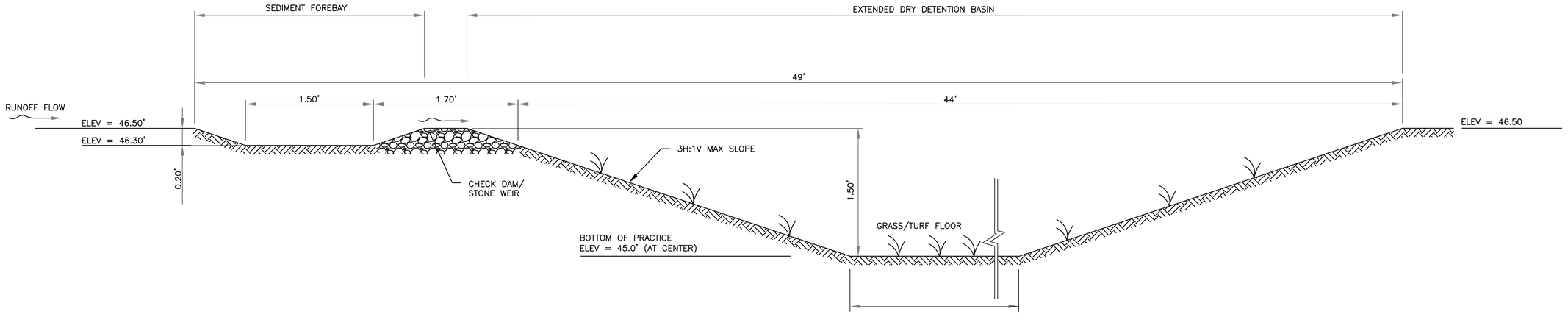
OUTLET CONTROL STRUCTURE (O.C.S.) DETAILS

APPROXIMATE LIST OF MATERIALS

1. 3 C.Y. – 5000 PSI CONCRETE
2. 15 ANGLE IRONS @ 4' LENGTH
3. REQUIRED S.S. BOLTS & FASTENERS
4. ¼" STEEL PLATE WITH DRILLED ORIFICES
5. 1 C.Y. – CRUSHED STONE FOR BASE
6. 48 #5 REBARS @ 1', 2', AND 3' LENGTHS
7. 32 #4 REBARS @ 4.5' LENGTH

NOTES:

1. REINFORCED STEEL SHALL CONSIST OF A SINGLE LAYER OF HORIZONTAL AND VERTICAL PLACED #4 REBAR @ 12" O.C.
2. CONCRETE BOX TO BE CONSTRUCTED OR PRECAST OF EQUAL DIMENSIONS AND REINFORCING.
3. CONCRETE SLAB TO BE CONSTRUCTED ALONG WITH BASE. FOR PRECAST BOX, A SLOTTED CONCRETE SLAB TO BE USED.
4. SECTION JOINTS AND PIPE OPENING SHALL BE SEALED WATERTIGHT WITH MORTAR BY CONTRACTOR.
5. ALL EXPOSED REBAR TO BE PAINTED WITH RUST–RESISTANT PAINT, COLOR AT CONTRACTOR'S DISCRETION.
6. STRUCTURE TO HAVE TEMPORARY PLYWOOD INSTALLED IN THE ORIFICE PLATE SLOT UNTIL THE SITE IS STABILIZED.
7. STRUCTURE IS TO BE DESIGNED FOR H20 LOADING.
8. SOIL UNDERLYING THE STURCUTRE IS TO BE COMPACTED TO 95% MODIFIED PROCTOR.
9. TRASH RACK TO PROTECT ALL ORIFICES 6" LESS IN DIAMETER.



RUNWAY 17 WEST EXTENDED DRY DETENTION BASIN CROSS SECTION (B–B')
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PROFESSIONAL SEAL

PERMITTING SET NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	BY	CK'D

NORWOOD MEMORIAL AIRPORT
111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

DRAINAGE DETAILS (2 OF 4)

DRAWN BY	DATE
DSC	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

C7.2

SHEET 32 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\31_C7.1_Stormwater Drainage Details.dwg JUNE 2021

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PERMITTING

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REALIGNMENT AND
RUNWAY 17-35
PAVED SAFETY
AREAS

SHEET TITLE

DRAINAGE DETAILS
(3 OF 4)

DRAWN BY	DATE
DSC	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

C7.3

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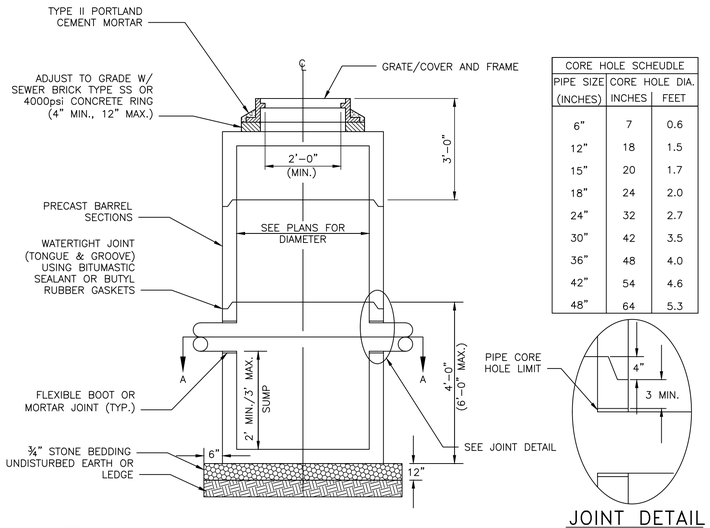


CORE HOLE SCHEUDLE		
PIPE SIZE (INCHES)	CORE HOLE DIA. INCHES	FEET
6"	7	0.6
12"	18	1.5
15"	20	1.7
18"	24	2.0
24"	32	2.7
30"	42	3.5
36"	48	4.0
42"	54	4.6
48"	64	5.3

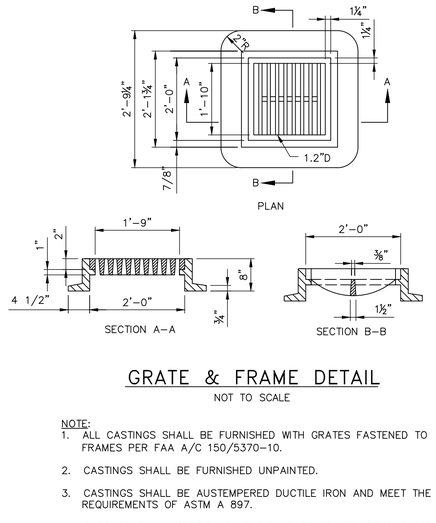
JOINT DETAIL

NOT TO SCALE

NOTES:

1. PRECAST SECTIONS SHALL BE REINFORCED AND BE 5" THICK FOR A 4' DIAMETER STRUCTURE, 6" THICK FOR A 5' DIAMETER STRUCTURE, 7" THICK FOR A 6' DIAMETER STRUCTURE AND 9" THICK FOR A 8' DIAMETER STRUCTURE.
2. PRECAST BASE SECTIONS SHALL BE REINFORCED AND CONSIST OF A FLOOR THICKNESS OF 6" THICK FOR A 4' DIAMETER STRUCTURE, 8" THICK FOR A 5' DIAMETER STRUCTURE, 8" THICK FOR A 6' DIAMETER STRUCTURE AND 10" THICK FOR A 8' DIAMETER STRUCTURE.
3. PRECAST SECTIONS SHALL MEET HS-20 LOADING, CONSIST OF CONCRETE THAT IS A MINIMUM OF 4000psi @28 DAYS AND SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C-478; LATEST REVISION.
4. PRECAST SECTIONS SHALL HAVE TONGUE AND GROOVE JOINT 4" HIGH AT AN 11-DEGREE ANGLE CENTERED IN THE WIDTH OF THE WALL AND SHALL BE ASSEMBLED USING AN APPROVED FLEXIBLE SEALANT IN JOINTS.
5. ALL STRUCTURES WITH MULTIPLE PIPES SHALL HAVE A MINIMUM OF 12" OF INSIDE SURFACE BETWEEN HOLES AND NO MORE THAN 75% OF A HORIZONTAL CROSS-SECTION SHALL BE HOLES, INCLUDING NO HOLES SHALL BE LOCATED CLOSER THAN 3" TO JOINTS.
6. OUTSIDE PIPE EDGES SHALL PROJECT NO MORE THAN 3" BEYOND INSIDE WALL STRUCTURE.
7. SEE PLANS FOR STRUCTURE SIZES.

DRAIN MANHOLE DETAIL

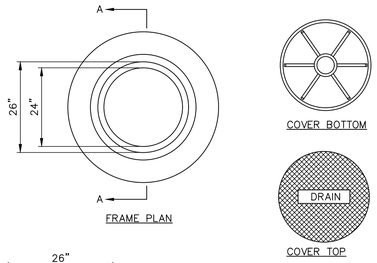


GRATE & FRAME DETAIL

NOT TO SCALE

NOTE:

1. ALL CASTINGS SHALL BE FURNISHED WITH GRATES FASTENED TO FRAMES PER FAA A/C 150/5370-10.
2. CASTINGS SHALL BE FURNISHED UNPAINTED.
3. CASTINGS SHALL BE AUSTEMPERED DUCTILE IRON AND MEET THE REQUIREMENTS OF ASTM A 897.
4. SUPPLIER SHALL CERTIFY THAT THE GRATE/FRAME ARE CAPABLE OF SUPPORTING HS20 LOADS.



NOTE:

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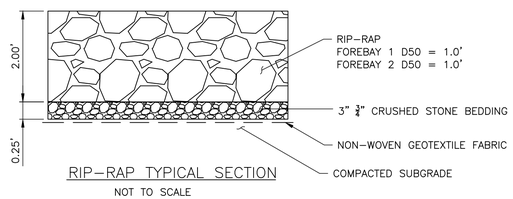
4. SUPPLIER SHALL CERTIFY THAT THE GRATE/FRAME ARE CAPABLE OF SUPPORTING HS20 LOADS.

DRAIN MANHOLE COVER AND FRAME DETAIL

NOT TO SCALE

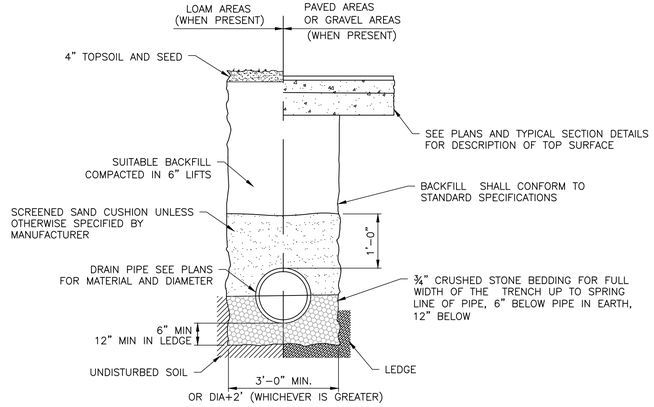


RIP-RAP TYPICAL SECTION

NOT TO SCALE

NOTES

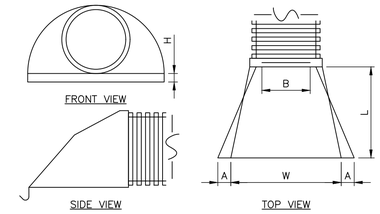
1. PROPOSED LIMITS OF RIPRAP APPLICATIONS ARE AS SHOWN ON SHEET C3.1



TYPICAL DRAIN TRENCH DETAIL

NOT TO SCALE

FLARED END SECTION SCHEDULE					
PIPE DIA. (D)	A	THREADED ROAD (MAX.) (B)	END LENGTH (L)	END WIDTH (W)	END HEIGHT (H)
15"	6.5"	10"	25"	29"	6.5"

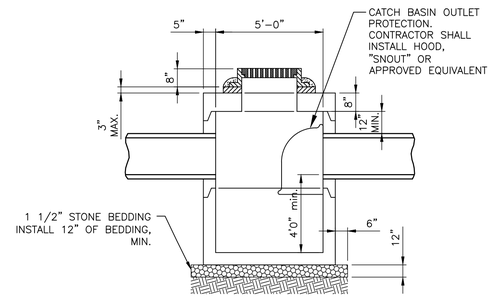


NOTES:

1. THREADED ROD WITH WING NUTS PROVIDED FOR END SECTIONS 12' THROUGH 24". END SECTIONS 30" AND 36" SHALL BE WELDED TO PIPE PER MANUFACTURER'S RECOMMENDATION

HDPE FLARED END SECTION DETAIL

NOT TO SCALE



NOTES:

1. PRECAST WALLS AND BASES REINFORCED WITH MINIMUM AREA STEEL AS FOLLOWS: 5' DIA. 5" WALL; 0.12 SQ. IN. / LF.
2. PRECAST REINFORCED CONCRETE SECTIONS SHALL BE MIN. OF 4000 PSI
3. FOR FRAMES AND GRATES SEE DETAILS
4. SEE PLANS FOR PIPE INVERTS.
5. PRECAST SECTIONS SHALL MEET HS-20 LOADING, CONSIST OF CONCRETE THAT IS A MINIMUM OF 4000PSI @28 DAYS AND SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C-478; LATEST REVISION.

DEEP SUMP CATCH BASIN DETAIL

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PROFESSIONAL SEAL

PERMITTING SET NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	BY	CK'D

NORWOOD MEMORIAL AIRPORT
111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

DRAINAGE DETAILS (4 OF 4)

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

SHEET NUMBER

C7.4

SHEET 34 OF 41

SEEDING NOTES:

SEEDING FOR TEMPORARY PROTECTION OF DISTURBED AREAS
DEFINITION: SEEDING OF GRASS OR SMALL GRAIN SUCH AS RYE, OATS, OR RYEGRASS ON A DISTURBED AREA TO PROVIDE PROTECTION FOR A LIMITED PERIOD OF TIME, USUALLY NOT MORE THAN A YEAR.
PURPOSE:
1. TO PROVIDE TEMPORARY PROTECTION AGAINST WIND OR WATER EROSION.
2. TO IMPROVE WATER QUALITY BY REDUCING SEDIMENTATION OF SURFACE WATERS.
3. TO FURTHER REDUCE DAMAGE FROM SEDIMENT AND RUNOFF TO DOWNSTREAM AREAS.

CONDITIONS WHERE PRACTICE APPLIES: ON AREAS WHERE A TEMPORARY STAND OF GRASS OR SMALL GRAINS WILL NORMALLY PRODUCE SUFFICIENT COVER TO RETARD EROSION AND REDUCE SEDIMENT.

PLANNING CONSIDERATIONS:
1. PREVENTING EROSION IS ALWAYS PREFERRED OVER SEDIMENT CONTROL. WHEN A DISTURBED AREA WILL BE INACTIVE FOR A PROLONGED PERIOD OF TIME, EROSION CONTROL MEASURES SHOULD BE USED.
2. TEMPORARY SEEDING IS ONLY EFFECTIVE FOR EROSION CONTROL WHILE VEGETATION IS ESTABLISHED. ANNUAL PLANTS THAT SPROUT QUICKLY AND GROW FOR ONLY ONE YEAR ARE USED FOR THIS PRACTICE.
3. ADEQUATE SEEDBED PREPARATION, USE OF QUALITY SEED AND TIMELY PLANTING ARE REQUIRED TO ACHIEVE A GOOD STAND OF VEGETATION TO CONTROL EROSION.

SEEDING RECOMMENDATIONS:
1. GRADING AND TEMPORARY STRUCTURE. ALL ESSENTIAL GRADING AND ALL TEMPORARY STRUCTURES, SUCH AS DIVERSIONS, DAMS, AND DRAINS NEEDED TO PREVENT GULLYING AND REDUCE SILTATION SHOULD BE COMPLETED PRIOR TO SEEDING.
2. SEEDBED PREPARATION: REMOVE STONES AND TRASH THAT WILL INTERFERE WITH SEEDING THE AREA. WHERE FEASIBLE, TILL THE SOIL TO A DEPTH OF ABOUT 3 INCHES TO PREPARE A SEEDBED AND MIX FERTILIZER INTO THE SOIL. THE SEEDBED SHOULD BE LEFT IN A FIRM CONDITION. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHEREVER PRACTICAL.
3. FERTILIZERS: FERTILIZERS SHOULD BE UNIFORMLY SPREAD OVER THE AREA PRIOR TO BEING INCORPORATED INTO THE SOIL. A MINIMUM OF 300 POUNDS PER ACRE (7 POUNDS PER 1,000 SQUARE FEET) OF 10–0–10 FERTILIZER, OR ITS EQUIVALENT, SHOULD BE APPLIED. PHOSPHORUS FREE FERTILIZER SHALL BE UTILIZED.
4. SEED AND SEEDING: SEED AND SEEDING RATES MAY BE SELECTED FROM THE TABLE BELOW. THE SELECTION WILL BE BASED ON THE TIME OF YEAR THE SEEDING IS TO BE MADE AND THE LENGTH OF TIME THE VEGETATION IS TO AFFORD PROTECTION. THE SEED SHOULD BE SPREAD UNIFORMLY OVER THE AREA. AFTER SEEDING THE SOIL SHOULD BE FIRMED BY ROLLING OR PACKING. WHERE ROLLING OR PACKING IS NOT FEASIBLE, THE SEED SHOULD BE COVERED LIGHTLY BY RAKING, DISKING, OR DRAGGING.
5. MULCHING: WHERE IT IS IMPRACTICABLE TO INCORPORATE FERTILIZER AND SEED INTO MOIST SOIL, THE SEEDED AREA SHOULD BE MULCHED TO FACILITATE GERMINATION.
6. PLANT SELECTION AND SEEDING RATES:

Species	Per Acre	Per 1000 S.F.	Dates	DEPTH
Winter rye	112 lbs.	2.5 lbs.	8/15–9/5	DEPTH 1 INCH
Oats	80 lbs.	2.0 lbs.	NO LATER THAN SPRING–5/15	DEPTH 1 INCH
Annual rye grass	40 lbs.	1.0 lbs.	4/15–9/15	1/4 INCH
perennial rye grass	30 lbs.	0.70 lbs.	4/1 to 06–01 8/15 to 09/15	1/2 INCH

MULCHING – WHERE IT IS IMPRACTICAL TO INCORPORATE FERTILIZER AND SEED INTO MOIST SOIL, THE SEED AREA SHOULD BE MULCHED TO FACILITATE GERMINATION. MULCH IN THE FORM OF HAY OR STRAW SHOULD BE APPLIED AT A RATE OF 70 TO 90 LBS. PER 1,000 S.F.

MAINTENANCE:
1. IF THE SEEDING FAILS TO GROW, IT MAY NEED TO BE REESTABLISHED TO PROVIDE ADEQUATE EROSION CONTROL.
2. IF WEEDS BECOME A PROBLEM, THEY MAY NEED TO BE CONTROLLED MY MOWING.

PERMANENT SEEDING:
1. TOPSOIL BEDDING – LOAM SHALL BE 4" THICK FERTILE, NATURAL SOIL, TYPICAL OF THE LOCALITY, SUBSTANTIALLY FREE FROM STONES LARGER THAN FOUR INCHES, ROOTS, STICKS, CLAY, PEAT, WEEDS AND SOD AND OTHER DEBRIS THAT WILL INTERFERE WITH THE SEEDING AND FUTURE MAINTENANCE OF THE AREA SHOULD BE REMOVED. LOAM SHALL BE OBTAINED FROM NATURALLY WELL–DRAINED AREAS. IT SHALL NOT BE EXCESSIVELY ACID OR ALKALINE, NOR CONTAIN TOXIC MATERIAL HARMFUL TO PLANT GROWTH. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF FOUR INCHES TO PREPARE A SEEDBED AND MIX FERTILIZER INTO THE SOIL. THE SEEDBED SHOULD BE LEFT IN A REASONABLE FIRM AND SMOOTH CONDITION.

2. LIME: GROUND LIMESTONE CONTAINING NOT LESS THAN 95% OF EITHER CALCIUM OR MAGNESIUM CARBONATE.

3. FERTILIZER – LIME AND FERTILIZER SHOULD BE APPLIED EVENLY OVER THE AREA PRIOR TO OR AT THE TIME OF SEEDING AND INCORPORATED INTO THE SOIL. TYPE AND AMOUNTS OF LIME AND FERTILIZER SHOULD BE BASED ON AN EVALUATION OF SOIL TESTS. WHEN A SOIL TEST IS NOT AVAILABLE, THE FOLLOWING MINIMUM AMOUNTS SHOULD BE APPLIED:
   - AGRICULTURAL LIMESTONE AT 100 LBS. PER 1,000 S.F.
   - 10 – 20 – 20 FERTILIZER AT 12 LBS. PER 1,000 S.F.

4. PERMANENT SEED MIXTURE – SEEDING RATE

SLOPE SEED: FOR DETENTION BASINS AND GRASS SWALES:

SPECIES	PER ACRE	PER 1,000 S.F
Tall Fesque	20 lbs.	0.45 lbs.
Creeping Red	20 lbs.	0.45 lbs.
Fesque Red Top	5 lbs.	0.13 lbs.
Perennial Ryegrass	10 lbs.	0.23 lbs.
Alsike Clover	5 lbs.	0.15 lbs.
Total	60 lbs.	1.41 lbs.

GENERAL SEEDING:

SPECIES	PER ACRE	PER 1,000 S.F
Creeping red Fesque	50 lbs.	1.15 lbs.
Kentucky Bluegrass	50 lbs.	1.15 lbs.
Total	100 lbs.	2.30 lbs.

5. MULCHING – MULCH SHOULD BE USED ON HIGHLY ERODABLE SOILS, ON CRITICALLY ERODING AREAS, AND ON AREAS WHERE CONSERVATION OF MOISTURE WILL FACILITATE PLANT ESTABLISHMENT.

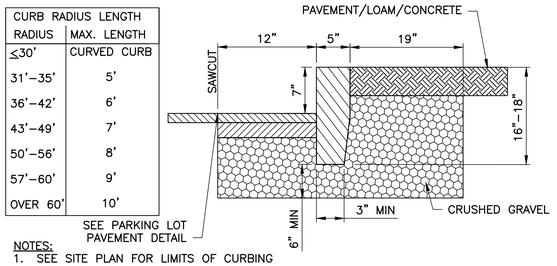
TYPE	RATE PER 1,000 S.F.	USE AND COMMENTS
Hay or straw	70 to 90 lbs.	Must be dry and free from mold. May be used with plantings.
Wood chips or bark mulch	460 to 920 lbs	Used mostly with trees and shrub plantings.
Jute and fibrous matting	As per manufacturers specifications	Used in slope areas water coursed and other areas.

Crushed stone
1/2" to 1 1/2" diameter Spread more than 1/2" thick. Effective in controlling wind and water erosion.

6. SODDING – SODDING IS DONE WHERE IT IS DESIRABLE TO RAPIDLY ESTABLISH COVER ON A DISTURBED AREA. SODDING AN AREA MAY BE SUBSTITUTED FOR PERMANENT SEEDING PROCEDURES ANYWHERE ON SITE. BED PREPARATION, FERTILIZING, AND PLACEMENT OF SOD SHALL BE PERFORMED ACCORDING TO THE S.C.S. HANDBOOK.

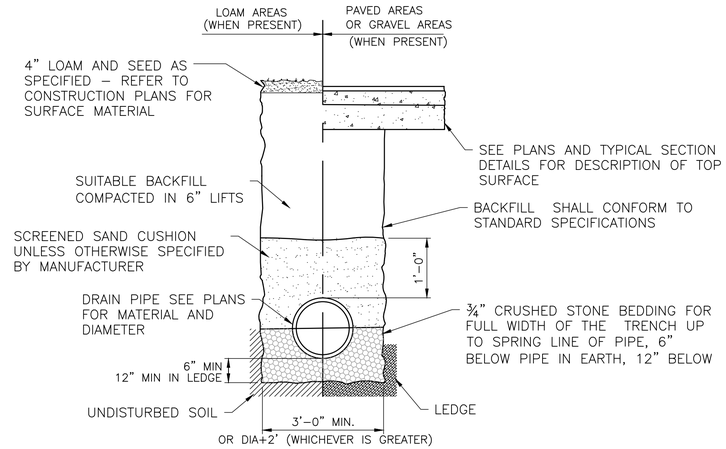
SODDING IS RECOMMENDED FOR STEEP SLOPED AREAS, AREAS IMMEDIATELY ADJACENT TO SENSITIVE WATER COURSES, AND EASILY ERODABLE SOILS (FINE SAND/SILT), ETC.

CURB RADIUS LENGTH	
RADIUS	MAX. LENGTH
≤30'	CURVED CURB
31'–35'	5'
36'–42'	6'
43'–49'	7'
50'–56'	8'
57'–60'	9'
OVER 60'	10'

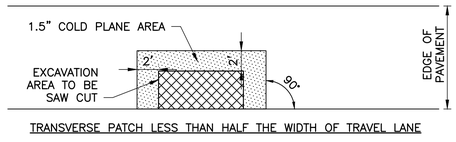


NOTES:
1. SEE SITE PLAN FOR LIMITS OF CURBING
2. ALL MATERIALS AND WORKMANSHIP SHALL COMPLY WITH NHDOT STANDARD SPECIFICATIONS
3. ADJOINING STONES SHALL HAVE THE SAME (OR APPROX.) LENGTH
4. MINIMUM LENGTH OF CURB STONES = 3'
5. MAXIMUM LENGTH OF CURB STONES = 10'
6. MAXIMUM LENGTH OF STRAIGHT CURB STONES LAID ON CURVES – SEE CHART
7. CRUSHED GRAVEL TO BE COMPACTED TO 95% MIN HAND COMPACTION IS NOT ALLOWED

VERTICAL GRANITE CURB DETAIL
NOT TO SCALE



TYPICAL DRAIN TRENCH DETAIL
NOT TO SCALE

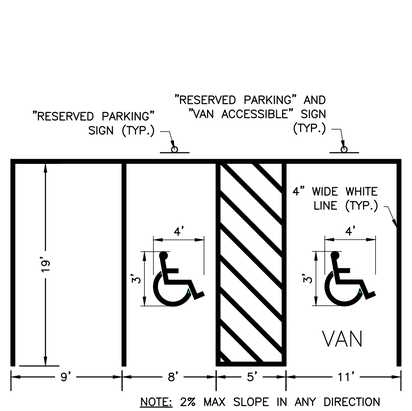


TRANSVERSE PATCH LESS THAN HALF THE WIDTH OF TRAVEL LANE

TRANSVERSE PATCH MORE THAN HALF THE WIDTH OF TRAVEL LANE

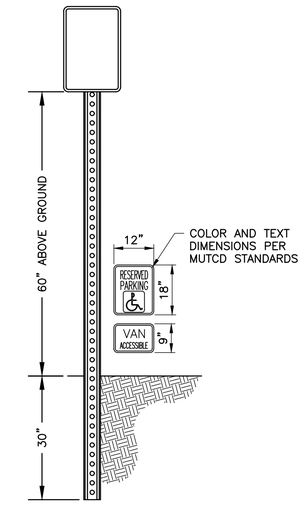
NOTE: WHERE LIMITS OF ADJACENT COLD PLANED AREAS ARE LESS THAN OR EQUAL TO 20', THE AREA BETWEEN SHALL BE COLD PLANED AND RESURFACED. PAVEMENT REPAIR SHALL HAVE EMULSIFIED TACK BETWEEN ASPHALT LAYERS AND ON ALL JOINTS.

SAWCUT DETAIL
NOT TO SCALE

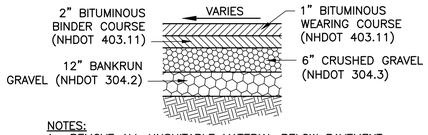


NOTE: 2% MAX SLOPE IN ANY DIRECTION

HANDICAP & STANDARD PARKING PAVEMENT MARKING DETAIL
NOT TO SCALE



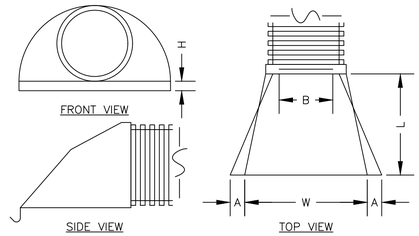
SIGN AND POST DETAIL
NOT TO SCALE



NOTES:
1. REMOVE ALL UNSUITABLE MATERIAL BELOW PAVEMENT SECTION TO THE SATISFACTION OF THE ENGINEER.
2. IN NON–CURB AREAS PAVEMENT SUB–BASE MATERIAL SHALL EXTEND 1' BEYOND EDGE–OF–PAVEMENT.

PARKING LOT PAVEMENT DETAIL
NOT TO SCALE

FLARED END SECTION SCHEDULE					
PIPE DIA. (D)	A	THREADED ROAD (MAX.) (B)	END LENGTH (L)	END WIDTH (W)	END HEIGHT (H)
12"	6.5"	10"	25"	29"	6.5"
15"	6.5"	10"	25"	29"	6.5"
18"	7.5"	15"	32"	35"	6.5"



NOTES:
1. THREADED ROD WITH WING NUTS PROVIDED FOR END SECTIONS 12' THROUGH 24". END SECTIONS 30" AND 36" SHALL BE WELDED TO PIPE PER MANUFACTURER'S RECOMMENDATION.

FLARED END SECTION DETAIL
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PROFESSIONAL SEAL

PERMITTING SET NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	BY	CK'D

NORWOOD MEMORIAL AIRPORT
111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

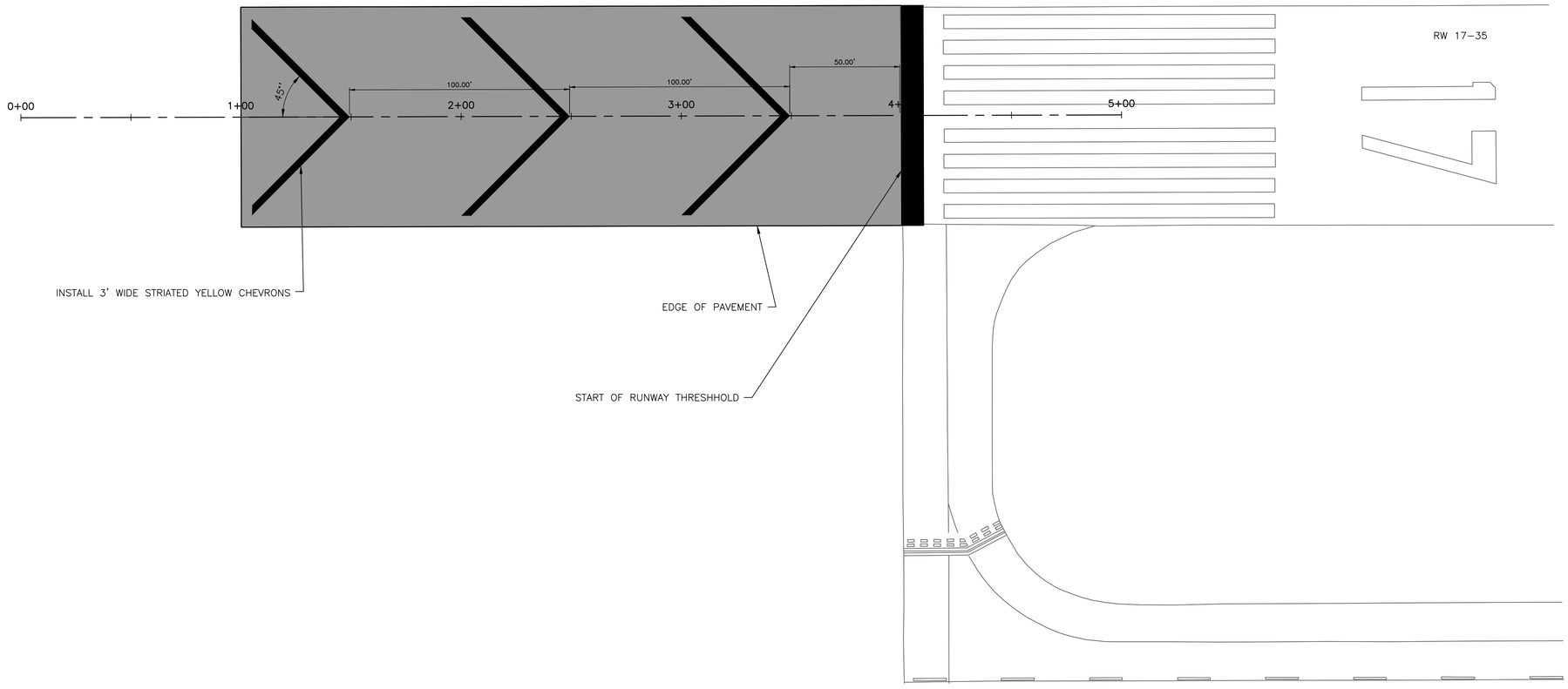
DRAINAGE DETAILS (5 OF 5)

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

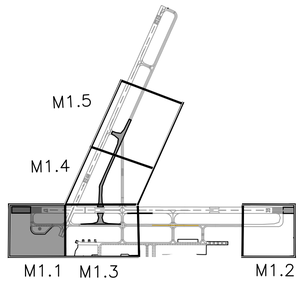
SHEET NUMBER

C7.5

SHEET 35 OF 41



RW 17 PSA MARKING PLAN



LEGEND

EXISTING PAVEMENT EDGE

NOTES:

1. REFER TO "MARKING NOTES & DETAILS" SHEET FOR MARKING NOTES.
2. REFER TO "DEMOLITION PLAN" SHEETS FOR REMOVAL OF EXISTING MARKINGS.
3. LOCATIONS OF EXISTING MARKINGS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.

HORIZONTAL SCALE

0 15 30 60

1" = 30'

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NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

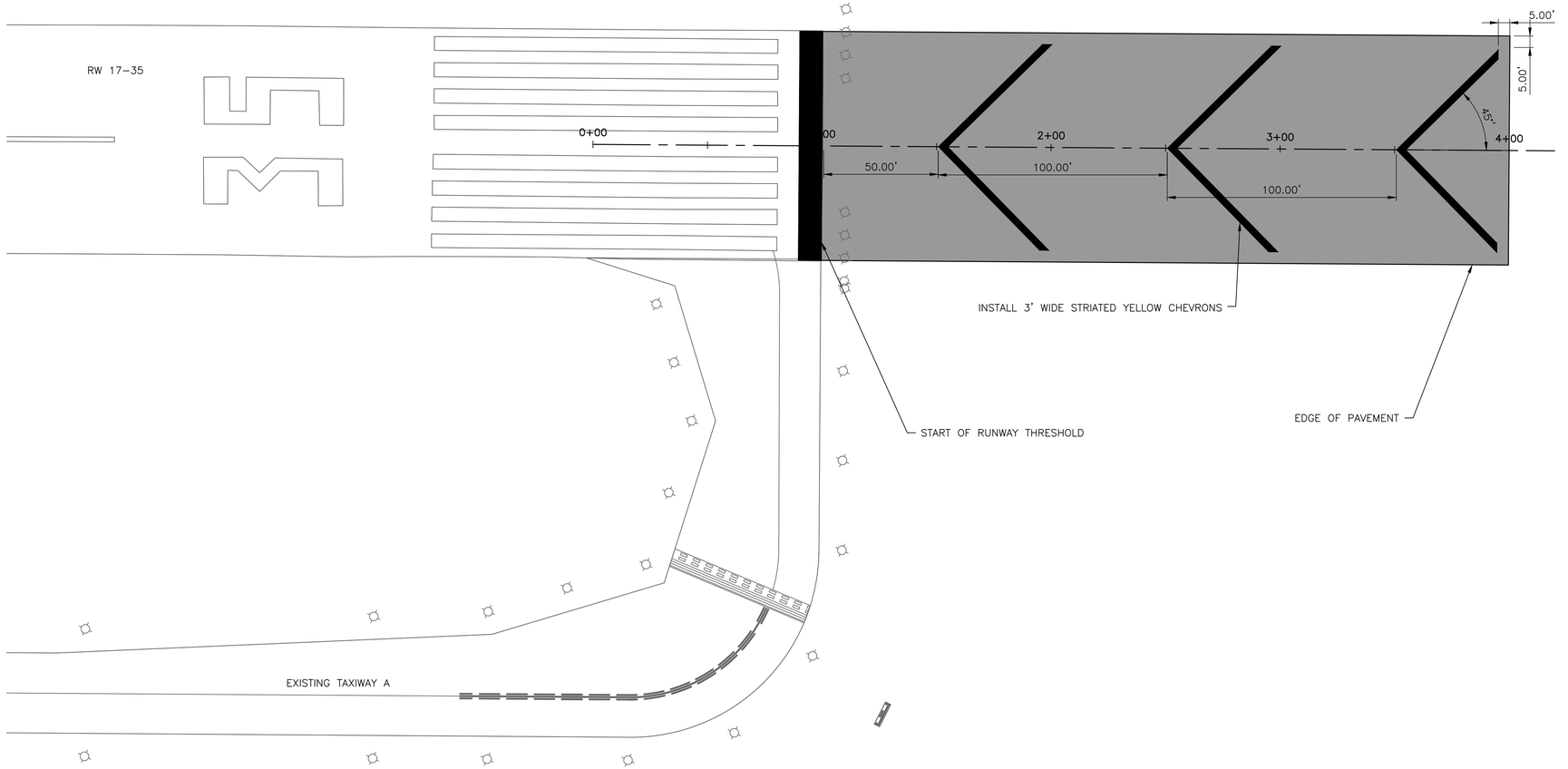
MARKING PLAN
RW 17 PSA
(LOCATION 1)

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
RLT	

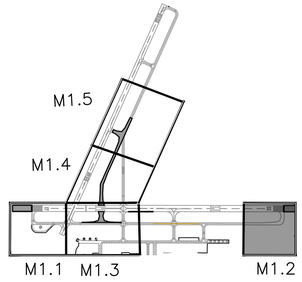
SHEET NUMBER

M1.1

SHEET 36 OF 41



RW 35 PSA MARKING PLAN



LEGEND

EXISTING PAVEMENT EDGE

NOTES:

1. REFER TO "MARKING NOTES & DETAILS" SHEET FOR MARKING NOTES.
2. REFER TO "DEMOLITION PLAN" SHEETS FOR REMOVAL OF EXISTING MARKINGS.
3. LOCATIONS OF EXISTING MARKINGS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.

HORIZONTAL SCALE

0 15 30 60

1" = 30'

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NORWOOD MEMORIAL AIRPORT
111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

MARKING PLAN
RW 35 PSA
(LOCATION 2)

DRAWN BY	DATE
DK	AUG. 2021
CHECKED BY	D&K PROJECT #
MCG	326165
PROJ. ENG.	D&K ARCHIVE #
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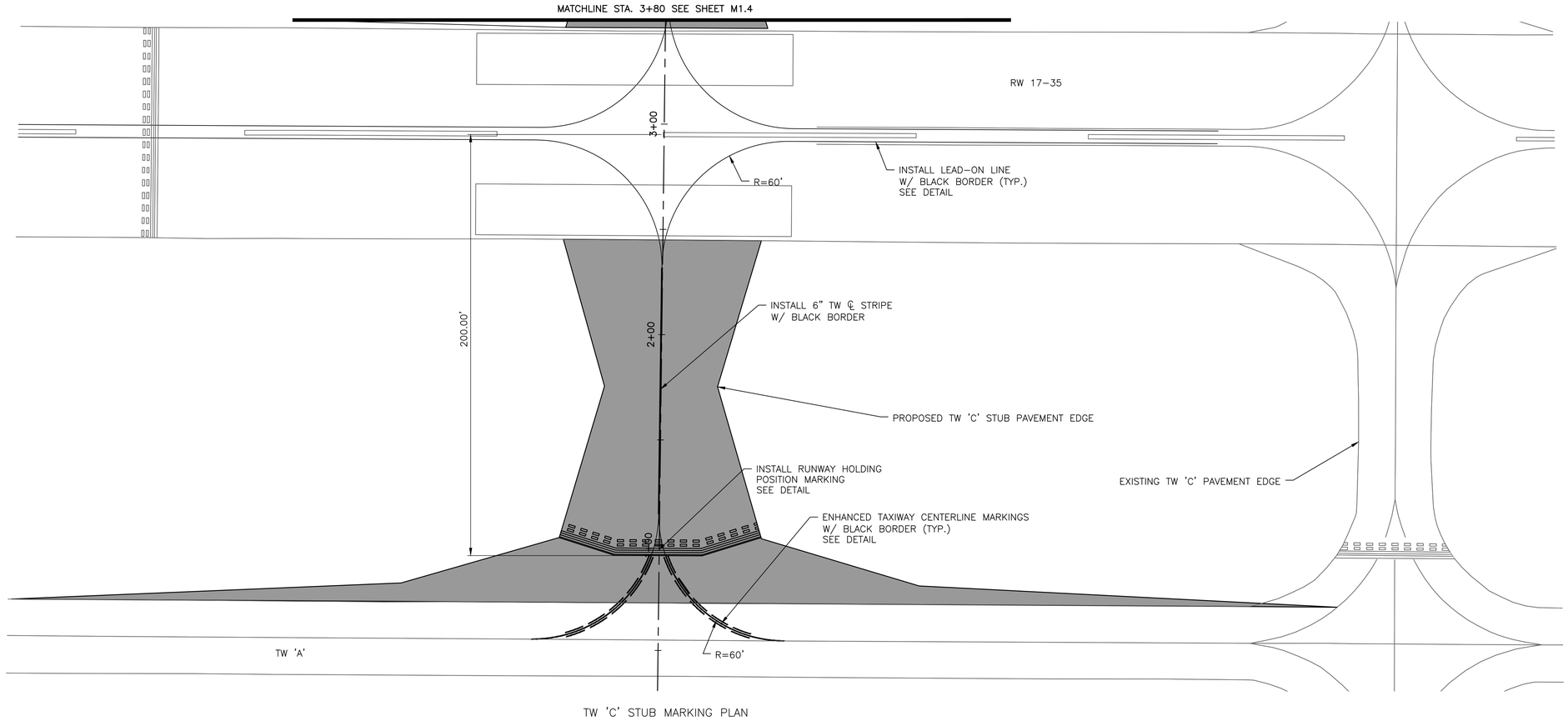
SHEET NUMBER

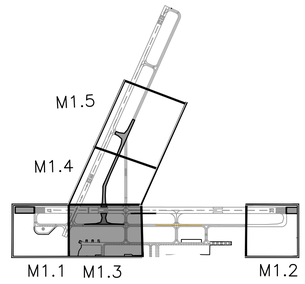
M1.2

SHEET 37 OF 41

I:\3\326165 Norwood Airport EA – 2020\Drawings\40-44_M1.1-M1.5_Marking Plans of PSA & TW 'C'.dwg JUNE 2021



TW 'C' STUB MARKING PLAN



LEGEND

PROPOSED PAVEMENT EDGE

EXISTING PAVEMENT EDGE

NOTES:

1. REFER TO "MARKING NOTES & DETAILS" SHEET FOR MARKING NOTES.
2. REFER TO "DEMOLITION PLAN" SHEETS FOR REMOVAL OF EXISTING MARKINGS.
3. LOCATIONS OF EXISTING MARKINGS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
4. TIE INTO EXISTING TAXIWAY CENTERLINE MARKINGS AS ORDERED BY THE ENGINEER.
5. ALL MARKINGS SHALL INCLUDE A 6" BLACK BORDER.

HORIZONTAL SCALE

0 15 30 60

1" = 30'

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111 ACCESS ROAD
BUILDING #9
NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

MARKING PLAN
TW 'C' STUB
(LOCATION 3)

DRAWN BY	DATE
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CHECKED BY	D&K PROJECT #
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PROJ. ENG.	D&K ARCHIVE #
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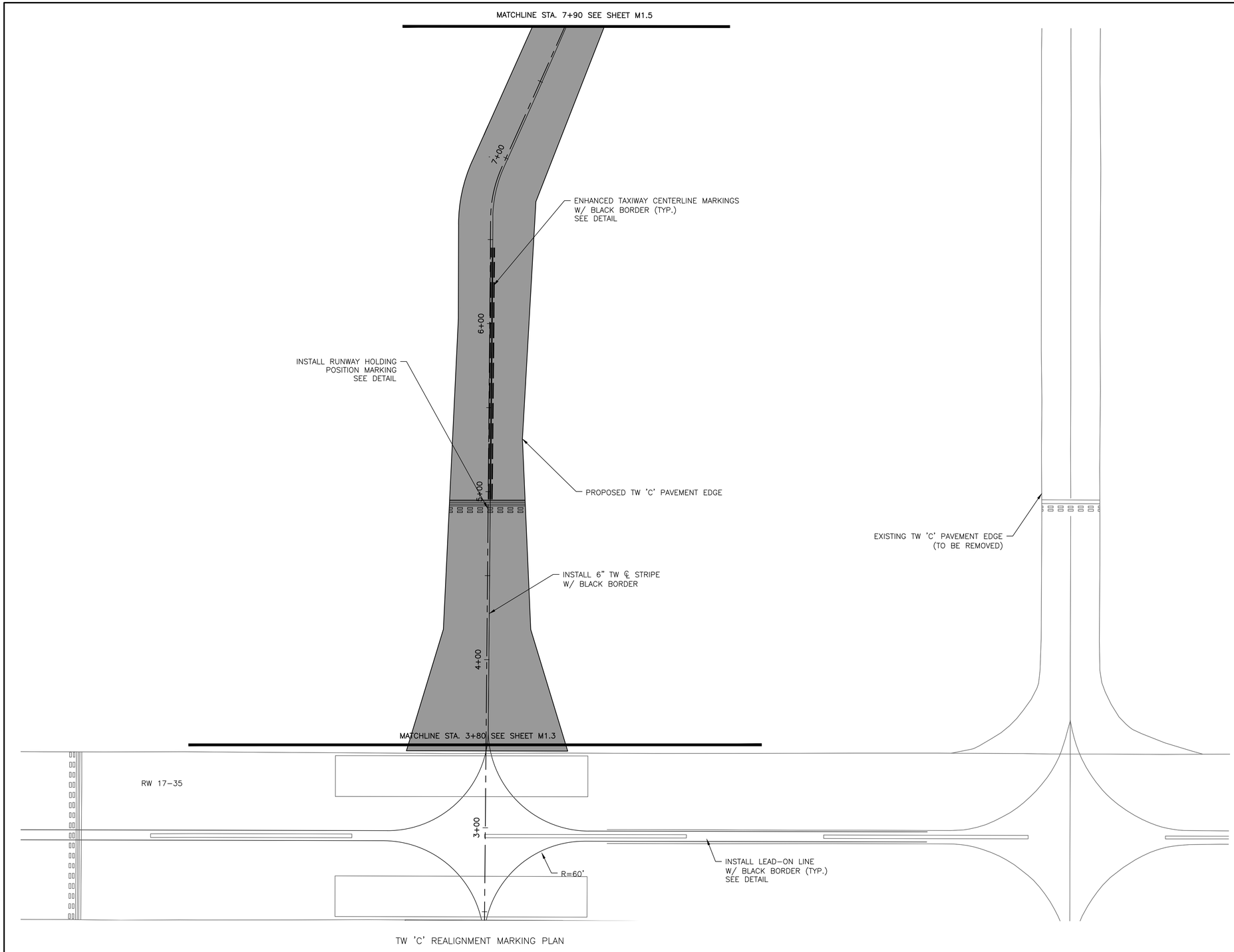
SHEET NUMBER

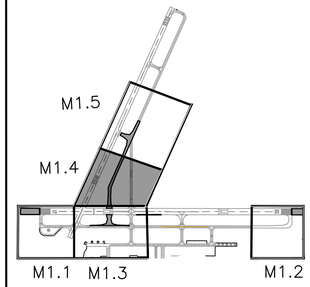
M1.3

SHEET 38 OF 41

I:\326165 Norwood Airport EA - 2020\Drawings\40-44_M1.1-M1.5_Marking Plans of PSA & TW 'C'.dwg JUNE 2021



TW 'C' REALIGNMENT MARKING PLAN



LEGEND

PROPOSED PAVEMENT EDGE

EXISTING PAVEMENT EDGE

NOTES:

1. REFER TO "MARKING NOTES & DETAILS" SHEET FOR MARKING NOTES.
2. REFER TO "DEMOLITION PLAN" SHEETS FOR REMOVAL OF EXISTING MARKINGS.
3. LOCATIONS OF EXISTING MARKINGS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
4. TIE INTO EXISTING TAXIWAY CENTERLINE MARKINGS AS ORDERED BY THE ENGINEER.
5. ALL MARKINGS SHALL INCLUDE A 6" BLACK BORDER.

HORIZONTAL SCALE

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1" = 30'

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ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

MARKING PLAN
TW 'C'
REALIGNMENT
(1 OF 2)
(LOCATION 4)

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SHEET NUMBER

M1.4

SHEET 39 OF 41

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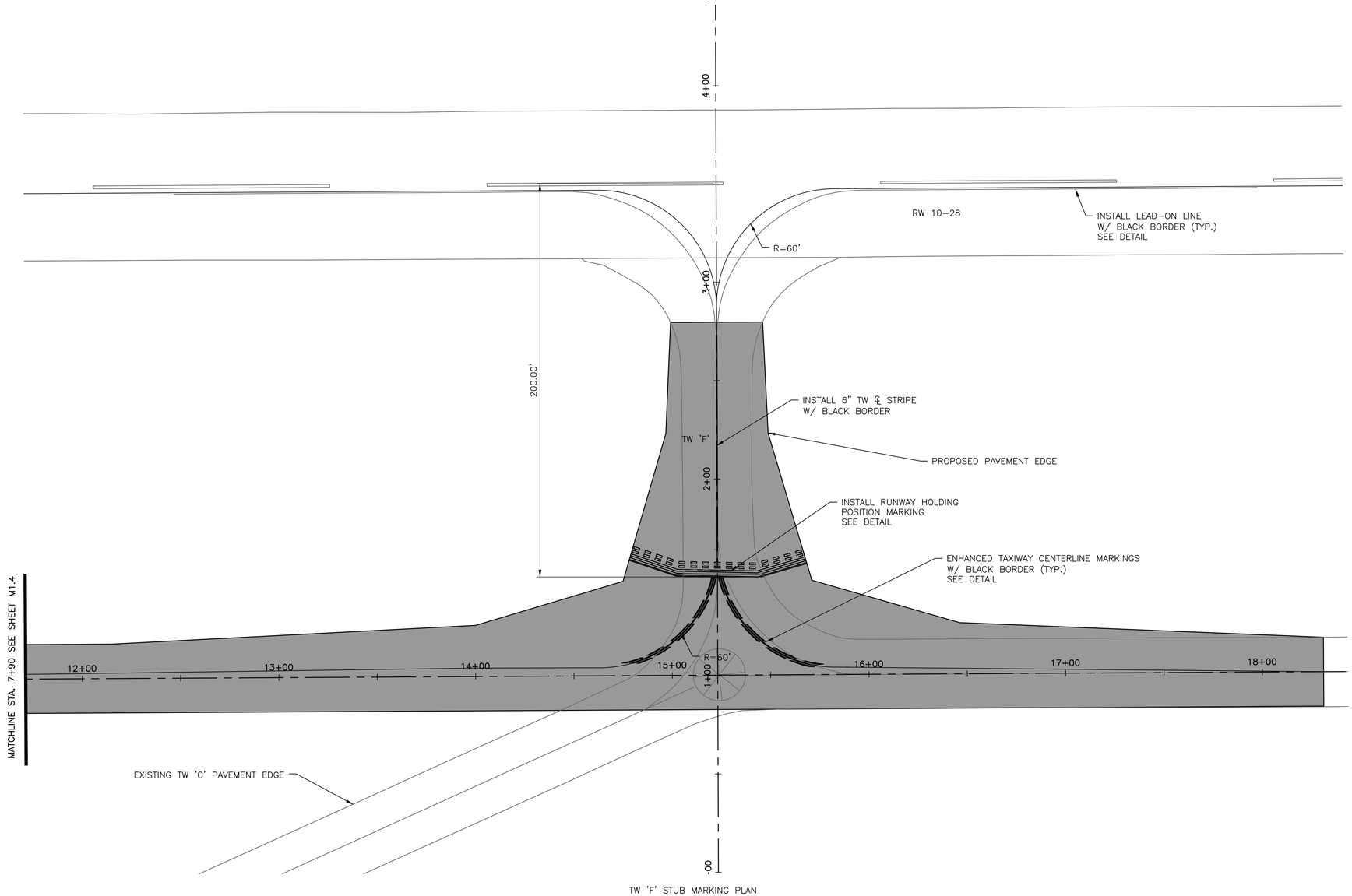
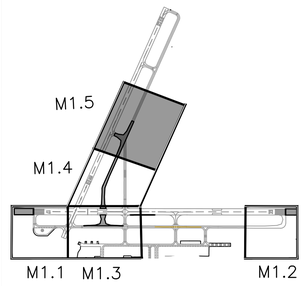


TW 'F' STUB MARKING PLAN



LEGEND

PROPOSED PAVEMENT EDGE

EXISTING PAVEMENT EDGE

NOTES:

1. REFER TO "MARKING NOTES & DETAILS" SHEET FOR MARKING NOTES.
2. REFER TO "DEMOLITION PLAN" SHEETS FOR REMOVAL OF EXISTING MARKINGS.
3. LOCATIONS OF EXISTING MARKINGS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
4. TIE INTO EXISTING TAXIWAY CENTERLINE MARKINGS AS ORDERED BY THE ENGINEER.
5. ALL MARKINGS SHALL INCLUDE A 6" BLACK BORDER.

HORIZONTAL SCALE

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1" = 30'

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TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

MARKING PLAN
TW 'C'
REALIGNMENT
(2 OF 2)
(LOCATION 4)

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SHEET NUMBER

M1.5

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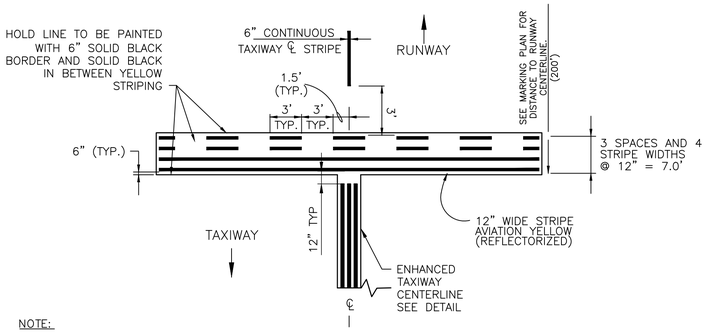
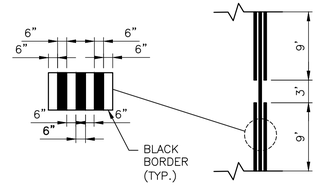


NOTE:

1. THE 3' DASHED STRIPES SHALL BE CENTERED AND SPACED AS SHOWN FROM THE GEOMETRIC CENTERLINE. ALL HOLDING POSITION MARKINGS TO BE AVIATION YELLOW AND REFLECTORIZED. ALL SPACES TO BE PAINTED SOLID BLACK.

RUNWAY HOLDING POSITION MARKING DETAIL

NOT TO SCALE

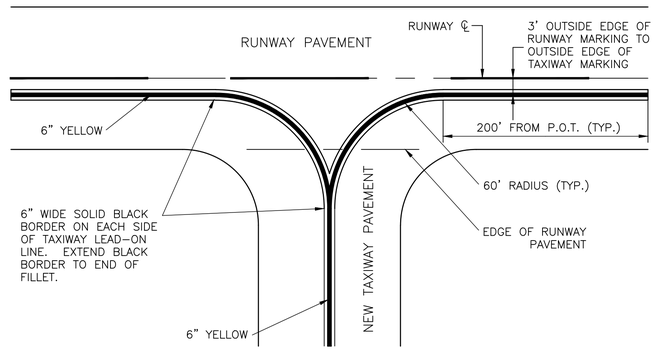


NOTE:

1. DASHED LINES FOR THE ENHANCED TAXIWAY CENTERLINE MARKING ARE 6 INCHES IN WIDTH AND SEPARTED 6 INCHES FROM THE TAXIWAY CENTERLINE.
2. LINE MARKINGS SHALL BE AVIATION YELLOW, REFLECTORIZED, WITH SOLID BLACK BORDER.
3. ETCL TO EXTEND 150' FROM HOLDLINE, UNLESS SHOWN OTHERWISE.

ENHANCED TAXIWAY CENTERLINE MARKINGS DETAIL

NOT TO SCALE

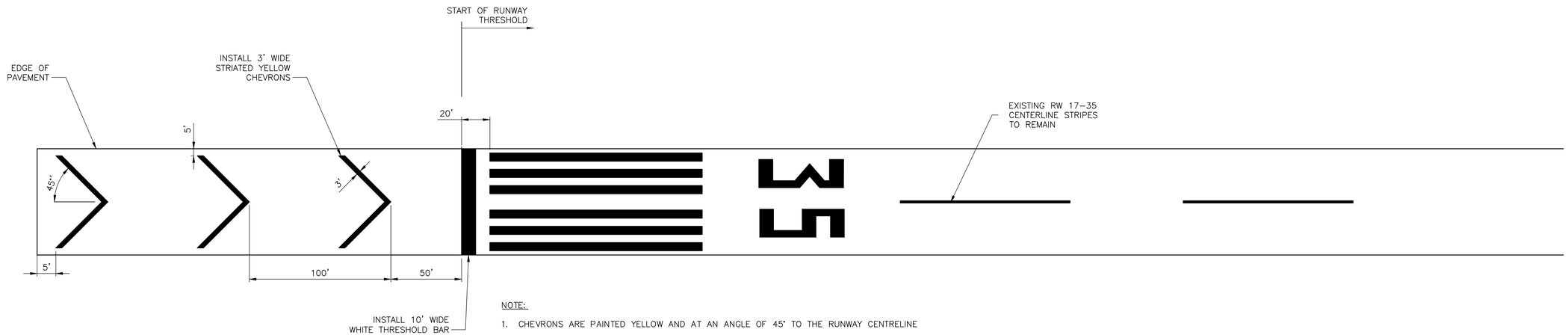


NOTES:

1. ALL TAXIWAY CENTERLINE MARKINGS TO BE SOLID YELLOW.
2. TAXIWAY CENTERLINE STRIPING TO BE 6" WIDE, PAINTED AVIATION YELLOW (REFLECTORIZED).
3. NEW 6" TAXIWAY CENTERLINE MARKING TO BE ACCOMPANIED BY NEW 6" WIDE BLACK MARKING ON EACH SIDE.
4. PAINT SHALL NOT BE APPLIED UNTIL THE SURFACE HAS BEEN PROPERLY CLEANED ACCORDING TO SPECIFICATIONS.

TAXIWAY CENTERLINE STRIPING DETAIL

NOT TO SCALE



NOTE:

1. CHEVRONS ARE PAINTED YELLOW AND AT AN ANGLE OF 45° TO THE RUNWAY CENTRELINE

RUNWAY STOPWAY MARKING DETAIL

NOT TO SCALE

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NORWOOD, MA

ENVIRONMENTAL PERMITTING

TAXIWAY 'C' REALIGNMENT AND RUNWAY 17-35 PAVED SAFETY AREAS

SHEET TITLE

MARKING DETAILS

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SHEET NUMBER

M2.1

SHEET 41 OF 41

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