Jacobs

BANGOR INTERNATIONAL AIRPORT MASTER PLAN

April 2023

BGR BANGOR INTERNATIONAL AIRPORT

Bangor International Airport Master Plan

April 2023

Prepared for:
Bangor International Airport

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Acronyms and Abbreviations

AAC	Aircraft Approach Category
ACAIS	Air Carrier Activity Information System
ADG	Airplane Design Group
ADIP	Airport Data and Information Portal
AIP	Airport Improvement Program
ANG	Army National Guard
ARFF	Aircraft Rescue and Fire Fighting
ATC	Air Traffic Control
ATCT	Air Traffic Control Tower
BGR	Bangor International Airport
CATS	Certification Activity Tracking System
CPE	Cost Per Enplaned
CY	Calendar Year
DoD	Department of Defense
DOT	Department of Transportation
FAA	Federal Aviation Administration
FBO	Fixed Base Operator
FY	Fiscal Year
GSE	Ground Support Equipment
IROPS	Irregular Operations
MRO	Maintenance-Repair-Overhaul
MTOW	Maximum Takeoff Weight
NAVAIDS	Navigation Aids
OPSNET	Operations Network
PFC	passenger facility charges
RDC	Runway Design Code
SWOT	Strengths, Weakness, Opportunities, And Threats
TAF	Terminal Area Forecast
TFMSC	Traffic Flow Management System Counts
TSA	Transportation Security Administration
YTD	Year-to-Date

1. Introduction

1. Introduction

This chapter provides an overview of existing activity and facilities at Bangor International Airport (BGR). In addition, demographic, environmental and other data pertinent to the development of a comprehensive airport master plan is covered. Information presented in this chapter serves as the basis for subsequent analysis and ultimately leads to the determination of facility requirements and projects that will be represented on the Airport Layout Plan and within the Airport Capital Improvement Program.

1.1 Airport Mission Statement

Bangor International Airport has emerged as Maine's friendly, convenient airport. The BGR team is dedicated to maintaining and enhancing the airport infrastructure to **provide global access and exceptional service with a personal touch and focus on dependability and value**. The airport is committed to being a leader in Trans-Atlantic tech stops, providing quick turns, and cost effective, professional service.

1.2 Public Participation Program

The public participation program consisted of convening a Technical Advisory Committee consisting of airport and community stakeholders. The list of participants/organizations and meeting minutes can be found in **Appendix A**. In addition, the Master Plan team provided briefings to the Bangor City Council via MS Teams. The City Council meetings are televised and recorded and are made available to the public.

1.3 Existing Documents and Reports

The last Master Plan for Bangor International Airport (BGR) was prepared in 2014. Since that time a number of changes have occurred at the airport, and throughout the aviation industry. BGR and the aviation industry as a whole, have seen increased activity related to:

- Passenger air service, including passenger enplanements and nonstop destinations. BGR has experienced double digit percentile growth in passenger demand from 2015 through 2019. Increased service to Charlotte and Chicago was announced in CY 2018. United Airlines has reintroduced service to Chicago and Newark. The airlines have also increased capacity to the New York City market. Since 2013, all major airlines have set records for revenue passenger miles, load factors, profitability, and new aircraft orders. Low-fare carriers have experienced significant growth, including in New England. And some carriers have started nonstop transatlantic service between Europe and small and medium-hub airports such as Bradley Airport in Hartford, T.F. Green Airport in Rhode Island, and Stewart Airport in NY.
- In response to increased airline activity, demand for additional gates and space within the terminal building at BGR has also grown. With this growth, BGR has experienced an increase in passenger screening requirements and the Transportation Security Administration (TSA) passenger checkpoint reaches full capacity during specific peak periods. The Airport has made a number of improvements to the building (including adding TSA Pre-check), but a comprehensive analysis needs to be undertaken to determine the optimum short and long-term development plan.
- BGR has handled an average of over 1,000 military transient aircraft per year for the last 15 years. This represents approximately 80% of transient military operations.

- Air cargo traffic. The global economy has been increasing output (GDP) since 2014, particularly the U.S. and China, and more recently Europe, which has resulted in growing demand for air cargo services, particularly by FedEx, UPS, DHL, Polar Air Cargo, etc. Air cargo carriers have placed large orders for new all-cargo aircraft, indicating their confidence that the growth will continue.
- Demand for hangar space from a variety of users is ever present. A number of aviation-related industries, including maintenance-repair-overhaul (MRO) firms, original equipment manufacturers, parts suppliers, outfitters, etc. have been expanding in response to growing air passenger and cargo demand. C&L Aerospace is an extremely successful aircraft maintenance firm based at BGR that has expanded rapidly since 2011. BGR has been very successful in leasing much of its available aeronautical and non-aeronautical use property. This places emphasis on the importance of a thorough review of land use and revenue generation opportunities for the remaining undeveloped airport land.

1.4 Key Issues

A number of key issues have been identified by BGR and the Federal Aviation Administration (FAA) to be analyzed in this Master Plan:

- Terminal Building Analysis – the growth in passenger air services has resulted in increased demand for additional gates, as well as related terminal facilities such as hold rooms, airline ticket office space, baggage hold and makeup rooms, concessions, TSA security areas, public circulation areas, and vehicle parking. BGR has made a number of short-term improvements to the terminal building to maximize the use of existing gates, including utilizing a former international hold room and loading bridges for domestic service. A more comprehensive terminal study update is required to address both the short and long-term facility requirements and provide a systematic approach to future terminal development.
- Aircraft Storage Hangars – BGR has received numerous requests for turnkey hangar sites. The master plan will identify specific areas for assorted hangar options. Planning level siting analysis to include connectivity with utilities will be completed to ensure the viability of each recommended site. Compatibility and/or alternate sites for existing uses such as munitions storage will need to be considered within this master plan.
- Cargo Facilities – The handling of air cargo is a key component of airfield operations and a revenue generator. The master plan will address the need for additional ramp space and associated facilities to accommodate the growing demand for air cargo handling. This master plan will make use of the cargo study recently completed by BGR. The master plan will identify the need for facilities such as warehouse space or other climate-controlled space.
- Runway Length Analysis – One of the key issues in this study will be to determine the specific runway length, as well as pavement weight bearing requirements for military and civilian aircraft. The runway length and pavement strength requirements will have an impact on FAA funding eligibility for common use facilities and dictate the funding split for the 2023 runway rehabilitation project.

2. Inventory

2. Inventory

2.1 Airport Location

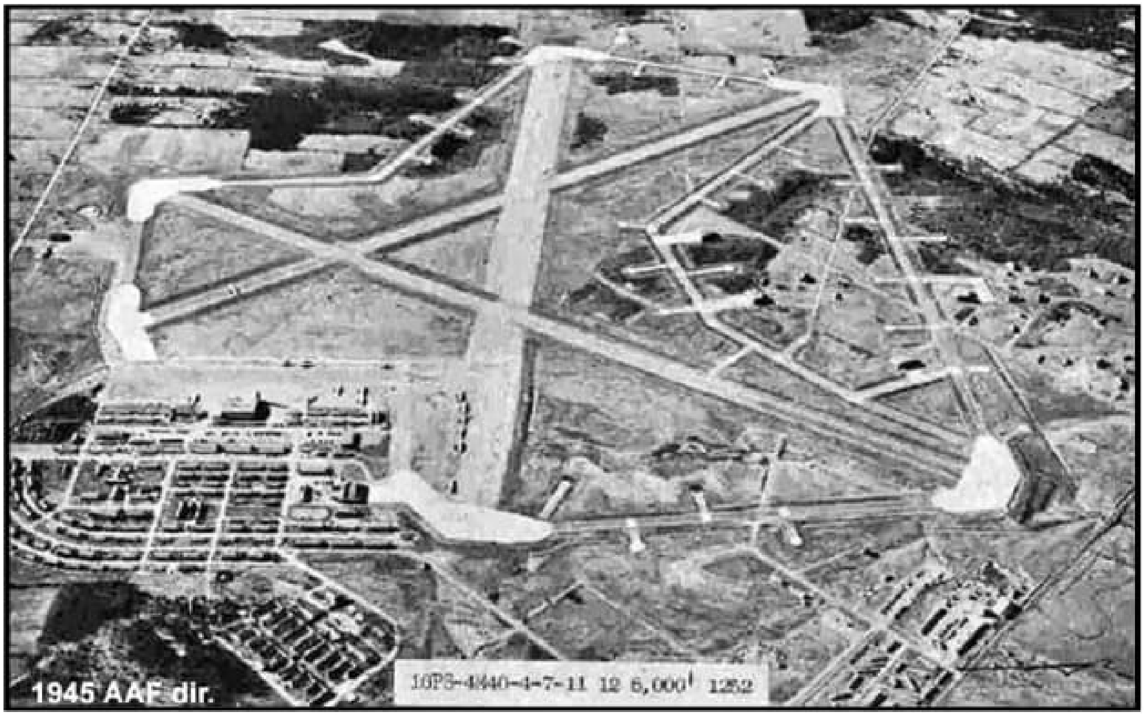
BGR is located three miles east of the City of Bangor in Penobscot County, Maine. The state capital, Augusta, Maine, is roughly 77 miles to the southwest of BGR (**Figure 2-1**). The airport is comprised of 2,079 acres and is owned and operated by the City of Bangor. BGR is a joint-use (civilian and military aviation) airport and remains the home of the 101st Air Refueling Wing of the Maine Air National Guard. The airport is one of three international airports in the state of Maine and provides aeronautical access for central, eastern, and northern Maine residents as well as Canada. BGR is also designated as an emergency landing location for the NASA space shuttle.

Figure 2-1. Airport Location

2.2 Airport History

BGR began as Godfrey Field in the 1920s, making it one of the oldest airports in the state, and in New England. Scheduled passenger airline service by Boston-Maine Airways between Bangor, Portland and Boston began in 1931. The airline was owned by the Boston and Maine, and Bangor and Aroostook railroads under contract to Pan American Airways. Pan Am was interested in BGR as a stop on its transatlantic route between the U.S. and Europe. Boston-Maine Airways became Northeast Airlines, which merged with Delta Air Lines in 1972, and Delta continues to serve Bangor to the present day. Four airlines provide scheduled passenger service to BGR: Delta (nonstop service to LaGuardia Airport, JFK, NY; and seasonal service to Boston, MA, Atlanta, GA and Detroit, MI); American Airlines (non-stop service to Philadelphia and Washington Regan National Airport and seasonally to Charlotte, NC and O'Hare, IL) and Allegiant (nonstop service to Orlando Sanford Airport and Clearwater-St. Petersburg, FL and seasonal to Fort Lauderdale). Just prior to the Second World War, Godfrey Field was taken over by the US Army Air Corps and became the Bangor Army Air Field, and subsequently operated until 1968 as Dow Air Force Base. As seen in the photo below from 1945, BGR's runway configuration has changed over the years.

Figure 2-2. Bangor International Airport Circa 1945



The Air Force constructed BGR's current Runway 15-33 (11,440 feet long) in the 1950s. Dow Air Force Base was closed as an active duty Air Force installation in 1968, and most of the Base was taken over by the City of Bangor and reopened the following year as Bangor International Airport (BGR). A portion of the airport still serves a military purpose (i.e. cantonment areas) for the Maine Air National Guard and the Army National Guard Aviation Support Facility.

For more than 30 years, from the 1970s to the early 2000s, BGR was used by major European charter companies and airlines providing service from Europe to Florida, California, the Caribbean, and Mexico as summarized in **Table 2-1.** Foreign Carriers that Served BGR below. A large number of foreign air carriers flew into Bangor, most of which are no longer in business.

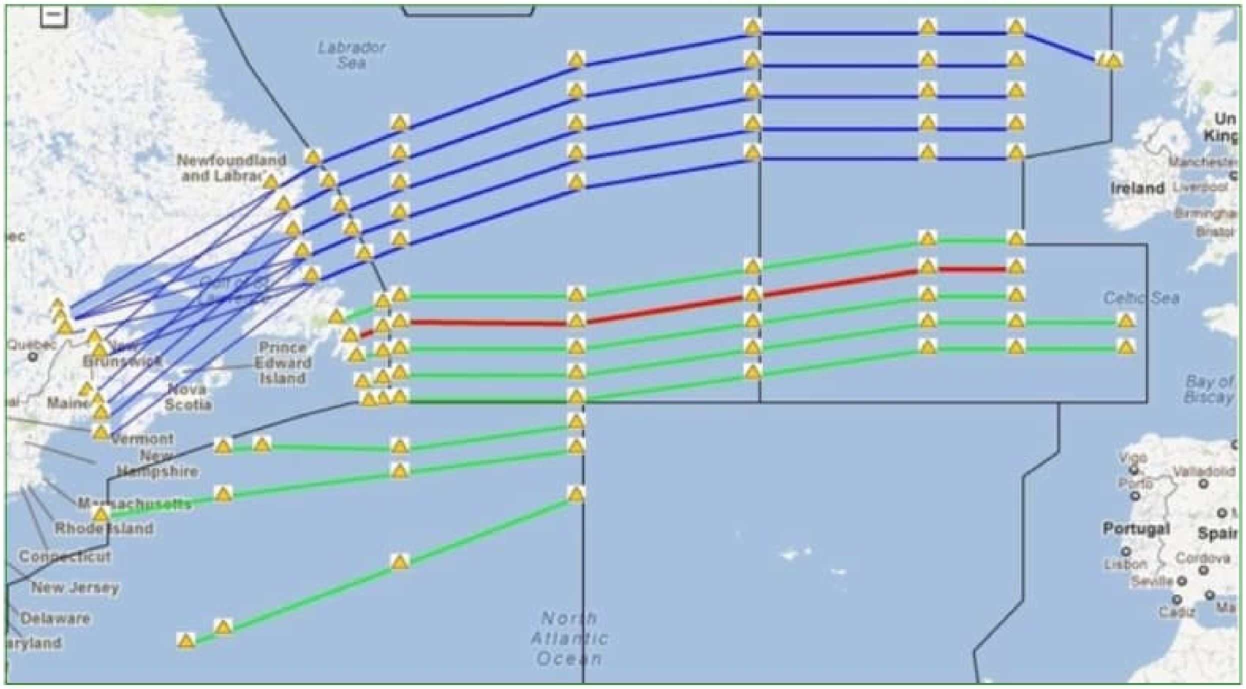
Table 2-1. Foreign Carriers that Served BGR

Foreign Carriers that served Bangor Airport	
Laker Airways	BOAC (subsequently British Airways)
Monarch	Balair
British Caledonian	Condor Airlines
Britannia Airways	LTU International
World Airways	Capitol International Airways
LOT Polish Airlines	Aeroflot
Aeromexico	Finnair
Airtours International	

BGR has a tradition for serving as a technical stop for refueling as well as a U.S. Port of Entry where passengers are processed through customs and immigration while the aircraft is serviced. Changes in aircraft technology, particularly in terms of increased range, as well as changes in the European tour market and U.S. customs and immigration procedures, resulted in the decline and eventual discontinuation of the European charter/technical stop market at BGR. However, BGR still receives both cargo and military charter flights from around the world.

BGR is strategically situated adjacent to the North Atlantic Track System, which is a series of designated airways across the North Atlantic used by civilian and military aircraft as pictured in **Figure 2-3.**

Figure 2-3. North Atlantic Track System



Approx. 1,200 flights per day use the North Atlantic Track System. The actual routes are adjusted daily by air traffic control centers based on the weather and winds over the North Atlantic. BGR has been the port of entry for over a million servicemen and women returning from the First and Second Gulf Wars, Operation Iraqi Freedom/Operation Enduring Freedom, and the NATO operations IFOR and SFOR in Bosnia and Herzegovina. Starting in 1991, a combination of local veterans' groups and interested citizens formed into troop greeters. The 'ceremony of return' at BGR has been profiled by news organizations around the world. In 2006 former president Bill Clinton spontaneously joined the line of troop-greeters when his private plane made a refueling stop at BGR. BGR has also been a major point of debarkation for general aviation and corporate aircraft being flown across the Atlantic (both east- and westbound), from small single-engine pistons up to large corporate jets. In addition to customs and immigration services, services provided by BGR also include fuel, maintenance, international flight planning, installation of long-range fuel tanks (when needed), as well as survival equipment and long-range (HF) radios.

2.3 Airport Classification / Role

The FAA defines a series of classifications for airports in the National Plan of Integrated Airports. These classifications in turn are used to determine funding levels. BGR is classified by the FAA as a commercial service, non-hub, primary airport. **Table 2-2** shows the various commercial service airport categories as defined by the FAA.

- "Commercial service" is defined as a publicly owned airport with at least 2,500 annual enplanements and scheduled air carrier service.
- "Non-hub" airports are defined as airports that enplane less than 0.05% of total passenger boardings in the U.S.
- "Primary airports" are defined as commercial service airports with more than 10,000 annual enplanements.

Table 2-2. Commercial Service

Publicly owned airports with at least 2,500 annual enplanements and scheduled air carrier service (§47102(7)). Primary airports are a commercial service airport with more than 10,000 annual enplanements (§47102(16)).

Statutory Definition	Criteria	Also referred to as:
Large Hub	Receives 1 percent or more of the annual U.S. commercial enplanements.	Primary
Medium Hub	Receives 0.25 to 1.0 percent of the annual U.S. commercial enplanements.	Primary
Small Hub	Receives 0.05 to 0.25 percent of the annual U.S. commercial enplanements.	Primary
Non-hub	Receives less than 0.05 percent but more than 10,000 of the annual U.S. commercial enplanements.	Primary
Nonprimary Commercial Service, Non-hub	Also referred to as non-hub, nonprimary, these airports have scheduled passenger service and between 2,500 and 10,000 annual enplanements.	Nonprimary

Table 2-3 summarizes the different classes of Part 139 Airports. Because BGR has scheduled air service, it is also certificated by the FAA under FAR Part 139, Certification of Airports, as a Class I airport, Aircraft Rescue and Fire Fighting (ARFF) Index B with Index E capabilities available 24/7 (as of 10 September 2020). In Calendar Year (CY) 2019 BGR was one of 403 primary airports and one of the 267 non-hub airports in the U.S. The Airport ranked 168th with regards to passenger enplanements (304,900 enplanements).

Table 2-3. FAA Part 139 Classifications

Type of Air Carrier Operation	Class I	Class II	Class III	Class IV
Scheduled Large Air Carrier Aircraft (30+ seats)	X			
Unscheduled Large Air Carrier Aircraft (30+ seats)	X	X		X
Scheduled Small Air Carrier Aircraft (10-30 seats)	X	X	X	

2.4 Airport Management

The management team at BGR is comprised of the Airport Director (appointed position) and Assistant Airport Director. They are supported by Admin, Operations, Finance and Marketing/Business Development teams. The Airport Director reports to the City Manager and an Airport Advisory Committee. The Airport Advisory Committee meets once a month and are responsible for providing review and advice to the Bangor City Council on airport issues.

The full list of Airport Committee duties can be found here: https://www.bangormaine.gov/content/1538/1415/1453/default.aspx#.

2.5 FAA Design Standards

2.5.1 Critical Aircraft

Critical Aircraft for AIP (Airport Improvement Program) / Passenger Facility Charges (PFC) funded projects (Boeing 757-300)

Critical Aircraft for Runway Length Requirements (Boeing 757-300)

The critical aircraft must be defined consistent with FAA Advisory Circular 150/5000-17, Critical Aircraft and Regular Use Determination. The critical aircraft is defined as the most demanding single aircraft or grouping of aircraft with similar performance characteristics conducting a minimum of 500 or more operations annually at the airport. Airport design standards are represented by alphanumeric codes referred to as the Aircraft Approach Category (AAC) and Airplane Design Group (ADG) and are based on the critical aircraft approach speed and wingspan. The FAA allows for the decoupling of the AAC and the ADG in the determination of the critical aircraft. For FAA funding purposes, annual operations for the critical aircraft determination may not include military or federally owned aircraft. However, they do include military charters, such as troop transport flights, that are operated by commercial charter carriers and handled by the Airport. Therefore, per the Advisory Circular, this master plan will consider several critical aircraft: one for AIP / PFC funded projects and one for overall airfield planning purposes.

The data used to determine the critical design aircraft is based upon Airport operations data for CY 2019 which is the most current complete calendar year available. Data for this period is also more representative of normal operations than data from 2020 as it is reflective of pre-pandemic activity levels. The sources of data used are:

- Airport Operations Data Jan. 2019-Dec. 2019 – Tracked by *FBO One* Software and submitted by the Airport.
- FAA Operations Data – Traffic Flow Management System Counts (TFMSC) from 2019 to 2020.

2.5.1.1 Critical Aircraft for AIP / PFC Funded Projects (Boeing 757-300)

BGR's FBO One and FAA's TFMSC data was processed and organized to determine the critical aircraft. Two approaches were taken. First, manufacturer's performance manuals were utilized to determine the wingspan and approach speed of the most demanding single aircraft with at least 500 annual operations. It was concluded that the Airbus A319 best met this criterion. There were 506 operations recorded by this aircraft at BGR in CY 2019. The A319 has an approach speed of 126 knots and a wingspan of 111.88 feet and is considered AAC C-III. At 95% of

MGTOW (which equates to approximately 82% load factor) the A319 requires roughly 5,200 feet of runway length.

The second approach considered the grouping of similar performance aircraft. FAA Advisory Circular 150/5000-17 allows for the grouping of aircraft with similar performance characteristics to determine the AAC and ADG for airfield planning purposes.

BGR saw over 1,200 operations by Approach Category D aircraft in 2019. These aircraft include the Gulfstream IV/G400, Boeing 737-800, 767-400, 747-400, 777-300ER and Airbus A380-800. Likewise, there were 544 operations by ADG IV aircraft at BGR which include the Boeing 757-300, 767-300, Antonov AN-12, and the Airbus A300. For the method of determining the critical aircraft based on a grouping of similar characteristics, **the AAC of D and the ADG of IV are recommended.** Based on this method, the critical aircraft would be the Boeing 757-300 which has an approach speed of 143 knots and a wingspan of 135 feet.

2.5.1.2 Critical Aircraft for Runway Length Requirements (Boeing 757-300)

Takeoff distance, particularly for turbine powered aircraft, is determined by a number of factors, including field elevation, ambient temperature, obstacle clearance, and runway slope, among other factors. The primary variable that aircraft operators use when determining takeoff distance requirements is the weight of the aircraft. Payload (passengers, baggage, and cargo), as well as fuel, can be adjusted to match the available runway length. The longest nonstop domestic scheduled passenger air service to/from BGR are to St. Petersburgh Florida (PIE), which is 1,211 nautical miles, and Orlando Sanford Airport (SFB), which 1,128 nautical miles.

Currently, Runway 15-33 is 11,440 feet long, which allows both domestic and international air carrier and charter service to operate with little to no weight constraints.

Required runway length is primarily governed by the takeoff weight of the aircraft. A small percentage of aircraft operations are conducted at maximum payload and maximum fuel load. 95% of Maximum Takeoff Weight (MTOW) is considered to be a realistic estimation of the majority of operations without significantly reducing allowable payload or fuel load for many of the routes flown to/from BGR. As such, this analysis is generally based upon reduced takeoff weight = 95% of MTOW.[1]

BGR's *FBO One* and FAA's *TFMSC* data was used to determine the critical aircraft for runway length requirements. When manufacturer's performance manuals were reviewed to determine the most demanding single aircraft in terms of runway length requirements which had conducted at least 500 annual operations, the ERJ-140/145 was identified. The ERJ-145 falls within Group C-II. That aircraft had 3,900+ operations at BGR in CY 2019, requiring approximately 7,000 feet ± of runway length (**Figure 2-4).** The ERJ-145 is operated by American Eagle (nonstop seasonally to Charlotte, NC) and United Express (nonstop seasonally to Chicago and Newark).

[1] Operations data from BGR indicated an average between 77% to 86% load factor in CY 2019 for domestic passenger carriers. Based on the payload (passengers and baggage) for 86% load factor, and mission fuel for 1,300 nm non-stop mission plus reserves, results in an average of 95% of max takeoff weight (MTOW). Aircraft manufacturers performance manuals, which are required to be used by FAA AC 150/5000-17, only provide two variables for calculating takeoff and landing distances: density altitude and takeoff weight (see Appendix A for excerpts from B757-200/300 manual). As a result, 95% of MTOW was used to calculate reduced takeoff distance. Takeoff distances at MTOW were also calculated.

Figure 2-4. ERJ-145 Runway Length Requirements

ERJ – 145

Airport Performance Manual	https://www.flyembraer.com/irj/go/km/docs/download_center/Anonymous/Ergonomia/Home%20Page/Documents/APM_145.pdf
Aircraft Type	ERJ-145 XR
Engines	AE 3007 A1E Engines
Payload Range Chart Used	3.2.1 – Payload x Range for Long Range Cruise at 37,000 ft (Pg 44)
Performance Charts Used	3.3.2 – FAR Takeoff Runway Length Requirements - ISA + 15 (Pg 51)

ERJ – 145	Design Takeoff Weight (lbs)	RWY length (ft)	Temp Correction	Gradient Correction	Jacobs NE Office Runway Lengths
MTOW	53,131	7,248	7,074	7,400	7,400
95% MTOW	50,474	6,448	6,293	6,600	6,600

* - The maximum takeoff weight the aircraft can have at that stage length.

American Airlines provided their operating data which illustrates that a minimum of 7,000 feet of runway is needed to operate with a full passenger load on their BGR-PHL route **Figure 2-5**). BGR to PHL is a relatively short route and longer routes require closer to the MTOW length of 7,400 feet to operate at full passenger load.

Figure 2-5. American Airlines Operating Data

The table below shows the various fleet types, routes, and required runway length.

- If the cell is empty this indicates we can carry full passengers.
- If the cell is shaded with a red number that is our outbound passenger restriction.

Fleet	Route	Runway Length - Feet						
		5500	5750	6000	6250	6500	6750	7000
E145	BGR-PHL	40	40	40	40	44	47	

As an alternative approach, aircraft were grouped according to similar performance characteristics and sorted by maximum gross takeoff weight. AAC C & D aircraft include the aircraft with the most demanding runway length requirements.

When grouped in this manner the **Boeing 757-300** (Approach Category D) can be identified as the critical aircraft for runway length requirements. As illustrated in **Figure 2-6** below, there are 558 operations of Group C & D aircraft that require >7,500 feet of runway at reduced takeoff weight.

Figure 2-6. Aircraft with Similar Performance Standards

BANGOR INTERNATIONAL AIRPORT				
RUNWAY LENGTH REQUIREMENTS - APPROACH CAT. C&D				
Airfiled elev. = 192'. Rwy 15 slope 0.4% down				
	MGTOW	Reduced TOW[2]	2019 Ops	*cumulative operations*
A388 - Airbus A380-800	17,000	11,200	2	*2*
B77W - Boeing 777-300ER	12,100	10,200	8	*10*
B744 - Boeing 747-400	10,300	9,600	6	*16*
MD11 - Boeing (Douglas) MD 11	10,200	9,800	4	*20*
B748 - Boeing 747-8	10,100	9,000	4	*24*
A-330-200/300	11,000	8,900	42	*66*
B777-200ER	10,100	8,900	72	*138*
DC10 - Boeing (Douglas) DC 10-10/30/40	10,100	8,800	22	*160*
B787-9	9,900	8,800	16	*176*
B767-400	10,100	8,500	10	*186*
B738 - Boeing 737-800	9,100	8,100	62	*248*
B739 - Boeing 737-900	9,100	8,100	12	*260*
B767-200ER	9,000	7,800	16	*276*
B767-300ER	10,400	7,600	190	*466*
B757-200/300	9,600	7,500	92	*558*
ERJ-140/145	7,400	6,600	3930	*4488*
MD88 - Boeing (Douglas) MD 88	7,000	6,400	4	*4492*
A-300-600F	7,200	6,200	32	*4524*
A-310	6,200	6,000	8	*4532*
A-320-200/NEO	6,800	6,000	516	*5048*
CRJ-900	6,500	5,900	662	*5710*
B737-700/BBJ	6,900	5,800	72	*5782*
CRJ-200ER	6,300	5,700	2837	*8619*
ERJ-175LR	7,800	5,600	30	*8649*
GLF5 - Gulfstream V/500/G550	5,910	5,277	94	*8743*
GLF6 - Gulfstream/G-650	6,299	5,241	58	*8801*
A-318/319/CJ	5,800	5,200	4900	*13701*
CRJ-700ER	5,500	4,900	1642	*15343*
ERJ-135LR	5,774	4,462	776	*16119*

Approach Category D aircraft, which include the Boeing 737-800, 777-300, 747-400, MD-11, Gulfstream GIV, G-450, G-V, G-500, G-650, generated 1,418 operations in CY 2019 (source: BGR). Many of those aircraft were troop transports and cargo flights, which departed BGR nonstop for Europe, including England, Germany, France, and Moscow, and many of those flights departed at or near MTOW. However, no single aircraft type generated more than 500 operations per year at BGR.

Regardless, the average runway length required for 1,400+ operations of Group D aircraft at reduced TOW is 7,758 feet (**Figure 2-7**).

Figure 2-7. Critical Design Aircraft Analysis

BANGOR INTERNATIONAL AIRPORT RUNWAY LENGTH REQUIREMENTS - APPROACH CAT. D				
Airfiled elev. = 192'. Rwy 15 slope 0.4% down				
	MGTOW	Reduced TOW[2]	2019 Ops	*cumulative operations*
A388 - Airbus A380-800	17,000	11,200	2	*2*
B77W - Boeing 777-300ER	12,100	10,200	8	*10*
MD11 - Boeing (Douglas) MD 11	10,200	9,800	4	*14*
B744 - Boeing 747-400	10,300	9,600	6	*20*
B748 - Boeing 747-8	10,100	9,000	4	*24*
DC10 - Boeing (Douglas) DC 10-10/30/40	10,100	8,800	22	*46*
B767-400	10,100	8,500	10	*56*
B738 - Boeing 737-800	9,100	8,100	62	*118*
B739 - Boeing 737-900	9,100	8,100	12	*130*
B767-200ER	9,000	7,800	16	*146*
B767-300ER	10,400	7,600	190	*336*
MD88 - Boeing (Douglas) MD 88	7,000	6,400	4	*340*
GLF5 - Gulfstream V/500/G550	5,910	5,277	94	*434*
GLF6 - Gulfstream/G-650	6,299	5,241	58	*492*
Lockheed L100 Hercules	6,300	5,200	90	*582*
GLF4 - Gulfstream GIV/450	5,600	3,304	836	*1418*
	average length for D ops=	7,758		

Based upon the above analysis, there are three scenarios that support the **Boeing 757-300** as the critical aircraft requiring approximately 7,500 feet of runway to support civil aircraft operations at BGR.

2.5.2 Runway Safety Areas

All safety areas at BGR meet FAA design standards

There are numerous safety areas that are centered on an airport's runway for the purposes of protecting aircraft while operating in the airport environment. The FAA requires that "certain areas on and near the airport are clear of objects or restricted to objects with a certain function, composition, and/or height". **Table 2-4** lists the safety area standards applicable at BGR.

Table 2-4. Runway Protection Design Standards Based On ARC/RDC D-IV, Lower Than 0.75-Mile Visibility

Surface	Location	Width	Length
Runway Safety Area (RSA)	Extends beyond Runway End, centered about Runway Centerline	500 feet	1,000 feet beyond departure end 600 feet prior to threshold
Runway Object Free Area (ROFA)	Extends beyond Runway End, centered about Runway Centerline	800 feet	1,000 feet beyond runway end 600 feet prior to threshold
Runway Protection Zone Approach (RPZ)	Trapezoid Shape Beginning 200 feet Prior to Runway End, Centered About Extended Runway Centerline	Inner 1,000 feet Outer 1,750 feet	2,500 feet
Runway Protection Zone Departure (RPZ)	Trapezoid Shape Beginning 200 feet Beyond Runway End, Centered About Extended Runway Centerline	Inner 500 feet Outer 1,010 feet	1,700 feet
Precision Obstacle Free Zone (POFZ)		800 feet	200 feet

2.5.3 Modification of Standards

Corrections to existing modifications to standards will be addressed in Chapter 5

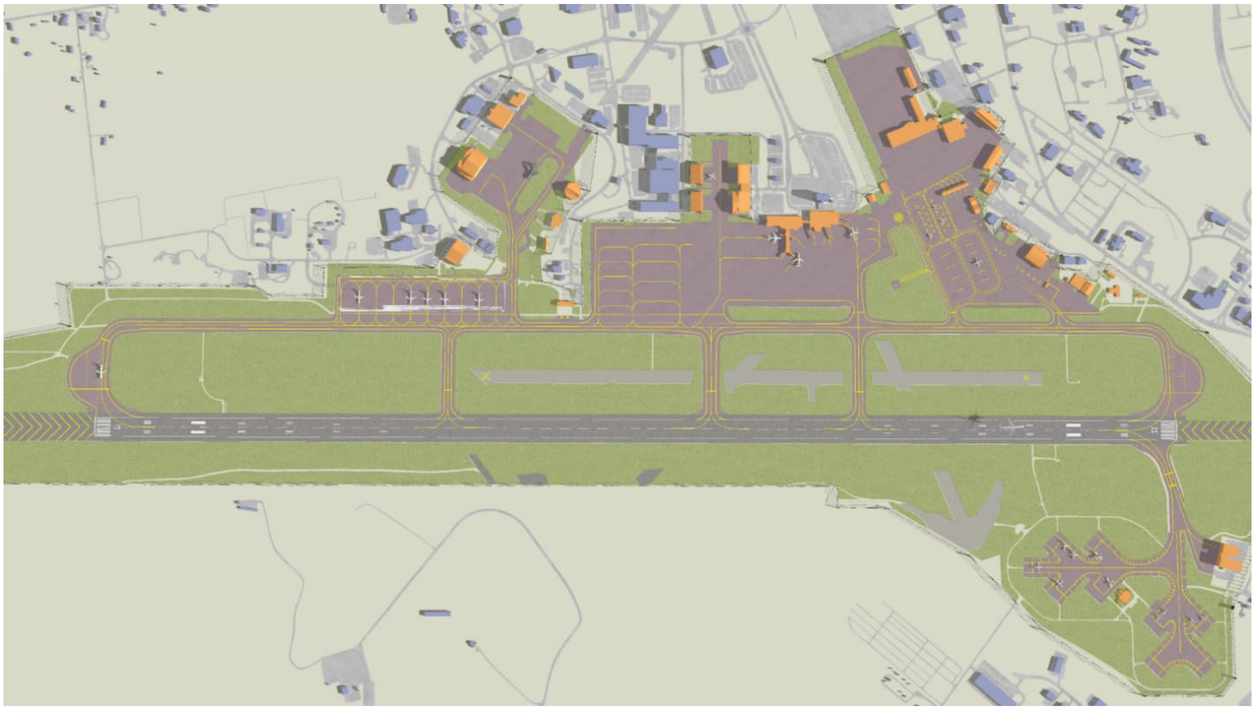
There are several FAA criteria where the Airport does not currently meet the FAA design standards. An analysis will be performed within this master plan to determine appropriate courses of action to correct the deficiencies noted below to the extent practicable.

- Taxiway ‘A’ longitudinal grade at the northern end of the taxiway exceeds 1.5%.
- The longitudinal grade within the first 123 feet of Runway 15 exceeds the criteria for the maximum longitudinal grade within first/last 2,500 feet of runway length as noted in FAA AC 150/5300-13A paragraph 313 section (b).
- Line of sight issue – there is a large hump in the runway that restricts visibility from the Runway 15 threshold to a point just prior to Taxiway ‘M’.
- The longitudinal grade over the 550 feet portion of Taxiway ‘M’ immediately before Taxiway ‘A’ is 1.9% and therefore exceeds the standard of 1.5%.
- There is a section of Runway 33 within the first 2,500 feet of runway where the vertical curve is 800 feet rather than the required minimum of 1,000 feet for each 1 percent of grade change.
- FAA Modification to Standard Waiver No. 56 is no longer applicable.
- The distance between the runway threshold bars and the threshold markings is incorrect.

2.6 Airport Facilities

This section presents the physical infrastructure comprising the airport. The airport is segregated into airside facilities and landside facilities as shown in **Figure 2-8**. Each are presented in the following sections.

Figure 2-8. Airside facilities (orange shading) and Landside facilities (blue shading)



2.6.1 Airside Facilities

Bangor International Airport (BGR) accommodates a variety of aircraft, operators, and activities. Airside facilities include the runway, taxiways, support facilities and non-terminal building areas of the airfield. The airside facilities currently present at BGR have been broadly divided into the following areas:

- Runway
- Taxiways
- Aprons
- Airfield Pavement
- Aircraft Storage Hangars
- Aircraft Maintenance and Ground Support Equipment (GSE) storage
- Helipad
- ARFF facilities
- Deicing tanks
- Fuel Farm
- Airfield Drainage

2.6.1.1 Runway

At 11,440-feet long by 200-feet wide, Runway 15-33 at BGR is one of the longest runways in the Northeast. A discussion on the existing runway length is presented in Section 2.5.1 Critical Aircraft for Runway Length Requirements. Future runway length requirements will be discussed under the Facility Requirements chapter later in this master plan.

Although the Runway Design Code (RDC) is D-IV as classified by the FAA, Runway 15-33 can accommodate some of the largest aircraft in operation today; up to aircraft design Group VI (such as the AN-124 and A-380). Large aircraft that use the North Atlantic Track System daily may use BGR as a diversion airport due to the size of the runway and the availability of good instrument approaches to each runway end. Therefore, maintaining a width larger than the 150 feet required by FAA's AC 150/5300-13A for a D-IV runway is critical to supporting safety margins of existing operations and continued growth. **Table 2-5** provides the main characteristics of the runway and **Figure 2-8** depicts the airfield layout.

The majority of aircraft operations are performed on Runway 33 while Runway 15 is primarily used in poor weather conditions (i.e. low visibility); as Runway 15 supports landing in lower weather conditions, with visibilities down to zero (CAT III) or when the wind is out of the east/southeast.

BGR was also designated as an East Coast Abort Landing site for the STS Space Shuttle before the program was discontinued by NASA.

Table 2-5. Runway Main Characteristics

Number of runways	1
Runway direction	15 – 33 (bi-directional)
RDC (Runway Design Code)	D-IV
Dimensions	11,440 feet (L) x 200 feet (W)
Pavement	Asphalt
Runway utilization	Runway 33 – 70% Runway 15 – 30%

2.6.1.2 Runway Orientation

2.6.1.3 Wind Coverage

Runway 15-33 meets FAA standards for wind coverage

A wind analysis was performed using the FAA's Standard Wind Analysis tool from the Airport Data and Information Portal website. The tool allows the user to search and download wind data from the National Oceanic and Atmospheric Administration Integrated Surface Database for specific stations, in this case BGR. The data is provided in a format that is compatible with the Wind Analysis / Generate Windrose tool which is also available on the same website. The wind data is provided for years 2010-2019. The FAA offers guidance in FAA Advisory Circular 150/5300-13A on generating windrose data.

Figure 2-9 shows the result of the wind analysis for the runway at BGR. Runway 15-33 provides a calculated 98% all-weather wind coverage. Although there are brief periods when crosswinds exceed aircraft capabilities, the ***200-foot width of the runway provides an added margin of safety when aircraft are arriving under crosswind conditions***. This is particularly relevant as BGR is a single runway airport. **Figure 2-10** provides an additional depiction of wind data which was retrieved from the website windhistory.com. Wind direction and velocity were aggregated from the weather station at BGR and the information validates the data obtained from the FAA's wind analysis tool shown.

Figure 2-9. Windrose and Runway Direction at BGR

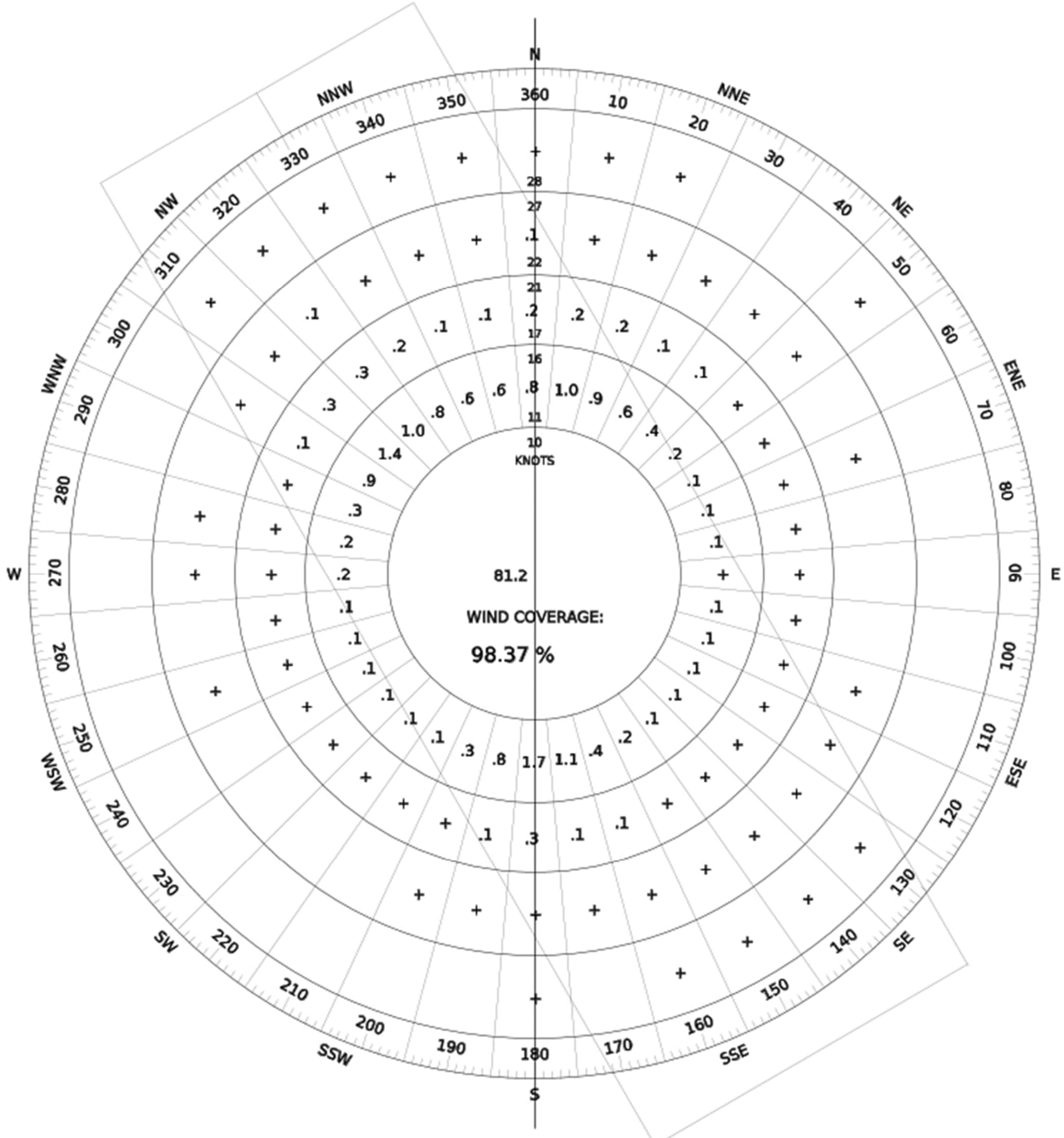


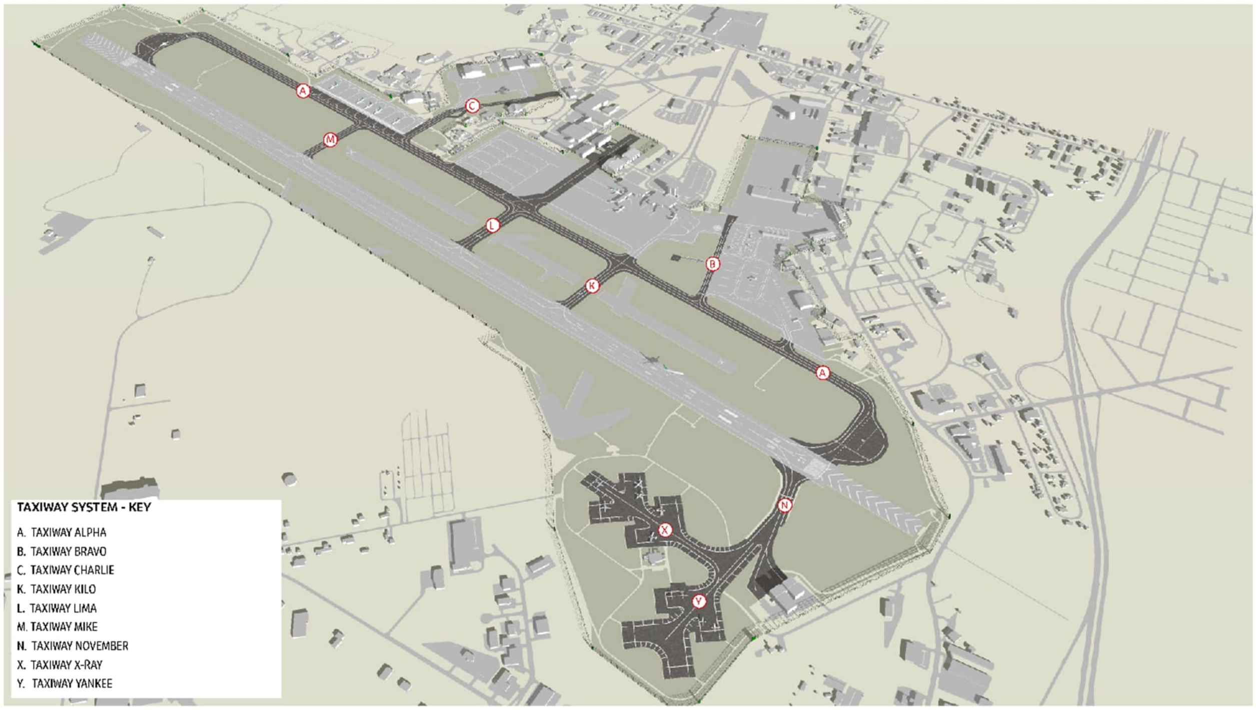
Figure 2-10. Wind Data

2.6.1.3 Taxiways

Taxiways (Existing Taxiways A, M, & K Provide Adequate Capacity)

Runway 15-33 is served by a full parallel taxiway (Taxiway 'A') which extends for the length of the runway and provides direct access to and from all the aprons located to the north of the airfield. A system of five stub taxiways (K, L, M, A-15 and A-33 at the two thresholds) connects the runway to Taxiway 'A'. Taxiway 'N' connects the runway to the 'Xmas Tree' apron, which is the only apron situated to the south of the airfield. **Figure 2-11** provides a visual depiction of the Airport's taxiway system and **Table 2-6** on the following page provides a list of the taxiways at BGR with the associated main characteristics. It should be noted that Taxiway B is considered a nonmovement area (meaning that it is not under the control of Air Traffic Control).

Figure 2-11. Taxiway System at BGR



Taxiway L is the widest taxiway serving the airfield and exceeds the width criteria for Taxiway Design Group (TDG) 7. The taxiway is 100 feet wide and TDG 7 design criteria require it to be only 82 feet wide. Due to its location near the midpoint of the runway it is used primarily by corporate jets and turboprops (TDG 2) landing on both Runway 33 and Runway 15. Large civilian and military aircraft, that need longer landing distances, more frequently use Taxiway M (for 33 arrivals) or A-15 and A-33.

The need for Taxiway L will be further analyzed in the Facility Requirements and Alternatives sections of this master plan.

Taxiway A meets TDG 6 width standards (75 feet wide). It occasionally accommodates ARC D-VI and TDG 7 aircraft, such as the AN-124, AN-225, and C-5.

BGR air traffic control tower (ATCT) personnel state that Taxiway K is used occasionally for departures on Runway 33 by regional jets and turboprops, particularly if there is construction on or in the vicinity of Taxiway A near Runway 33.

Table 2-6. Main Characteristics Of The Taxiway System at BGR

Taxiway	Width (feet)	TDG	Distance from Runway 33 Threshold (feet)	Distance from Runway 15 Threshold (feet)
A	75	6	Parallel	Parallel
B	50	4	N/A	N/A
C	75	6	N/A	N/A
K	75	6	3,300	8,000
L	100	7	4,900	6,500
M	75	6	7,650	3,700
N	75	6	0	11,440

Table 2-6. Main Characteristics Of The Taxiway System at BGR

Taxiway	Width (feet)	TDG	Distance from Runway 33 Threshold (feet)	Distance from Runway 15 Threshold (feet)
X	75 / 100	6	N/A	N/A
Y	75 / 100	6	N/A	N/A

On the south end of the airfield Taxiway N connects the runway with the 'Xmas Tree' area (the former military alert area). The 'Xmas Tree' area includes Taxiways N, X, and Y, which are used by C&L Aerospace for aircraft Maintenance, Repair, or Overhaul (MRO) activity. Additionally, Taxiways X and Y are used for aircraft under Irregular Operations (IROPS) that are required to be isolated from the public areas of the airport.

The current location of both Taxiway L and K directly opposite the air carrier apron does not comply with current FAA design standards as they provide direct access to the runway from the apron and have the potential for a runway incursion. However, given the long distance from the apron to the runway along each of those taxiways, the FAA has dismissed it as a safety issue. Discussions with BGR control tower personnel, as well as review of FAA incident and NASA ASRS files, indicated that there have not been any runway incursion incidents at the airport.

Although there are no high-speed exit taxiways, the availability of three exit taxiways (K, L, M) and the throats at either runway end (A-15 and A-33) minimize runway occupancy time thus increasing the runway operational capacity. Based on existing levels of aviation demand, there is no operational or capacity need for additional taxiways.

2.6.1.4 Aprons

BGR has adequate aircraft parking apron space

There is over 8.6 million square feet of apron space at BGR. Each apron is designated for specific uses. **Figure 2-12** below depicts the existing aircraft parking aprons and **Table 2-7** describes the characteristics of each.

Figure 2-12. Apron Areas at BGR

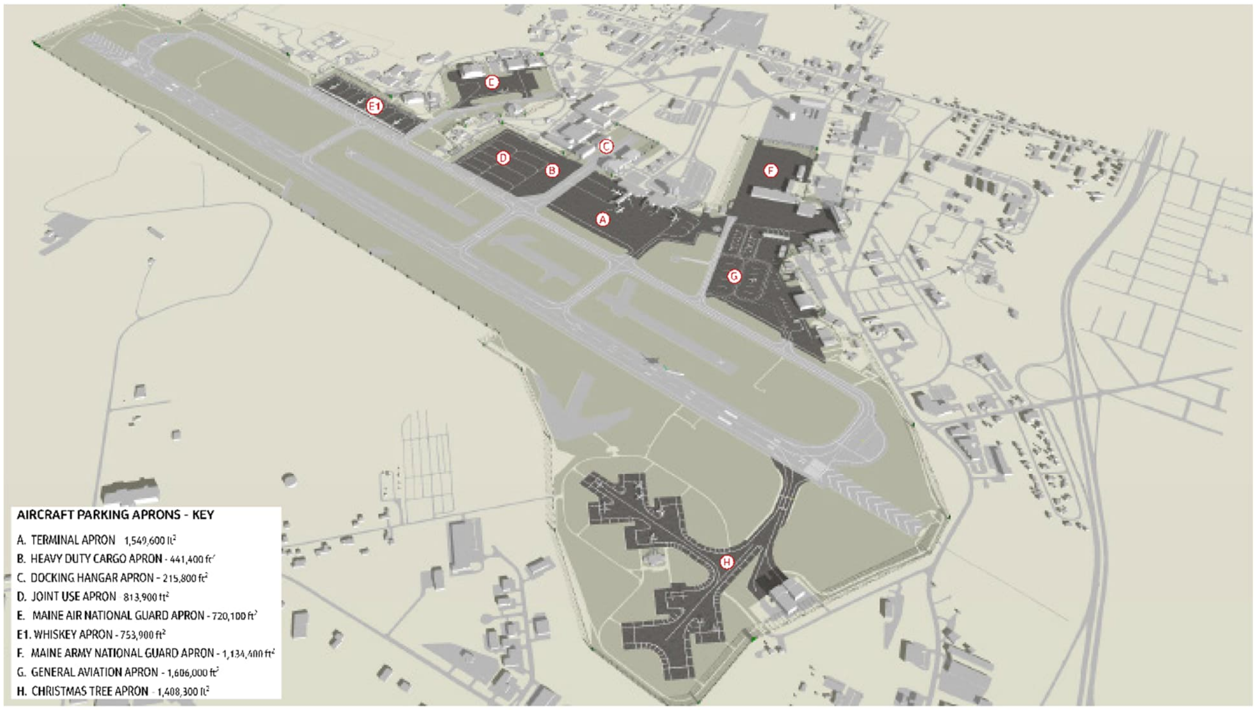


Table 2-7. Aircraft Aprons at BGR

Apron	Location	Size (sq.ft.)	Use
Terminal Apron		1,549,600	
Heavy Duty Cargo Apron		441,400	
Docking Hangar Apron		215,800	
Joint-Use Apron		813,900	
Maine Air National Guard Apron		720,100	
Whiskey Apron		753,900	
Maine Army National Guard Apron		1,134,400	
General Aviation Apron		1,606,000	
Christmas Tree Apron		1,408,300	
	Total	8,643,400	

2.6.1.5 Navigational Aids

Current navigational aids provide optimal all-weather access

The FAA has published multiple instrument approaches for both ends of Runway 15-33. **Table 2-8** provides a listing of the navigation aids (NAVAIDS) for both Runway ends as well as their associated lighting systems.

Table 2-8. NAVAIDS

Navaid	Runway 15	Runway 33
ILS	CAT III	CAT I
PAPI (4-light)	Yes	Yes
GPS	RNAV procedures	RNAV procedures
ALS	ALSF 2	MALSR
HIRL, Threshold and Touchdown lights	Yes	Yes

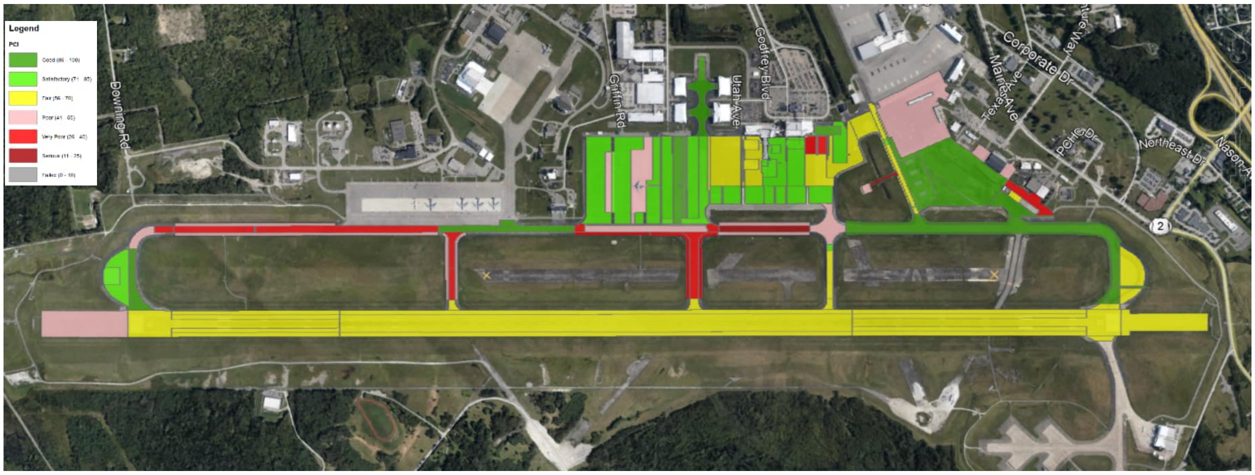
2.6.1.6 Airfield Pavement

Airfield pavements that receive a PCI rating of Fair (56-70) or less will be evaluated for repair or replacement in Chapters 4 & 5.

An airfield pavement condition index (PCI)survey was performed in the Fall 2020. The determination of the PCI is a useful tool in the evaluation of airport pavements. The PCI is a numerical rating of the surface condition of a pavement and is a measure of functional performance with implications of structural performance. PCI values range from 100 for a pavement with no defects to 0 for pavement with no remaining functional life. The index is useful in describing distress and comparing pavements on an equal basis. The survey provides a means for BGR to prioritize pavements for future rehabilitation. The PCI performed as part of this master plan update followed the recommended ASTM D 5340, Standard Test Method for Airport Pavement Condition Index Surveys.

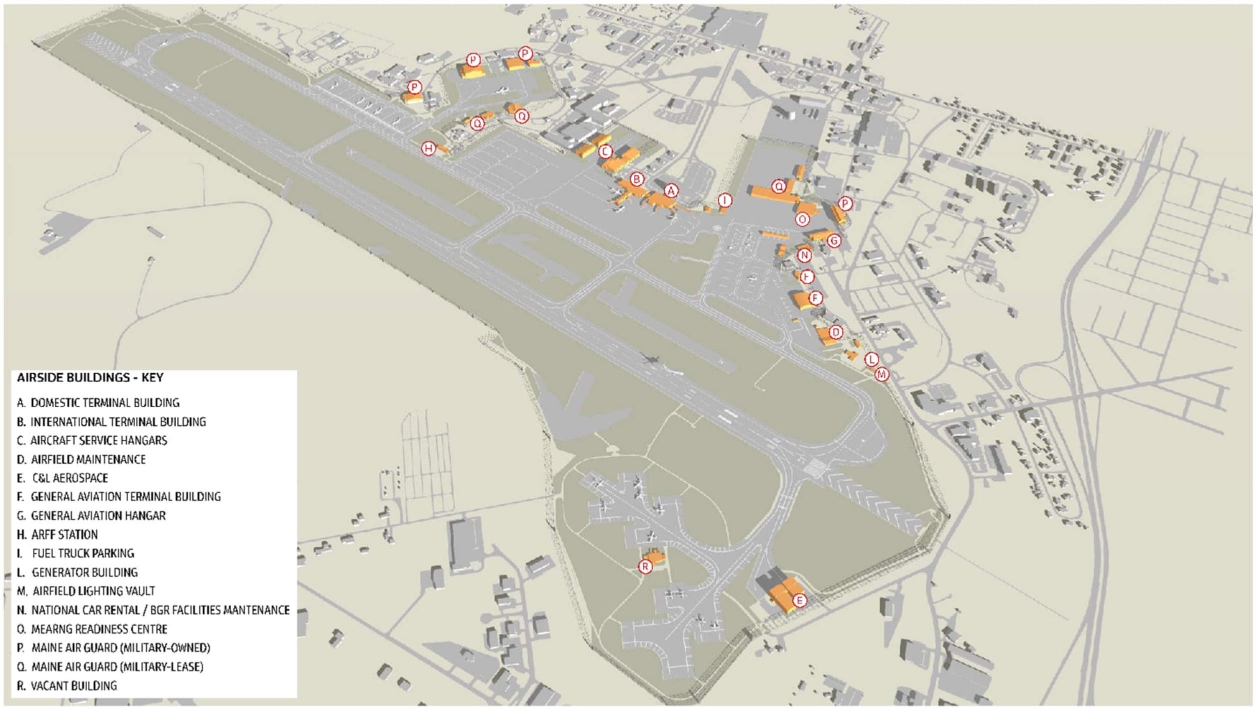
The PCI survey was conducted on BGR's Runway 15-33, Taxiway 'A', Taxiway 'K', Taxiway 'L', Taxiway 'M', Taxiway 'N', Taxiway 'B', Heliport, GA Apron (2 sections) and the Heavy-Duty Apron (5 sections). Taxiway 'C' and 'W' Ramp are owned by the Air National Guard and were not evaluated. **Figure 2-13** shows the PCI value for each of the evaluated pavement sections. There are extensive areas of pavement that received less than a satisfactory PCI rating including the runway, portions of Taxiway 'A' and several sections of aircraft parking apron. The PCI survey forms the basis for recommendations for pavement maintenance and repair which are presented in Chapters 4 and 5 of this Master Plan. The full PCI study and documentation can be found in **Appendix F**.

Figure 2-13. Airfield Pavement Condition Index (PCI)



The following sections provide an overview of the airside buildings shown in **Figure 2-14.**

Figure 2-14. Airside Buildings at BGR



2.6.1.7 Aircraft Storage Hangars

Airport management has stated that there is a need for additional large aircraft storage at BGR

Aircraft storage hangars for general aviation/corporate aircraft as well as hangar space for MRO activities for both civilian and military operators is provided at BGR. There are two tenants (C&L and Maine Aero Service) that maintain large hangars at BGR as well. In addition, the military operates from several owned/leased hangars.

A listing of aircraft storage hangars and related details is provided in **Table 2-9** below.

Table 2-9. Aircraft Storage Hangars at BGR

Hangar	Location	Size	Tenant
General aviation/Corporate Community Hangar	Located on the northeastern edge of the general aviation apron, facing north	296’ x 86’	Shared Aircraft Storage
General aviation/Corporate T-Hangar	Located on the north edge of the general aviation apron with lead in lines to the north	5 Aircraft Bays	Bays are privately leased to individuals
Dock Hangars (11 & 13)	Two hangars located on the east side of the Dock Hangar Apron	202’ x 130’ 202’ x 187’	C&L Aerospace
Dock Hangars (10 & 12)	Two hangars located on the west side of the Dock Hangar Apron	202’ x 130’ 204’ x 130’	Used to store transient air cargo aircraft and airport equipment
Maine Air National Guard Hangars	Two hangars situated to the north and one hangar to the east of the airfield	213’ x 210’ 315’ x 214’	Maine Air National Guard
Maine Army National Guard Hangar	One hangar situated on the east side of the airfield	575’ x 163’	Maine Army National Guard

Table 2-9. Aircraft Storage Hangars at BGR

Hangar	Location	Size	Tenant
MRO Facility Hangar	Situated off Taxiway N in the 'Xmas Tree' area which is located on the southeast portion of the airfield	248' x 238'	C&L Aerospace
Lease/Rent Hangar	Situated to the east of the terminal building	73' x 82'	

2.6.1.8 Maintenance (Bldg #253)

This building houses both the Ground Service Equipment (GSE) for Airport Maintenance and the car maintenance facility for Alamo and National Rental Car. The two occupants are physically separated in the building. Each space consists of high-bay maintenance space as well as support office and facilities. Building 253 is a single-story building originally constructed in the 1950s. The building construction consists of block walls with brick veneer and a flat membrane roof. The building has single pane operable windows with storm glass inserts in the office areas and high bays.

Figure 2-15. Building 253

2.6.1.9 Airfield Maintenance and GSE Storage (Bldg #100)

The Airfield Maintenance building is located on the southern edge of the general aviation apron. The Airfield Maintenance building is a one-story building with one bay on the east and one bay on the west of the building. Administration space is located in between the bays including offices, restrooms, locker rooms and kitchen/break room. The Airport Facilities Maintenance department uses the building for equipment and workshop space to support general airport building maintenance. Several garage bays provide ample space for the storage of airport maintenance vehicles such pickup trucks and vans.

Figure 2-16. Building 100

Snow removal equipment, airfield mowers, loaders, and other equipment are stored in the bays and around the outside of the maintenance building. The building walls are constructed of cast concrete with insulated panels on the interior of the bays. The roof consists of a flat steel frame and membrane. The building also has single pane operable windows with storm glass inserts in the office areas. There is also a transpired solar collector (Solar Wall) on the west bay that provides heating to the space. There is no mechanical cooling in the building.

2.6.1.10 Helipad

Helipad and associated taxiway pavement is in disrepair, however BGR has entered into a long-term lease for the MEARNG to maintain the facility

The helipad was constructed in the 1980s and was originally located on the air carrier apron but was subsequently moved to its current location. The helipad is used extensively by the Maine Army National Guard (which is accessed via Taxiway ‘B’ from their cantonment area).

The helipad as well as the taxiway pavement needs rehabilitation. The Army National Guard UH-60 Blackhawk helicopters can generate up to 20-40 operations per day in good weather when the unit is at full strength and not on deployment. Civilian operators such as Maine LifeFlight use the helipad to a lesser extent.

The Army Guard noted that the helipad provides an operational benefit for helicopter arrivals and departures in terms of avoiding fixed-wing aircraft. The intersection of Taxiway ‘A’ and ‘B’ has been used previously as a helicopter touchdown and departure point, but that location is challenging in terms of avoiding fixed-wing aircraft. The helipad is lit and is used regularly, particularly at night.

The airport has recently entered into a long-term lease of the helipad with the Maine Army National Guard so that the helipad will be eligible for Federal military funding through the military construction funding program.

Figure 2-17. Location of Helipad

2.6.1.11 ARFF Facilities (Bldg #512)

Current ARFF Facilities are adequate

Currently, the ARFF facilities are equipped to operate at Index E, meaning the facility is equipped to provide emergency services to aircraft that have a fuselage length of 200 feet or greater. Although ARFF capabilities meet Index E requirements, BGR is classified as Index B (aircraft length >90 feet but <126 feet) due to the average daily departures of air carrier aircraft.

The fire station is located in the Maine Air National Guard cantonment area adjacent to the ATCT.

Figure 2-18. Location of ARFF Facility

ARFF services are operated by the Air National Guard. The ARFF facility houses the equipment listed below:

- (1) one P-4, 1,500-gallon water/foam vehicle
- (2) two P-23, 3,300 gallons each, water/foam/dry chemical vehicles
- (1) one P-26, 5,000-gallon pumper/tanker with 1,500-gallon-per-minute pump
- (2) two Rapid intervention vehicles which include:
  - P-32 fully equipped rescue vehicle
  - P-15, 6,100-gallon combination water and foam unit

The City of Bangor Fire Department supports the Maine Air National Guard ARFF with personnel and equipment from Station 6 approximately 1-mile from the airport.

2.6.1.12 Fixed Base Operator (FBO) (Bldg #121)

Need to consider updates to location and layout of FBO building

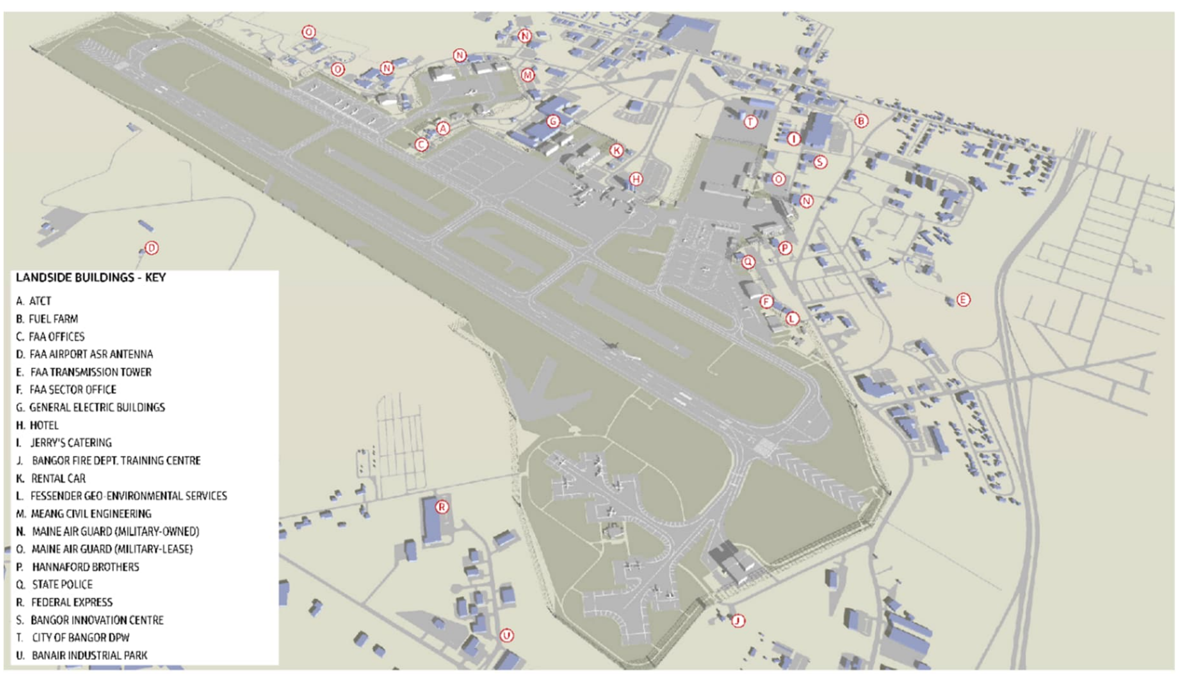
Figure 2-19. Bangor Aviation Services Building #121

Building 121 houses Bangor Aviation Services which is the Airport's only FBO on the airfield. The FBO is owned and operated by the City and is located on the east edge of the general aviation apron. The building is two-stories which was originally constructed in the 1950s and has had several recent renovations including an expansion of the second floor. The FBO contains the general aviation terminal, and consists of office areas, lounge spaces, conference and break rooms and locker rooms. Bangor Aviation Services sells fuel for all civilian operations and handles transient aircraft needs such aircraft parking, passenger movements, coordinating catering, flight planning, coordinating ground transportation, and temporary hangar space. Although based military aircraft are responsible for their own fueling and handling, Bangor Aviation Services handles a number of ***transient*** military aircraft that utilize the Airport. Building 121 is constructed of brick walls and a flat membrane roof. The building has single pane operable windows with storm glass inserts which are scheduled to be replaced.

2.6.2 Landside Facilities

Landside facilities include the passenger terminal, automobile parking, and access roads. An overall visual of the landside buildings at BGR is shown below in **Figure 2-20**

Figure 2-20. Landside Buildings



2.6.2.1 Airport Access Roadway and Curbside

- *Adequate Airport access roadway network.*
- *Operational policy change may be needed to address curbside parking.*

BGR is readily accessible from I-95. The main access road to the terminal is Godfrey Boulevard, which connects the terminal area with Union Street (Route 222), which in turn connects with I-95. The airport is also served by Maine Avenue and Odlin Road, which run along the south side of the airport, and connect with both I-395 and I-95. There is an extensive public road network both on and adjacent to the airport that serves the various tenants, including the Maine Air and Army National Guard units. A roundabout was constructed at the intersection of Godfrey Boulevard and Maine Avenue. Curbside access to the terminal building is available from Godfrey Boulevard. **Figure 2-21** depicts the roads providing access to the Airport.

Currently the access roads leading to the Airport Terminal have enough capacity to serve passengers through the end of the planning horizon, but there are some improvements that could be made. The existing northbound roadway from the terminal narrows down to one lane just prior to the roundabout. It would be beneficial to the passenger experience and to alleviate potential congestion if a lane was added. Additional lanes exiting the roundabout southbound may also be needed as vehicle activity will continue to increase through the 2040 planning period. Further discussion on access road requirements will be in subsequent chapters of this master plan.

The vehicle area in front of the terminal building includes two thru vehicle lanes, a maneuver lane and a pick-up/drop-off lane. There is a total usable curb of 305'. **The staff at BGR report that the curbside lanes are beyond capacity during peak arrival and departure periods.** Improving the curbside experience will be addressed in subsequent master plan chapters.

Figure 2-21. Airport Access Roads

2.6.2.2 Vehicle Parking

Passenger Parking

Automobile parking capacity is limited during peak periods

Passengers have the option to park in the long-term or short-term lots and can pay for as little as 30 minutes before the rate progresses to an hourly fee and then to a daily fee. A breakdown of passenger parking rates is included in **Table 2-10.** Also associated with the long-term parking lot is a shuttle lot, where passengers can park farther away from the terminal and take a complimentary airport shuttle. **Figure 2-22** shows the location of the long-term lot (A), short-term lot (B), and shuttle lot (C). Currently, the short-term lot provides 172 parking stalls and the long-term lot with the associated shuttle lot provides 1,123 parking stalls.

During peak periods the passenger parking lots operate at and above capacity. The airport has recently expanded ground-level parking to meet growing demand by adding 440 temporary overflow spaces. Peak parking demand typically occurs in the February-May period, particularly during spring school break. During the peak period there can be as many as 1,200+ vehicles parked at BGR. Approximately 30% of that demand is comprised of cross-border Canadian passengers. Outside of the peak period a baseline analysis was preformed to determine the year-round utilization for both the short-term and long-term parking lots. The base year utilization indicates that the short-term lot is operating at 90% capacity year-round. The long-term lot with the associated shuttle lot are operating at 75% utilization year-round.

Figure 2-22. Airport Passenger Parking Areas

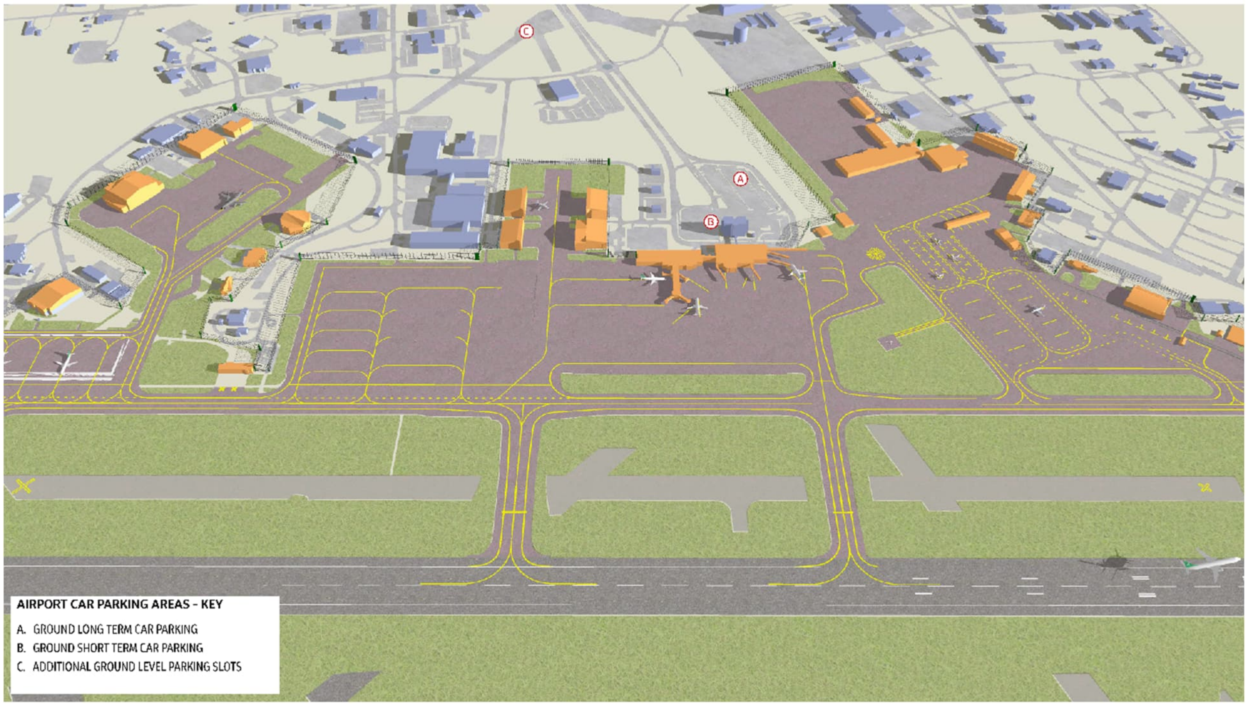


Table 2-10. Ground-Level Parking Areas - BGR

Parking Area	Description
Courtesy Parking	▪ 15-minute free parking in the hourly and daily parking lots ▪ Loading and unloading of passengers and luggage is permitted directly in front of the domestic terminal ▪ During High Security times, other precautions may be made
Hourly Parking Lot (Short Term)	▪ 172 spaces located off Godfrey Boulevard ▪ Hourly parking is available at $1.00 for each half hour (or fraction thereof). The maximum daily charge is $17.00 ▪ Average yearly occupancy rate is 90%
Daily Parking Lot and Shuttle (Long Term)	▪ 1,123 spaces located off Godfrey Boulevard ▪ Daily parking lot is available for $1.00 for each half hour (or fraction thereof). Maximum $11.00 per day (24 hours) and $70.00 per week ▪ Average yearly occupancy rate is 75%.
Parking for Persons with Disabilities	▪ 23 parking spaces are marked for persons with disabilities in the parking areas ▪ Average daily occupancy rate is 50%
Employee Parking	▪ 150 parking spaces ▪ Average yearly occupancy rate is 100%
Rental Car Ready-Return	▪ 172 parking spaces ▪ Average yearly occupancy rate is 100%

Employee Parking

There is a need for additional employee parking

The employee parking lot is located between the docking hangars and the terminal building and serves more than just airport employees. The lot offers 150 parking spaces to employees of the airport, the Four Point by Sheraton Bangor Airport Hotel, C&L Aerospace, the Transportation Security Administration (TSA), U.S. Customs and Border Control. The employee lot operates at 100% utilization year-round and currently is lacking enough parking spaces for all its users. The Airport has estimated the employee parking lot needs 30 to 50 additional parking spaces to meet the capacity requirements.

Curbside

Inefficient use of curbside needs to be addressed

Passengers have the option to drop-off/pickup on the terminal curb but cannot leave their vehicle unattended. The total curb length in front of the terminal measures 305 linear feet. In additional to passenger vehicle traffic, the terminal curbside area is used by the airport shuttle, taxis, transportation network companies (TNCs), public transit buses, hotel shuttles, and coach buses.

The Airport currently experiences congestion on the curb during peak periods. It is estimated that 20% of the short-term and long-term lot users also use the curbside to drop off passengers prior to parking. A dwell time analysis was performed to find an average of how much of the curb is occupied. The results of the analysis are provided in **Table 2-11**. The analysis indicated that private vehicle drop-off and pick-up puts the most strain on curbside utilization by taking up 100% of the curb for the longest period when compared to the other groups of curbside users.

Table 2-11. Dwell Time Analysis

User Type	% Using Curb	Dwell Time (mins)
Private vehicle pick-up/drop-off, curbside	100	2.4
Short-term parking	20 (a)	2.4
Long-term lot parking	20 (a)	2.4
Shuttle lot parking	100	1.2
Taxi	100	1.9
TNC / Autonomous Vehicle	100	1.9
Rental Car	0 or 100 (b)	1.2
Public Transit	100	1.0
Shuttle (Hotel)	100	1.2

(a) Assumed 20% of short-term lot users and long-term lot users use the curb to drop off passengers before they park.

(b) 0% if the ready-return lot stays. 100% if the ready-return lot move to a future remote ConRAC, assuming rental car users need to use shuttles.

Through traffic observations, it appears as though the congestion may be stemming from users not utilizing all 305' of available curbside. Rather, users are mostly occupying the approximately 163' of curb located directly in front of the ticketing and baggage claim areas for pick-up and drop-off instead of using the total amount of curb available. Recommendations to mitigate this issue are presented in later chapters of this master plan.

Rental Car Vehicle Parking

There are currently five rental car facilities at the Airport which utilize two parking lots for vehicles. The first parking lot is located across from the employee lot and is used for quick turnaround (QTA), storage, and maintenance. There are three buildings located in this lot where the rental car facilities perform the necessary services to prepare the vehicles for the next user. The second shared parking lot is located directly next to the short-term lot and is referred to as the ready-return lot. This lot is used for rental car users to drop-off or pick-up a rental car. The existing parking areas are adequate for the current levels of demand, but peak period demand does put a strain on the ready-return lot. This causes the rental car facilities to use some of the parking spaces that are in front of the hotel. Because of this, it is assumed that there will be a need for additional parking spaces designated for ready-return in the future as passenger demand grows.

2.6.2.3 Rental Cars (Bldg #4)

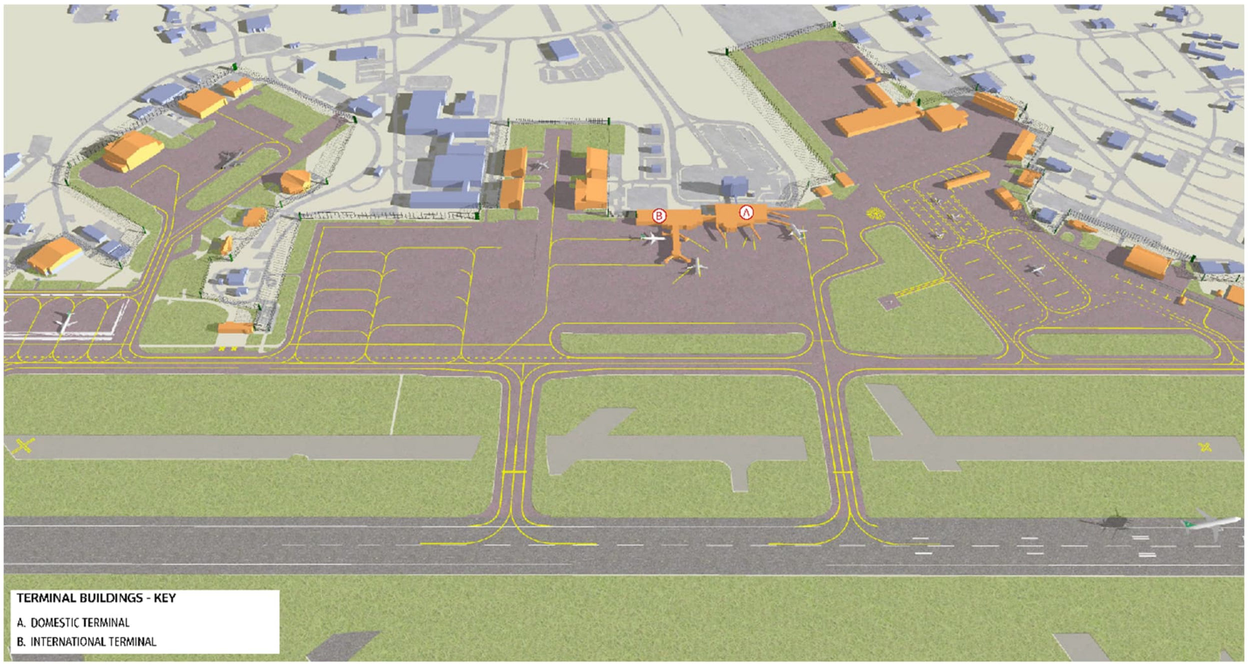
Rental cars are available at BGR from the five national rental car companies including Avis, Budget, Hertz, Alamo, and National. There are customer service desks located in the lower level of the terminal building. The rental car companies lease the space for a fee and pay a concession fee to the City. In addition to service counters in the terminal, the rental car facilities utilize buildings located in the QTA lot to service and store rental vehicles and supplies.

2.6.2.4 Terminal Building (Bldg #'s 2 & 3)

The current terminal building layout is unable to process peak period passenger demand, lacks concessions and connectivity

An in-depth passenger terminal study with a focus on the upper level airside and security screening portions of the terminal building was prepared in parallel with this master plan. The complete terminal study is presented in **Appendix D**. The analysis and recommendations from the Terminal Study are included within this master plan. The terminal complex is comprised of the domestic terminal and the international pier. The two buildings are connected through a single security checkpoint and other secure corridors. Both the domestic and international terminal buildings are constructed primarily of concrete masonry unit, precast concrete walls, and a flat roof with white membrane covering. There are also a large number of windows throughout the buildings with clear glazing and no shading. An energy audit of the terminal building was conducted in the late Fall of 2020 and is presented as **Appendix E** within this master plan.

Figure 2-23. Terminal Buildings at BGR

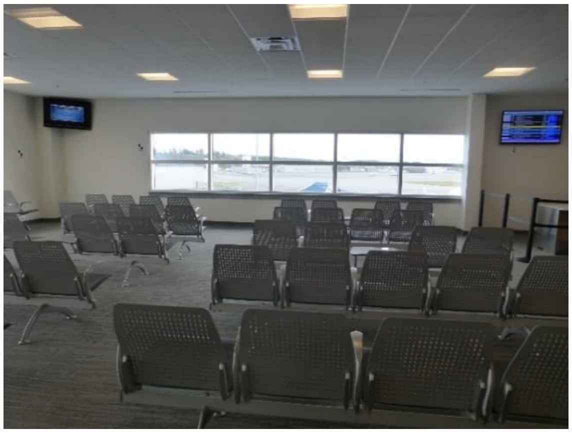


The domestic terminal building totals approximately 73,000 square feet of passenger processing and related support space and has four passenger boarding bridges as well as ground-level ramp gates for regional aircraft (narrow-body). The adjacent international terminal building is approximately 55,000 square feet in size and has four passenger boarding bridges that can accommodate up to B-747-400 aircraft (wide-body), and associated hold rooms.

The total curb length in front of the terminal measures 305 linear feet. The domestic terminal provides hold rooms, public waiting areas, airline ticket counters and office space, baggage claim, and security areas. There are a number of concessions in the domestic terminal including rental cars (Avis, Budget, Hertz, Alamo, and National), restaurants and shops such as The Grasshopper Shop, Bangor News and Gifts, Red Baron Lounge, and The Coffee Shop that pay building rent and a concession fee to the airport. Each airline also rents space in the terminal building, including ticket counters, offices, baggage makeup, gate hold room.

The international terminal is where the U.S. customs and immigration offices and screening facilities for international passengers are located. There are no active concessions in this terminal. The Airport dispatch office and the Airport's administrative offices, which are located

Figure 2-24. Domestic Terminal Interior Passenger Gate Area



between the international and domestic terminal buildings are also located here. With the reduction in military charters due to the drawdown of U.S. troops in Iraq and Afghanistan, there is available capacity in the international terminal's four gates to accommodate additional service, particularly if a new low-fare airline such as JetBlue were to start domestic service at BGR. In order for domestic airlines and passengers to use some or all of the international gates, additional access between the international terminal and domestic terminal would be needed for passengers to access the concessions and other services in the domestic terminal, while still providing sterile areas for arriving and departing international passengers.

In 2007 the "Bangor Airport Passenger Terminals and Aircraft Parking Ramp Study" was completed. The study examined the terminal building and ramp area, identified constraints in its operations, developed forecasts of passenger demand through 2020, and presented alternative layouts to meet demand and improve traffic flows. The forecasts, which were prepared in 2005, identified future demand broken down by peak periods. BGR has implemented several recommended improvements presented in that terminal study and will continue implementing an improvement program for the foreseeable future. The terminal study conducted as part of this master plan provides recommendations to help resolve current capacity and peak demand issues as well as to "future-proof" the terminal building to accommodate growing passenger demand.

2.6.2.5 Deicing Tanks

Sustainable methods for collection, storage and treatment of deicing fluid are considered in Chapter 5

BGR provides aircraft anti-icing services to aircraft via mobile deicing trucks. To effectively dispense and treat the deicing fluid (glycol) after application, BGR uses pavement drains with oil-water separators as well as mobile vehicles to collect the used glycol.

BGR maintains a National Pollutant Discharge Elimination System permit to ensure compliance with regulations regarding the storage, dispensing and treatment of deicing fluid.

The glycol is collected and stored in underground glycol storage tanks located adjacent to Dock Hangar 10. The Airport's Storm Water Pollution Prevention Plan provides guidance on best management practices to eliminate, prevent, and reduce pollutants in storm water runoff associated with various airport activities, including collecting and disposing of deicing fluid. After the used deicing fluid is collected via the existing drainage system, which includes oil/water separators, it is routed to the underground storage tanks. It is subsequently released to the municipal waste treatment facility – the storage tanks have valves that release the stored fluid into the airport's drainage system at metered rates. During large storm events in the winter the used fluid cannot be discharged quickly enough due to the metering and the storage tanks become full. The excess runoff is released into the adjacent waterways.

As noted by FAA: "A major problem facing airport operators is the biological oxygen demand and chemical oxygen demand loading from de/anti-icing wastes to receiving waters and wastewater treatment plants to ensure compliance with applicable permits and regulations." Therefore, additional glycol collection and storage methods will be examined within the master plan. Opportunities to address sustainable means of collection, storage and treatment will be considered.

2.6.2.6 Fuel Farm

Alternative locations to accommodate an on-airport fuel farm are considered within this master plan.

The fuel farm at BGR consists of three large above ground Jet A storage tanks located off-airport on Maine Avenue. The Airport provides fueling services for all civilian activity and transient aircraft. The Maine Air National Guard and Army National Guard provide fueling for their own operations. The characteristics of each tank are included below. In 2019, the Airport pumped 20.2M gallons of Jet A fuel. The 12,000 gallon 100LL (AVGAS), diesel, and regular auto gas are all stored on-airport. The airport reports an average day of 50,000 gallons pumped. The typical range is anywhere from 10,000 – 200,000 gallons per day depending on the type of activity occurring. The airport receives an average of (12) twelve 10,000 gal. tanker trucks per day to support aviation fueling operations.

Table 2-12.Existing Fuel Farm Capacity

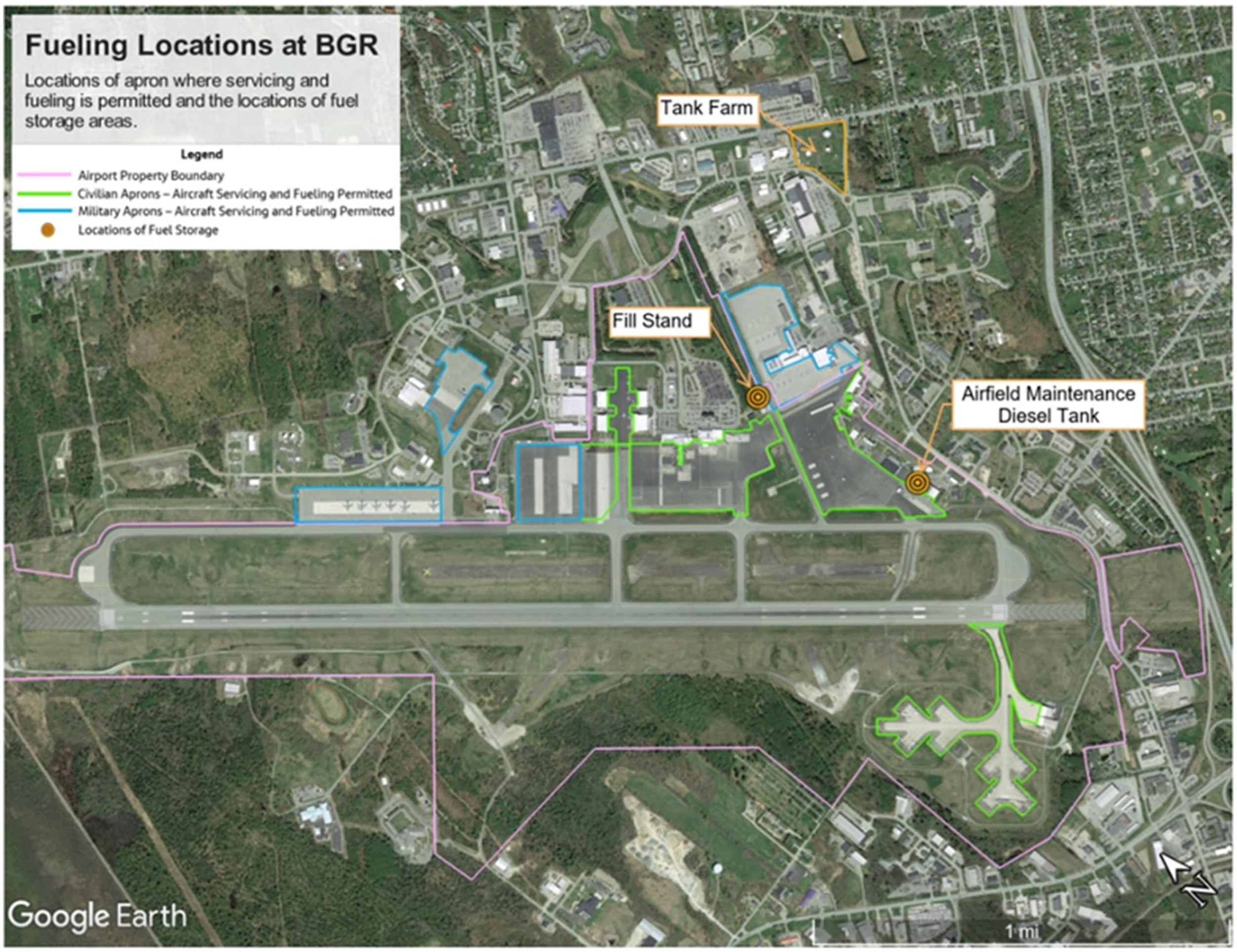
Tank	Height (ft)	Diameter (ft)	Capacity (gal)
1	30	60	628,000
2	40	90	1.88M
3	47	48	685,000

Bangor Aviation Services is the sole fixed base operator (FBO) on the airfield which is owned and operated by the Airport. The FBO provides fueling services and a number of other ground handling services to commercial aircraft, transient military aircraft, based aircraft, and GA/Corporate aircraft. The Maine Air National Guard and Maine Army National Guard who operate their own based aircraft at the Airport are responsible for managing their own fueling and ground handling operations.

The FBO offers Jet-A fuel via hydrant and truck fueling and AVGAS/100 Low Lead via fueling trucks. The Airport stores fuel in a Tank Farm which connects to fueling hydrants via a pipeline. The tank farm is located outside of the Airport's fence at 449 Maine Avenue where five fulltime City employees manage and operate the system. The system consists of three above ground tanks that store Jet A fuel which are separated from each other by their own earthen containment berms. The berms contain concrete valved sumps to manage snow melt and precipitation from the berms. This system helps the Airport observe if the captured water is clean of oil and other contaminates or if there are contaminates that need to be absorbed or vacuumed out. The clean water is discharged from the berms and released into stormwater system. Another component of the Tank Farm is a 12,000-gallon oil water separator and a 300-gallon tank that holds reclaimed Jet A fuel. Clean water from the oil water separator also gets discharged into the stormwater drainage system.

Altogether, the three fuel storage tanks at the Tank Farm can hold 3,260,000 gallons of fuel. A pipeline connects the Tank Farm to a Fill Stand on the airfield. The Fill Stand consists of three additional tanks. From there, the fuel is sent to hydrant locations on aircraft parking ramps which are then accessed by employees to begin fueling larger aircraft. Smaller aircraft receive fuel by fuel trucks which fill up their tanks at the Fill Stand and drive over to aircraft. The following figure depicts the location of the Tank Farm, the location of the Fill Stand, and the aircraft aprons where aircraft fueling, and other servicing activities are permitted.

Figure 2-25. Fuel Farm Location



2.7 Airspace

The airspace surrounding BGR is part of the National Airspace System (NAS) which the FAA is responsible for managing to provide for the safe approach and departure for aircraft operating at BGR. The NAS consists of various classifications of airspace to ensure the safety of all aircraft utilizing public airspace, with the primary function of airspace classification being the separation of instrument flight rules (IFR) traffic from each other, as well as from visual flight rules (VFR) traffic. Pilots flying in controlled airspace (Class A, B, C, D, and E under certain conditions) are subject to air traffic control (ATC) and minimum equipment requirements and must follow VFR or IFR regulations. These regulations, which include combinations of operating rules, aircraft equipment, and pilot certification, vary depending on the class of airspace and are described in Federal Aviation Regulation (FAR) Part 61 and 91.

Class C airspace surrounds BGR meaning that all aircraft operating in the airspace must be equipped with a Mode-C transponder and must establish two-way radio communications with the ATCT prior to entering. Although the configuration of airspace can differ by airport, Class C airspace consists of a surface area with a five nautical mile radius and an outer circle with a ten nautical mile radius the extends from 1,200' above airport elevation to 4,000' above airport elevation. The ATC facility provides air traffic services to aircraft operating in the airspace and communications between the controller and the aircraft must be maintained at all times.

The FAA also utilizes instrument approach procedures and protected airspace surfaces to assist pilots in maintaining safe operations at the airport. The instrument approaches and airspace surfaces that apply to BGR are discussed in the following sections.

2.7.1 Instrument Approach Procedures

The FAA has published multiple instrument approaches for each end of Runway 15-33 at BGR. With the help of navigational aids, the instrument approach procedures provide optimal all-weather access to the airport. The capability of an instrument approach is defined by the visibility and cloud ceiling minimums associated with the approach.

There are four published instrument approaches for each end of the runway. Runway 15 is served by a Category III (CAT III) precision ILS approach which provides both course guidance and vertical decent information to pilots. The Runway 15 ILS system consists of the localizer and glideslope antenna. The CAT III approach allows a pilot to fly an approach down to a runway visual range (RVR), meaning forward visibility as low as 600'. Runway 33 is also equipped with an ILS system and provides a CAT II approach requiring an RVR of 1,200' or greater to fly the approach procedure.

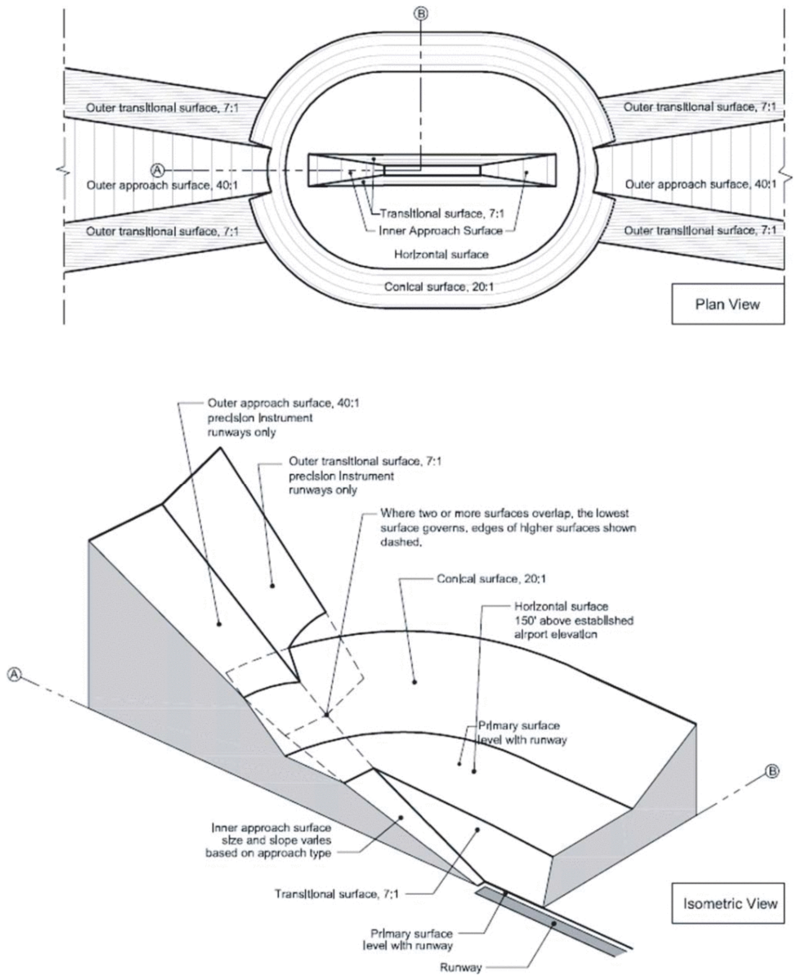
Both ends of Runway 15-33 are served by non-precision GPS (RNAV) approaches and HI-VOR/DME navigation. All of the published instrument approach procedures for BGR are included in **Appendix F**. BGR is currently optimized for the best instrument approaches given the technology of today.

2.7.2 Protected Airspace

To reduce the risk of an aircraft colliding with tall vegetation and/or manmade objects the FAA strives for airports to maintain protected airspace surfaces free and clear of obstructions. These surfaces, referred to as FAR Part 77 and TERPS (FAA Order 8260.3C, United States Standard for Terminal Instrument Procedures), extend outward and upward from the runway at various slopes that protect the visual and instrument approaches and departures at an airport. In the past, airports were required to maintain the airspace surfaces described in CFR 14 FAR Part 77, *Objects Affecting Navigable Airspace.* These surfaces should still be adopted by the City to protect the airspace surrounding BGR. The FAA has shifted airspace protection to the surfaces described in FAA AC 150/5300-13A and Engineering Brief 99A as these surfaces will have a negative impact to the airport infrastructure if penetrated. The airspace surfaces described in FAR Part 77 are intended to be adopted by local municipalities to prevent impacts to the airport by limiting manmade development below FAR Part 77 surfaces.

Figure 2-26 illustrates the individual FAR Part 77 Airspace Surfaces and their respective slopes, these surfaces include the primary, approach, transitional, horizontal, and conical surfaces. The properties of the primary, approach, and transitional surface differ based upon the type of approach procedure available for the runway end and the applicable FAR Part 77 runway category criteria. **Table 2-13** details the dimensions of the Part 77 surfaces as they apply to BGR.

Figure 2-26. 14 CFR Part 77 Typical Airspace Surfaces



Sources: FAR Part 77

Table 2-13. FAR Part 77 Surfaces at BGR

Surface	Dimension	RWY 15	RWY 33
Primary	Width	1,000’	
	Length Beyond RWY End	200’	
Approach	Inner Width	1,000’	
	Outer Width	16,000’	
	Length	50,000’	
	Slope	50:1 – first 10,000’	
		40:1 – outer 40,000’	
Transitional	Slope	7:1	

Sources: Federal Aviation Regulations (FAR) Part 77 Standards

2.7.2.1 Primary Surface

The Primary Surface is a flat imaginary surface that extends along the length of the runway and is centered on the runway centerline. At BGR the Primary Surface extends 200' beyond each end of Runway 15-33 and has a width of 1,000' because Runway 15-33 has a precision instrument approach on both ends. The elevation of any point on the Primary Surface is the same as the elevation of the nearest point on the runway centerline. The purpose is to establish a "safety zone" along the runway within which no large structures or objects can be located to reduce chances of collisions by aircraft.

Currently, there are no vegetation penetrations to the Primary Surface but there are several man-made objects within the surface. These man-made objects are lit and are permitted to be inside the Primary Surface because they are related to the Airport's navigational aids and are considered fixed by function.

2.7.2.2 Transitional Surface

The Transitional Surfaces extend outward and upward at right angles from the sides of the Primary and Approach Surfaces at a slope of 7:1 up to the elevation of the Horizontal Surface (150' above airport elevation). The Transitional Surfaces project through and beyond the limits of the Conical Surface for those portions of the precision Approach Surface

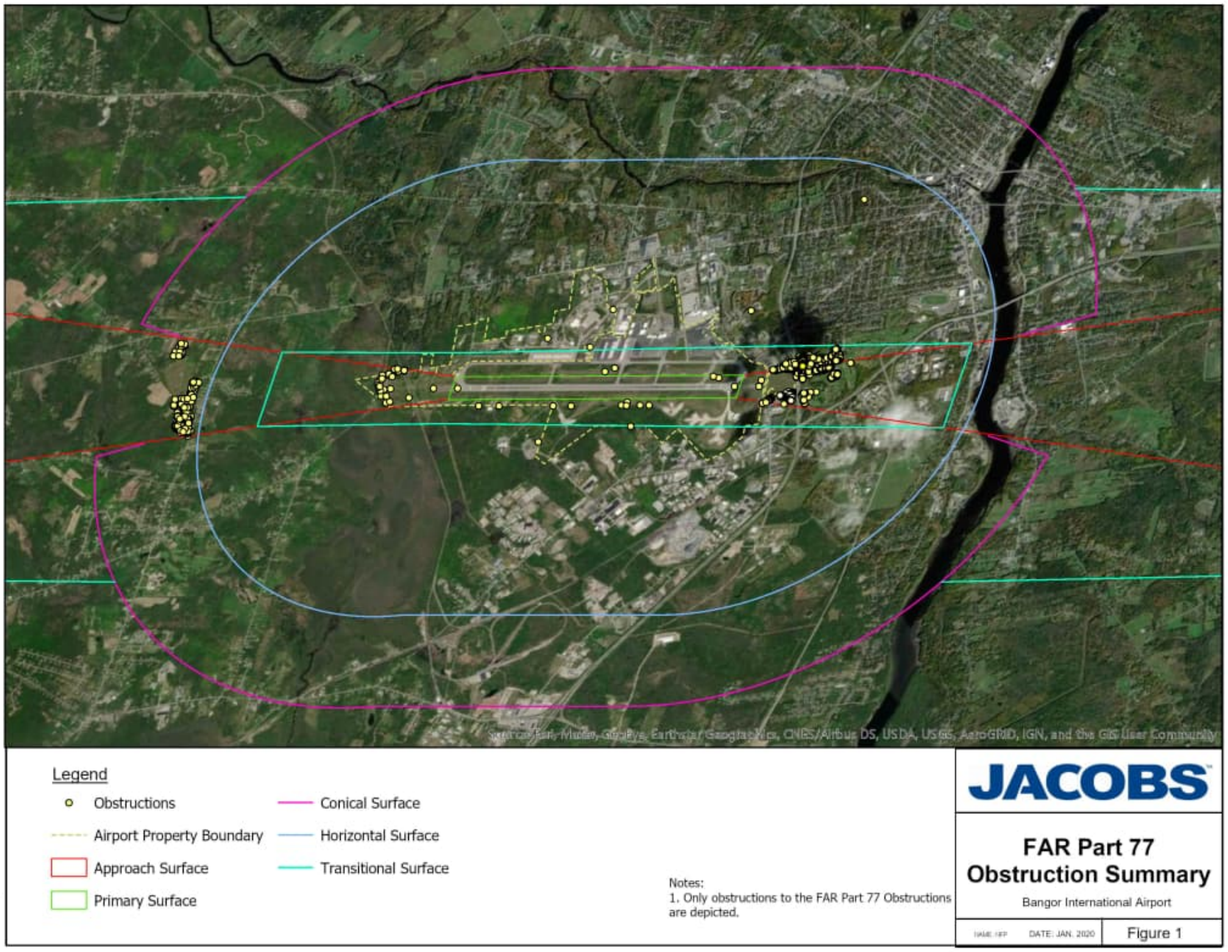
Due to the sloping features of the Transitional Surfaces there are often obstructions detected along the flight path and areas surrounding the Primary Surface. There are various existing penetrations to the Transitional Surfaces at BGR including different types of vegetation and navigational aids (**Figure 2-27**). Mitigation methods for the existing obstructions will be assessed in later chapters of this Master Plan.

2.7.2.3 Approach Surface

The Approach Surface is longitudinally centered on the extended runway centerline and extends outward and upward from each end of the primary surface. The Approach Surface criteria varies based upon the type of approach for that runway, a slope of 20:1, 34:1 or 50:1 could apply. The inner edge of the surface is the same width as the Primary Surface, and it expands uniformly to a width corresponding to the FAR Part 77 runway classification criteria. The purpose is to prevent construction of man-made objects or growth of tall trees that would obstruct aircraft on approach to the runway. Both ends of Runway 15-33 have a precision approach; therefore, the surface requires a slope of 50:1 for the first 10,000 feet, and a slope of 40:1 for the next 40,000 feet.

There are numerous existing penetrations to the Part 77 Approach Surfaces, the majority of which are vegetation such as trees. See **Figure 2-27** on the following page for obstructions to the Approach Surface. Mitigation measures for the obstructions are discussed in later chapters.

Figure 2-27. FAR Part 77 Obstruction Summary



2.7.2.4 Horizontal Surface

The Horizontal Surface is a flat plane established 150 feet above the airport elevation. The outer edges of the Horizontal Surface are constructed by arcs of specified radius from the center of each end of the primary surface of each runway. The radius of each arc is 5,000 feet for runways designated as utility or visual and 10,000' for all other runways. BGR has a Horizontal Surface that is comprised of arcs having a radius of 10,000'. The purpose of the Horizontal Surface is to protect aircraft maneuvering over and in the vicinity of the Airport.

There are a few obstructions to the Horizontal Surface, most are man-made which are required to be lit. Mitigation measures will be discussed in later chapters.

2.7.2.5 Conical Surface

Extending outward and upward from the Horizontal Surface at a 20:1 slope is the Conical Surface. The surface extends for 4,000' and creates the outer edges of the protected FAR Part 77 Surfaces which overlie BGR. There are currently no obstructions to the Conical Surface.

2.7.3 TERPS Surfaces

The airspace surfaces described in FAA Order 8260.3C United States Terminal Instrument Procedures (TERPS) ensure obstacle clearance for arriving and departing aircraft. These complex airspace surfaces have been streamlined and incorporated in FAA Engineering Brief (EB)No. 99A, and FAA AC 150/5300-13A Table 3-2. An excerpt from EB 99A is included below.

There are several rows of criteria from EB 99A that apply to each runway end at BGR.

- Row 5 applies to each runway end because both accommodate instrument approaches having visibility minimums less than 3/4 statue mile.
- Row 6 applies to each runway end because published instrument approaches for each runway provide vertical guidance
- Row 7 because instrument departures are allowed on each runway end.

There are no penetrations to the surfaces listed above for Runway 15, However there are a few vegetative obstructions to the surfaces listed for Runway 33.

Figure 2-28. FAA Engineering Brief No. 99A, Table 3-2 Approach and Departure Standards Table

Table 3-2. Approach and Departure Standards Table [1, 2]

Runway Type		DIMENSIONAL STANDARDS* Feet (Meters)					Slope
		A	B	C	D	E	
1	Approach end of runways expected to serve small airplanes with approach speeds less than 50 knots. (Visual runways only, day/night).	0 (0)	120 (37)	300 (91)	500 (152)	2,500 (762)	15:1
2	Approach end of runways expected to serve small airplanes with approach speeds of 50 knots or more. (Visual runways only, day/night).	0 (0)	250 (76)	700 (213)	2,250 (686)	2,750 (838)	20:1
3	Approach end of runway expected to serve large airplanes. (Visual runways only, day/night).	0 (0)	400 (122)	1,000 (305)	1,500 (457)	8,500 (2591)	20:1
4	Approach end of runways expected to accommodate instrument approaches having visibility greater than or equal to 3/4 statute mile. [3]	200 (61)	400 (122)	3,400 (1036)	10,000 [4] (3048)	0 (0)	20:1
5	Approach end of runways expected to accommodate instrument approaches having visibility minimums less than 3/4 statute mile.	200 (61)	800 (244)	3,400 (1036)	10,000[4] (3048)	0	34:1
6 [5]	Approach end of runways expected to accommodate instrument approaches with vertical guidance.	0 (0)	Runway Width + 200 (61)	1520 (463)	10,000 [4] (3048)	0 (0)	30:1
7	Departure runway ends used for any instrument operations.	Runway Width (RW)	500 (152) – ½ RW	7,512 (2290)	12,152 (3704)	6,160 (1878)	40:1

* The letters are keyed to those shown in Figure 3-2 of AC 150/5300-13A. For Row 7, refer to Figure 1 of this Engineering Brief

2.8 Airport Activity

Bangor International Airport (BGR) is a joint-use airport serving both civilian and military aircraft. Analyzing both historical and current aviation activity and based aircraft provides an understanding of the type of aircraft and the operators that the facilities must accommodate in a safe and efficient manner. Each type of activity puts different demands on airport facilities and requires different airport services and FAA design standards to be met. Current and historical airport statistics and data (based aircraft, aircraft movements, passenger traffic, air cargo tonnage) at BGR have been considered from the following sources:

- FAA Operations & Performance Data:
  - Airport Data and Information Portal (ADIP)
  - Operations Network (OPSNET) – data previously available in FAA's Air Traffic Activity System is now available in OPSNET
  - Terminal Area Forecast (TAF)

- Traffic Flow Management System Counts (TFMSC)

- FAA's Air Carrier Activity Information System (ACAIS)
- U.S. Department of Transportation (U.S. DOT)
- Information provided by Bangor Airport ATC (although air traffic controllers do not identify the specific type of aircraft, its origin or destination, or the registration number of the aircraft, much of that data is available from other sources and is compiled from flight plans that have been filed by aircraft operators).

2.8.1 Based Aircraft

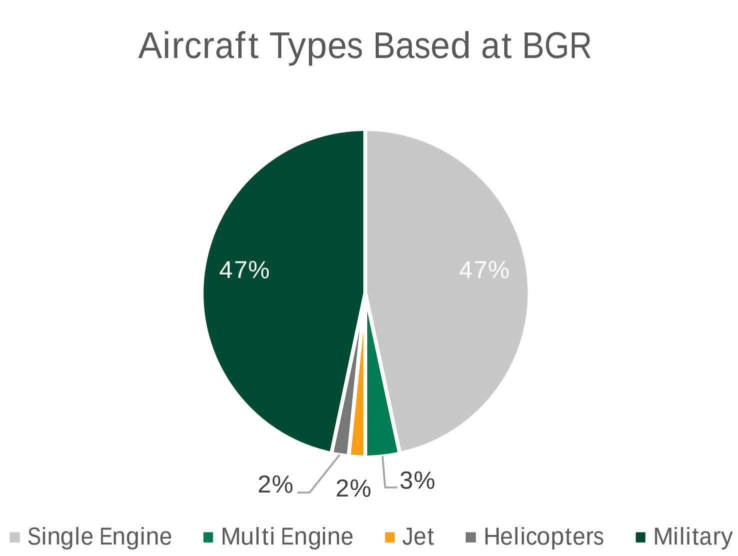
The FAA's ADIP records indicate that as of 8 October 2020, there were a total 60 based aircraft at BGR which was comprised of 32 civilian based aircraft and 28 military based aircraft. **Table 2-14** and **Figure 2-29** provide a summary of based aircraft.

Table 2-14. Based Aircraft at BGR - 2020

Aircraft Type	Quantity
Single Engine	28
Multi Engine	2
Jets	1
Helicopters	1
BASED CIVILIAN AIRCRAFT	32
Gliders	0
Military	28
BASED MILITARY AIRCRAFT	28
TOTAL BASED AIRCRAFT	60

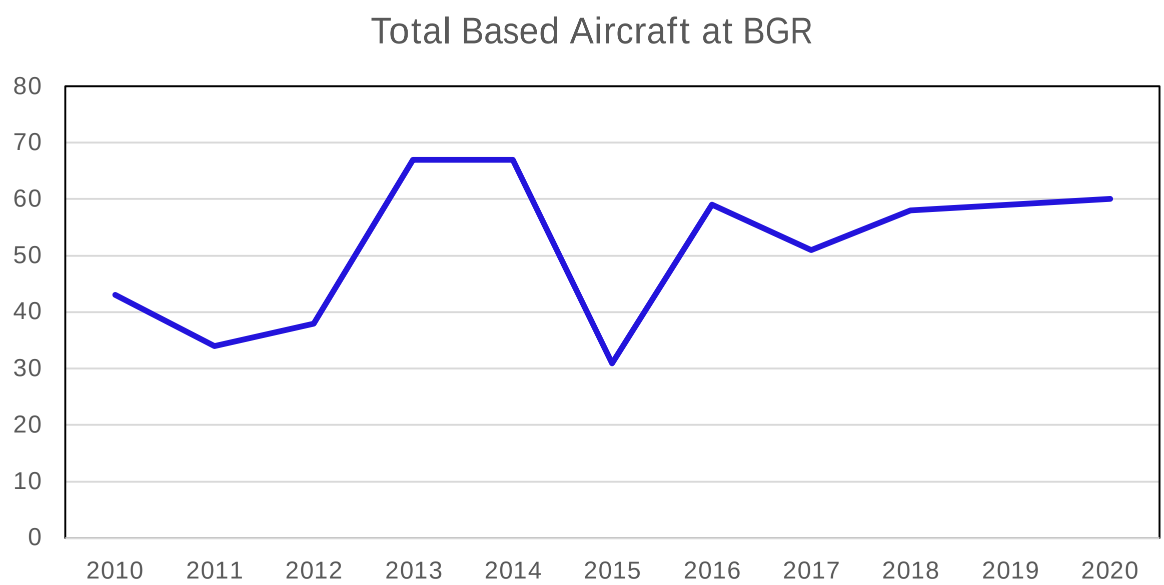
Note: Note that this count of based aircraft does not include the aircraft undergoing maintenance, repair, overhaul (MRO) by C&L, which can number up 40+ airplanes parked at any one time at BGR.

Figure 2-29. Based Aircraft Breakdown as of October 2020



The number of total based aircraft at BGR has remained relatively stable at 60 over the last 4 years as reported in the historical traffic counts of TAF (**Figure 2-30**). There was a noticeable decline in the number of reported based aircraft in 2015. The sharp decline was due to a slight recession in 2015–2016.

Figure 2-30. Historical Based Aircraft at BGR 2010–2020



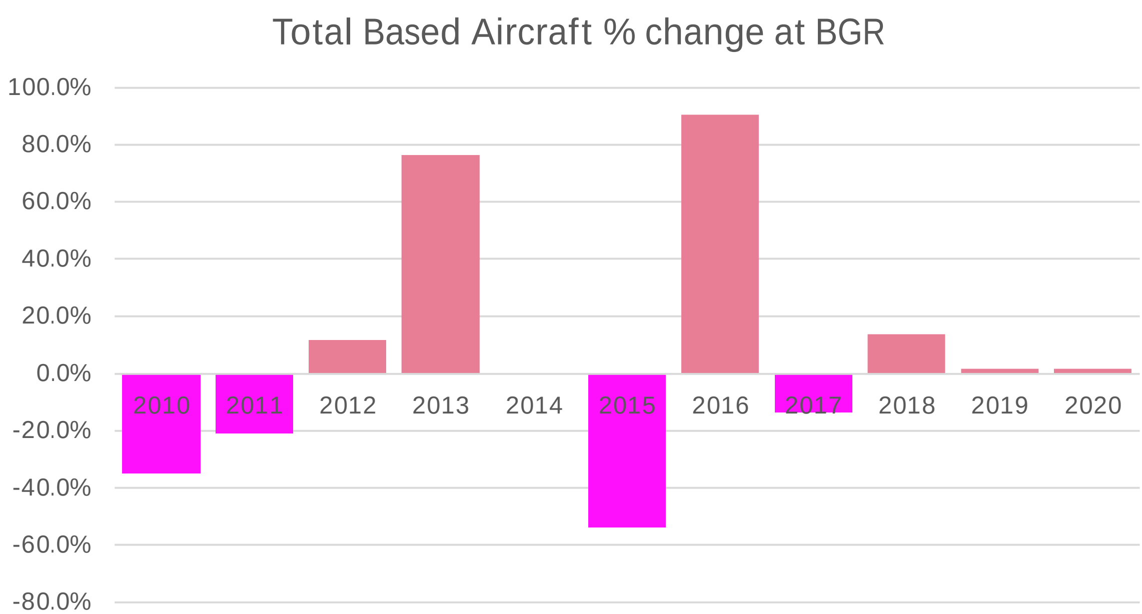
2.8.1.1 Based Aircraft – Civilian

A variety of factors impact the number of based aircraft at a particular airport. Of the various factors listed below, only airport rates and charges and the availability of hangars and tiedowns are controlled by the airport itself, the remaining factors are typically outside of any particular airport's control. **Figure 2-31** graphically depicts the percent change of total based aircraft at BGR over the past decade.

- Rising aircraft ownership and operating costs, including new and used aircraft prices, parts, fuel prices, insurance, fuel, maintenance, etc. Aircraft ownership and operating costs have increased steadily, in particular the price of new aircraft and fuel, at a pace faster than the overall rate of inflation. Those increased costs have lowered the number of new aircraft sales nationally. As a result, the average age of a general aviation airplane is almost 40 years old, which results in higher maintenance and operating costs.
- State sales and use taxes – in the past the state of Maine charged sales tax on aircraft sold and/or based in the state, as well as an aircraft use tax on airplanes based in other states but temporarily parked in Maine for a period of 30 days or more. Other New England states, such as NH, do not charge sales or use tax on aircraft, and a number of owners and operators in Maine moved their aircraft to adjoining states to avoid Maine state taxes. In 2011 Maine repealed its use tax to help aircraft service companies and vendors.
- Airport rates and charges – general aviation aircraft owners are relatively price sensitive and will base their aircraft at airports with competitive prices for tiedowns, hangars, and fuel. Generally, airports that are located within a convenient driving distance (typically less than 1-hour drive time from home or office) are preferred. A number of general aviation airports are situated within one-hour drive time of Bangor, including Brewer (turf runway – 3.4 nm), Pittsfield (22 nm), Dexter (18 nm), Bar Harbor (32 nm), Old Town (11 nm), Belfast (27 nm),

and Waterville (39 nm). These airports have no control tower and relatively little military activity, and only Bar Harbor has scheduled airline service.

Figure 2-31. Percent Change of Total Based Aircraft Comparing the Last Decade



- Availability of hangars and tiedowns – both the availability and the cost of hangars and aircraft tiedowns will affect the number of based aircraft. The number of based aircraft at BGR typically increases in the winter months when some aircraft are taken off of floats and also moved from grass fields so that they can operate year-round. Airport management has noted a demand for aircraft hangars.
- Local and regional economy – factors such as rates of employment, per capita income, and disposable income have a bearing on the number and type of based aircraft. Ownership and operation of general aviation aircraft requires disposable income.
- Aircraft mix – some general aviation airplane owners prefer not to base their aircraft and operate at airports with scheduled airline service and/or military activity, such as BGR and Portland Jetport, and in some cases prefer not to operate at airports with air traffic control towers.

2.8.1.2 Based Military Aircraft

Both the Maine Air National Guard and the Maine Army National Guard (ANG) have aircraft based at BGR. The Maine Air National Guard unit at Bangor is the 101st Air Refueling Wing and operates 15 KC-135R aerial refuelers. These aircraft are Airport Reference Code D-IV. The ANG's cantonment area encompasses approximately 300 acres. The Maine Army Guard's 521st Troop Command includes the 126th Aviation and 142nd Aviation companies that combined operate 17 UH-60 and HH-60 Blackhawk helicopters. They will be receiving two UH-72A Lakota helicopters as well, which will bring the Maine Army Guard's total complement to 19 helicopters based at BGR.

2.8.2 Aviation Activity Overview

BGR provides services 24/7 for commercial airline service, non-scheduled charter operations, general aviation, and the military. BGR also accommodates a variety of special civilian aviation activity including government flights such as presidential visits and campaigning presidential candidates. BGR serves as a diversion airport for flights that are considered a security risk or have other emergencies requiring an extensive runway or a secure area to park and quarantine aircraft. In addition, the Airport is a designated emergency landing location for the NASA space shuttle.

Aviation activity at BGR can be aggregated into a broad range of both civilian and military aircraft operations.

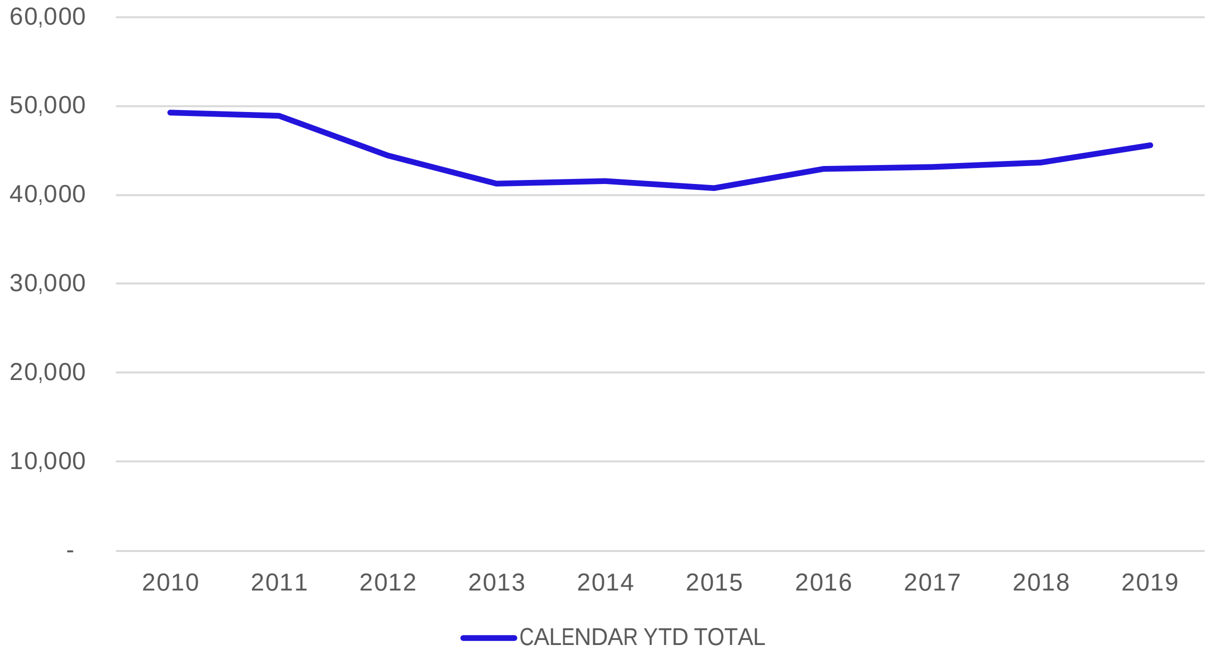
- Civilian operations:
  - Commercial vs. general aviation
  - Scheduled vs. non-scheduled
  - Passenger vs. cargo
  - Domestic vs. international
  - Based vs. transient
  - Irregular Operations (IROPS)
- Military operations:
  - Based vs. transient
  - Domestic vs. international
  - IROPS

The FAA counts one aircraft operation as one landing or one takeoff. A ‘touch-and-go’ (usually conducted for training purposes) is counted as two operations, i.e. one landing and one takeoff. Air traffic controllers at BGR count and categorize aircraft operations as either local (operations that remain within airport-controlled airspace) or itinerant (operations by civilian and military aircraft arriving or departing from outside airport-controlled airspace).

Figure 2-32 shows the total aircraft movements as reported by the ATCT at BGR over the last decade (2010-2020) and collected in the OPSNET database. The total movements include commercial scheduled, commercial non-scheduled, general aviation and military aircraft passenger movements (cargo is not included).

As indicated in the graph below, the trend for the overall number of aircraft movements has been progressively increasing over the past five years (from 40,789 in 2015 to 45,600 by 2020) and prior to the decline in traffic due to the COVID-19 pandemic, the airport was realizing a recovery from the mini recession of 2015-16. Aircraft operations for 2020 were on track to outperform the same period for 2019 prior to the pandemic (**Figure 2-33 and Figure 2-34**).

Figure 2-32. Total Aircraft Movements at BGR 2010–2020 (Air Cargo Excluded)



The airport is currently starting to see demand increase as policies and procedures are put in place to limit the spread of the virus and travelers get acclimated. As aircraft operations slowly increase, the gap between pre-pandemic traffic levels is beginning to close (**Figure 2-34**).

Figure 2-33. Traffic Figures Comparing Jan–August CY2019 vs CY2020 (Air Cargo Excluded)

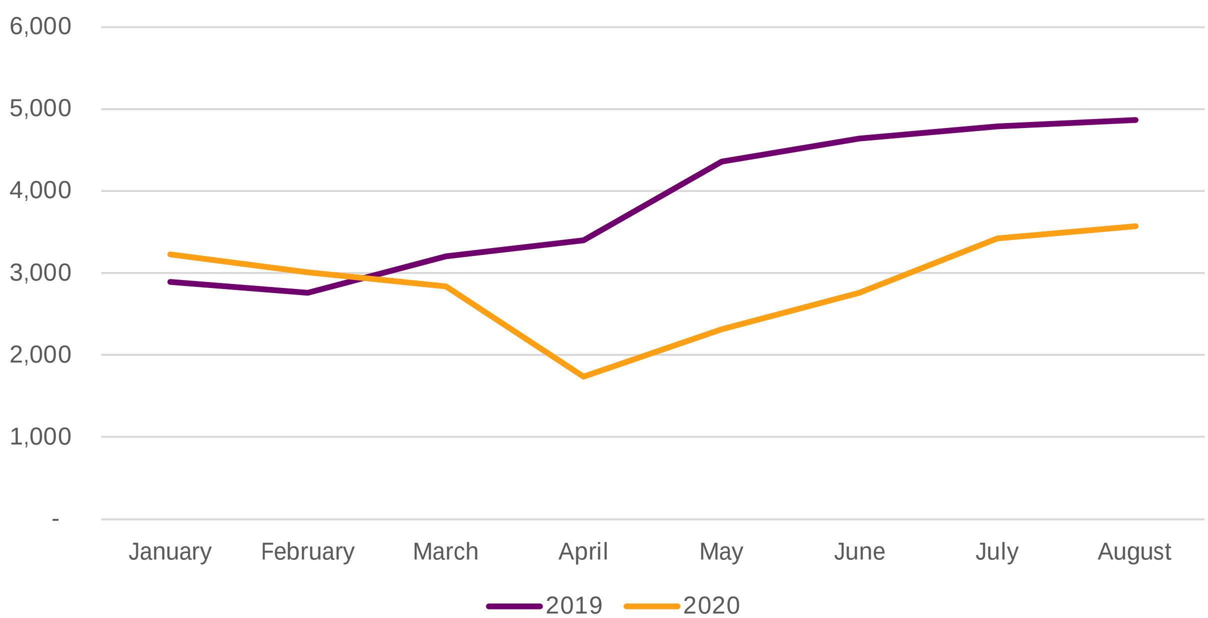
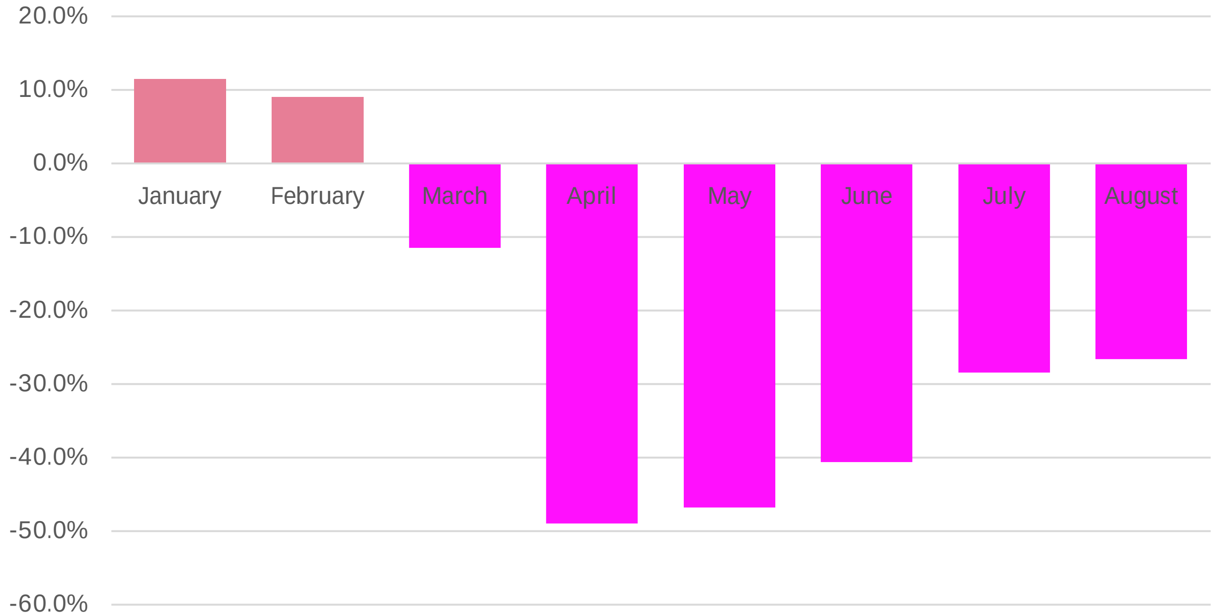


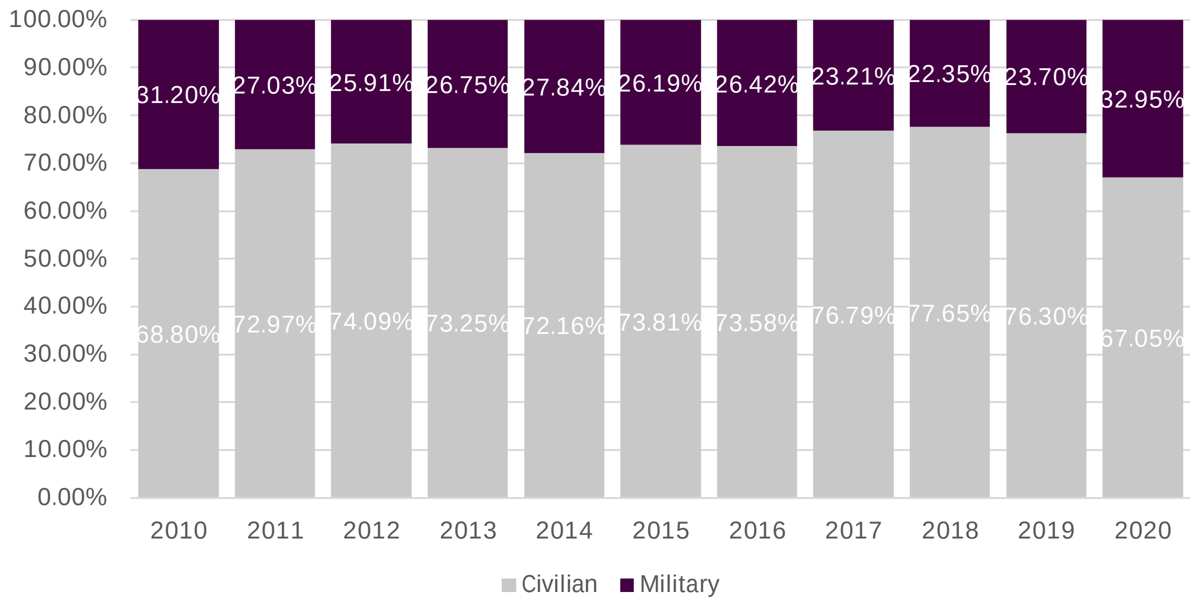
Figure 2-34. Percent Change of Traffic Comparing CY2019 with CY2020 (Air Cargo Excluded)



2.8.2.1 Military vs Civilian Operations Split

Data provided by OPSNET was queried to determine the split between civilian aviation and military aviation movements and is shown in **Figure 2-35**. Roughly 1/3 of activity at BGR is represented by military aviation.

Figure 2-35. Civilian vs. Military Aircraft Movements Split



2.8.2.2 Civilian Aviation Activity

Civilian air service is a broad category that is regulated and licensed by the U.S. DOT and the FAA. It includes the following aviation activities:

- Commercial service (domestic and international)
  - Scheduled passenger service (passenger air carriers)
  - Non-scheduled passenger service (charter carriers)
  - Scheduled Cargo service (air cargo carriers)
  - Non-scheduled cargo service (on-demand carriers)
- General aviation / Corporate services (domestic and international)
  - Private / Corporate jets
  - Private owner-flown aircraft
- Government agencies visits and technical stops (domestic and international)
  - U.S. (e.g. NASA, U.S. DOT, DHS, etc.)
  - Foreign (e.g. U.K., Spain, France, etc.)
- IROPS (Diversions, Maintenance / Repair / Overhaul)

2.8.3 Commercial Service

2.8.3.1 Passenger Traffic

There are currently four scheduled commercial air carriers (airlines) that service BGR (**Table 2-15** and **Figure 2-36**). The top Origin & Destination markets are large metropolitan areas such as Washington, D.C., New York City, Philadelphia, Atlanta, and Chicago. Because of BGR's geographic location and large catchment area, particularly with its reach into Canada, opportunity exists for increased capacity (BGR provides an excellent option for long or short getaways for both Maine and Canadian residents).

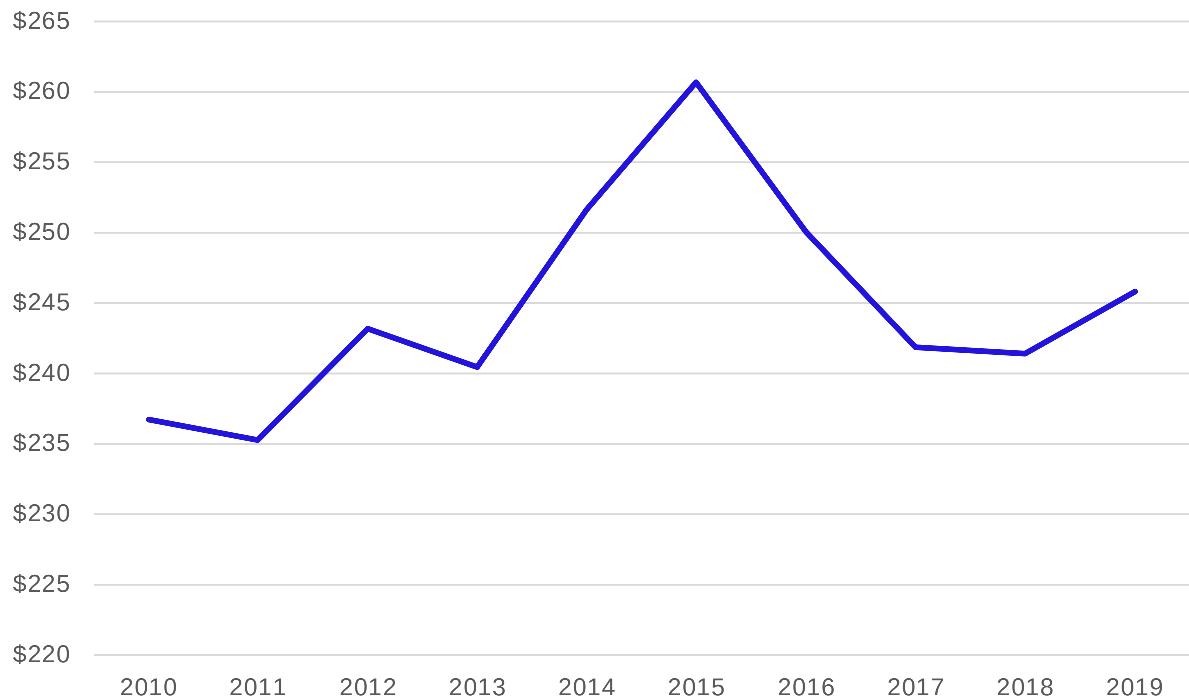
Table 2-15. Scheduled Commercial Air Service at BGR

Airline	To / From	Aircraft
American	▪ Philadelphia, PA (KPHL) ▪ Washington, DC (KDCA) ▪ Charlotte, NC (KCLT) seasonally ▪ Chicago, IL (KORD) seasonally ▪ New York, NJ (KLGA)	▪ ERJ-145 / CRJ-700 / ERJ-175 ▪ CRJ-200 / CRJ-700 ▪ ERJ-145 / CRJ-900 / ERJ-175 ▪ CRJ-700 / ERJ-175 ▪ ERJ-140 / ERJ-175 / ERJ-135
Allegiant	▪ St. Petersburgh/Clearwater/Tampa, FL (KPIE) ▪ Orlando, FL (KSFB)	▪ A320 ▪ A319 / A320
Delta	▪ New York, NJ (KLGA) ▪ Detroit, MI (KDTW)	▪ CRJ-200 / CRJ-900 ▪ CRJ-900
United	▪ Newark, NJ (KEWR) ▪ Chicago, IL (KORD) seasonally	▪ ERJ-145 / ERJ-145XR/ ERJ-135 ▪ E170 / B737-700 / ERJ-175 / A319

Figure 2-36. Main Destinations for BGR Airlines

The average airfare in the past decade, as provided by the U.S. DOT, aggregated for all direct flights from BGR to the eight destinations identified above is shown in **Figure 2-37.** It displays a peak in 2015 when the average airfare of the four airlines spiked to $260. This corresponds to the mini-recession of 2015-16. The average airline airfare over the last decade to specific destinations is given in **Figure 2-38** and **Figure 2-39** (air carrier movements). In the years since, the average airfare has fluctuated between $235 and $245.

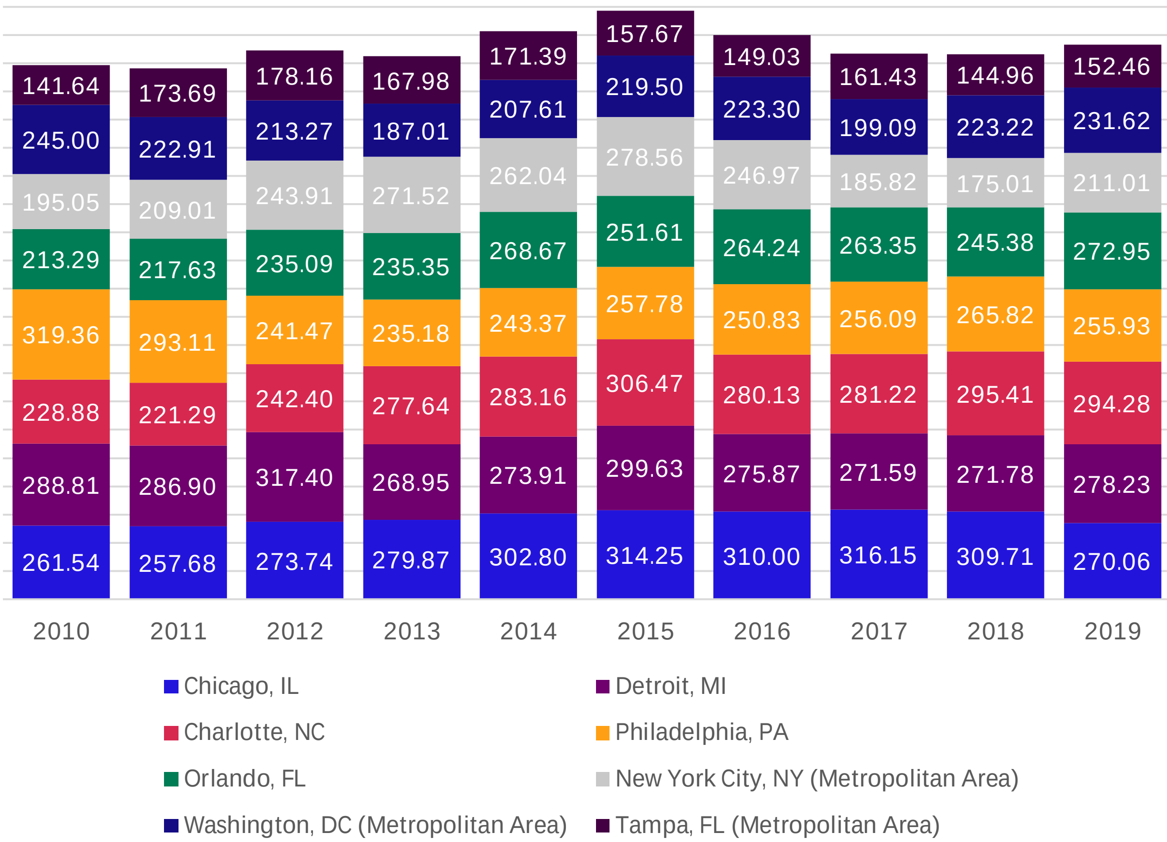
Figure 2-37. Average Airfare ($$ US) from BGR – Direct Flights



The breakdown into the single destinations by each year between 2010 and 2019 is provided in the U.S. DOT website and shown in **Figure 2-38**. The highest average fare was recorded for the Chicago market whereas the cheapest was the Tampa market:

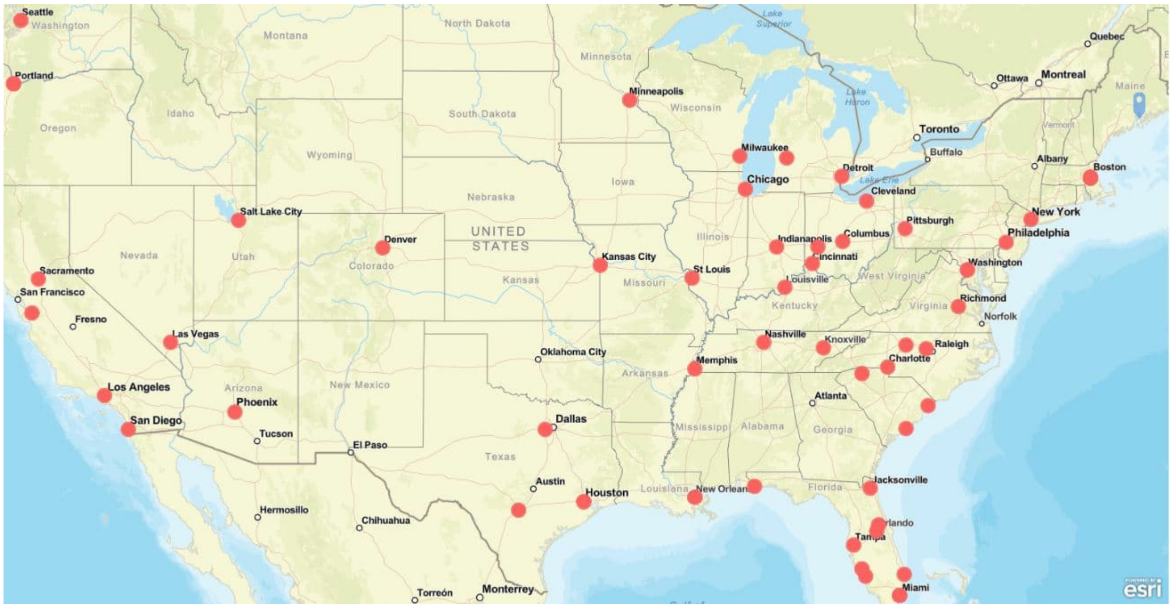
- Chicago, IL: $290
- Detroit, MI: $283
- Charlotte, NC: $270
- Philadelphia, PA: $262
- Orlando, FL: $247
- New York, NY (Metropolitan Area): $228
- Washington, DC (Metropolitan Area): $217
- Tampa, FL (Metropolitan Area): $160

Figure 2-38. Average Airline Airfare ($$ US) - Direct Flights from BGR to Specific Destinations



From BGR the four airlines also serve a number of additional airports via stopovers that take place in the 8 destinations mentioned above. In particular, the U.S. DOT identifies 52 city pairs involving Bangor as shown in **Figure 2-39**.

Figure 2-39. BGR City Pair Markets: Airports Serviced from BGR with a Direct Flight or via Stopover by the Four Airlines



City pairs have also been considered for the competing airports that are shown in **Figure 2-40** for MHT – Manchester-Boston Regional Airport and BOS – Boston Logan (179 destinations) and in **Figure 2-41** for PWM – Portland International Airport (24 destinations). The average airfare of the total 52 city pairs are depicted graphically in **Figure 2-42**.

Figure 2-40. MHT and BOS Airports City Pair Markets

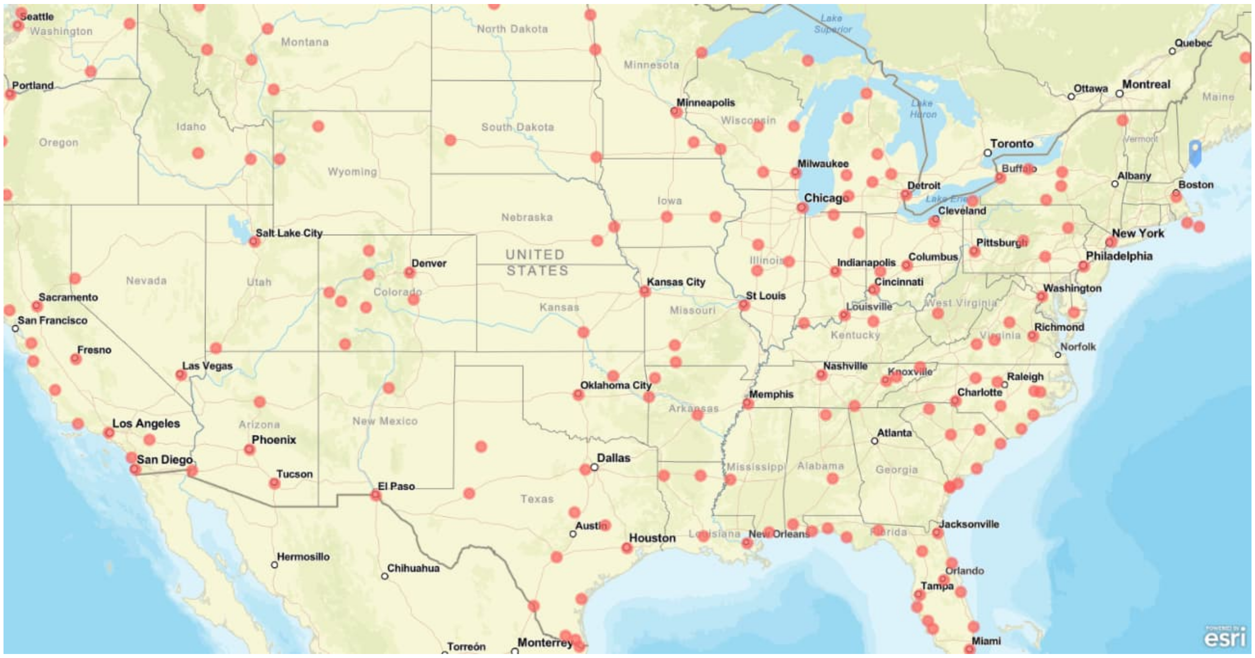
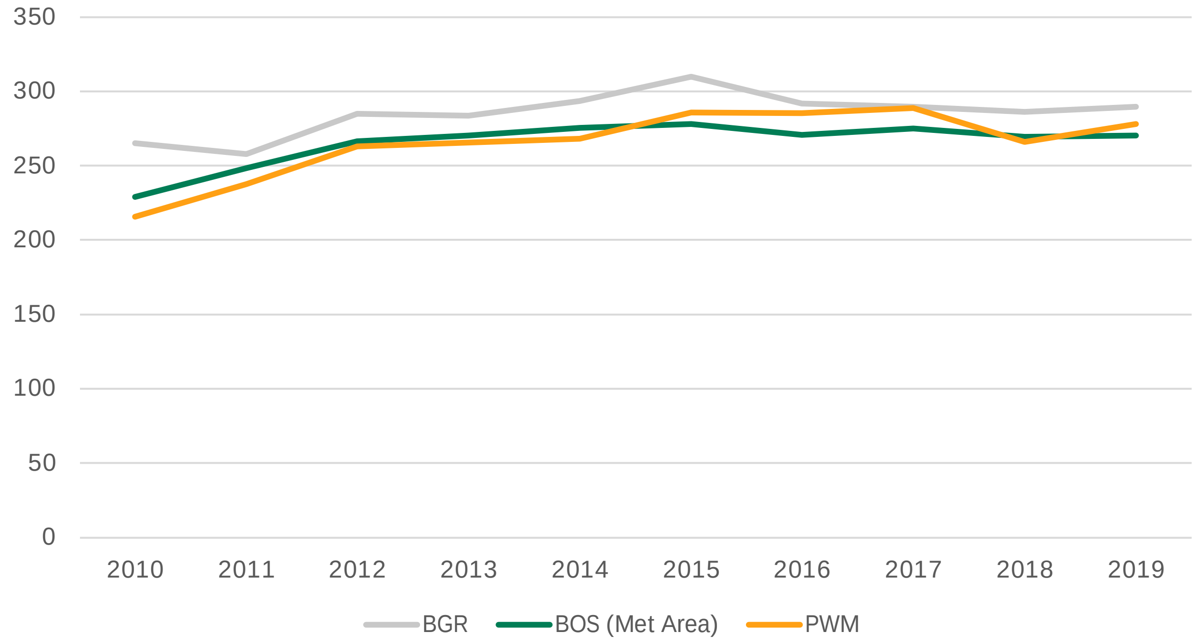


Figure 2-41. PWM City Pair Markets

Figure 2-42. Average Airfare ($$ US) of BGR City Pairs

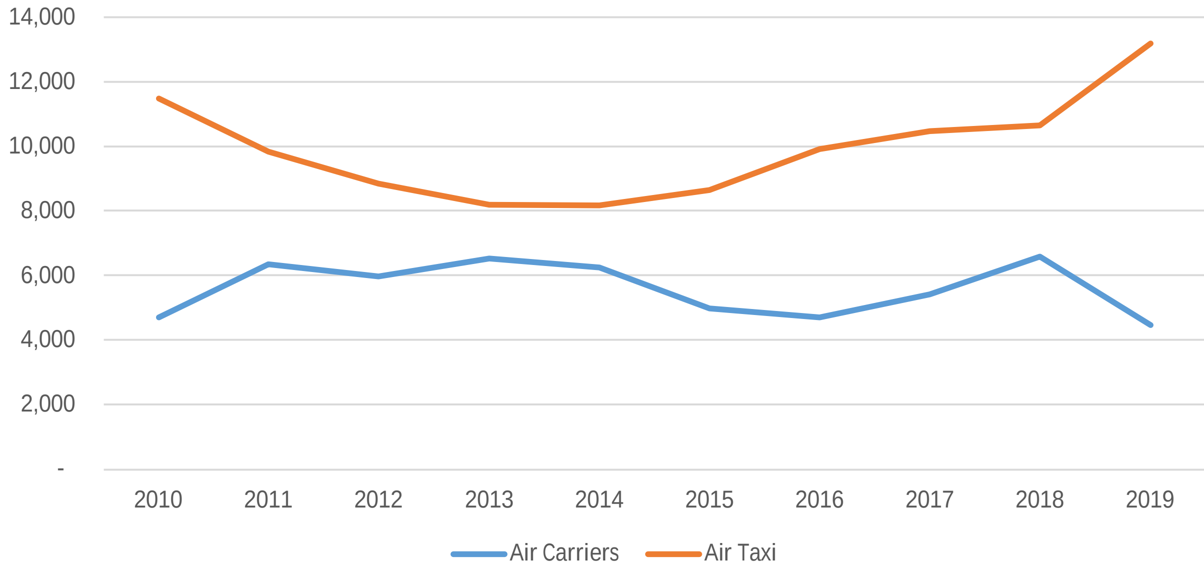


A large number of U.S. and foreign companies provide commercial non-scheduled (i.e. on-demand) passenger service to BGR. Non-scheduled services are provided by a wide variety of operators using aircraft that range in size from small piston engine up to large (wide-body) aircraft.

The graph in **Figure 2-43** shows the trend of air carrier and air taxi operations over the past 10 years as found in the FAA's OPSNET dataset. The FAA defines an air carrier as an aircraft with seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds, carrying passengers or cargo for hire or compensation; this includes US and foreign-flagged carriers. An air taxi is defined as an aircraft designed to have a maximum seating capacity of 60 seats or less or a maximum payload capacity of 18,000 pounds or less, carrying passengers or cargo for hire or compensation.

It appears that air taxi movements (these include scheduled and non-scheduled services carried out with airline or charter aircraft that have less than 60 seats) have a trend aligned to the one analyzed for the total aircraft movements in **Figure 2-43**, as they are characterized by a "U-shape" with a low point between CY2012 and CY2015, before growing between CY2015 and CY2019. On the contrary, it is interesting to note that air carriers' movements in and out of BGR (operated by the four airlines listed in **Table 2-15**) have a mirrored shape compared to the one of the air taxi service. The air carrier service has been characterized by a sinusoidal trend, presenting an overall growth in CY2012 through to CY2014, a decrease of traffic between CY2014 and CY2016 and a new positive trend from CY2016 to CY2018. In CY2019, air carrier movements decreased by 30% with respect to the previous year, just before a further drop in CY2020 due to the COVID-19 global crisis (-30% air carrier operations in the first six months of 2020 compared to the same period of the year before).

Figure 2-43. Total Commercial Aircraft Movements at BGR in the Years 2010–2019



Over the last decade, air carrier operations have accounted for an average of 17% of civilian movements and an average of 12.5% of overall BGR movements (**Figure 2-44**); Air Taxi operations have accounted for an average of 31% of civilian movements and an average of 22.5% of overall BGR movements. The percentage of overall operations by both air carrier and air taxi operators has remained stable during that period. Further analysis reveals that the summer season has the highest demand for aviation travel through BGR with an average of 800 operations in both July and August (**Figure 2-45**).

Figure 2-44. BGR Aviation Traffic Split (2010 – 2020)

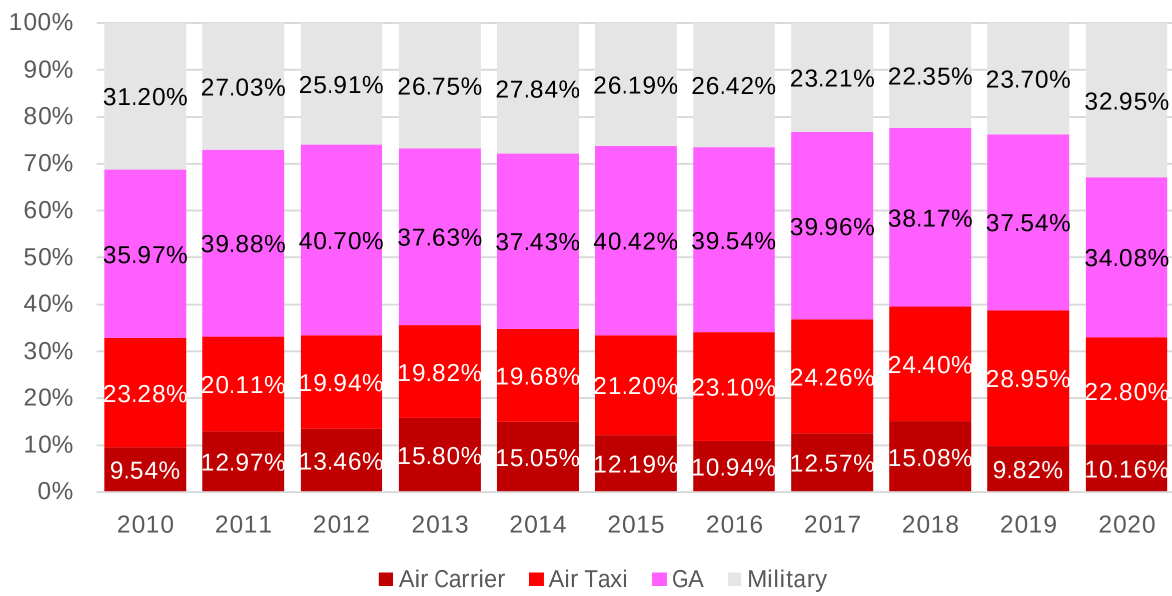
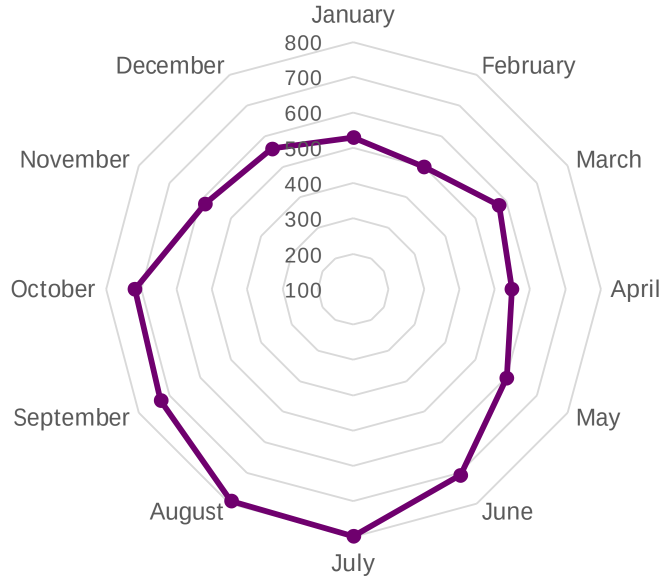


Figure 2-45. Average Monthly Commercial Aircraft Movements at BGR



2.8.3.2 Commercial Peak Time Operations

The peak season for commercial airline activity at BGR is during the summer with majority of movements taking place in July and August. It is apparent that passengers utilizing BGR prefer to fly on weekdays rather than on weekends to take advantage of lower airfares and avoid higher prices that airlines usually apply to weekend flights towards leisure destinations. Additionally, business trips normally take place on weekdays and it is known that the Bangor Metropolitan Area is a center of attraction for many business activities.

Figure 2-46 represents the average aircraft operations during the week in the last 10 years. It appears that the airport is busier on weekdays with a peak on Thursdays whereas a low in traffic is recorded over weekends. **Figure 2-47** depicts peak day operations spiked in 2010 with 380 movements in 24 hours and dropped ever since, with only a limited recovery in 2016 at the end of the slight recession of 2015-2016. The daily peak registered in CY2020 so far has been of just over 200 movements.

Figure 2-46. BGR Aircraft Operations – Average Week (2010 – 2020)

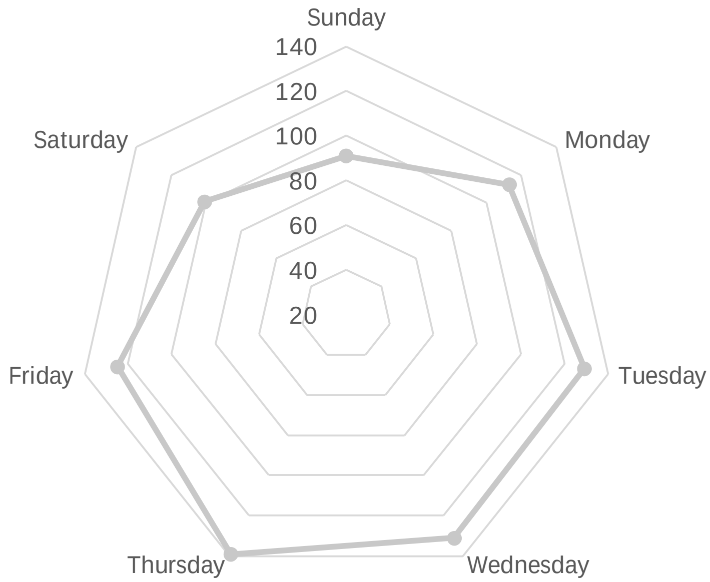
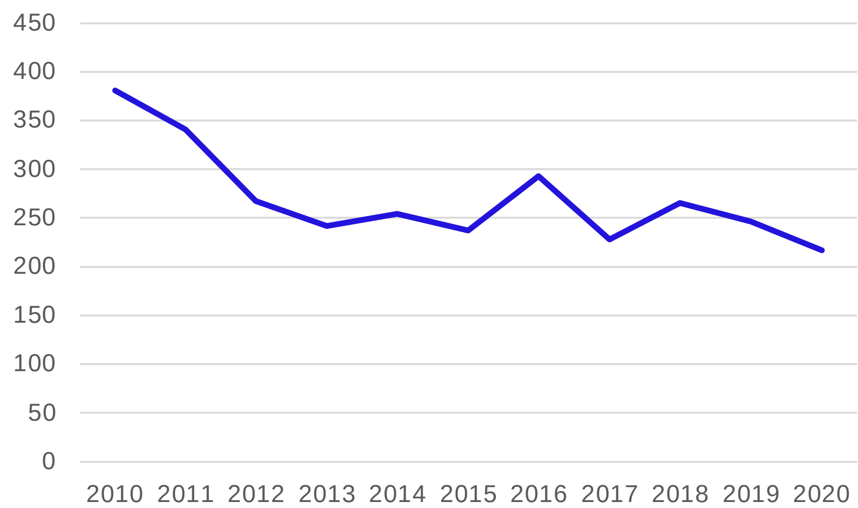


Figure 2-47. BGR Aircraft Operations – Peak day (2010 – 2020)

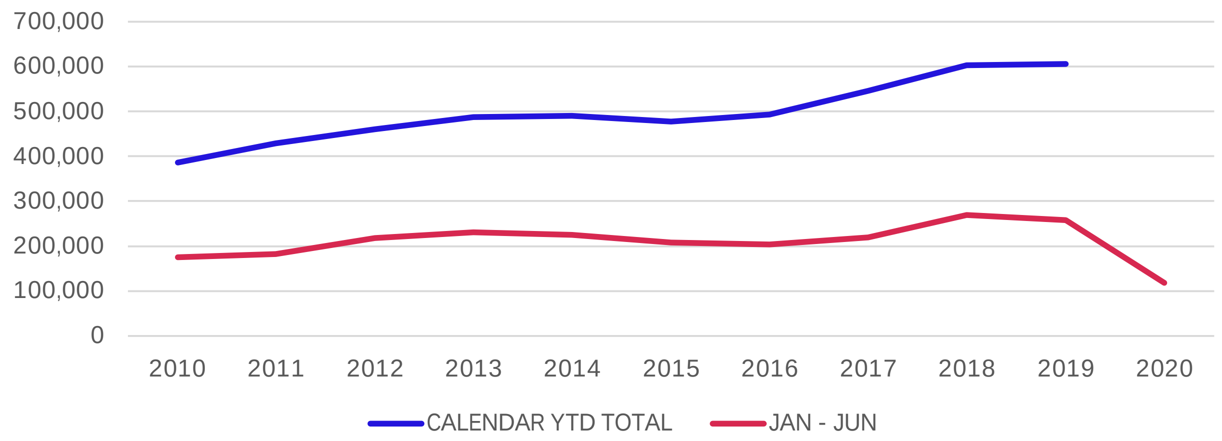


2.8.3.3 Commercial Enplanements

Records of passenger movements have been provided by BGR ATCT and include enplanements and deplanements from commercial aircraft only (i.e. the four airlines operating at BGR: American, Allegiant, Delta, United).

The number of commercial passengers was increasing steadily from CY2015 through 2019 where it has plateaued. As shown by the red line in **Figure 2-48**, passenger traffic has dropped dramatically in the first half of CY2020 when people from all over the globe were refrained from traveling due to the pandemic.

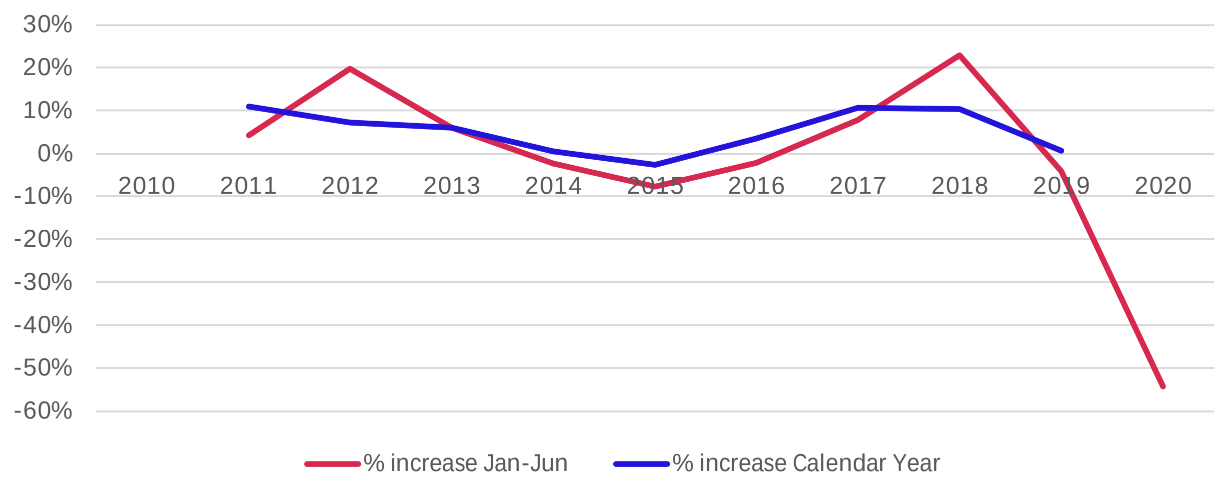
Figure 2-48. Total Commercial Passenger Enplanements at BGR (2010–2019)



The traffic increase that took place in CY2018 was spurred by air service additions that included daily summer seasonal service by American Airlines serving CLT and LGA, Saturday only summer seasonal service to Chicago's O'Hare, as well as service from United Airlines to Newark, NJ.

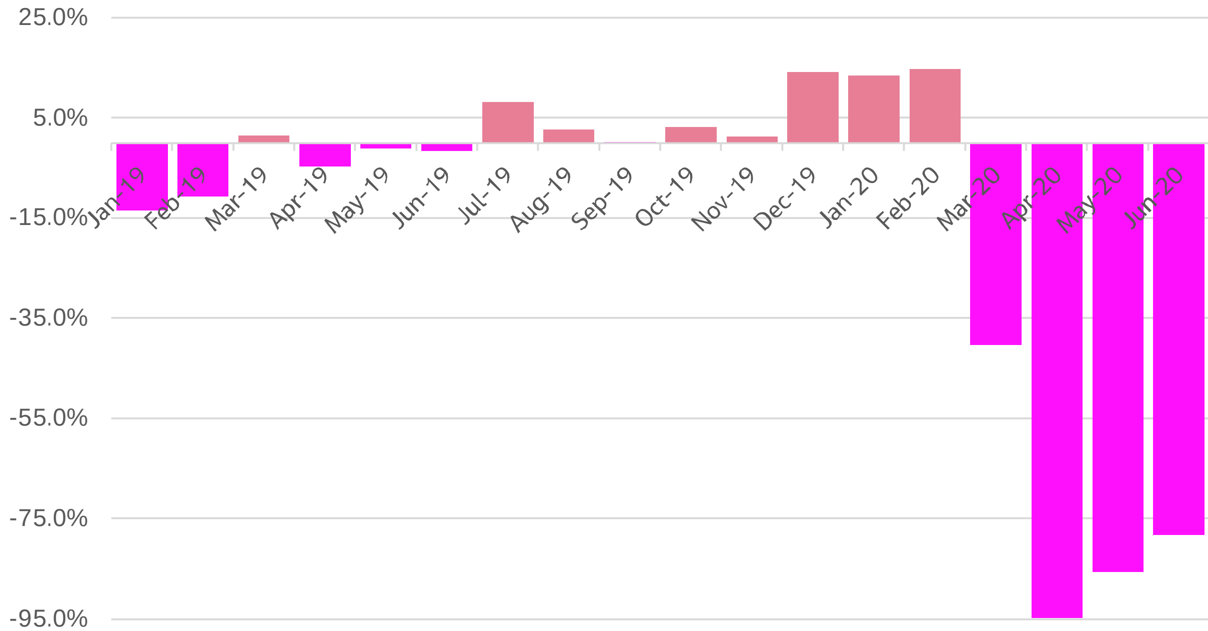
It should be noted that the passenger enplanements in **Figure 2-48** include passengers who flew with any of the four airlines servicing BGR, hence it considers customers who boarded or disembarked either an air carrier movement or a scheduled air taxi movement. While air carriers' movements dropped by over 30% in CY2019 compared to CY2018, passenger enplanements in CY2019 remained stable, the net percent change in **Figure 2-49** is close to 0%, meaning there has been no significant variation compared to the previous CY. The reason being air taxi movements include both charter aircraft (non-scheduled) and airline's smaller aircraft (scheduled and operated by the airlines at BGR). Therefore, although air carrier movements dropped, passenger trends in CY2019 do not show a downturn as air taxi movements spiked reaching the highest level of the past 10 years.

Figure 2-49. Percent Change of Commercial Passenger Traffic Comparing the Last Decade (Air Cargo Excluded)



Additionally, there are two other aspects to note. **Figure 2-50** compares (in percent with respect to 2018 data) the passenger traffic trend in the months between January 2019 and June 2020. Passenger movements in the first half of CY2019 were lower than the same period of the previous year (average -4% passenger traffic compared to Jan-Jun 2018). BGR had experienced a decline in passengers in the first 6 months since CY2015. However, the positive trend in the second half of CY2019 (from June 2019) allowed the overall annual traffic level to recover and match the total annual passengers of CY2018 (**Figure 2-50**). Also, the positive trend continued into the first two months of CY2020 showing that, just before the effects of the COVID-19 pandemic took hold, traffic was responding positively and BGR was again experiencing growth.

Figure 2-50. Percent Change of Passenger Traffic at BGR between January 2019 and June 2020



The second aspect relates to the load factor of commercial scheduled aircraft. **Figure 2-51** shows the average load factor of commercial scheduled aircraft (the figure includes all scheduled services, that is, passenger and cargo, as noted by the Bureau of Transport Statistics in the U.S. DOT website) increased from CY2018 to CY2019, thus suggesting that commercial scheduled flights were accommodating more passengers than the previous year.

Figure 2-51. Load Factor Trend of Commercial Scheduled Services (Passenger & Cargo)

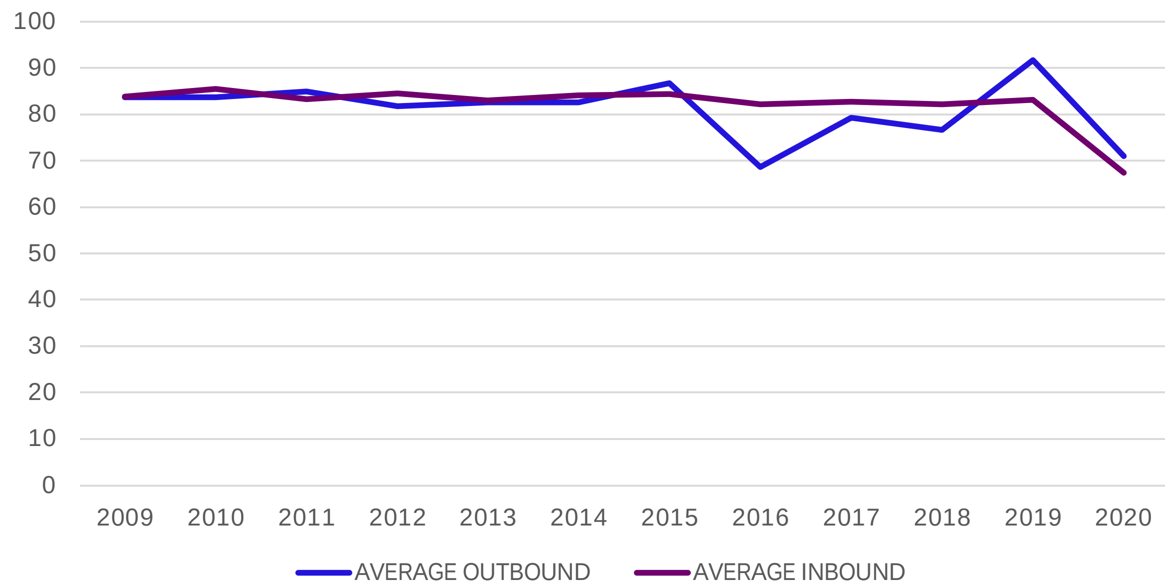


Figure 2-52 illustrates the passenger share across the four main airlines operating at BGR. American Airlines boasts the largest portion of total commercial scheduled passenger traffic. **Figure 2-53** shows that in the last 3 years, more than 40% (in CY2019 almost 50%) of the total passengers flew in and out of BGR onboard American Airlines aircraft. The remainder 50-60% is shared across the other three airlines (Allegiant, Delta and United). Allegiant fluctuated much more than Delta or United in the past 3 years (Allegiant's share rocketed from 19% to 30%, **Figure 2-53**) while Delta reduced its presence year after year at BGR. Due to the COVID-19 pandemic, Delta had temporarily suspended service to the airport in July 2020.

Data from the Bureau of Transport Statistics shows that more than 90% of passengers traveling to and from BGR on commercial scheduled aircraft are related to domestic routes rather than international routes.

Figure 2-52. Annual Share of Commercial Passengers

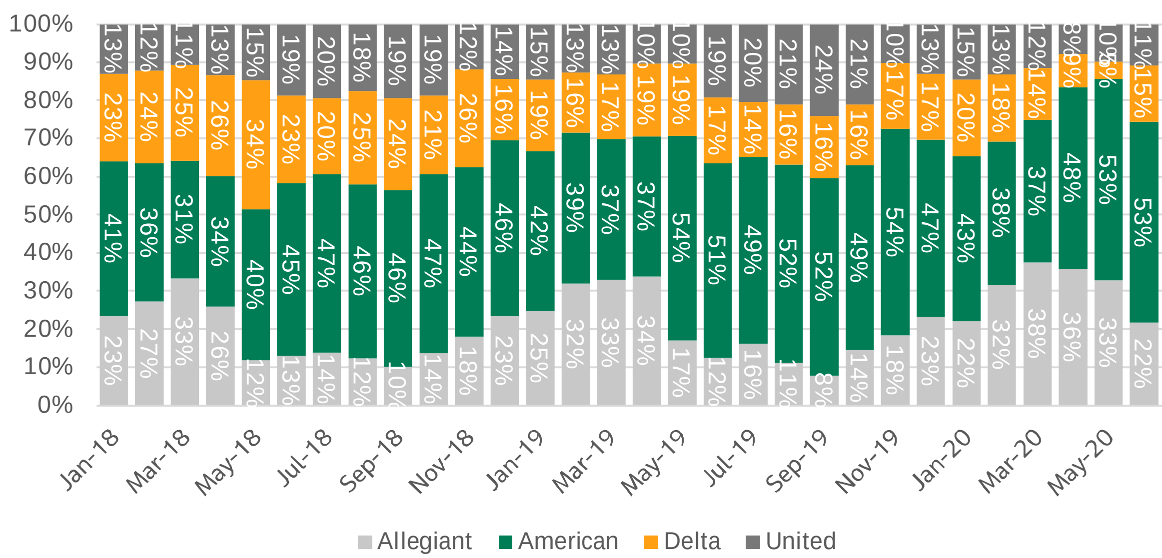
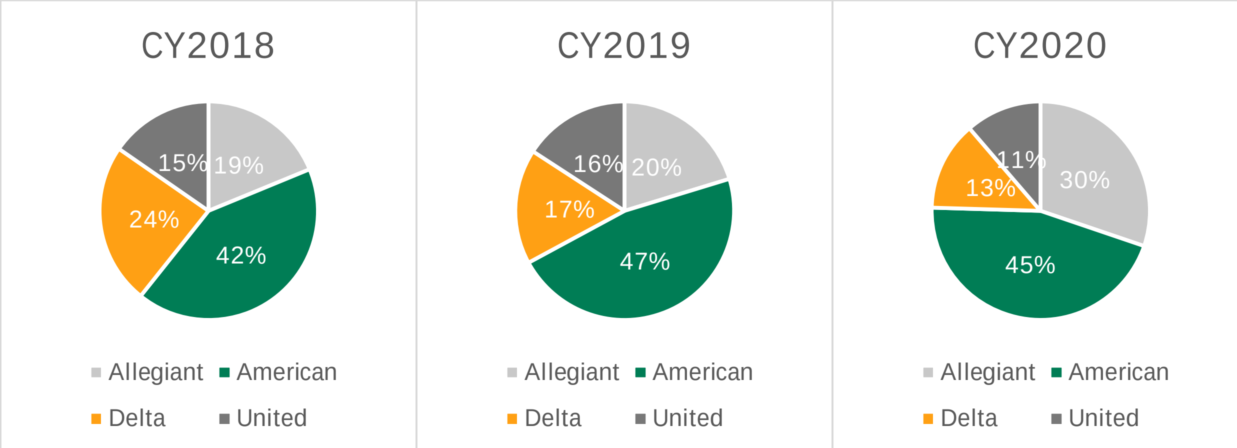


Figure 2-53. Average Annual Share of Commercial Passengers



2.8.4 Air Cargo Traffic

BGR entered into the air cargo market in 1973 when the Master Plan included Air Cargo Development. Forecasts for 1979 were 960,000 pounds and 24 operations (actual reported was 456,713 pounds and 572 operations). In 1982 the Arthur C. Little Air Cargo Development study was completed: recommendations included pursuing the potential to ship 7-10 pallets of cargo per week to Europe on mixed load carriers, attract a scheduled carrier, follow-up on shippers survey, develop a brochure, monitor trade and special markets, maintain competitive pricing, and finally, consider incentives. The 1980s and 1990s saw several cargo programs develop and in 2005 the Polar Project was carried out. It was an extensive survey and interview program to identify potential users for a cargo service that Polar Air was willing to consider. It required 38.5 tons per flight to Amsterdam to be successful. The project never came to fruition. In 2007 the Safety, Health, and Environment Study recommended to focus efforts on increasing tech stops. In 2014 Maine Maritime Academy, Loeb-Sullivan School of International Business and Logistics Air Cargo Strategy recommended to use an “Economic Tech Stop” strategy to increase exposure of BGR to the cargo industry and concurrently work on finding a first mover for hub activities such as shipping lobster.

Today, the Airport currently has the capability to handle any commercial cargo aircraft presently flying. This includes the Antonov AN-225 and the Airbus 380 which are the two largest aircraft in service today. **Table 2-16** details the Strengths, Weakness, Opportunities, and Threats (SWOT) analysis of the current state of the Airport’s cargo capabilities.

Table 2-16. Cargo Business SWOT Analysis Results[1]

Strengths	Weakness	Opportunities	Threats
Runway length	Bonded warehouse development	Develop new relationships with new partners	Stricter trucking laws
Geographic location	Low population density	Lease land	Lack of transportation infrastructure upgrades (rail)
Handling experience	Lack of scheduled cargo carries	Use FTZ	No belly cargo options
Good industry reputation	Lack of freight forwarders	Stevens Exemption like law	Established distribution systems

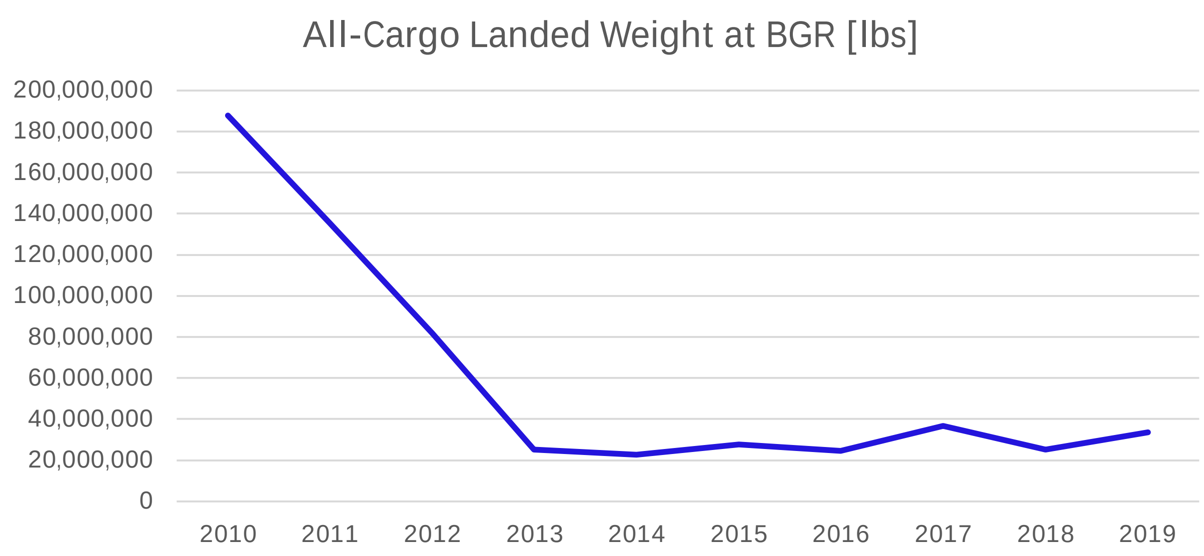
Table 2-16. Cargo Business SWOT Analysis Results[1]

Strengths	Weakness	Opportunities	Threats
Open in all-weather condition	Lack of first movers	Increase tech stops	Increased regulation and security
Space availability		Economic development	
Cold storage accessibility			
FTZ			
Access to highway system			
Competitive pricing			
[1]SWOT Analysis provided by BGR			

The landing weight of cargo aircraft has consistently declined in the last decade as data provided by FAA's ACAIS shows in **Figure 2-54**. It is unlikely that the global COVID-19 crisis had severe effects on cargo movements as government restrictions had the most effect on passenger movements, whereas freight shipments were only minimally affected.

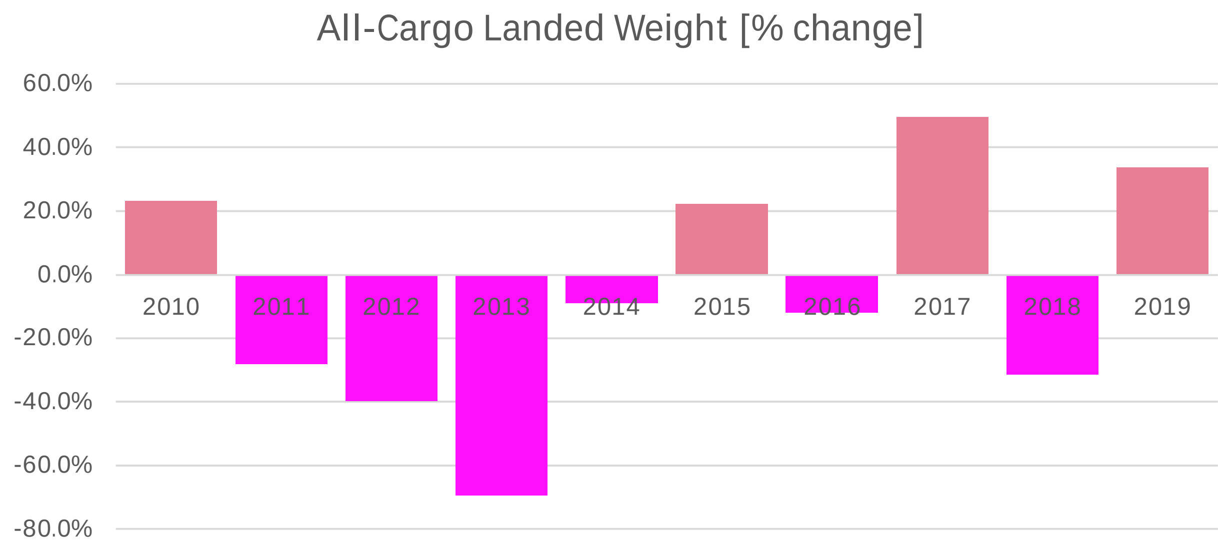
It should be noted that the figures do not include belly cargo carried by scheduled passenger airlines.

Figure 2-54. Air Cargo Landed Weight at BGR in the Past Decade



CY2011 was the last year for BGR to rank within the first 111 airports qualifying for All-Cargo Entitlement Funding from the FAA (BGR recorded 135,480,506 landed lbs). In CY2012 and CY2013 air cargo traffic dropped by 40% and 69% respectively (as shown in **Figure 2-55**).

Figure 2-55. Percent Change, All-cargo landed weight (2010 – 2019)



A variety of U.S. and foreign cargo carriers fly into Bangor. Wiggins Airways flies Cessna Caravans and Beech 99s under contract to UPS and FedEx on daily cargo feeder flights from Manchester–Boston Regional Airport (MHT). The majority of large cargo (vs. small packages and mail) is outbound - typically cargo is enplaned at BGR and flown outside of the U.S. Charter cargo carriers typically provide several days' notice to BGR of their arrival, which occur on an as-needed (vs. scheduled) basis.

Cargo aircraft are accommodated on the heavy-duty cargo apron, that offers approximately 441,400 square feet of apron space, 20,000 square feet of on-airport warehouse space, and a variety of equipment for loading and unloading both conventional and unconventional cargo. Bangor's Foreign Trade Zone (U.S. No. 58) is also located on the Airport which serves as a port of entry for foreign merchandise to be distributed and processed.

Other airports considered as competitors with regards to air cargo business are:

- John F. Kennedy International Airport/JFK (New York City, New York)
- Boston Logan International Airport/BOS (Boston, Massachusetts)
- Stewart International Airport/SWF (New Windsor, New York)
- Newark Liberty International Airport/EWR (Newark, New Jersey)
- Halifax Stanfield International Airport/YHZ (Enfield, Nova Scotia)
- Manchester–Boston Regional Airport/MHT (Manchester, New Hampshire)
- Chicago O'Hare International Airport/ORD (Chicago, Illinois)
- Philadelphia International Airport/PHL (Philadelphia, Pennsylvania)
- Lehigh Valley International Airport/ABE (Allentown, Pennsylvania)

2.8.5 General Aviation

A study of general aviation activity prepared by MIT in 2012 (Shetty, Kamala I. and Hansman, R. John, *Current and Historical Trends in General Aviation in the United States*, August 2012, MIT International Center for Air Transportation, ICAT), which included a national survey of general aviation pilots, confirmed the factors impacting general aviation across the U.S.

The following subsections summarize study conclusions.

2.8.5.1 General Aviation Activity

General aviation activity at BGR encompasses a broad range of activity, including domestic and international operations. Domestic general aviation activity includes local training operations (such as touch-and-go), as well as transient operations (i.e. arrivals and departures of private business jets to and from BGR).

Also, as noted previously, BGR is unique in terms of being the closest port of entry in the north eastern U.S. to Europe, at the same time offering excellent airport facilities and support services. Those factors have generated a large amount of transatlantic flights by general aviation aircraft (both piston engine and turbine aircraft). Since it became a public use airport in the 1960s, transatlantic general aviation aircraft have used BGR to clear customs, buy fuel, and in some cases install equipment such as long-range fuel tanks, high frequency radios, and survival equipment.

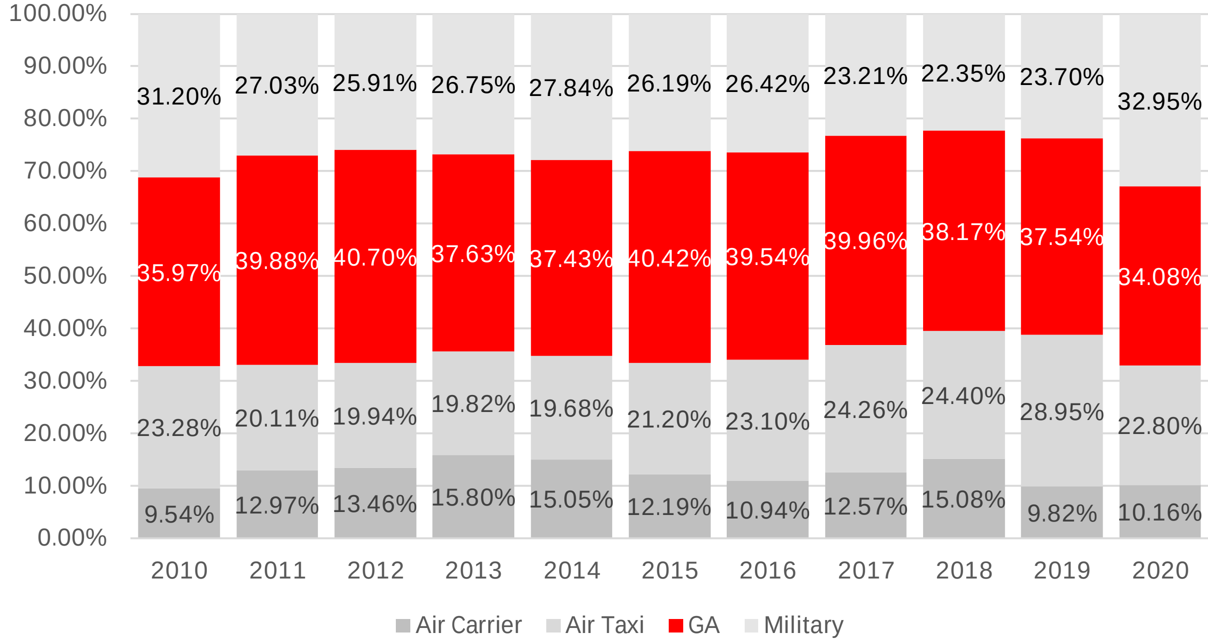
As provided by FAA's OPSNET, general aviation operations have accounted for an average of 52% of civilian movements and an average of 38% of overall BGR movements in the last 10 years (**Figure 2-56**).

Looking at past levels in general aviation operations in the context of other related trends and historical events has shed light on what drives GA activity. General aviation in terms of (control) towered (airport) activity reached its peak by the late 1970s, supported by strong production rates of general aviation aircraft. However, aging aircraft, liability issues causing drops in (aircraft) production rates, and increasingly volatile fuel costs, stalled the activity significantly in the early stages. (GA) Activity slowly grew back, again approaching peak levels until war, natural disasters, and economic downturn resulted in a decline in the early 1990s. The recovery from this decline followed for several years until another economic downturn in the 2000s stopped the growth and they activity began its continual decline, compounded by the effects of 9/11 terrorist attacks, rising fuel prices, and worldwide economic recession at the end of the decade. Throughout this time, general aviation continued to suffer from aging (aircraft) fleets and declining numbers in the pilot population.

An exploratory survey of 1,250 general aviation pilots was conducted to give context to these trends and to help shed light as to what factors affect an individual pilot's flying activity. As also seen in the historical trends, fuel costs and costs in general have had a major influence on the activity levels of those surveyed. The results of the survey echoed what the trends implied - economic recessions and fuel costs are major factors that impede the growth of activity. An interesting result of the survey that was not clear in the data indicated that available free time has also been a major factor in affecting (GA) activity levels.

Another goal of the survey was to gain perspective on the future of general aviation. When asked what would help stimulate their activity in the future, pilots wished for less cumbersome regulations, better access to aircraft through rentals or flying clubs, and an overall decrease in costs. In the responses of the surveyed pilots, increasing costs, increased regulation, lack of public understanding of the role of general aviation, and the declining pilot population stand out as the biggest challenges that general aviation faces

Figure 2-56. BGR Aviation Activity by Segment (2010 – 2020)



General aviation aircraft operations have fluctuated between 15,500 and 19,500 movements per CY in the last 10 years, with an annual average of 17,000 movements (**Figure 2-57**). Overall, general aviation aircraft operations in CY2019 (17,117) have rebounded after a downturn in 2013.

Figure 2-57. Total General Aviation Aircraft Movements at BGR in the Years 2010–2019

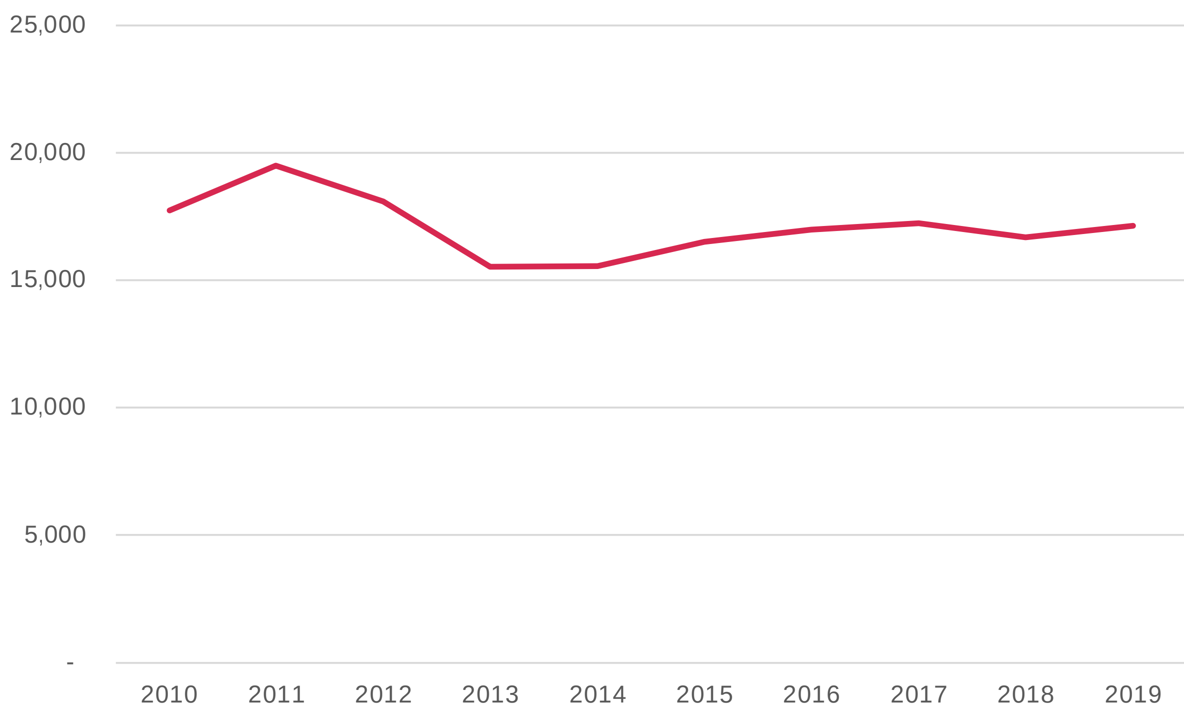
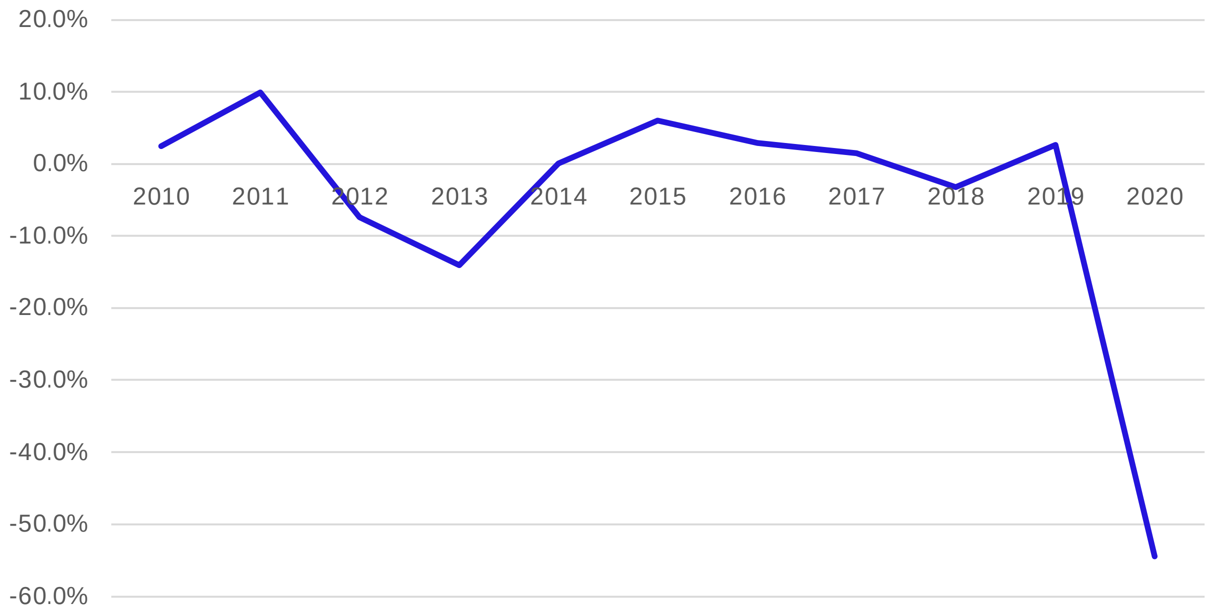


Figure 2-58 shows the annual percent change of aircraft traffic. It appears that after a 14% decline in CY2013, the growth of general aviation traffic in the past 6 years has been constantly

positive, except for a -3.2% recorded in CY2018. The fluctuation might be partially ascribed to the large number of airports in the area from which general aviation aircraft operators and owners can operate. To attract GA activity, BGR can stay competitive by providing modern and cost-effective infrastructure.

The overall growth of general aviation movements in the last 5 years has seen traffic levels recover from the low recorded in CY2013 (15,535 the lowest in 30 years). Additionally, the positive trend that was stopped mainly because of the COVID-19 crisis at the beginning of CY2020, was bringing general aviation traffic levels closer to the peak of 2011 (19,503 movements).

Figure 2-58. General Aviation Movements Percent Change (2010 – 2020)



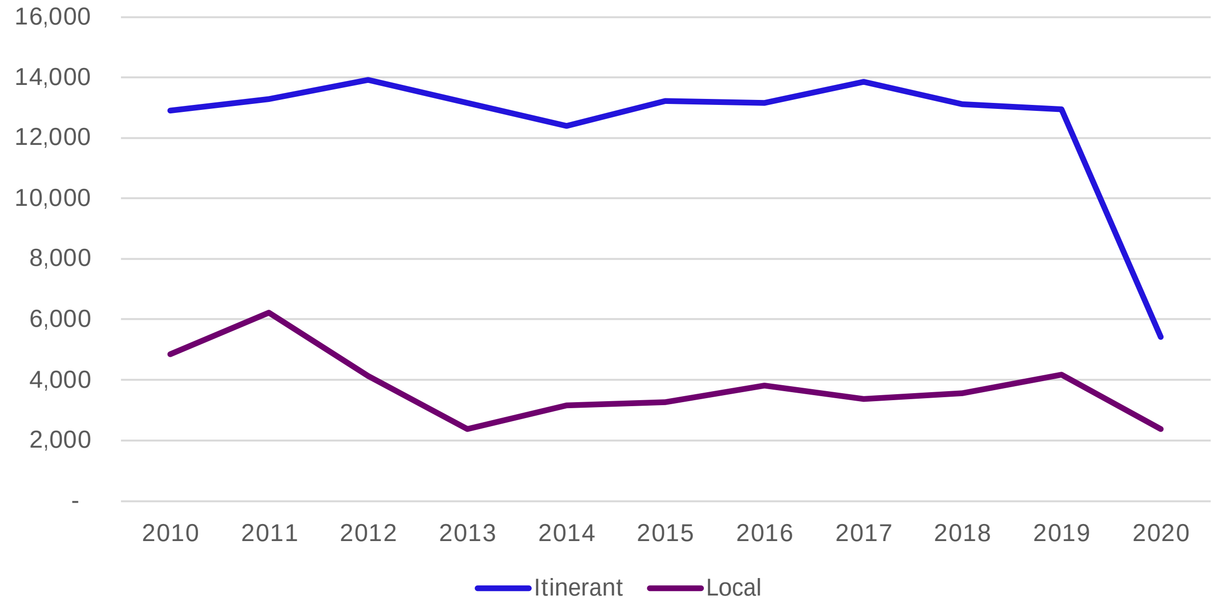
2.8.5.2 *Itinerate and Local Operations*

The split between training activities and the rest of general aviation movements is shown in **Figure 2-59**. Labels are as per definitions provided in the FAA's OPSNET website.

- Itinerant: Operations performed by an aircraft, either Instrument Flight Rules or Visual Flight Rules, that land at an airport arriving from outside the airport area or depart from an airport and leave the airport area.
- Local: Operations performed by an aircraft that remain in the local traffic pattern, execute simulated instrument approaches or low passes at the airport, and operations to or from the same airport within a designated practice area within a 20-miles radius of the tower.

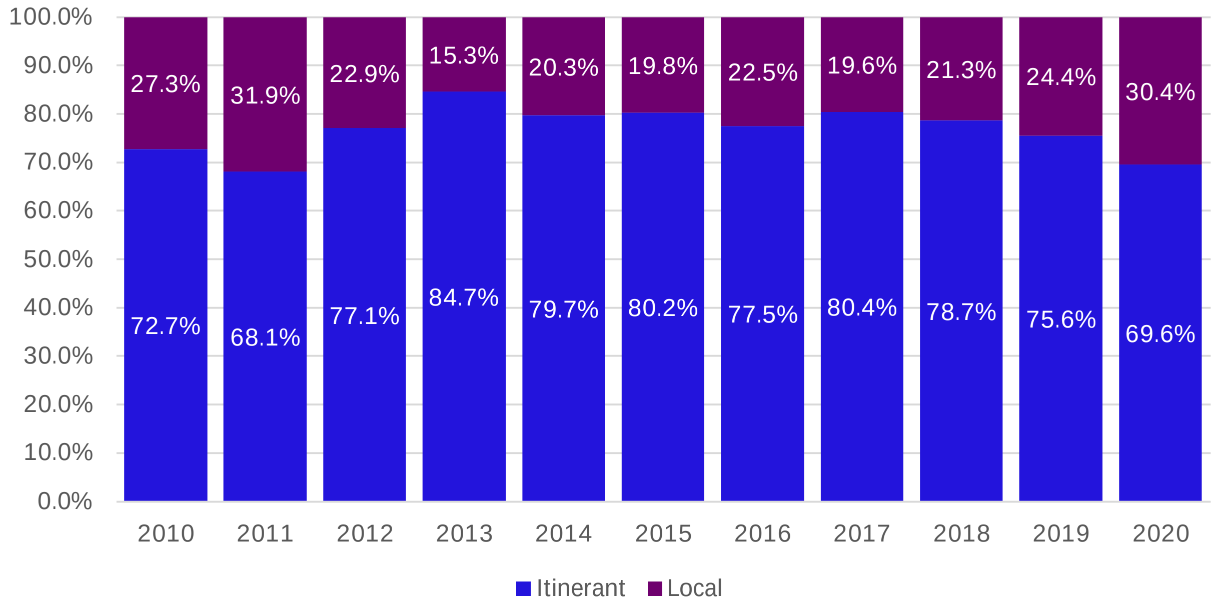
The downturn of total general aviation movements that occurred between 2011 and 2013 is reflected on both local and itinerant operations. Both categories experienced a decline between 2011 and late 2013, although local movements were characterized by a steeper decline than itinerant operations, indicating that overall local recreational flying or training activity has dropped more rapidly than other types of general aviation activities. Several factors affect general aviation activity, but BGR can only control the rates and charges applied by the airport, and also the physical facilities and services provided. For instance, BGR serves as the FBO, and their level of general aviation service is rated by users as high quality.

Figure 2-59. General Aviation Movements – Itinerant vs. Local (2010 – 2020)



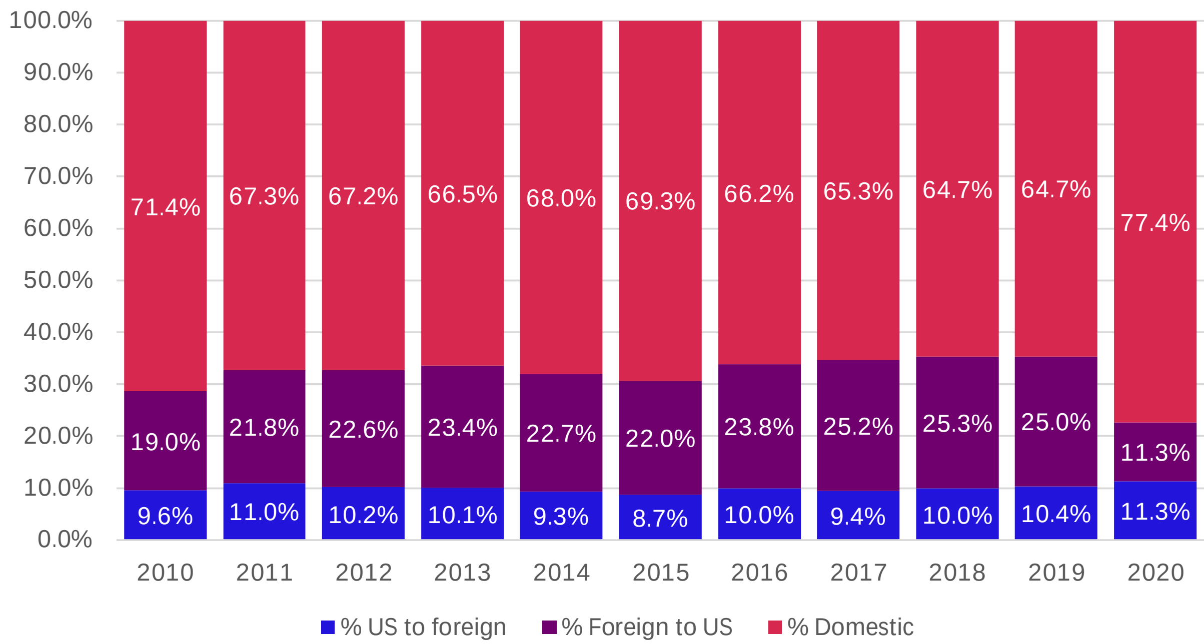
Local flying activities account for an average of 23% of the total yearly general aviation movements in the last 10 years. On average, 73% of operations in the last 10 years have been conducted by transient private or corporate jets (**Figure 2-60**).

Figure 2-60. General Aviation Movements – Percent Change (2010 – 2020)



The number of general aviation flights from outside of the US (foreign countries) are shown in **Figure 2-61**. Data was taken from the FAA's TFMSC, which includes data for flights that fly under Instrument Flight Rules. However, most Visual Flight Rules and some non-en-route Instrument Flight Rule traffic is excluded. Therefore, the figures below represent only the overall trend of domestic and international general aviation flights.

Figure 2-61. Itinerant General Aviation Activity – Domestic vs. International (2010 – 2020)



Additionally, corporate jets with enough range to fly nonstop from Europe to California (including the Gulfstream G450, G550, and G650, Falcon 7X, Canadair Global Challenger, Cessna Citation Longitude and Ten, Embraer 600 Legacy, Boeing BBJ, and Airbus ACJ, etc.) stop at BGR to clear customs and take advantage of quick turnarounds (fuel, catering, etc.). As depicted in **Figure 2 - 60**, most of the international traffic at BGR is westbound (foreign to U.S.). It is interesting to notice that in the first eight months of CY2020 international general aviation flights from abroad into BGR were drastically reduced in favour of domestic general aviation movements, consequence of the strict restrictions imposed on entering foreign countries during COVID-19 times.

BGR will continue to serve as a technical stop for general aviation transatlantic aircraft into the foreseeable future. New GPS navigation and weather technology in general aviation airplanes has made flying the Atlantic Ocean safer, and customs and immigrations requirements set by the U.S. government will continue to make BGR an optimal stop for westbound traffic from Europe. Given harsh weather conditions in the winter months, general aviation transatlantic activity will also continue to be highly seasonal, peaking in the summer months and declining in the winter.

2.8.6 Government Agency Flights

Civilian aircraft activity at BGR also includes U.S. and foreign government aircraft that use the airport as a technical stop for fuel and services. Agencies will occasionally stage aircraft at BGR for a period, such as NASA, when performing atmospheric research with their DC-8.

2.8.7 Irregular Operations (IROPS)

IROPS are non-scheduled diversions and unexpected landings, particularly by large commercial aircraft. BGR is used regularly as a diversion destination by U.S. and foreign airlines but also military, and other aircraft operators.

IROPS have occurred at BGR more frequently than at other U.S. airports due to its strategic location close to the Atlantic coast in south-central Maine. Depending on the direction of travel, BGR is the first or last major U.S. airport for transatlantic flights to make emergency stops. In addition to its strategic location, BGR's long runway (11,440 feet), support facilities (such as its CAT III instrument landing system and terminal facilities), U.S. customs and immigration facilities, ground handling services, emergency medical and law enforcement services, are also key reasons why BGR serves as the primary U.S. option for transatlantic flights that need to divert.

Both civilian and military aircraft have diverted to BGR for a wide variety of reasons, some of which are listed in **Table 2-17**. Each type of IROP requires a different response by BGR and other emergency response teams, as well as access to different airport facilities and services. BGR has an approved IROPS/emergency contingency plan, which is updated regularly.

Table 2-17. IROPS Overview

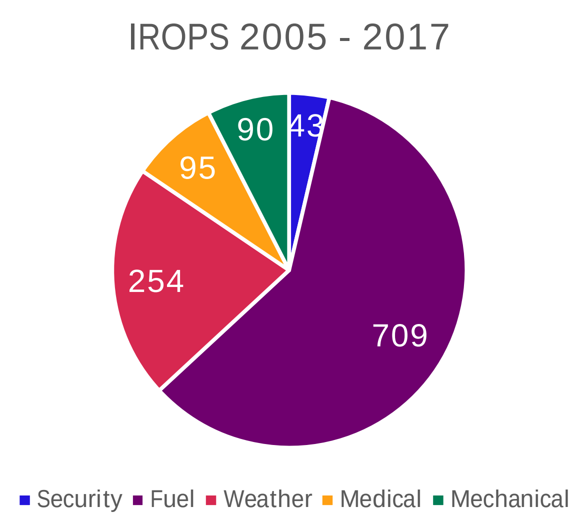
Cause of Diversion	Facilities and Services Required
Adverse weather at destination	▪ Terminal building ▪ Aircraft gate ▪ Customs & immigration (if international) ▪ Ground transportation
Terrorist threats /acts	▪ Remote and secure ramp (typically the 'Xmas Tree' area Taxiway N/X/Y ▪ Law enforcement & monitoring ▪ Ground access
Passengers on TSA's No Fly List	▪ Terminal building ▪ Gate ▪ Customs & immigration (if international) ▪ Law enforcement
Unruly passengers/air rage	▪ Terminal building ▪ Gate ▪ Customs & immigration (if international) ▪ Law enforcement
Ill passengers or flight crew	▪ Terminal building ▪ Aircraft gate ▪ Customs & immigration (if international) ▪ Emergency medical services
Aircraft mechanical problems	▪ Terminal building ▪ Aircraft gate ▪ Customs & immigration (if international) ▪ Ground transportation, mechanical services
Criminal acts/hijacking	▪ Isolated & secure ramp (typically the 'Xmas Tree' area Taxiway N/X/Y), law enforcement & monitoring, ground access
Government/NGO aircraft on temporary duty (e.g. NASA weather research)	▪ Terminal building, aircraft gate, customs & immigration (if international), ground transportation

In terms of airport facility and service requirements, there are several key points about IROPS:

- By their definition it is not possible to predict when an IROP will occur, how frequently they will occur, what type of incident may occur (such as air rage, mechanical, illness, etc.), how many aircraft may be involved (for example, diversions due to adverse weather often involve multiple airplanes, while air rage or terrorist threat incidents typically involve single aircraft), or what type of aircraft will be involved (from a regional turboprop up to an Airbus A-380 or B-747-800). Consequently, BGR must always be prepared to respond.

- As noted above, different IROPS require different services, emergency responses, as well as different airport facilities. For example, aircraft diverted due to weather, mechanical problems, ill passengers, or fuel alert, need access to the terminal building and/or Joint-Use Apron, a sterile waiting area, immigration and customs if it is an international flight, and ground transportation. Aircraft diverted due to a terrorist threat or act or criminal activity must be isolated from the rest of the airport until the threat is resolved, requiring a substantial response from law enforcement, after which the aircraft and remaining passengers need access to the terminal building.
  - Typically, the ‘Xmas Tree’ Taxiway N/X/Y area is used for incidents that require a secure and sterile environment. The area can accommodate Group VI aircraft. Taxiway ‘X’ has been used previously and should remain clear of parked or based aircraft in the future so as not to constrain its use for certain types of IROPs.
  - The northern end of Taxiway ‘A’, adjacent to the Runway 15 threshold, could also be used, but an IROPs aircraft situated there, along with the emergency vehicles, would require closing the northern half of Taxiway ‘A’ and Runway 15 which would adversely impact all large aircraft operations.
- Designated sterile areas in the terminal building are required for international passengers, as well as those that have cleared security screening but are intending to re-board a flight. U.S. immigration & customs, as well as TSA and law enforcement personnel, are required to respond to certain IROPS, as well as airport staff.
- The airport must also maintain a variety of equipment for quick response including GSE (aircraft tugs, air stairs, power carts, etc.), fire engines, ambulances, law enforcement, surveillance, as well as ground transportation (buses, vans, cars).

Figure 2-62. IROPS breakdown



- Some IROPS can be resolved relatively quickly (in a matter of hours) and the aircraft can be enroute in less than 12 hours, while other emergencies (such as weather or mechanical problem) may require parking at BGR for days.

BGR has a long history accommodating IROPS aircraft. In October 1969, a Trans World Airlines plane that had been hijacked in California was refueled in Bangor on its way to Rome (where the hijacker was captured). Among those who have diverted to BGR due to mechanical problems include former President George H. W. Bush and Gen. Colin Powell, as well as actors Clint Eastwood and Harrison Ford. Numerous flights have diverted to BGR due to unruly passengers, and the airport has been recognized in the national and international media for its excellent service and experience accommodating IROPS.

In May 2001, BGR handled two maintenance issues from Britain within three hours: a Britannia Airways B-767 enroute to Cancun, Mexico, landed at BGR, and three hours later a British Airways B-747 enroute to Mexico City did the same. In May 2012, a US Airways B-767-200, Flight #787 in flight from Paris to Charlotte-Douglas International Airport with 179 passengers and nine crew diverted to BGR because of a terrorist threat.

Over time, BGR has developed a reputation within the industry as a go-to facility for technical stops. In addition, it still serves as a primary refueling hub for overseas military flights carrying personnel and cargo.

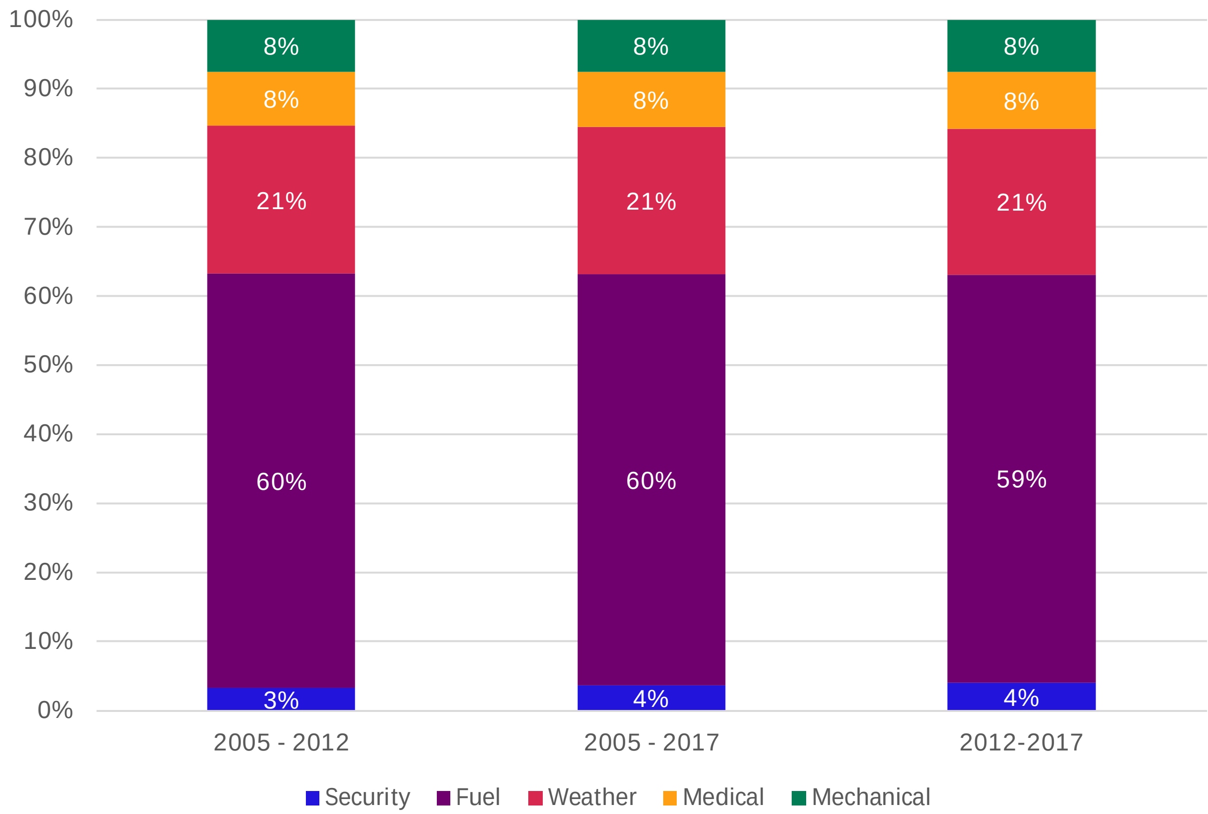
Between 2005 and 2017 Bangor Airport handled a total of 1,191 IROPS, as reported by the telegraph.co.uk. This represents an average of almost 100 IROPs per year equating to almost two per week. **Figure 2-63** depicts a breakdown of the reasons for the 1,191 total unscheduled landings, the breakdown is as follows:

- 43 were for security reasons (4%)
- 709 for fuel (60%)
- 254 for weather (21%)
- 95 for medical reasons (8%)
- 90 for aircraft maintenance issues (8%)

Almost half of the total diversions took place in the 5 years between 2012 and 2017. In this timeframe BGR handled 544 IROPS (46% of total diversions occurred between 2005 and 2017).

The breakdown into the various IROPS has essentially remained unchanged as displayed in (see **Figure 2-63).**

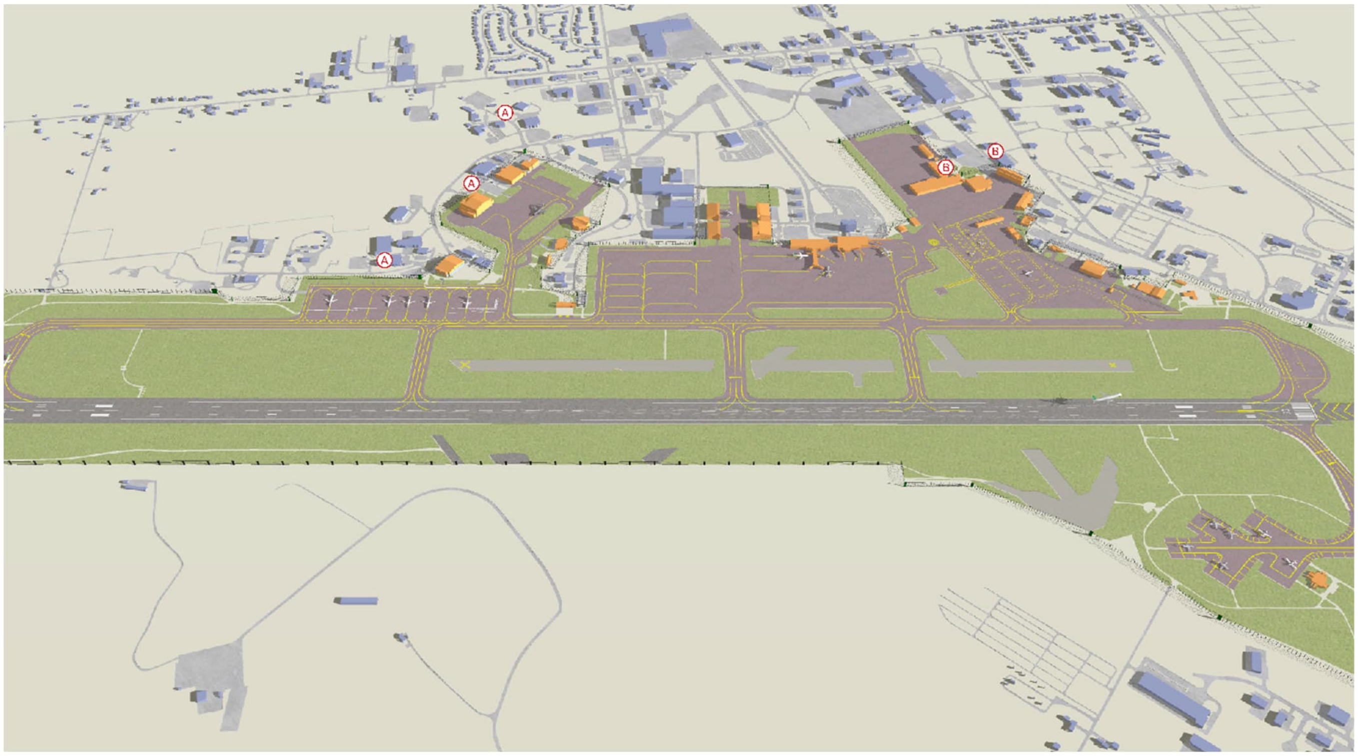
Figure 2-63. IROPS Breakdown



As noted by airport management at BGR, IROPS is an activity which occurs regularly and that also has generated positive national media coverage about the airport's ability to handle such circumstances.

One of the main challenges in the response to IROPS incidents at BGR is the presence of the Maine Air and ANG, and in particular their respective cantonment areas (**Figure 2-64**). Those areas are secured by the Guard, which must also be protected from IROPS aircraft that may pose a security threat.

Figure 2-64. Owned / Leased by Military: (A) Maine Air National Guard facilities; (B) Maine Army National Guard Facilities



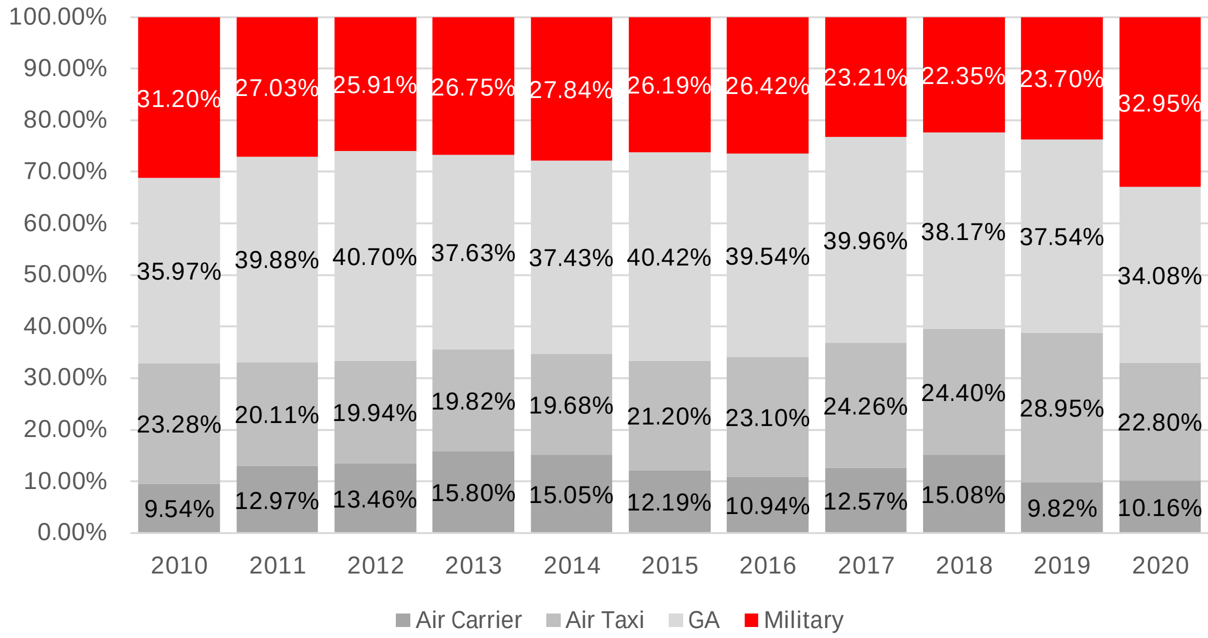
2.8.9 Military Aviation Activity

At BGR military aircraft activity is generated by based units including the Maine Air National Guard and Maine Army National Guard aviation units, as well as transient military operations by both U.S. and foreign military squadrons. BGR is home to the 101st Air Refueling Wing of the Maine Air National Guard. The primary mission of the 101st Air Refueling Wing is to provide inflight refueling with the capability to transport cargo, personnel, and medevac operations. The 101st Refueling Wing utilizes the KC-135 Stratotanker which is based at BGR. Other than domestic and transatlantic missions, the 101st Refueling Wing practices training exercises at BGR such as touch and goes and instrument approaches.

Other military aviation activity at BGR includes transient military aircraft from other U.S. units as well as transatlantic aircraft from foreign military forces.

Military operations have accounted for an average of 27% of overall BGR movements in the last 10 years as gathered from the data provided by FAA's OPSNET dataset (**Figure 2-65).**

Figure 2-65. Percent of Military Aviation Traffic (2010 – 2020)



Military activity is generated by specific missions, such as support for overseas deployments and more routine missions, all of which change over time based on DoD needs domestically and internationally. The Maine Air National Guard Air Refueling Wing supports DoD deployments throughout the U.S. and all over the world. The Maine Army Guard has also been deployed overseas several times in the past. While the DoD can change the mission of specific units, as well as the type of aircraft they operate (as has been the case with both the Air National Guard and Army National Guard units at BGR over the last 50 years), military activity normally fluctuates based on specific needs and missions. If the U.S. DoD were to change the role of either the Maine Air and/or Army National Guard, such as changing their mission, aircraft type, or consolidating and moving aviation units elsewhere, then the number of military operations at BGR could change significantly and could be either lower or higher than historic levels.

Military aircraft operations have fluctuated between 15,500 and 9,500 movements per CY in the last 10 years, with an average of 11,500 movements (**Figure 2-66**). Overall, military operations declined across the past 10 years with limited positive trends recorded only during CY2014 and CY2016. It is interesting to highlight that also during CY2019 and continuing into the first two months of CY2020, military traffic was experiencing a spiking trend (896 military movements in January 2019 vs. 1,013 in January 2020 and 689 military movements in February 2019 vs. 778 in January 2020) (**Figure 2-67**).

Figure 2-66. Total Military Aircraft Movements (2010–2019)

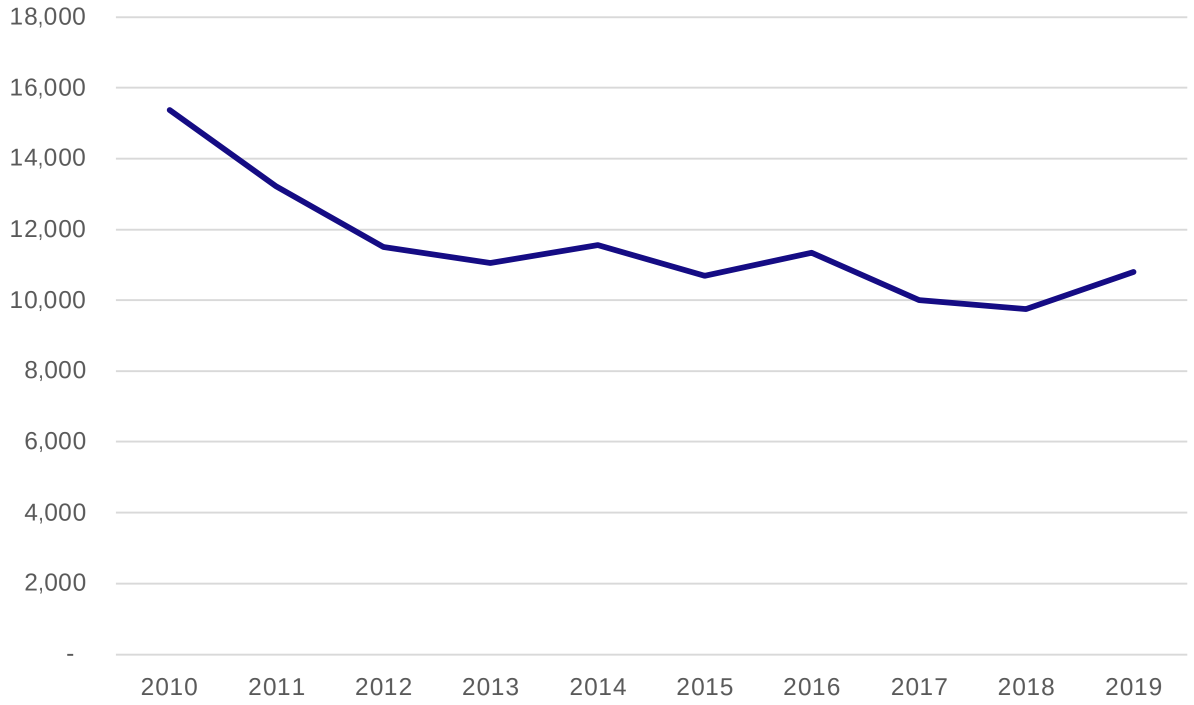


Figure 2-67. Military Movements – Percent Change (2010 – 2020)

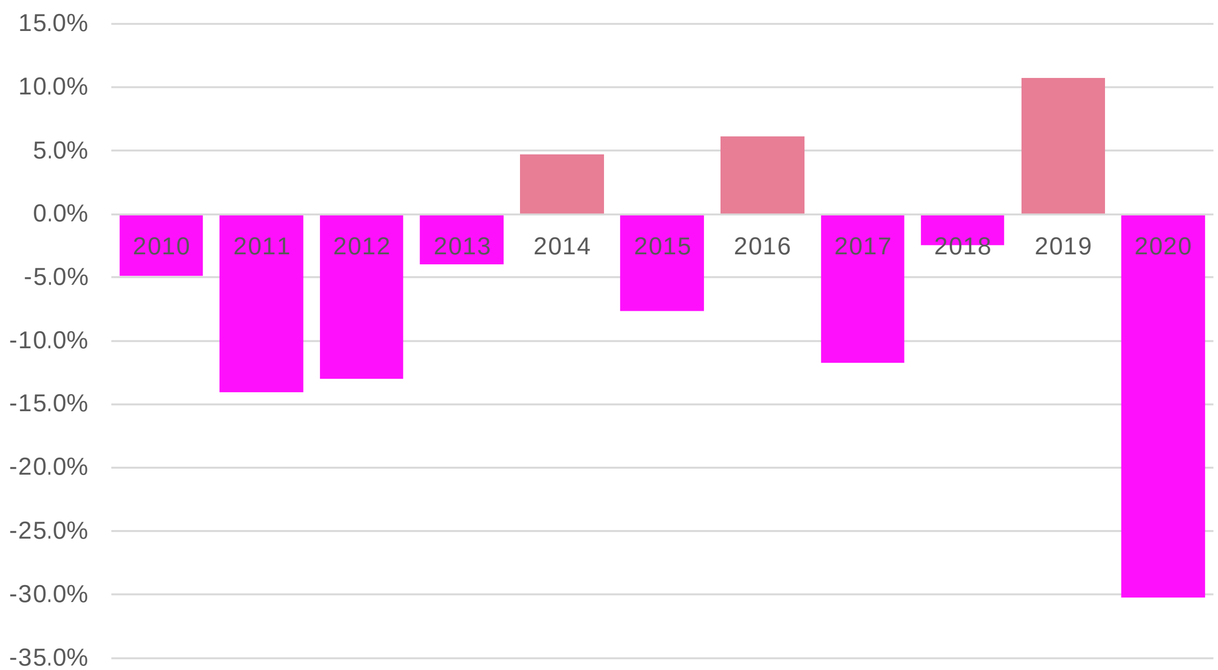


Figure 2-68 shows that after a severe downturn in military operations in the first 4 months of 2020 (-40%) traffic seems to have rebounded with movements increasing to more than 1,000 per month in July and August. Local (i.e. training such as touch-and-go) operations have experienced a more consistent decline than itinerant operations, as shown in **Figure 2-69**.

Figure 2-68. BGR Military Aircraft Movements – First 8 Months of CY2020

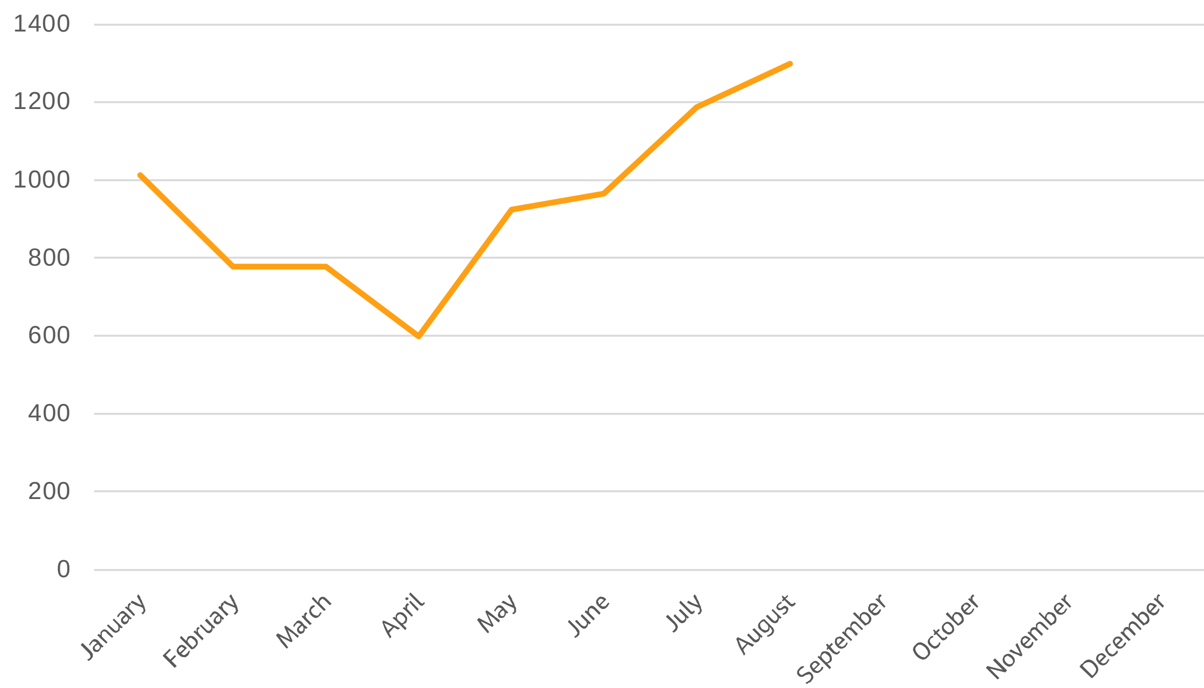
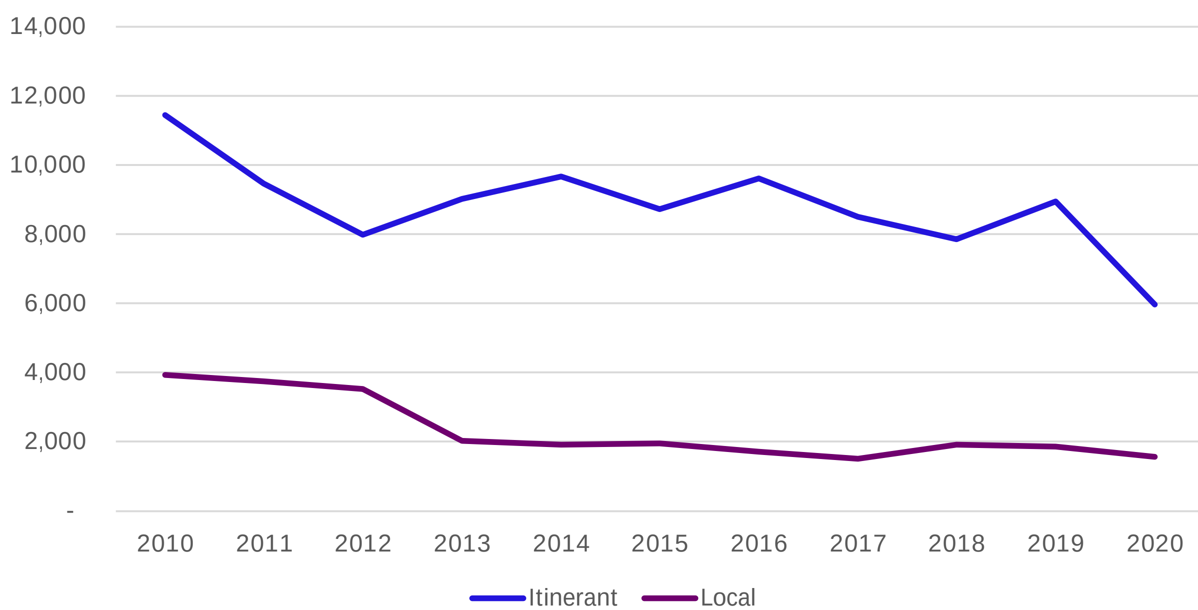


Figure 2-69. BGR Military Movements – Transient vs Itinerant (2010 – 2020)



Training activities have accounted for an average of 20% of the total yearly military movements in the last 10 years. The majority of movements, approximately 80% on average, have been from

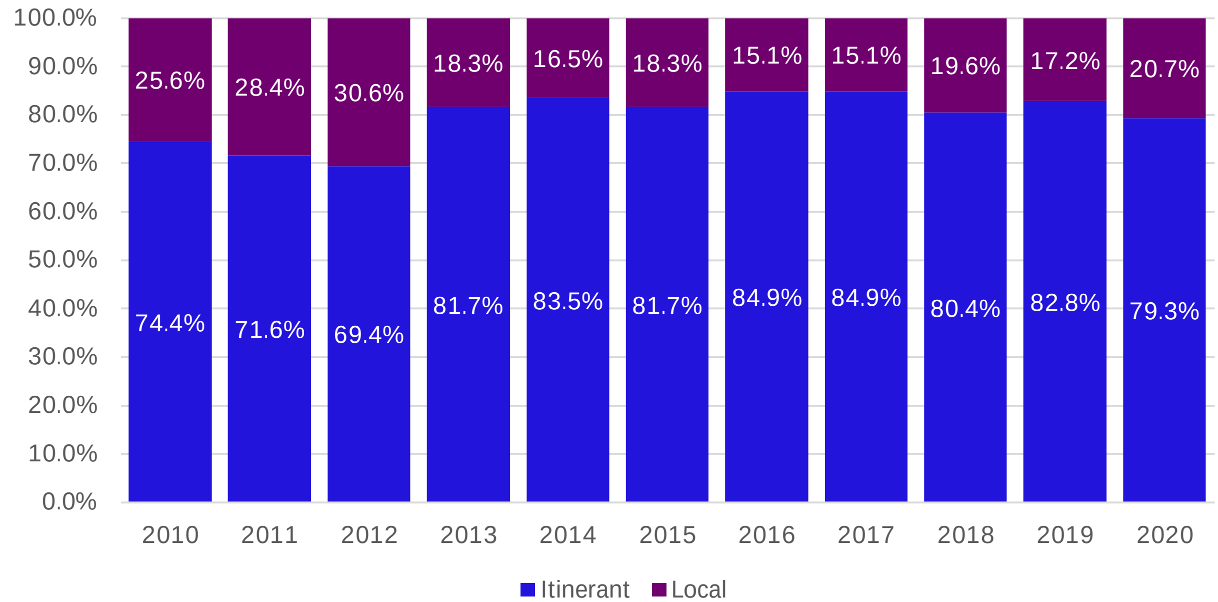
U.S. and foreign transient military aircraft not based in BGR (**Figure 2-70**). The DoD also made extensive use of civilian aircraft for troop and equipment charters that transitioned through BGR flying to/from Europe, Iraq, Afghanistan, etc. Those charters were conducted by U.S. airlines and air taxi companies and were counted as civilian aircraft operations.

BGR accommodates a variety of other U.S. and foreign transient military aircraft and missions:

- Technical stop for fuel, support services, etc. - both U.S. and foreign military units
- Training (by non-based units) – including touch and goes, practice instrument approaches, etc.
- Temporary Duty station at BGR - such as the F-16s with VT ANG based in Burlington VT
- Security escort missions – MA ANG F-15s from Westfield, MA
- Troop charters with both civilian and military aircraft
- Cargo charters with both civilian and military aircraft

Both U.S. and foreign transient military aircraft use the civilian parking apron near the terminal building, as well as Bangor Aviation Services for fuel, ground handling, and flight planning.

Figure 2-70. Breakdown of Military Movements at BGR – Percentage Split



2.9 Airport Financial Data

2.9.1 Introduction

As noted in FAA AC 150/5070-6B, *Airport Master Plans*, Chapter 6, Existing Conditions:

> *Airport master planners must examine an airport's financial resources, including its basic business model, operating revenues and expenses, and sources and uses of capital funds… (The Airport's) business model summary should describe the financial operations of the airport, including how its costs and revenues are charged or credited to airport users and how any operational surplus or deficit is handled. In addition, the business model summary should outline how the airport typically funds capital projects (i.e., with AIP and other grants, Passenger Facility Charges, airport revenue bonds, and so forth).*

In addition, FAA Sponsor Grant Assurance No. 24:

> *It (i.e. the airport sponsor) will maintain a fee and rental structure for the facilities and services at the Airport which will make the Airport as self-sustaining as possible under the circumstances existing at the particular airport, taking into account such factors as the volume of traffic and economy of collection.*

Current financial data was provided by BGR. The FAA requires airports with commercial air carrier service and a minimum of 2,500 passenger enplanements per year, which includes BGR, to submit a detailed annual financial report. The FAA compiles that data within their Certification Activity Tracking System (CATS). The FAA uses two forms to record the financial data:

- *The Financial Government Payment Report, FAA Form 5100-126*. This form is for the payments the airport makes to governmental entities, the services the airport performs for governmental entities, and the land and facilities that the airport provides to such entities.
- *The Operating and Financial Summary, FAA Form 5100-127*. This form is for the airports revenues, expenses, and other financial information (**Figure 2-71**).

It is important to note that each airport sponsor completes and submits the forms to FAA annually, so the financial data is provided by the airport. In addition to reporting annually, the forms also provide a standardized format for recording a variety of airport financial data, as shown below. This allows for extended trend analysis as well as for benchmarking among different airports.

Between FY 2010 – 2019, BGR has shown very positive financial trends (**Table 2-18**). In FY 2019 – 2020, actual expenses were $16,675,329 (compared to the budget of $17,473,491, -4.8% less than budgeted), and actual revenues were $18,738,254 (compared the budget of $18,036,729 - an increase of 3.9%), for a net profit of $2,062,925.

Figure 2-71. Information to be Reported on FAA Form 127

1.0 Passenger Airline Aeronautical Revenu
1.1 Passenger airline landing fees
1.2 Terminal arrival fees, rents, and utilities
1.3 Terminal area apron charges/tiedowns
1.4 Federal Inspection Fees
1.5 Other passenger aeronautical fees
1.6 Total

2.0 Non-Passenger Aeronautical Revenue
2.1 Landing fees from cargo
2.2 Landing fees from GA and military
2.3 FBO revenue; contract or sponsor-operated
2.4 Cargo and hangar rentals
2.5 Aviation fuel tax retained for airport use
2.6 Fuel sales net profit/loss or fuel flowage fees
2.7 Security reimbursement from Federal Governmer
2.8 Other non-passenger aeronautical revenue
2.9 Total

3.0 Total Aeronautical Revenue

4.0 Non-Aeronautical Revenue
4.1 Land and non-terminal facility leases and revenu
4.2 Terminal-food and beverage
4.3 Terminal-retail stores and duty free
4.4 Terminal-services and other
4.5 Rental cars-excludes customer facility charges
4.6 Parking and ground transportation
4.7 Hotel
4.8 Other
4.9 Total

5.0 Total Operating Revenue

6.0 Operating Expenses
6.1 Personnel compensation and benefits
6.2 Communications and utilities
6.3 Supplies and materials
6.4 Contractual services
6.5 Insurance claims and settlements
6.6 Other
(Sponsorship/Licenses/Permits/Taxes/Claims/Fines,
6.7 Subtotal
6.8 Depreciation
6.9 Total Operating Expenses

8.0 Non-Operating Revenue (Expenses) and Capital
8.1 Interest Income - restricted and non-restricted.
8.2 Interest expense (use minus sign)
8.3 Grant receipts
8.4 Passenger Facility Charges
8.5 Capital Contributions (for withdraw use minus sign)
8.6 Special items (loss)
8.7 Other
8.8 Total Non Operating Revenue (Expenses)

9.0 Net Assets
9.1 Change in net assets
9.2 Net assets (deficit) at beginning of year
9.3 Net assets (deficit) at end of year

10.0 Capital Expenditures and Construction in P
10.1 Airfield
10.2 Terminal
10.3 Parking
10.4 Roadways, rail, and transit
10.5 Other
(Building Improvements & Equipment: $1,395,893)
10.6 Total

11.0 Indebtedness at End of Year
11.1 Long Term Bonds (GA, GARB, PFC, etc.)
11.2 Loans and interim financing
11.3 Special facility bonds
11.4 Total Debt at End of Year

12.0 Externally Restricted Assets
12.1 Externally Restricted Debt Reserves
12.2 Other Externally Restricted Assets
12.3 Total

13.0 Unrestricted Cash and Investments

14.0 Reporting Year Proceeds
14.1 Bond proceeds
14.2 Proceeds from sale of property

15.0 Debt Service
15.1 Debt service, excluding coverage
15.2 Debt service, net of PFCs and Offsets

Source: FAA Form 127

Table 2-18. BGR Financial Trends

Bangor International Airport Financial Performance	% Change 2010-2019
Passenger Airline Aeronautical Revenue	162.2%
Non-Passenger Aeronautical Revenue	14.8%
Total Aeronautical Revenue	30.9%
Non-Aeronautical Revenue	58.7%
Total Operating Revenue	38.9%
Total Non-Operating Revenue	-2.2%
Airport Operating Expenses	24.3%
Depreciation	-4.7%
Capital Expenditures & Construction	-1.4%
Total Debt Year-end	-25.9%

Source: FAA CATS Form 127, FY 2010-2019

The COVID-19 pandemic has severely impacted all transportation and leisure industries, in addition to many others, in the second and third quarters of 2020. In addition to the financial damage already done as of the third quarter 2020, the future is also very uncertain with regards to the resumption of normal activities, including when airline service will return to 2019 levels.

The International Air Transport Association recently stated that airline traffic recovery has been delayed due to recurring outbreaks of COVID-19 around the world, and further noted[2]:

- Global passenger traffic (revenue passenger kilometers) will not return to pre-COVID-19 levels until 2024, a year later than previously projected.
- The recovery in short haul travel is still expected to happen faster than for long haul travel. As a result, passenger numbers will recover faster than traffic measured in revenue passenger kilometers. Recovery to pre-COVID-19 levels, however, will also slide by a year from 2022 to 2023. For 2020, global passenger numbers (enplanements) are expected to decline by 55% compared to 2019, worsened from the April forecast of 46%.

A number of domestic and international airlines have gone out of business, and more may follow, as well as additional airline mergers and acquisitions. General aviation and corporate activity, as well as military traffic, has been recovering quicker than airline traffic through the summer and Fall of 2020, which will help increase revenues at BGR.

However, if airline traffic does not rebound to 2019 levels until 2022 or 2023, that will have a long-term impact on revenues at all commercial service airports, including BGR, because that will result in decreased revenues from landing fees, PFC, concessions, vehicle parking, fuel sales, terminal rental fees, etc.

Such a long-term recovery could also adversely impact an airport’s bond ratings, which could also impact an airport’s borrowing costs.

[2] Source: https://www.iata.org/en/pressroom/pr/2020-07-28-02/

2.9.2 BGR Airport Revenues

BGR has a wide variety of revenue sources in place, which provides two fundamental advantages: a) it maximizes the revenue potential for the airport, and b) the various revenue sources peak and ebb in response to different factors, which balances out the overall revenue stream (**see Figure 2-72**) This was evident in the recent downturn in traffic due to COVID-19.

According to the Airport budget for FY 2019-2020, the total budgeted revenue amount of $18,036,729 was exceeded by actual receipts of $18,738,254, an increase of 3.9%, even though every category of aircraft operations declined in relation to 2019 (**Table 2-19**).

Table 2-19. Aircraft Operations—January through August at BGR

	2019	2020	% Change
Air Carrier + Air Taxi	11,604	7,542	-35.0%
General Aviation	11,812	7,798	-34.0%
Military	7,868	7,214	-8.3%
Total Operations	30,908	22,880	-26.0%

Source: FAA Air Traffic Activity System

According to FAA Form 127, the largest single category of revenue at BGR is Non-Passenger Aeronautical, which includes landing fees from general aviation, cargo and military aircraft, FBO fees, cargo and hangar rentals, fuel sales net profit, security reimbursements from the Federal Government, and other non-passenger aeronautical revenues.

A key factor regarding revenues is that BGR also serves as the FBO, and directly sells fuel to all aircraft operators (airline, military, and general aviation), collects landing fees from general aviation, cargo, and transient military aircraft, etc. As a result, the Airport receives all of the revenue from fuel sales, unlike airports that have FBOs and collect fuel flowage fees. According to the Airport budget for FY 2019-2020, net profit from all fuel sales was (after subtracting cost-of-goods-sold – COGS) was $6.9 million.

The other large category of revenue, at least until 2016, was Non-Operating Revenue, which includes interest income, grant receipts, and income from PFC, which is directly related to passenger enplanements.

Between FY 2010 and 2019, operating expenses exceeded operating revenues (**Figure 2-73**), although the net loss has declined by 52.6% over that period. The balance is made up by non-operating revenues (interest income, grant receipts, and PFCs), which in FY 2019 exceeded the operating loss.

Figure 2-72. BGR — Revenue Sources

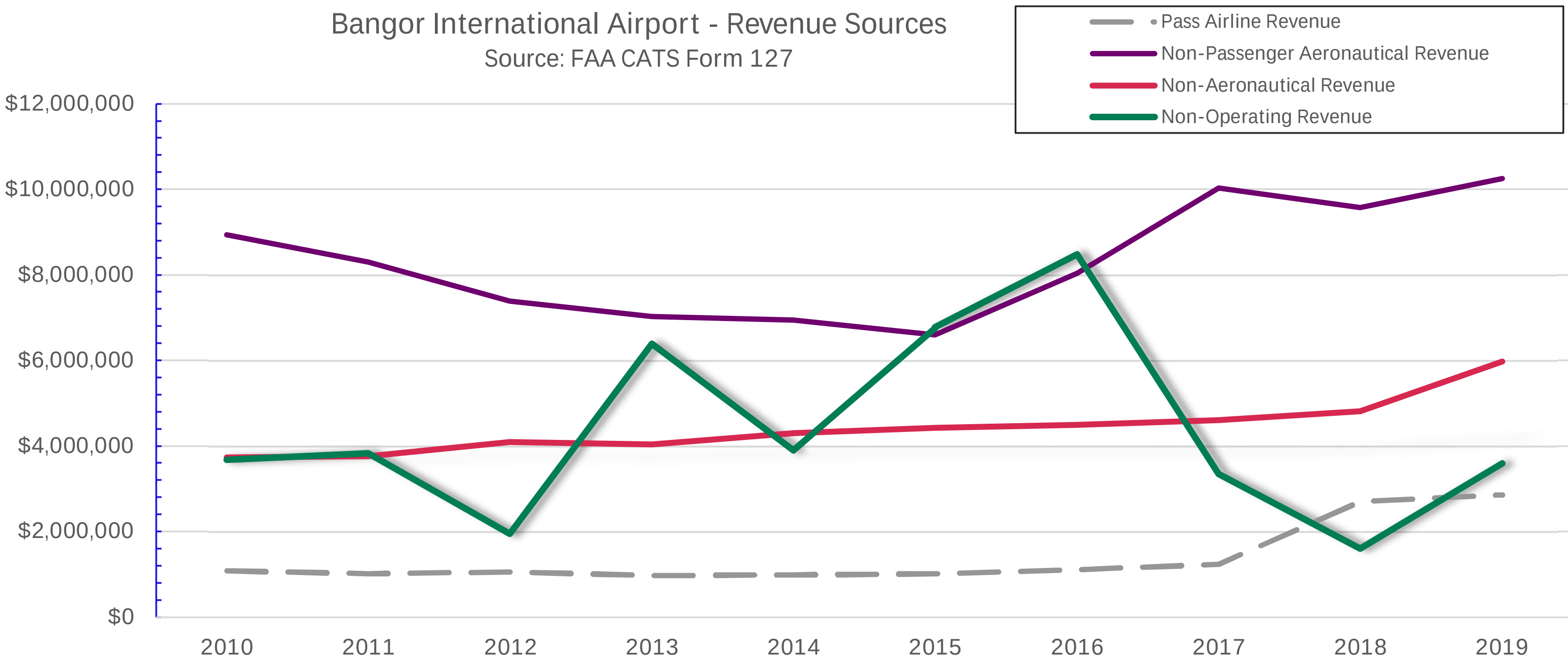
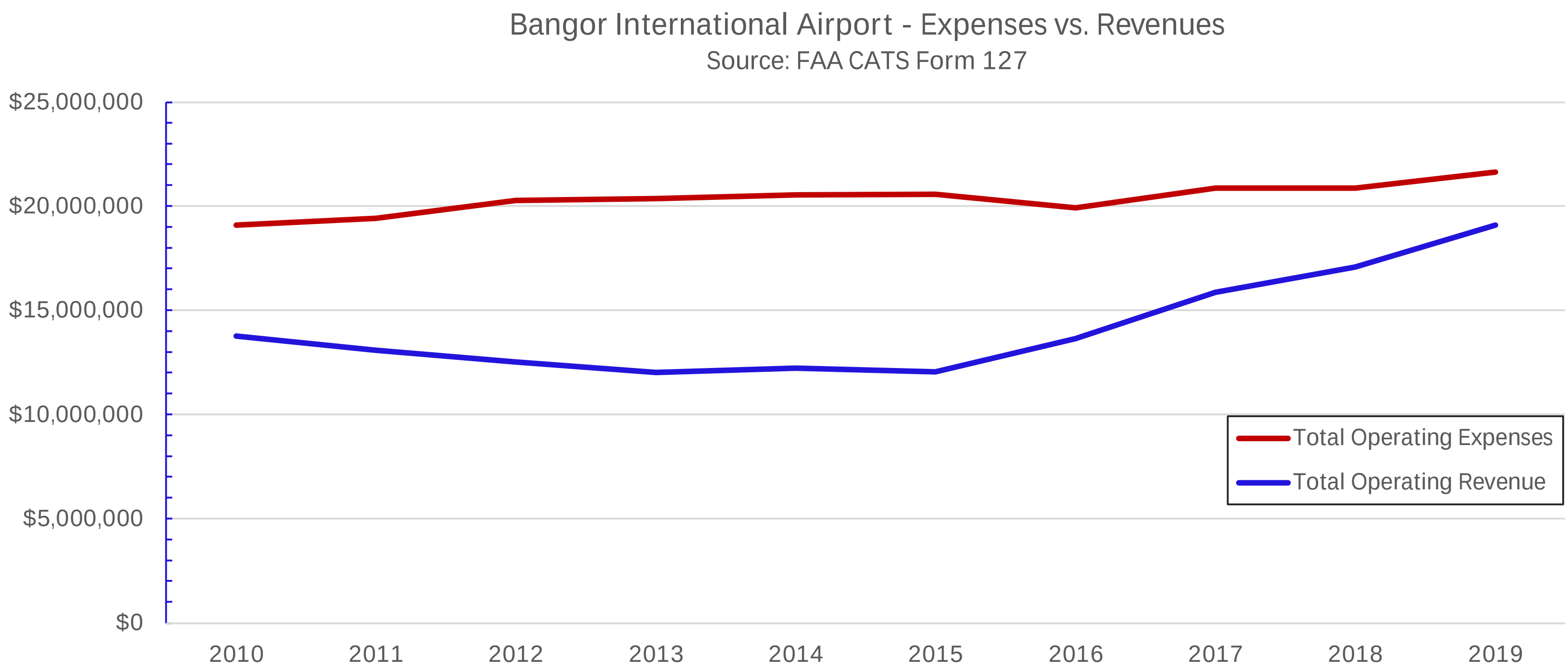


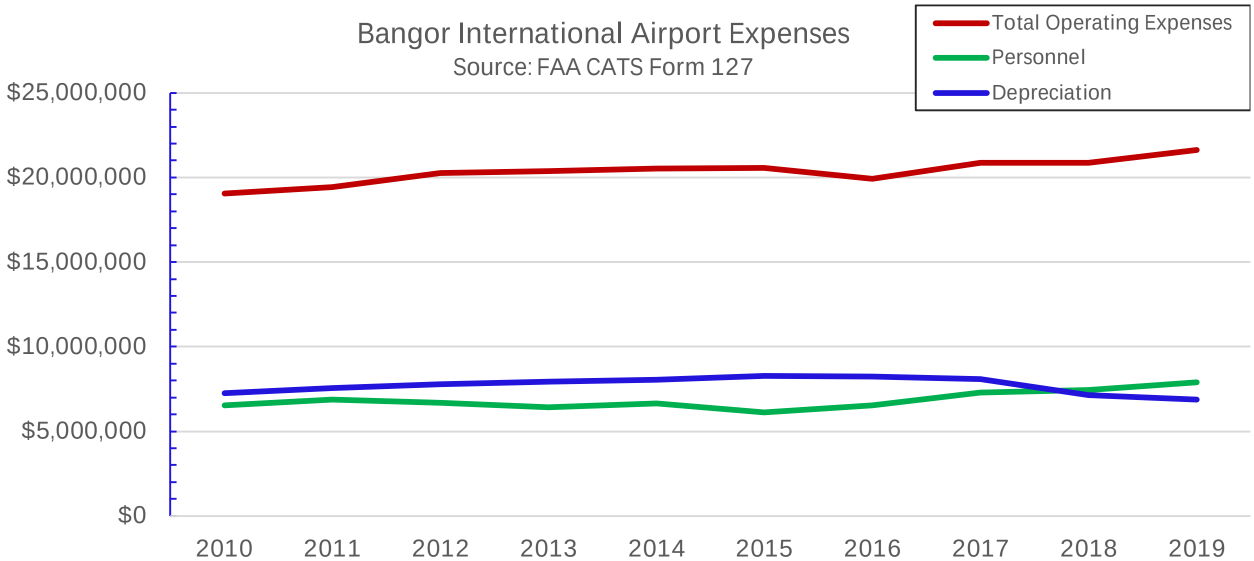
Figure 2-73. BGR – Expenses vs. Revenue



2.9.3 Airport Expenses

The largest categories of expenses at BGR are personnel compensation and benefits, followed by depreciation. Contractual services, supplies and materials, and communications and utilities comprise the remaining operating expenses (**Figure 2-74**). Overall operating expenses that include personnel and benefits, communications and utilities, supplies and materials, contractual services, and insurance claims, increased by 24.3% between FY 2010-2019. Depreciation over the same period decreased by 4.7%.

Figure 2-74. BGR Expenses



A number of airport expense categories have declined steadily between FY 2010 – 2019, with the exception of operating costs, particularly personnel costs.

2.9.4 Airport Rates and Charges

BGR has a comprehensive menu of rates and charges (see **Appendix C**). The rates and charges are based on a variety of factors and apply to every aspect of airport services and operations.

Rates and charges are one of the key elements of an airport's financial success, the other being expenses (including debt service). It is important to point out several facts regarding airport rates and charges:

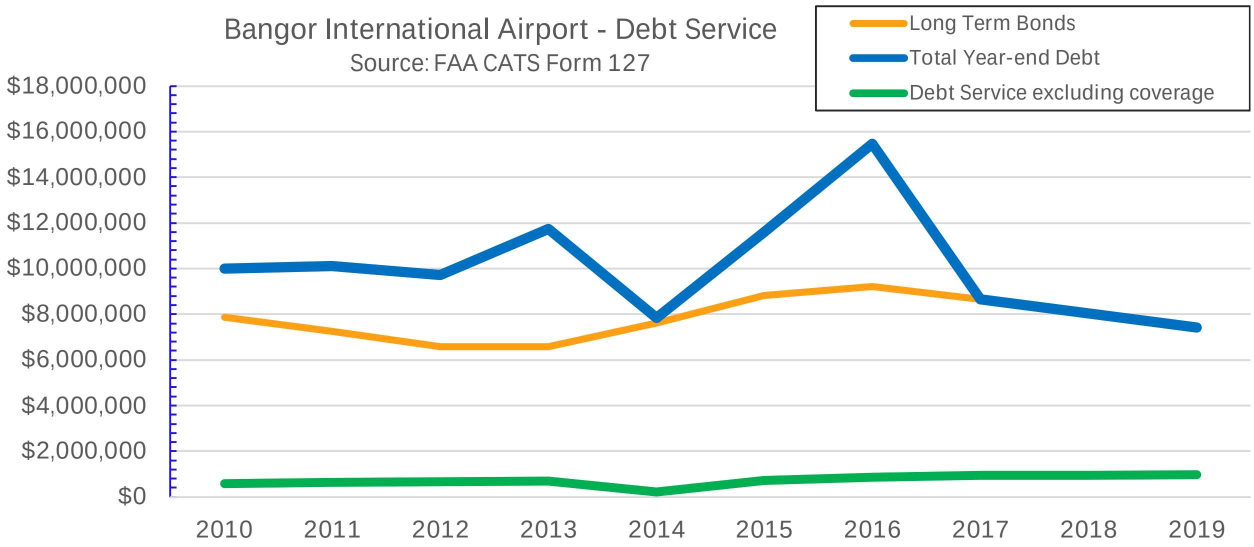
1. Airports operate in an extremely competitive environment, and frequently compete with other airports within the same state, region, and even across the country, for example, as is the case for fuel sales due to the ability of turbine aircraft to tanker fuel.
2. Increases in rates and charges or the imposition of new rates and charges can negatively impact traffic levels, to the extent of negating the overall potential net revenue benefits.
3. All rates and charges require an administrative structure to collect and track, and the consequent administrative costs impact the overall net revenue from the rates and charges. For example, general aviation airports may wish to impose a landing fee tailored to aircraft size and type of

operation but find the administrative costs to administer and track such a fee would outweigh the net benefits, as well as decrease activity.

2.9.5 Airport Debt Servicing

Annual debt service excluding coverage increased from $583,914 in FY 2010 to $963,781 in FY 2019, an increase of 65.1%. However, debt service net of PFCs and offsets was $636,329 in FY 2010 and 2011 but has been $0 between FY 2012-2019 (**Figure 2-75**).

Figure 2-75. BGR Debt Service

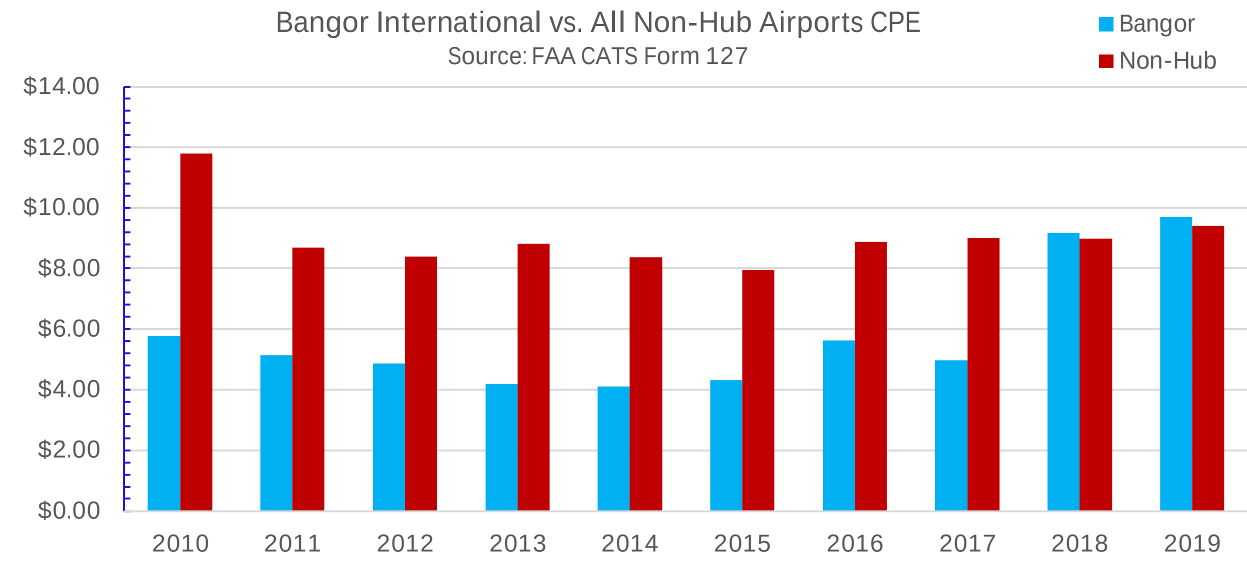


2.9.6 Airport Cost Per Enplaned Passenger

The cost per enplaned passenger (CPE) is an important metric in terms of the level of cost for an airline operating at a particular airport. The CPE at BGR had been relatively low between 2010-2017, ranging between $5.78 and $4.96, which was well below the average for all non-hub airports (**Figure 2-76**).

However, in FY 2018 and 2019, the CPE at BGR almost doubled to $9.70, which made it higher than the non-hub average CPE. By comparison, the CPE at Portland Jetport in FY 2019 was $8.24 (15% less than BGR), the CPE at Burlington Airport was $6.04 (60.6% lower than BGR), while Manchester Airport was $15.54 (60.2% higher than BGR). Continuation of a growing CPE will make BGR less competitive in relation to other airports in the region.

Figure 2-76. BGR vs. All Non-Hub Airports CPE

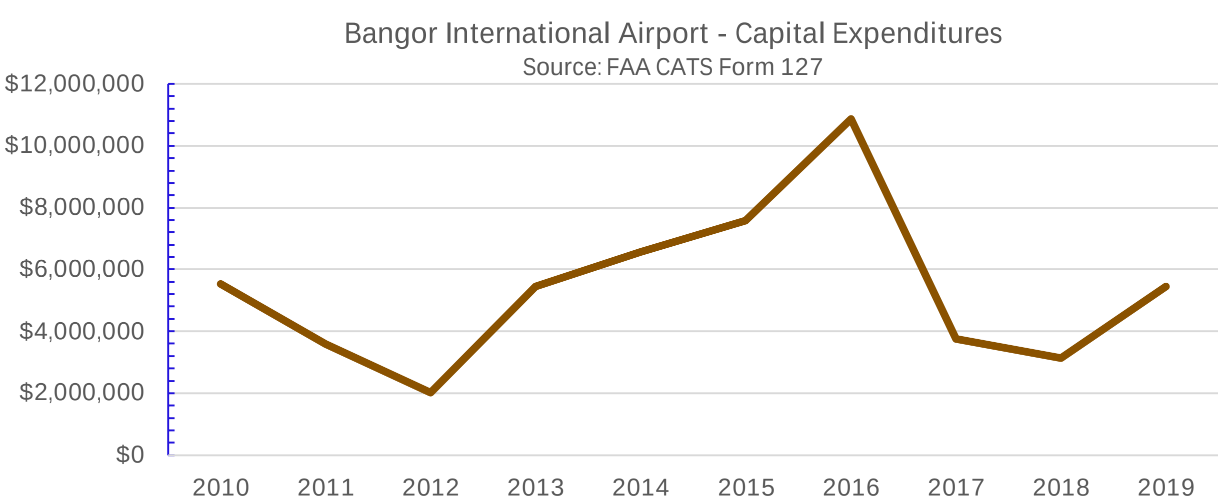


2.9.7 Capital Improvement Project (CIP) Costs and FAA and State Grants

BGR has maintained a continuous capital improvement program in its infrastructure investment (see **Figure 2-77**). BGR's Capital Improvement Program is formally updated annually, but is continually reviewed based on traffic levels, the financial situation at the airport, as well as funding availability from FAA and Maine DOT. BGR fully utilizes the FAA and state matching shares for eligible capital projects.

Because the Maine Air National Guard 101st Air Refueling Wing has a cantonment area on the airport and operate KC-135 aircraft, the ANG shares in some of the capital expenses dealing with taxiways and runway rehabilitation to are shared jointly with civilian aircraft.

Figure 2-77. BGR – Capital Expenditures



2.10 Environmental Overview

FAA Advisory Circular 150/5070-6B Airport Master Plans was released January 27, 2015 and outlines the environmental considerations that should be incorporated into the master planning and alternatives development process. The purpose of this overview is to provide a general summary of environmental conditions and to identify sensitive environmental resources specific to BGR that should be considered during the alternatives development process. The inventory of environmental resources also serves as the baseline condition for evaluation of the potential effects of airport development alternatives on sensitive environmental resources. Compliance with federal, state, and local regulations regarding potential impacts on the sensitive environmental resources is addressed later in this master plan.

In order to develop a comprehensive inventory of sensitive environmental resources, study areas were identified for the individual topics discussed in this section. **Table 2-20** lists the resources included in the environmental overview and their corresponding study areas. Note that only those environmental topics germane to existing conditions at BGR are included in this overview. A full review of pertinent NEPA categories is provided for any proposed projects in **Chapter 7**.

Table 2-20: Environmental Topic Study Areas

Environmental Topic	Study Area
Air quality; Coastal Zone Resources	City of Bangor, Town of Herman, Town of Hampden, City of Brewer
Floodplains; Surface and Ground Water Quality (Drinking Water); Wetlands and Water Resources	BGR Airport Development Zoning Boundary
Fish, Wildlife and Plants; Hazardous Materials; Cultural Resources	BGR Property Boundary
Land Use Compatibility; Noise; Socioeconomic and Community Resources	0.5 miles from 65 decibel (dB) contour

The following publicly available data sources were used to identify the sensitive environmental resources on and adjacent to BGR.

- 2014 Airport Master Plan
- State of Maine Department of Marine Resources
- State of Maine Department of Environmental Protection
- Maine Geological Survey
- US Fish and Wildlife Service online database
- Maine Department of Inland Fisheries and Wildlife online database
- Maine Geographic Information Portal
- US Environmental Protection Agency online database
- Federal Emergency Management Agency online database
- US Census Bureau online database

2.10.1 Air Quality

The assessment of the potential for air quality impacts followed the FAA Aviation Emissions and Air Quality Handbook Version 3 Update 1, January 2015 and the Airports Desk Reference, October 2007. The US environmental Protection Agency (EPA) and the State of Maine Department of Environmental Protection (MDEP) are responsible for managing air quality within the State of Maine. The State maintains the Federally required Air Monitoring Program (AMP) that seeks to collect ambient air data for six (6) criteria pollutants and implement reduction strategies for air pollution. The EPA has set air quality standards for six common “criteria pollutant”:

- Particulate matter (PM, PM2.5, PM10)
- Ozone (O3)
- Sulfur dioxide (SO2)
- Nitrogen dioxide (NO2)
- Carbon monoxide (CO)
- Lead (Pb)

Potential sources of emissions for these criteria pollutants at BGR include aircraft, ground transportation vehicles, ground support equipment, ground access vehicles, and emissions caused through construction/maintenance activities. Air quality in the Bangor region is monitored by the MDEP Eastern Maine Regional Office. Air quality monitoring has not detected any notable emissions of criteria pollutants based on the 2015 Five Year Assessment of Maine’s Ambient Air Monitoring Network report published by the State of Maine Department of Environmental Protection.

BGR is located in Penobscot County and is currently in attainment status for the six criteria pollutants.

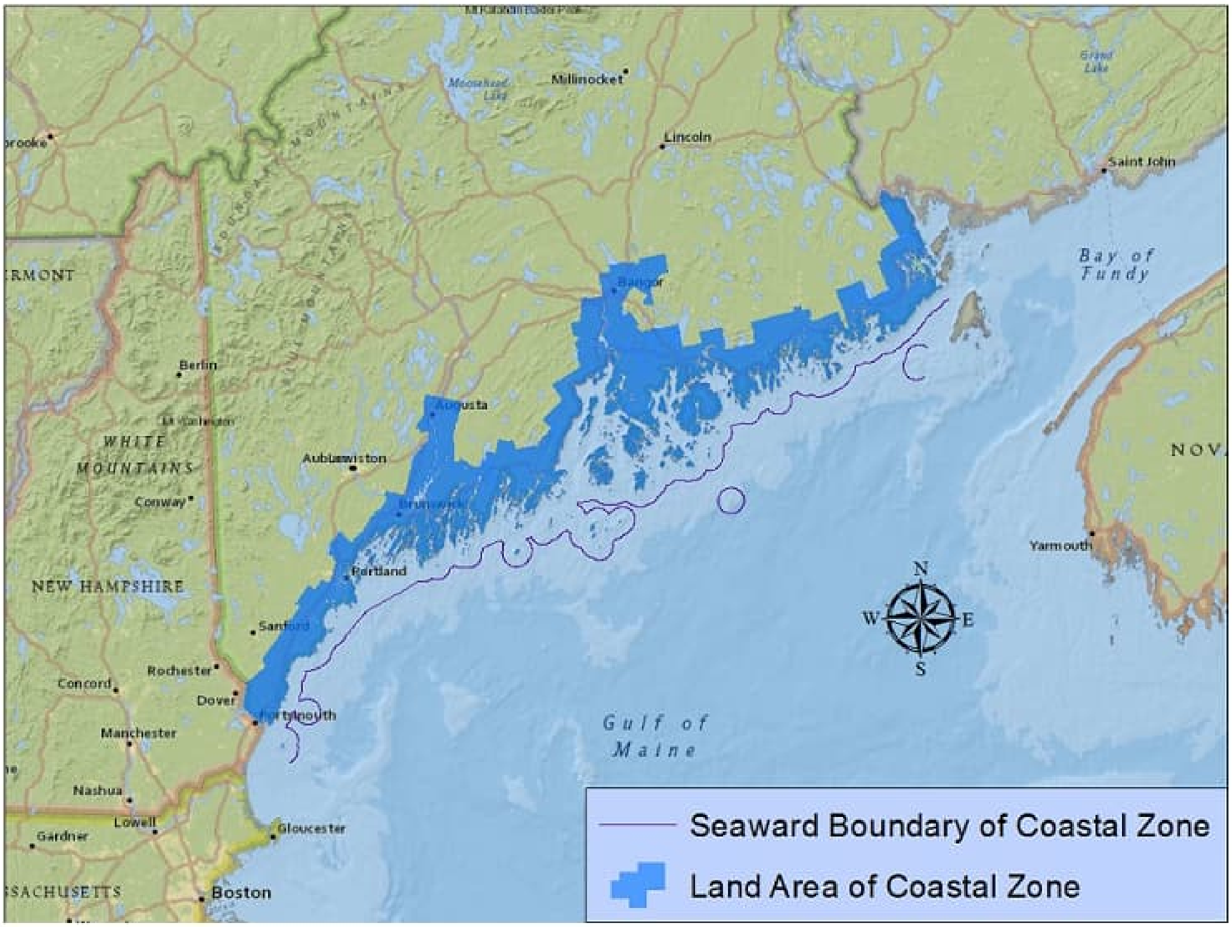
Beyond considering the effects of projects related to the six criteria pollutants, federal agencies are also required under Executive Order 14008 Tackling the Climate Crisis at Home and Abroad (January 27, 2021) to require that federal permitting decisions consider the effects of greenhouse gas emissions and climate change. While consideration of greenhouse gas emissions and climate change is required for compliance with the NEPA and the CEQ’s implementing regulations, currently no federal standards exist for greenhouse gas emissions applicable to aviation.

The need for a detailed air quality analysis will be evaluated based on the forecast of aviation activity and proposed projects within subsequent chapters.

2.10.2 Coastal Zone Resources

Coastal Zones include areas adjacent to the Great Lakes as well as the Atlantic and Pacific coastlines. Maine’s coastal zone includes the inland line of coastal towns on tidewaters and all islands. BGR is located in the City of Bangor which is considered inside the Maine Costal Zone (see **Figure 2-78**). Projects associated with this Master Plan must meet the requirements of the Maine Coastal Program, which is updated every five years.

Figure 2-78. Maine's Coastal Zone



Source: State of Maine Department of Marine Resources

2.10.3 Land Use Compatibility

Land use decisions that conflict with aviation activity and BGR facilities can result in undue constraints being placed on an airport. It is vitally important that airports operate in an environment that maximizes compatibility with off-airport development. This can be achieved through the adoption of a local land use plan, zoning codes, and coordination with stakeholders. Airport master plans provide a means to promote land use compatibility around an airport by guiding development patterns to avoid uses that may impact an airport's airspace or be otherwise generally unsuitable neighbors to an airport.

The majority of the BGR property is located in the City of Bangor, while a small portion is located in the Town of Hermon. Surrounding the portion of BGR property that is located in Bangor are the following land use zone categories:

- Rural Residence and Agricultural
- Industry and Service
- Government and Institutional
- General Commercial and Service
- Parks and Open Space
- Technology and Service

- Urban Industry
- Urban Residential
- Urban Service

The small portion of BGR property that is located in Hermon, Maine categorizes the surrounding land use zones as Agriculture – Forestry, and Industrial. The Town of Hermon does have a local zoning ordinance in place related to land use under the approach and departure paths of Runway 15. Chapter 4, ordinance 154.069 of the Hermon, ME Code of Ordinances states

"Notwithstanding any other provisions of this section, no use may be made of land or water in such a manner as to create electrical interference with navigational signals or radio communication between Bangor International Airport and aircraft, make it difficult for pilots to distinguish between airport lights and other, result in glare in the eyes of pilots using the airport, impair visibility in the vicinity of the airport, create bird strike hazards, or otherwise in any way endanger or interfere with the landing, takeoff, or maneuvering of aircraft intending to use the airport."

BGR owns avigation easements on several properties in the vicinity of the airport and the 2011 Airport Master Plan recommended that additional easements be obtained. The City of Bangor Land Use Ordinances, specifically Article XIII, Section 165-95 "Airport Development District" helps to ensure compatible uses within the vicinity of the Airport. The zone in which the Airport is located is defined as Airport Development District (ADD). The ADD is for aviation use, but is also open to certain manufacturing, retail, and service uses which would be considered compatible with the Airport complex. Additionally, similar to the Town of Hermon, Article VIII "Height Regulations", Section 165-58 "Airport Glide Zones" states that

"*No building permit shall be issued by the Code of Enforcement Officer or approved by the Planning Board for any building or structure which will violate the provisions of the federal aviation regulations in effect in the vicinity of Bangor International Airport.*"

In regard to noise, the ADD is exempt from noise level limits set forth in the Chapter 194 "Noise" of the City of Bangor Codes of Ordinances. However, the Town of Hermon does not have any explicit ordinances limiting noise levels at the airport.

2.10.4 Fish, Wildlife and Plants

In Penobscot County, BGR is located in the Acadian Plains and Hills of the Level III Ecoregion and Penobscot Lowlands of the Level IV Ecoregion of Maine. EPA Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. They are designed to serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components. The Acadian Plains and Hills Ecoregion is characterized by forested areas with glacial lakes. Vegetation here is mostly spruce fir on lowlands with maple, beech, and birch on the hills. The Penobscot Lowlands Ecoregion is lower and flatter than surrounding ecoregions and is characterized by wet flats with swamp and bog deposits. Northern hardwoods and northern hardwoods-spruce forests are major forest types (EPA 2021).

A desktop study was conducted to identify federal and state endangered or threatened species that could potentially be found at BGR. The United States Fish and Wildlife Service (USFWS) database and Maine Department of Inland Fisheries and Wildlife (MDIFW) database were searched to determine if there would be a need for further evaluation as a result of any proposed actions within the project area.

2.10.4.1 Federally listed Endangered and Threatened Species

Atlantic Salmon

The Atlantic Salmon has been listed as an endangered species by the USFWS since June 2009. Although it is listed as endangered by USFWS it is not protected by the 4(d) Rule which refers to protective regulations issued under section 4(d) of the Endangered Species Act (ESA). The Atlantic Salmon is an anadromous fish species that spends most of its adult life in the ocean and returns to freshwaters to reproduce. A search of the USFWS Environmental Conservation Online System (ECOS) indicated that the State of Maine is the only state remaining with Atlantic Salmon populations in the United States. The USFWS identifies most of the state of Maine as Atlantic Salmon critical habitat which includes all perennial rivers, streams, estuaries, and lakes connected to the marine environment except specifically excluded areas by federal regulations. The Kenduskeag Stream and Penobscot River are both located approximately 1.5 miles off airport property and have been identified by the Gulf of Maine Coastal Program (USFWS) as Atlantic Salmon habitat. Because both the Kenduskeag Stream and Penobscot River are located outside of the project area it is likely that there will be no need for further analysis.

Northern Long-eared bat

As of April 2015, the Northern Long-eared Bat (NLEB) is listed by the USFWS as a threatened species under the 4(d) Rule. This listing also applies statewide in Maine with the NLEB being protected under the Maine Endangered Species Conservation Act. During winter, the NLEB hibernates in caves and abandoned mine portals (hibernaculum) and in summer they roost in cavities, underneath bark, crevices, or hollows of live and dead trees (typically greater than 3 inches diameter at breast height). The USFWS data check indicates that the federally listed NLEB species may occur within Penobscot County which is where the Airport is located. The NLEB is also listed as a State-listed species. Potential projects will be evaluated for impacts to the NLEB.

2.10.4.2 State-listed Species

The State of Maine lists the federally threatened NLEB as an endangered Species. The NLEB has been known to exist in the few hibernaculua sites in Maine. The NLEB habitat may occur in the project area as it is listed to occur in Penobscot County by USFWS. It may be determined by USFWS that any incidental take of the NLEB habitat for proposed projects will not be prohibited if the project is conducted during the winter months when the NLEB is not active. Construction in the vicinity of NLEB habitat will need to be further coordinated with USFWS.

Upland Sandpiper

The Upland Sandpiper is classified as threatened by the State of Maine. The majority of BGR property has been identified as a habitat for the Upland Sandpiper. Further coordination with MDIFW is needed to mitigate the habitat prior to any obstruction removal or modifications to the airfield. **Figure 2-79** on the following page has been sourced from Beginning with Habitat which is a data mapping program managed by MDIFW. The map on the next page depicts the Upland Sandpiper habitat in orange.

Figure 2-79. Upland Sandpiper Habitat (Source: Beginning with Habitat – Maine Department of Inland Fisheries and Wildlife)

Beginning With Habitat

February 11, 2021

1:36,112

0 0.2 0.4 0.8 mi

0 0.35 0.7 1.4 km

- Deer Wintering Areas
- Natural Communities
- ETSC Animal Habitat Buffers
- sspawn
- srear

Earthstar Geographics, City of Bangor, Esri, HERE

This map is intended for planning purposes and should not be used for

2.10.5 Floodplains

Airport development actions must avoid impacting floodplains as per Executive Order 11988 in addition to the US Department of Transportation (USDOT) Order 5650.2 *Floodplain Management and Protection*. Floodplains are lowland areas adjacent to coastal or inland waters, and also include areas prone to flooding during 100-year flooding events as defined by the Federal Emergency Management Agency (FEMA).

Figure 2-80. Floodplain Zone A *(blue shading)*

The National Flood Insurance Program aims to reduce the impact of flooding on private and public structures by providing affordable insurance to property owners and encouraging communities to adopt and enforce floodplain management regulations to comply with the National Flood Insurance Act of 1968. The City of Bangor has formally adopted a Flood Insurance Program in concurrence with a Flood Management Ordinance which provides standards for development within Flood Zones.

Desktop research using the FEMA website has indicated that BGR and the surrounding land falls within Zone X (areas determined to be outside 500-year floodplain). Two small areas located in Bangor to the south and northwest of the Airport have been identified as Zone A, which is defined as being within the 100-year floodplain (areas that are subject to inundation by the 1-percent-annual-chance flood event) (**Figure 2-80**). Floodplain data for the neighboring Town of Hermon was not available from FEMA, but the data was sourced from Maine Office of GIS. Data provided by the State of Maine has indicated that there are large areas located in Hermon to the west of BGR that are identified as Zone A (**Figure 2-81**).

Given that no development or obstruction removal is anticipated within a designated floodplain it is not expected that any adverse impacts within the designated floodplain areas will occur.

Figure 2-81. Hermon Flood Zone A

2.10.6 Hazardous Materials

2.10.6.1 Fuel and Other Hazardous Substances

The Airport stores and distributes aviation fuel to private and commercial aircraft, gasoline and diesel fuel are also stored and distributed to BGR owned vehicles. A fuel tank farm is located outside of the airfield fence and consists of three Jet A above ground tanks and three earthen dike systems/berms that provide secondary containment. The berms each have a concrete valved sump with a hydrocarbon sensor alarm that will get manually activated to remove precipitation or snowmelt from each dike. Oil or other contaminates are removed through absorption or vacuuming prior to the water being released into the stormwater system an ultimately the Containment Pond. There is also an oil water separator at the off-loading area of the tank farm which can hold 2,000 gallons of water that is subsequently discharged through the stormwater system and into the Containment Pond. Total storage at the tank farm totals 3,260,000 gallons and the tanks are replenished by supplier fuel tankers that deliver product to the tank farm. The fuel gets transported to the airfield through a federally jurisdictional DOT Hazardous Liquid Pipeline which is 0.96 miles long. The pipeline begins at a pump house on the tank farm and carries fuel at low pressure to a fill stand located inside the airfield fence and to hydrant locations on aircraft ramps. The fuel at the hydrant locations can be accessed by FBO employees via a refueling cart which then gets connected to an aircraft needing refueling. At the fill stand, the FBO fills their fuel tank trucks which is then driven over to the appropriate aircraft for refueling. The fill stand also has three above ground tanks for storing AvGas for general aviation aircraft and gasoline and diesel fuel for Airport owned vehicles and equipment. The three tanks get replenished by supplier tanker trucks. An oil water separator is also located at the off-loading area of the fill stand which discharges through the stormwater system and ultimately the Containment Pond.

Multiple bulk fuel and lubricant storage areas are located at BGR and are used for the storage and handling of substantial quantities of hazardous substances. Associated with these are fueling and fuel transfer areas. These fueling and fuel transfer areas generally present a higher risk of hazardous substance leaks and therefore often require additional spill control measures, such as pollution control/holding ponds, and stormwater management measures. Standard applicable engineering controls and the use of best management practices (BMPs) to store and handle fuel and lubricants have been implemented by BGR.

Hazardous substances such as paints, solvents, pesticides, and cleaning products are used for the ongoing operation and maintenance activities at BGR. These substances are stored and used at various locations around the BGR property and are managed in accordance with federal, state, and local regulations. In some areas, specifically near aprons, structural water-quality controls have been constructed. These controls consist of holding ponds designed to capture runoff containing de-icing fluids or hazardous materials, typically fuel spills. BGR has a Stormwater Pollution Prevention Plan (SWPPP) to mitigate stormwater runoff which can cause significant harm to rivers, lakes, and coastal waters. BGR also has a Spill Prevention and Countermeasure Control (SPCC) Plan to help prevent spills from entering navigable waters and the environment that may be harmful. Both plans are in compliance with MDEP regulations.

No field investigations or site assessments were carried out to identify or characterize potential sources of hazardous materials, hazardous wastes, or environmental contamination. It will be documented whether any significant impacts from hazardous materials are anticipated from any of the proposed projects. Further analysis will be required if there is a need for airfield construction as identified in the Airfield Requirements chapter.

2.10.7 Cultural Resources

BGR began as Godfrey Field in 1921. Just before World War II, the airfield was taken over by the US Army Air Corps and became the Bangor Army Airfield. The airfield became Dow Air Force Base in 1947 when the US Air Force was created. Dow Air Force Base officially closed, and major portions of the airfield were sold to the City of Bangor in 1968. The western portion of Dow Air Force Base is occupied by the Maine Air National Guard. BGR opened in 1969 as commercial service airport.

Architecturally and culturally significant projects are federally recognized by inclusion as listed properties on the National Register of Historic Places and recognized at the State level by inclusion on the State Register of Historic Places. Properties listed on the National Register are evaluated and found significant within a historic context of criteria which seek to capture a place's historic integrity and connection to a community's past. Historic criteria encompass both the tangible and intangible elements of history. Physical characteristics such as a building's form, style, engineering technique, or artistic value are considered in addition to a place's information potential, association with an important person, or site of significant events deemed historically important to society.

Historic properties must also retain sufficient integrity to merit a listing, assessing a property's location, design, setting, materials, workmanship, and a community's feelings or association which is used in tandem with additional Department of the Interior criterion to determine significance. The National Register of Historic Places in addition to the Maine State Register of Historic Places were reviewed to determine the presence of historically significant properties/structures at BGR. It has been determined that no federally or state listed or potentially listed properties exist within the project area.

2.10.8 Noise

An Airport's noise levels are primarily measured through the Day-Night Sound Level (DNL) which is based on sound levels measured in relative intensity of sound, or decibels (dB), on the "A" weighted scale (dBA). This scale most closely approximates the response characteristics of the human ear to sound stimuli. The higher the number on the dBA scale, the louder a sound is perceived. To capture the true sound impact of an Airport's operations, an average all noise exposure events within a 24-hour period is represented by the DNL.

Compatibility of existing and planned land uses with aviation-related actions is typically assessed within the context of noise effects on those uses. As defined in FAA Order 5050.4B, noise-sensitive land uses typically include residential dwellings, schools, health services, churches, and parks. However, Title 14 CFR Part 150 Airport Noise Compatibility Planning specifies that it is the responsibility of local authorities to determine acceptable and permissible land uses within specific noise contours, and that while all land uses are considered compatible with noise levels less than 65 dB, "local needs or values may dictate further delineation based on local requirements or determinations."

Currently there are no impacts to noise in the project area. The fleet mix and forecast of annual operations will be reviewed in subsequent chapters to determine if critical thresholds are exceeded.

2.10.9 Socioeconomic and Community Resources

2.10.9.1 Environmental Justice

Executive Order 12898 requires federal agencies to provide meaningful opportunities for public participation by minority and low-income populations. It requires a demographic analysis to identify and address potential impacts that are disproportionately high on these populations.

To understand the population living near the Bangor International Airport, socioeconomic data was retrieved from the U.S. Census Bureau. This data is used to understand how a proposed action would affect among minority and low-income populations living near the Airport. Census data for Bangor, Maine was compared against county, state, and national levels. **Table 2-21** relates that low-income populations are higher in Bangor, Maine than in other areas of Penobscot County, the State of Maine, and the Country. Minority populations are slightly higher which is due to a larger Asian and mixed-race population in Bangor. Environmental justice was measured by percentage of non-white racial origins, percentage of individuals below the poverty level, and the percentage of individuals unemployed within the area. Additional financial considerations were evaluated to determine the extent of income and housing-cost hardships on the populations, if any. Median household values are significantly higher than the other study areas, yet median household income is lower in Bangor compared to the county, state, and country median household income. This could indicate that residential populations near the Airport are proportionately more impoverished than other areas of the County.

In the City of Bangor and Greater Penobscot County, the impacts of potential projects are not expected to be borne predominately by minority or low-income populations. These populations are not anticipated to experience any disproportionate impact by the effects of proposed projects when compared to other non-minority or higher income populations.

This category is not expected to require further evaluation within this master plan.

Table 2-21. Environmental Justice Impacts on Selected Demographic

	Bangor City*	Penobscot County	State of Maine	United States of America
Socioeconomic Characteristics				
% Minority	10.6%	6.8%	7.3%	42.1%
% Below Poverty Level	18.9%	12.4%	12.5%	10.5%
% Unemployed	4.6%	2.7%	4.9%	6.7%
Financial Characteristics				
Median Gross Rent	$ 816	$ 799	$ 853	$ 1,062
Median Household Value	$ 157,000	$ 144,700	$ 190,400	$ 217,500
Median Household Income	$ 46,625	$ 50,808	$ 57,918	$ 62,843

*Bangor city is a U.S. Census geographic area that encompasses the area of BGR.

Source: Source: U.S. Census Bureau, 2010-2019 American Community Survey 5-Year Estimates. Data derived from Selected Economic Characteristics, Rental Housing, Owner Occupied Housing, and Race

Children's Health and Safety Risks

Executive Order 13045 "Protection of Children from Environmental Health Risks and Safety Risks," requires Federal agencies to "identify and assess the environmental health risks and safety risks that may disproportionately affect children" and "ensure that policies, programs, activities, and standards address disproportion risks to children" that can result from such environmental risks.

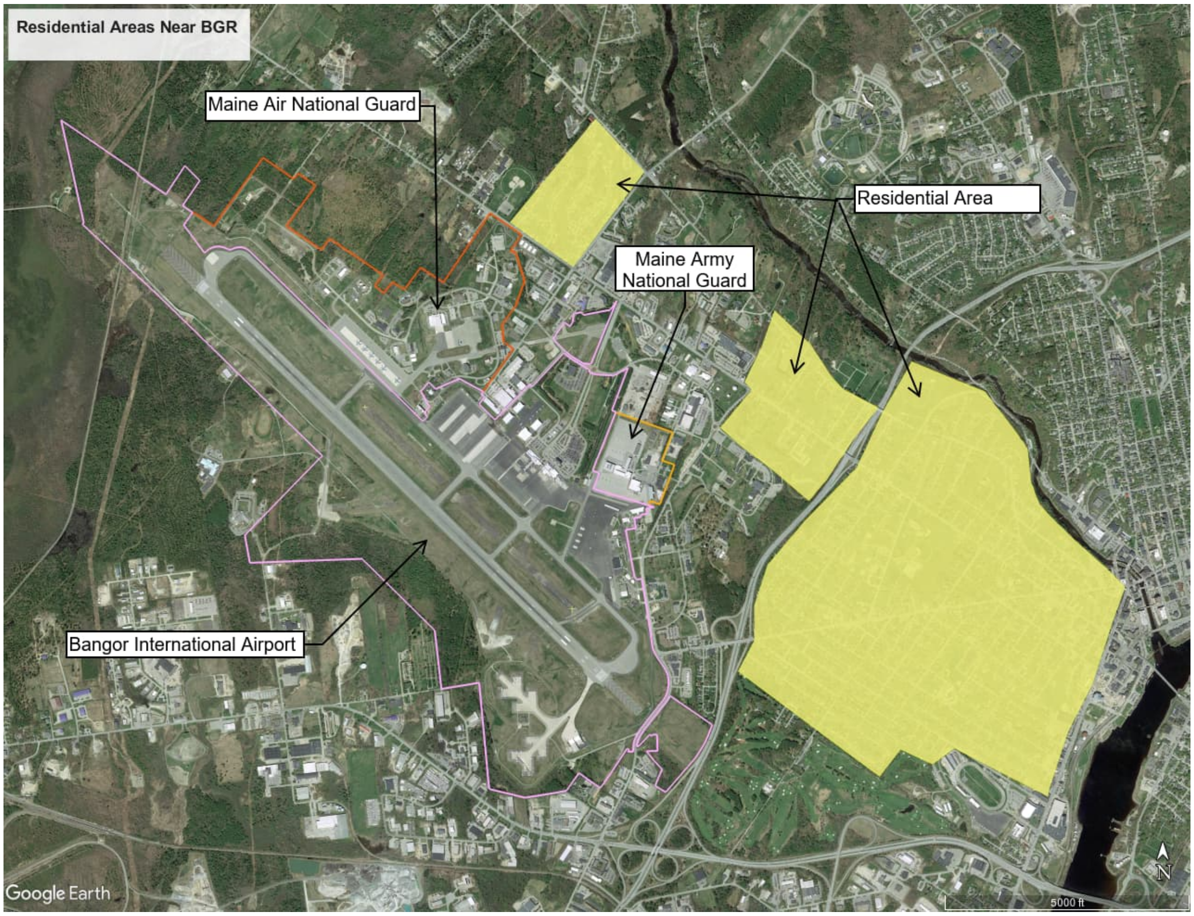
Although there are not any schools or childcare facilities on Airport Property, there are care facilities in close proximity to the Airport. **Figure 2-82** depicts the location of the childcare facilities that exist close to the southern portion of BGR. Given that any proposed projects (with the exception of tree clearing that may need to take place on privately owned property) will take place on airport owned property this category is not expected to need further analysis. If there is a need to acquire avigation easements and clear vegetative penetrations to airspace surfaces it will not result in an increase in air emissions, or an increased discharge of any criteria pollutants. Therefore, given that any proposed projected will not cause disproportionate health and safety impacts on children, additional analysis of Children's Health and Safety Risks is not expected to require further evaluation.

Figure 2-82. Childcare Facilities Near BGR

Community Resources

BGR is located in an area zoned as 'Airport Development' by the City of Bangor and there are residential neighborhoods located northeast and southeast just outside of Airport Development Zoning (**Figure 2-83**). Projects performed on Airport property should not affect these residential areas because they are located outside of the Airport Development Zone.

Figure 2-83. Residential Areas near BGR



There are several community resources that are located in close proximity to the Airport. Resources such as a university, public health offices, and other offices for community services are located off Airport property to the northeast of Runway 33 end (see **Figure 2-84**).

Figure 2-84. Community Resources Near BGR

2.10.10 Surface and Ground Water Quality (Drinking Water)

The Federal Water Pollution Control Act of 1972, commonly called the Clean Water Act (CWA) requires submittal of a report describing the quality surface waters and the undertaking of an analysis to determine the extent at which such waters provide for the protection of a balanced population of shellfish, fish, wildlife, and allow for recreational activities on the waters. In addition to this report, a 303(d) List, so called as it is a requirement of Section 303(d) of the CWA is required. This list includes surface waters that are:

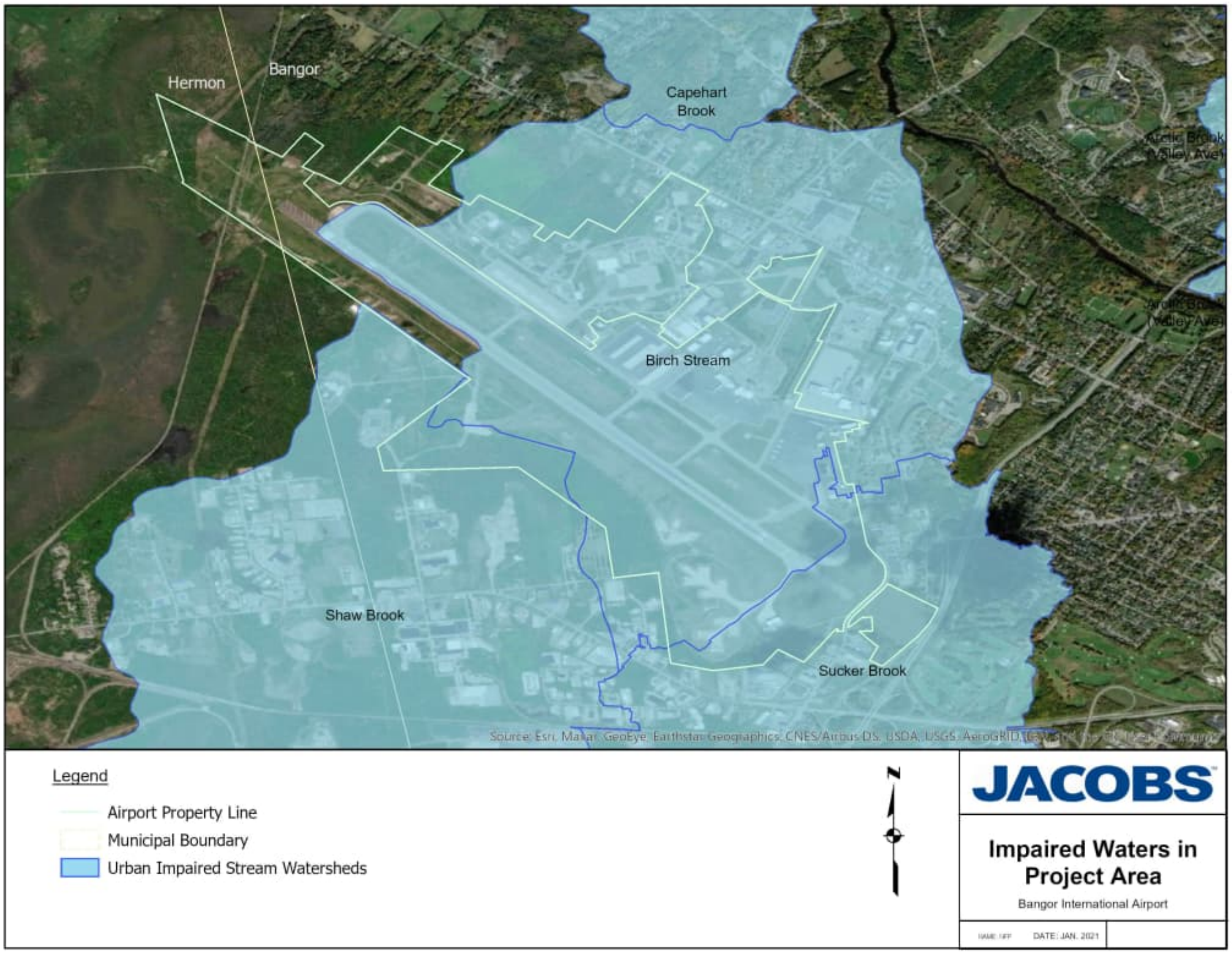
- Impaired or threatened by a pollutant or pollutants;
- Not expected to meet water quality standards within a reasonable time even after application of best available technology standards for point sources or best management practices for nonpoint sources; and
- Require development and implementation of a comprehensive water quality study (called a Total Maximum Daily Load or TMDL study) that is designed to meet water quality standards.

The 2016 Integrated Water Quality Report prepared by MDEP was used to identify impaired waters located in the project area. This report includes both the 305(b) list of impaired waters which is generated by the Environmental Protection Agency (EPA) and the 303(d) list which is produced by the state to meet Clean Water Act requirements.

*The Integrated Water Quality Report does indicate that impaired waters are located on BGR (**Figure 2-85**).*

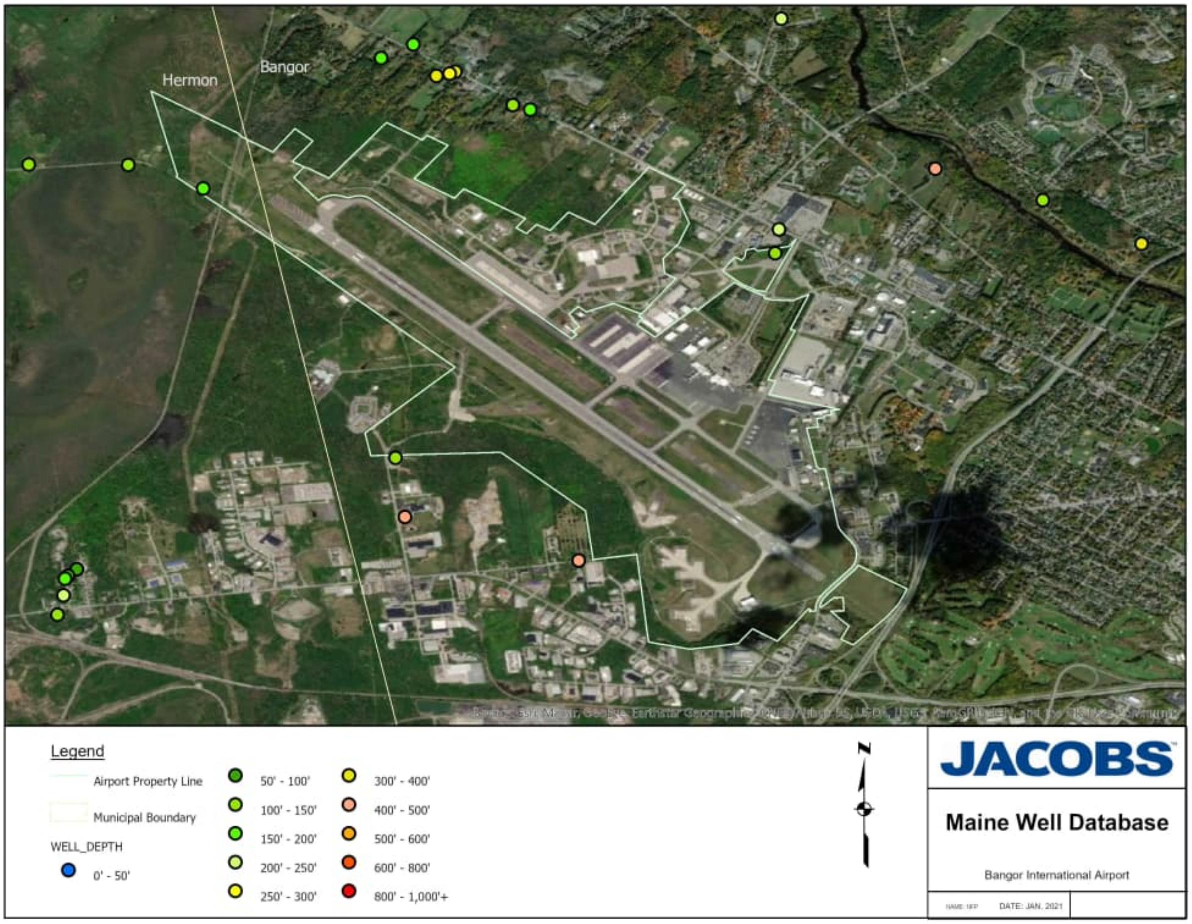
The following watersheds were identified as impaired: Birch Stream, Sucker Brook, and Shaw Brook.

Figure 2-85. Impaired Waters in Project Area



Maine Geological Survey maintains a Significant Sand and Gravel Aquifer Map using digital data depicting geologic and well information, seismic-line information, and significant sand and gravel aquifers. According to the map, which was updated in February 2019, no sand and gravel aquifers are located on or around BGR. The Maine Well Database does indicate that there are domestic wells of various depths located on the outskirts of Airport Property. **Figure 2-86** depicts the locations of wells in proximity of BGR.

Figure 2-86. Maine Wells Database



Impacts to surface and ground water from existing and potential future activity will be evaluated in subsequent chapters of this master plan.

2.10.11 Wetlands and Water Resources

According to the Clean Water Act, waters of the US (WOUS) include rivers, streams, tributaries, interstate waters, and wetlands. Such areas are regulated and subject to permitting under the Clean Water Act by the EPA and the US Army Corps of Engineers (USACE). Wetlands include areas where water either covers the soil or is present at or near the surface of the soil at a frequency and duration to support plants that would grow in saturated soil conditions. Hydrology largely determines how the soil develops and the types of plant and animal communities living in and on the soil, which can support both aquatic and terrestrial species. The prolonged presence of water creates conditions that favor the growth of specially adapted plants, or hydrophytes, and promotes the development of characteristic hydric wetland soils. MDEP provides four (4) categories of wetlands which include coastal wetlands, forested wetlands, floodplain wetlands, and freshwater wetlands.

Wetlands are protected on the state level under the Natural Resources Protection Act (NRPA) of 1988 to prevent any unreasonable impact, degradation, and/or destruction of natural resources and encourages their protection or enhancement. The NRPA applies to coastal wetlands and sand dunes, freshwater wetlands, great ponds, rivers, streams and brooks, fragile mountain areas, and significant wildlife habitat. The permitting process under the NRPA establishes state regulatory authority over wetlands. A permit is required when an “activity” will occur in, on, or over any protected natural resource or is adjacent to (A) a coastal wetland, great pond, river, stream or brook, or significant wildlife habitat contained within a freshwater wetland, or (B) certain freshwater wetlands.

Planning level wetland identification efforts included a review of aerial photography, National Wetlands Inventory (NWI) maps, Natural Resource Conservation Service (NRCS) Soils maps (through Web Soil Service), and other publicly available resources.

The presence or absence of wetlands, streams, and potential vernal pools was determined through desktop research using the NWI maps and data. Freshwater forested/shrub wetlands are located at the end of Runway 15 in an area known as the Hermon Bog. Although the wetlands are mostly located off airport property, the following wetland types exist within the airport property (**Figure 2-87**):

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

Desktop review utilizing the Beginning with Habitat Data Mapping Program, which is maintained by Maine Department of Inland Fisheries and Wildlife, was performed to determine the presence / absence of major surface water features and drainage area, associated shoreline habitats and riparian zones, as well aquifers and wells that supply public drinking water. A 75-foot riparian buffer also exists off the Runway 15 end indicative of the presence of Osgood Brook and the Herman bog in that area. **Figure 2-88** includes the riparian mapping from Beginning with Habitat Mapping Program which depicts the type of wetland on and around BGR.

Impacts from potential future activity will be evaluated in subsequent chapters of this master plan.

Figure 2-87. Wetlands

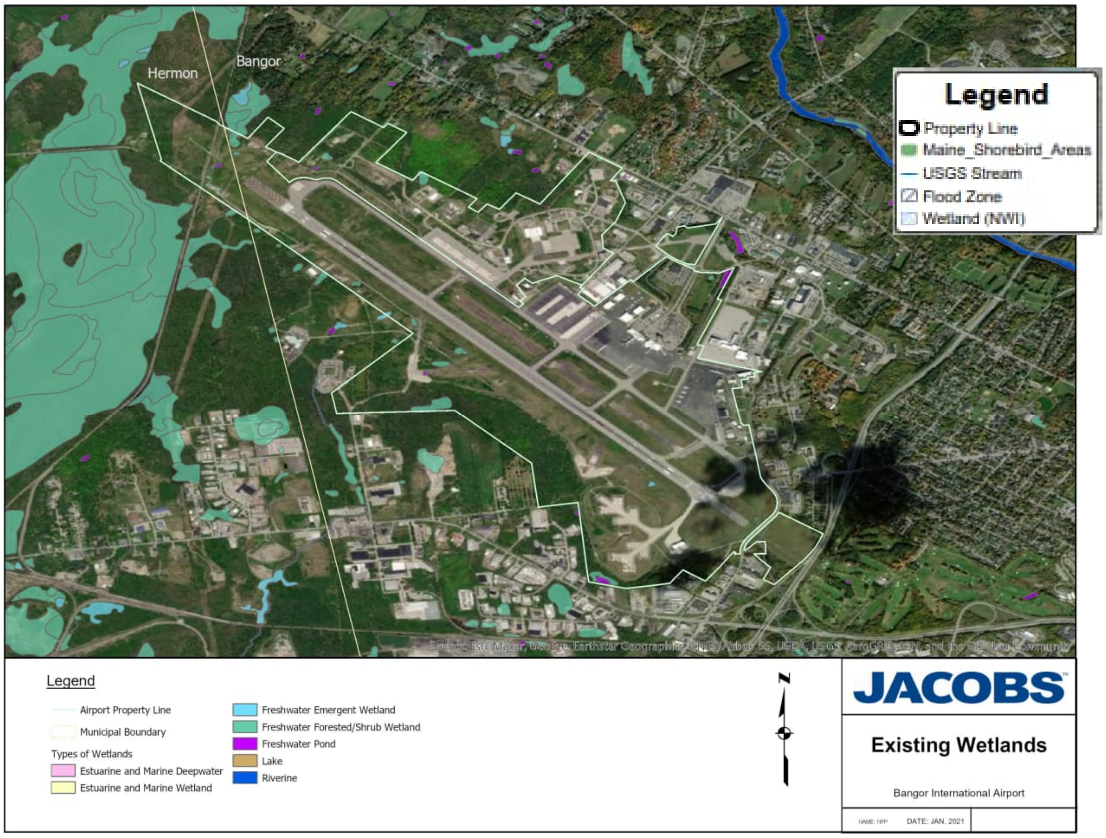


Figure 2-88. Beginning with Habitat Riparian Mapping

3. Forecasts of Aviation Demand

3. Forecasts of Aviation Demand

Existing and future aviation activity has a direct impact on a number of important elements on and adjacent to BGR:

- Airport facilities
- Airport services
- Airport revenue and expenses
- Airport role and appropriate design standards
- Environmental impacts
- Ground transportation

There have been a number of forecasts of aviation activity prepared previously for BGR, which are reviewed and summarized below. In addition, the FAA prepares forecasts of aviation activity on a national level based on broad economic, demographic, and industry trends, which are also reviewed and summarized below. Because of the additional uncertainty in how governments and industries will need to adapt to the ongoing pandemic, specifically regarding business and leisure air travel, it is nearly impossible to provide an aviation forecast with any level of accuracy, even in the next several years. It is still unknown how airport infrastructure may need to be adapted to provide health screening and monitoring or what policies should be put in place to ensure the traveling public a comfortable level of safety. Therefore, for aviation planning purposes this master plan has provided a range of possible aviation activity scenarios based on several potential trends. It is generally anticipated that at some point aviation activity will return to pre-pandemic levels and that the airport can take advantage of the lull in activity to respond with several infrastructure improvements to meet the growing demand that was experienced prior to the sharp decline in passenger activity in March 2020 due to the pandemic.

The aviation forecasts are discussed below.

3.1 Forecast Periods

The aviation forecasts for this Master Plan extend to 2040, and are divided into three periods that coincide with the FAA Terminal Area Forecast, discussed below:

Short Term: 2021-2025
Medium Term: 2026-2030
Long Term: 2031-2040

One characteristic of all forecasts is that their accuracy, and hence their statistical level of confidence, are directly correlated with time. As forecasts look further into the future their level of accuracy decreases. The correlation with time is due to a number of factors, including the increasing chance (or likelihood) that unforeseen events will occur. That is particularly relevant to aviation forecasting where a number of external factors, such as fluctuations in fuel prices and/or availability of certain types of fuel, changes in the airline industry, airport and airspace security regulations, the performance of the economy, or the recent pandemic, each have an impact on demand for aviation services.

Those factors are increasingly difficult to predict with accuracy as forecasts proceed into the future. As a result, the short and intermediate term forecasts have a relatively higher level of confidence than long-term forecasts, which are considered an outlook and subject to change. All forecasts should be reviewed and compared against actual activity and updated regularly based on current events.

3.2 Commercial Airline Operations

Air Carrier aircraft are defined by FAA as aircraft with greater than 60 passenger seats, and air taxi aircraft as those with less than 60 passenger seats.

Regional carriers including PSA (American Eagle), Piedmont (American Eagle), Endeavor (Delta Connection), and Commutair (United Express), serve as subsidiaries of American, Delta, and United, serving BGR in lieu of mainline flights. This has allowed major carriers to maintain hub-connecting service in markets like BGR with regional aircraft such as the CRJ-200/700/900, ERJ-145/170, which are smaller than the B-737-700/-800 and A-319/320.

3.2.1 Commercial Aircraft Fleet Mix

The commercial aircraft fleet mix in 2019 at BGR was predominantly comprised of regional jets as noted above and shown in **Table 3-1** below.

Based on the changes that American (AA), Delta (DL), and United (UA) have announced since the start of the pandemic in March 2020, the fleet mix at BGR will likely shift to almost exclusively regional jets such as the ERJ-170/175 in the near-term. Older regional jets such as the CRJ-200 and ERJ-135/145 are being retired, and all three carriers (AA, DL, UA) have announced they will decrease their overall fleet size. Allegiant does not operate regional jets, so their service will continue with A-319/320 aircraft.

Further changes to the fleet mix could occur as major carriers re-evaluate relationships with regional carriers that operate as subsidiaries to them such as Endeavor / Delta, United / Commutair, and American / PSA. BGR could see a blend of regional jet and narrow-body aircraft as airlines seek to reduce costs and operate more fuel efficient narrow-body aircraft such as the Boeing 737MAX and Airbus A220. These aircraft would initially be operated with a reduced passenger load factor until passenger demand increases.

Table 3-1. BGR Airlines, Destinations & Equipment

Airline	Nonstop Destination	Aircraft Type
American	Philadelphia (PHL)	ERJ-145 / CRJ-700 / ERJ-175
American	Washington DC (DCA)	CRJ-200 / CRJ-700
American	Charlotte (CLT)	ERJ-145 / CRJ-900 / ERJ-175
American	Chicago (ORD)	CRJ-700 / ERJ-175
Allegiant	St. Petersburgh, FL (PIE)	A320
Allegiant	Orlando Sanford (SFB)	A319 / A320
Allegiant	Fort Lauderdale	A320
Delta	NY (LGA/JFK)	CRJ-200 / CRJ-900
Delta	Detroit (DTW)	CRJ-900
United	Newark (EWR)	ERJ-145 / ERJ-145XR/ ERJ-135
United	Chicago (ORD)	E170 / B737-700 / ERJ-175 / A319

Source: Bangor International Airport, 2019 Data

3.2.2 Commercial Airline Activity

The total number of operations by each type of carrier had fluctuated at BGR between 2009-2019 (**Figure 3-1** and **Table 3-2**).

Figure 3-1. Commercial Aircraft Operations

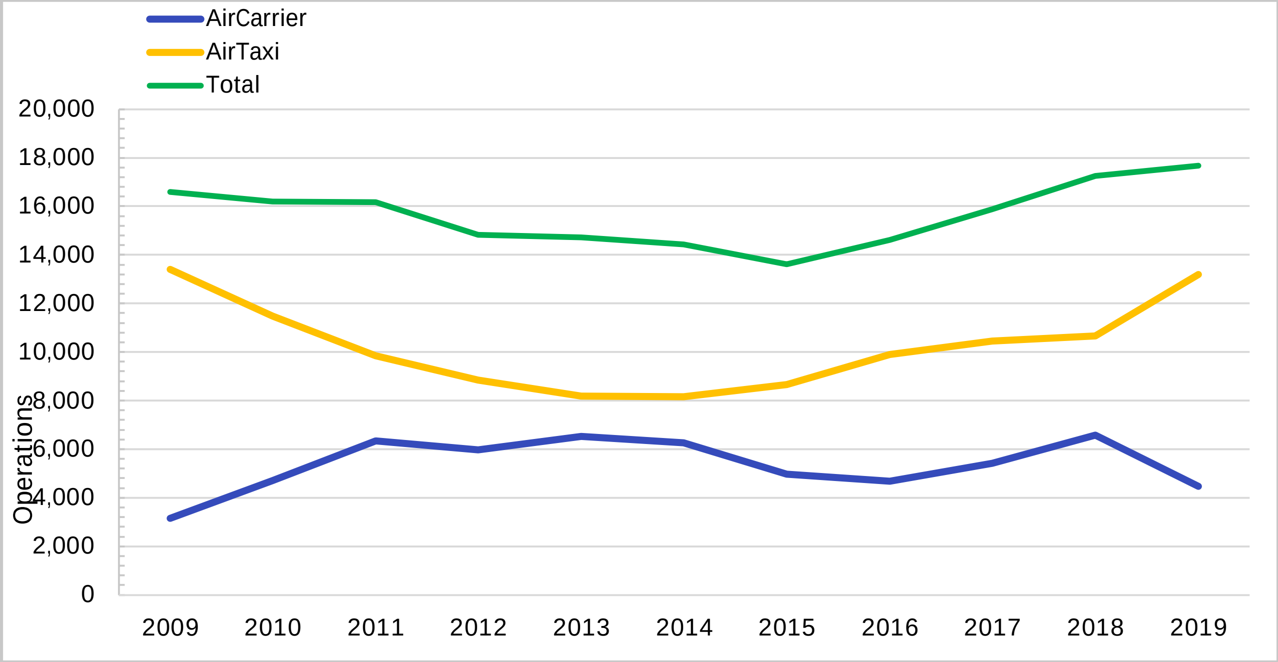


Table 3-2. Air Carrier Aircraft Operations

CY	Air Carrier	Air Taxi	AC+AT
2009	3,164	13,416	16,580
2010	4,704	11,479	16,183
2011	6,342	9,835	16,177
2012	5,975	8,851	14,826
2013	6,522	8,185	14,707
2014	6,253	8,175	14,428
2015	4,971	8,647	13,618
2016	4,692	9,911	14,603
2017	5,416	10,458	15,874
2018	6,587	10,654	17,241
2019	4,478	13,200	17,678
2009-2019	41.5%	-1.6%	6.6%

Source: FAA Operations Network (OPSNET)

From January through June, air carrier and air taxi operations were 30.3% lower in 2020 compared to 2019 (**Table 3-3**). The decline in activity remained relatively steady in April, May, and June 2020.

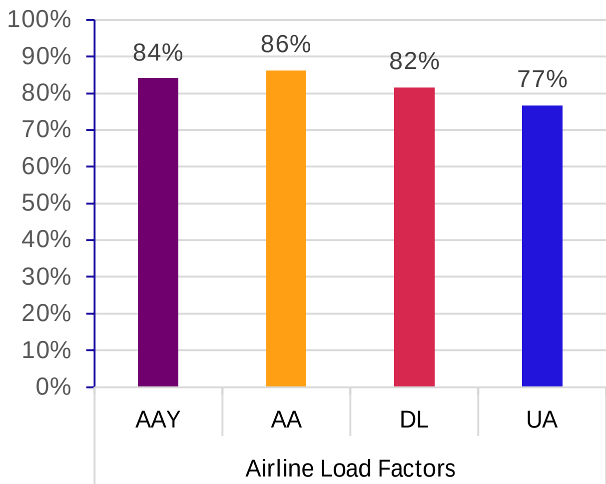
Table 3-3. Air Carrier + Air Taxi Operations

	2019	2020	% Change
Jan	1,040	1,158	11.3%
Feb	1,050	1,152	9.7%
Mar	1,268	1,090	-14.0%
Apr	1,267	609	-51.9%
May	1,391	648	-53.4%
Jun	1,742	753	-56.8%
Year-to-date	7,758	5,410	-30.3%

Source: FAA OPSNET

The airlines serving BGR had been averaging greater than 80% load factor, which is typically higher than break-even load factors (**Figure 3-2**). It is easier to maintain such load factors using regional jets such as the ERJ-170/175, CRJ-700/900, etc., compared to larger B-737-700 and A-319/320 aircraft.

Figure 3-2. Airline Load Factors at BGR 2019

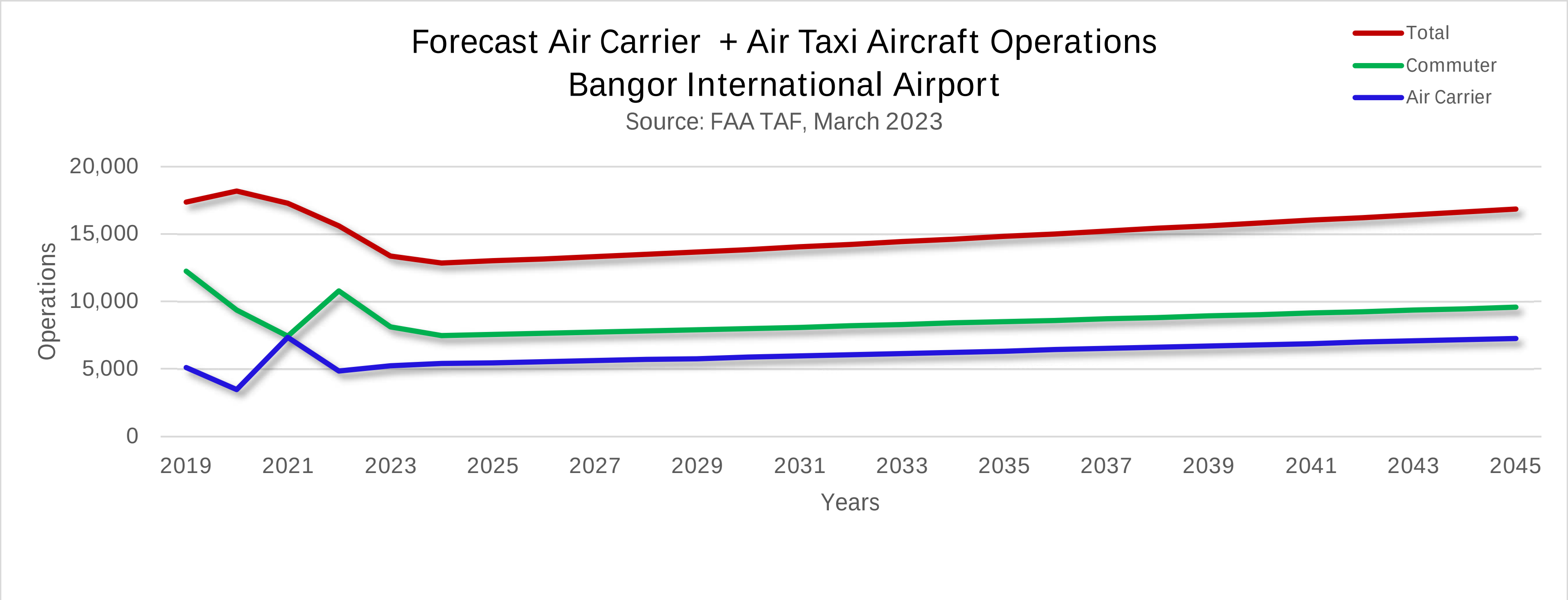


Source: Bangor Airport
Note: AAY – Allegiant; AA-American; DL-Delta; UA-United

3.2.3 Forecast of Commercial Airline Operations

Applying growth rates from the FAA's Terminal Area Forecast assumes that the economy will rebound in 2022 or 2023, airlines will rebound as well, and service to BGR will pick up at the level it was in 2019. **Figure 3-3** on the following page depicts a steady rise in commercial aircraft operations over the planning period when the FAA Terminal Area Forecast (TAF) growth rate is applied to airline operations at BGR. If realized, commercial operations would increase from 13,400 in 2025 to 16,900 by 2045. This represents a compound average annual growth rate of 1.17% over a 20-year period.

Figure 3-3. Commercial Aircraft Operations Forecast (2021-2045)



3.3 Passenger Demand

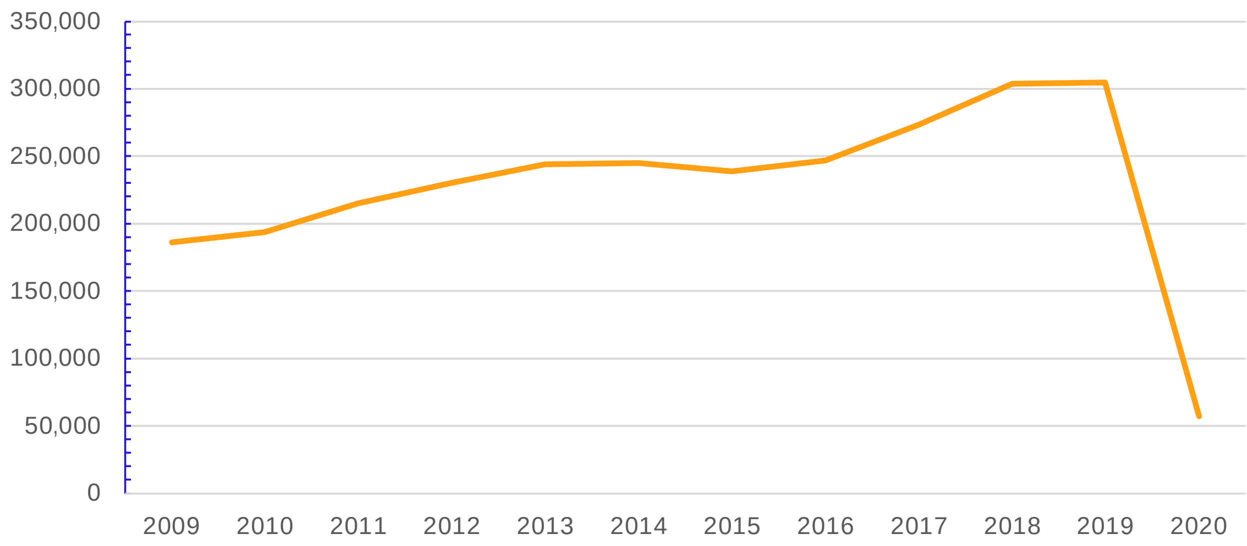
Scheduled passenger traffic at BGR declined sharply starting in March 2020, as it did at every airport in the U.S., due to the COVID-19 pandemic. A number of airlines have declared bankruptcy and almost all have announced significant numbers of voluntary layoffs and separations, as well as upcoming furloughs and layoffs. All of the major carriers have announced that they will emerge from the pandemic as smaller companies with fewer employees and airplanes.

For example, Delta Air Lines announced in late May 2020 that it was suspending service to BGR beginning in early July. Initially the carrier said the suspension was though September 30, 2020, but subsequently Delta announced that the suspension was indefinite. BGR is one of 11 markets to which Delta has discontinued service. In 2019, Delta captured 19% market share at BGR, or approximately 57,931 passengers. Delta served BGR with flights to LGA (LaGuardia Airport) and DTW (Detroit).

As a result of these and other service contractions at BGR, there were 78.2% fewer enplanements and deplanements in June 2020 than there were in June 2019 (**Figure 3-4**).

Prior to mid-2020 passenger enplanements at BGR were rising and BGR was experiencing a surge in growth from 2017 to early 2020. However, year-to-date (YTD) through the end of June 2020, passenger traffic at BGR is down by 54.3% compared to YTD in 2019.

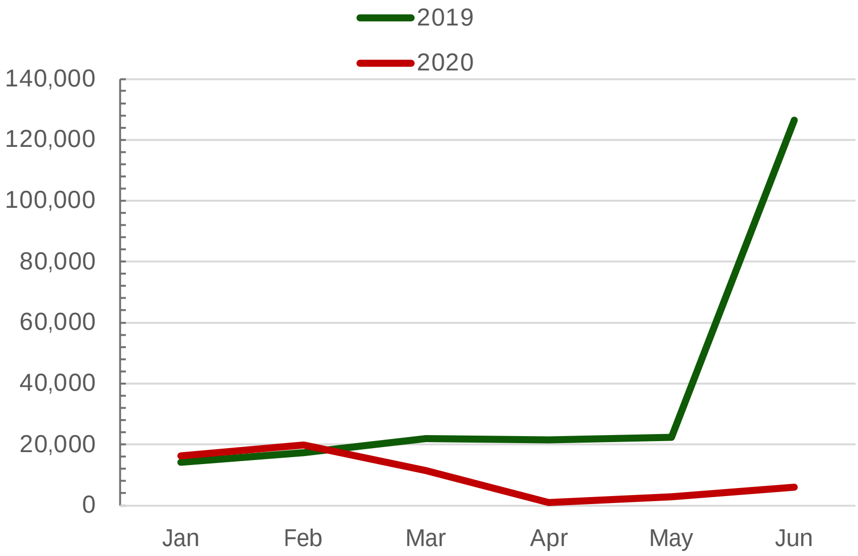
Figure 3-4. Passenger Enplanements



Source – Bangor International Airport.
Note: 2020 enplanement data January-June.

Comparing 2019 and 2020 passenger activity at BGR by month, from January through June (**Figure 3-5**), shows that passenger activity declined suddenly in March 2020 and continued through June. This is the result of the nationwide shutdown due to the COVID-19 pandemic.

Figure 3-5. Passenger Activity January-June 2019-2020



June 2020 passenger enplanements were 95.3% lower than June 2019 (**Table 3-4**).

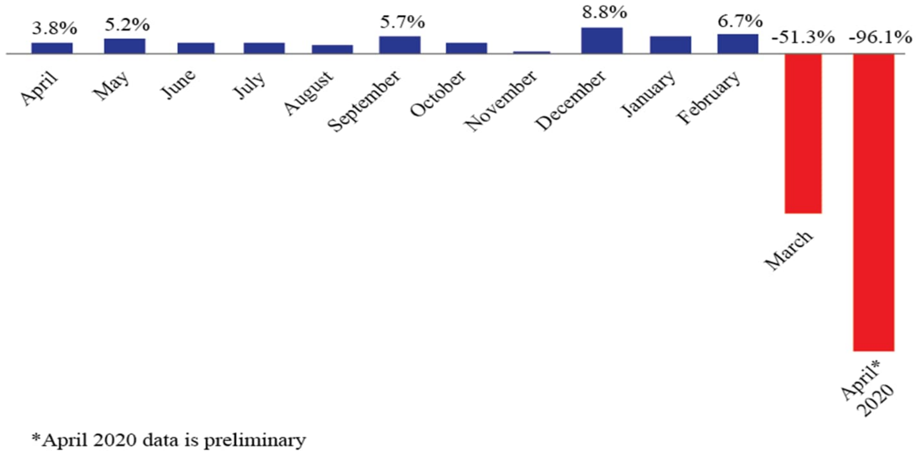
Table 3-4. Passenger Enplanements

	2019	2020	% Change
Jan	14,276	16,277	14.0%
Feb	17,240	19,913	15.5%
Mar	21,994	11,390	-48.2%
Apr	21,566	923	-95.7%
May	22,278	2,793	-87.5%
Jun	126,588	5,905	-95.3%

Source: Bangor International Airport

In April 2020, total U.S. airline passengers declined by 96% compared to April 2019 (**Figure 3-6**).

Figure 3-6. US Airlines—Percent Change from Previous Year



Source – U.S. DOT, Bureau of Transportation Statistics (BTS)

The primary reasons for the decline in air travel at BGR, around the US, and across the world, are the business lockdowns and social restrictions imposed in response to the COVID-19 pandemic. But the larger problem is that the pandemic is having enormous impacts on the broader economy in Bangor, across Maine, the US, and globally. The pandemic's impact on the economy is having a direct impact on air travel demand.

To summarize the economic impacts of the COVID-19 pandemic:

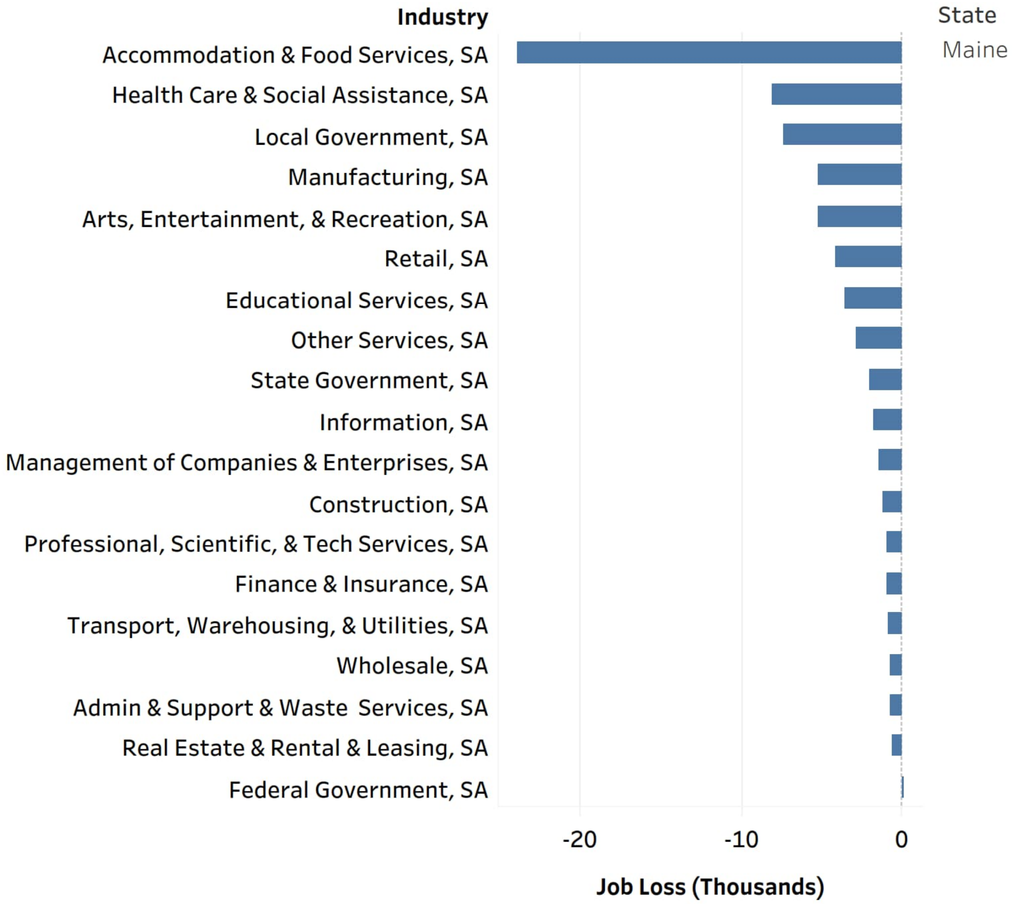
- The national GDP in 2nd Quarter dropped by 32.9%, the largest decline since records have been kept.
- The unemployment rate in the US was 11.1% as of July 2020. It reached 14.7% in April 2020.
- Approximately 41 million people were unemployed as of July 2020.
- Hospitality and leisure industries, including airlines, have been hit the hardest. Airline traffic declined by 96% from April 2019 to April 2020. Delta, American, United, and Southwest each announced they will emerge from the crisis as smaller airlines. In Spring and Summer 2020, Delta, American, and United each announced large reductions in staff and airplanes.
- The State of Maine, like every other state, has been greatly impacted by the virus. In May the statewide unemployment rate was 9.4%, which declined to 6.6% in June. In 2019 it was 3.0% (**Figure 3-7, Figure** 3-8**, and Figure** 3-9).
- A vaccine is seen as the best option for the economy to rebound. The Centers for Disease Control and Prevention estimates that a vaccine may be available sometime in early 2021.

Figure 3-7. Total Jobs: December 2007–June 2020, State of Maine

Source: University of New Hampshire, Carsey School of Public Policy, COVID-19 Crisis: by State

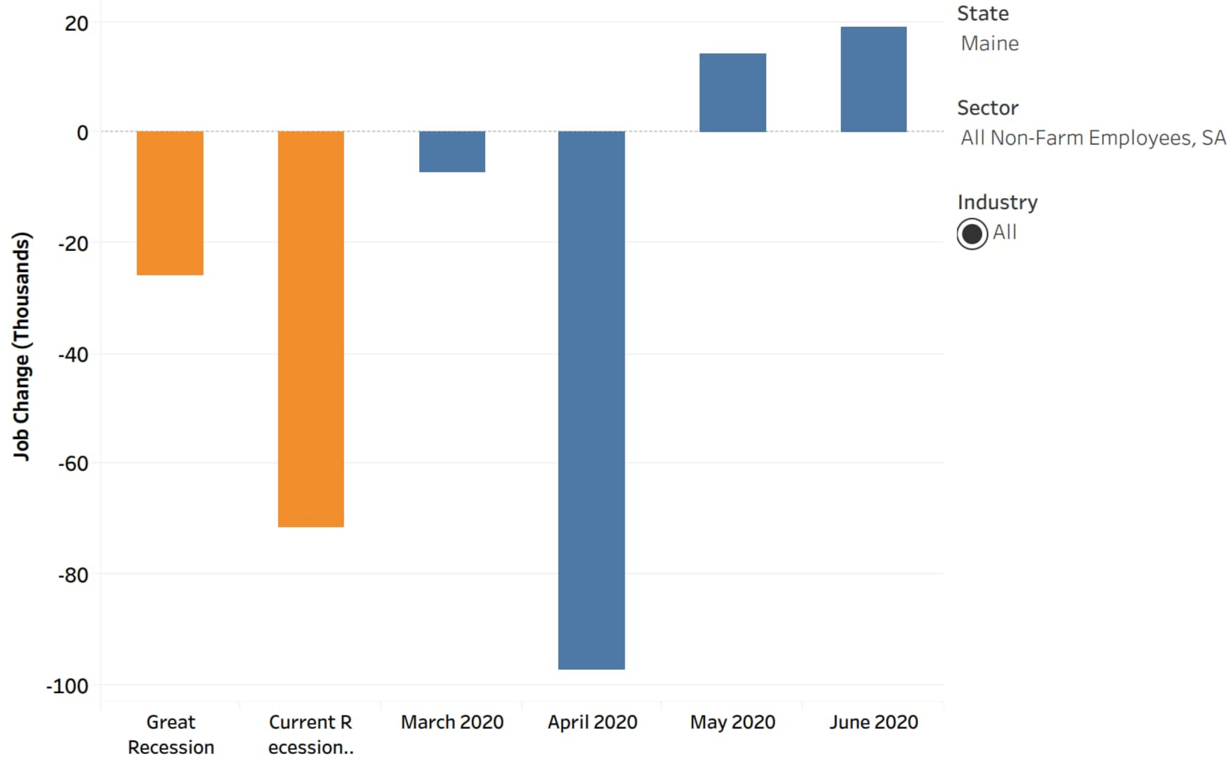
There is a great deal of uncertainty about the timing and extent of the economic recovery, which should lead to a recovery in the airline market. However, the way business is conducted has adapted and changed to suit the recent period of COVID restrictions. Business workers have been able to successfully work remotely, and in person meetings are now being held virtually. It is anticipated that the demand for business travel may not rebound as quickly as it might for discretionary travel.

Figure 3-8. Total Jobs: December 2007–June 2020, State of Maine



Source: University of New Hampshire, Carsey School of Public Policy, COVID-19 Crisis: by State

Figure 3-9. Comparative Job Losses during COVID-19 (through June) and Prior Recessions, State of Maine



Source: University of New Hampshire, Carsey School of Public Policy, COVID-19 Crisis: by State

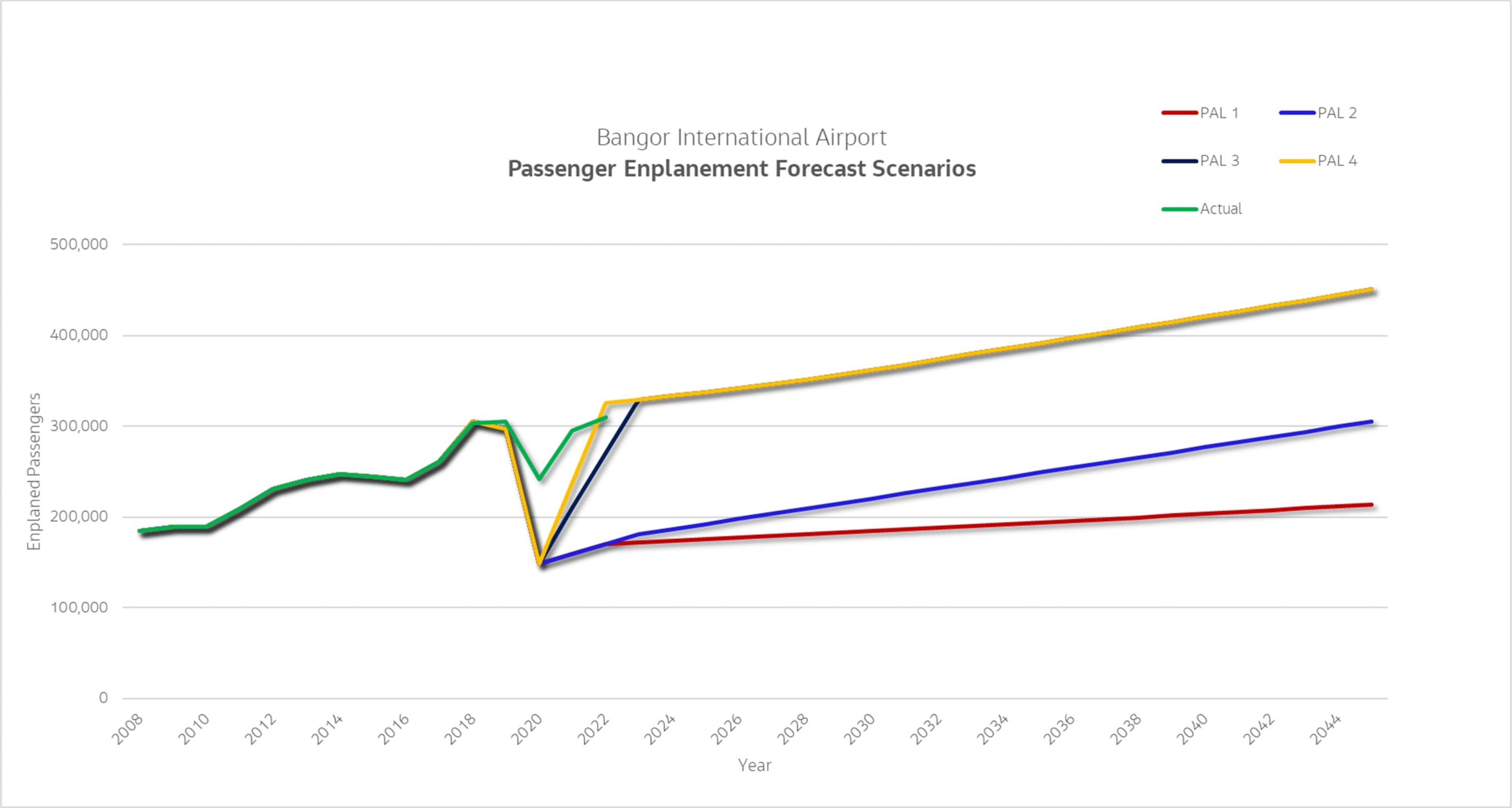
3.3.1 Passenger Enplanement Forecasts

Given the uncertainties about the future recovery from the virus, and the condition of the airlines when that recovery begins, four forecast scenarios for passenger service to BGR were developed. The FAA had issued their TAF for BGR in January 2020, prior to the pandemic, so their TAF reflects unconstrained growth.

Two of the forecast scenarios developed for this master plan show traffic at BGR recovering within 2 or 3 years to the level that the TAF had projected and follow the same growth curve through 2045. These scenarios assume a robust recovery from the pandemic, the economy recovering by 2021 or 2022, that there will be minimal damage in terms of business failures or permanent unemployment, and that travel demand and the airlines will rebound quickly. The other two forecast scenarios assume that the economic and airline recovery would be slower, and that traffic at BGR would not match the TAF growth rate (**Figure 3-10**).

It is difficult to assess which passenger enplanement scenario is most valid at this time (early winter 2020).

Figure 3-10. Passenger Enplanements Forecast Scenario



Notes: *2008-2022 Actual Pass. Enplanement Data.*

PAL 1 : Applied 1% per year growth rate between 2022-2045

PAL 2 : Slow Rebound to 2019 enplanements by 2045

PAL 3 : Rebound to TAF by 2023

PAL 4 : Fast rebound to TAF by 2022

Table 3-5. Passenger Enplanement Forecast Scenarios

Year	PAL			
	4 (high)	3 (Recommended)	2 (base)	1 (low)
2021	237,326	209,693	159,385	159,385
2025	337,670	337,670	192,221	175,328
2030	362,150	362,150	220,376	184,271
2040	420,517	420,517	276,686	203,550

The preferred forecast for passenger enplanements assumes BGR is able to return to pre-2019 passenger levels. Prior to the pandemic, passenger enplanements for year ending 2019 were 304,900 with 42% of enplanements on American Airlines aircraft. Assuming the passenger levels return to that level and continue to grow at the forecast growth rate provided under Planning Activity Level (PAL) 3 above, the airport could realize passenger enplanements shown below in **Table 3-6** over the planning period.

Table 3-6. Preferred Passenger Enplanement Forecast – PAL 3

	Base Year (2020)	Short-term (2025)	Medium-term (2030)	Long-term (2040)
Annual enplanements	209,693	337,670	362,150	420,517
Peak month - July	38,300	39,800	43,000	54,350
Average day/peak month	1,276	1,326	1,433	1,811

Notes: Assumes compound annual growth rate of 1.57% annually; Avg. day/peak month is the peak month/30.

3.3.2 Peak Periods

The 2019 airline schedule for the peak month of July at BGR was analyzed to determine the peak hour passenger demand. All four domestic gates are occupied during the hour of 1150 to 1250. During this time American Airlines and United Airlines each had two arrivals and departures. American Airlines occupied Gates 3 & 4, Delta occupied Gate 5 and United Gate 6. United Airlines had two arrivals and one departure (**Table 3-7**).

Table 3-7. Baseline Peak Activity

Gate	Aircraft	Seats available	% load factor	Peak Passengers
3	CRJ700 (AA)	70	86%	60
4	CRJ900 (AA)	90	86%	77
5	ERJ145 (DL)	50	82%	41
6	ERJ145XR (UA)	50	77%	39
6	ERJ145XR (UA)	50	77%	39
			Peak 60-minute Pax Demand	256
			15% surge	38
			Total Peak Hour Demand	294

Five scenarios have been developed to provide a range of peak hour activity for the purpose of terminal planning. The peaking characteristics are directly related to the spatial requirements of the terminal facilities over the planning period. The forecasts presented below assume that the major air carriers phase out the smaller regional jets for larger regional jet aircraft such as the CRJ900 and ERJ170 in the near-term. A blend of regional jet and narrow-body aircraft are anticipated thereafter until the entire fleet is replaced by the larger and more fuel efficient narrow-body aircraft like the Boeing 737MAX or the Airbus A220/A320.

Table 3-8 provides a range of peak hour demand forecasts that allow for flexible planning over the forecast period. The recommended forecast is one where passenger levels remain consistent with the reduced passenger demand beginning in March 2020 due to the pandemic and continuing through 2021. It is anticipated that with the introduction of a vaccine in 2021, that traffic levels will gradually increase as the general population become inoculated and the leisure market begins to rebound with the economy. This is expected to continue over the next several years to approximately 2025 at which point traffic may reach the demand experienced in 2019. From 2025 through the remainder of the 20-year planning period, the forecast follows a growth trend that is anticipated in the FAA's TAF. The existing terminal has adequate holdroom capacity to accommodate the increase in forecast demand, however automated screening technology will be needed to supplement current practices.

Table 3-8. Peak Hour Passenger Demand

Year	4 (high)	3 (med)	PAL Recommended	2 (base)	1 (low)
2021	607	294	150 (current 2020)	150	150
2025	646	574	244 (2019 summer)	244	159
2030	698	659	659	294	171
2040	881	832	770	371	216
	Fast recovery in 2021, strong growth	Fast recovery in 2021. Back to 2019 levels by 2023.	Hybrid. Use of new technology by 2045 for screening checkpoints.	Slow recovery by end of 2021. Back to 2019 levels by 2025	Cont. slow growth

3.4 Military Aircraft Operations

Military aircraft operations at BGR have been less affected by the COVID pandemic in 2020 than other segments of activity at BGR (**Table 3-9**). Between January and June, military aircraft operations are down by 11.5% in 2020 compared to the same period in 2019.

The Maine Air National Guard 101st Air Refueling Wing, which operates KC-135 aircraft, and the Maine Army Guard 3rd Battalion 142nd Aviation Regiment, which operates UH-60 Blackhawk helicopters, are both based at BGR. Military missions have continued across the US. BGR also accommodates transient military aircraft operations.

Table 3-9. Military Aircraft Operations

	2019	2020	% Change
Jan	896	1,013	13.1%
Feb	689	778	12.9%
Mar	868	777	-10.5%
Apr	995	599	-39.8%
May	1,252	923	-26.3%
Jun	1,008	964	-4.4%
YTD Total	5,708	5,054	-11.5%

Source: FAA OPSNET

The most recent FAA TAF issued in January 2020 projected that military activity at BGR will remain steady at 10,464 operations per year through 2045.

Fluctuations in activity at BGR through 2040 will likely occur due to ongoing military needs, including training, readiness, transients, and deployments of based units.

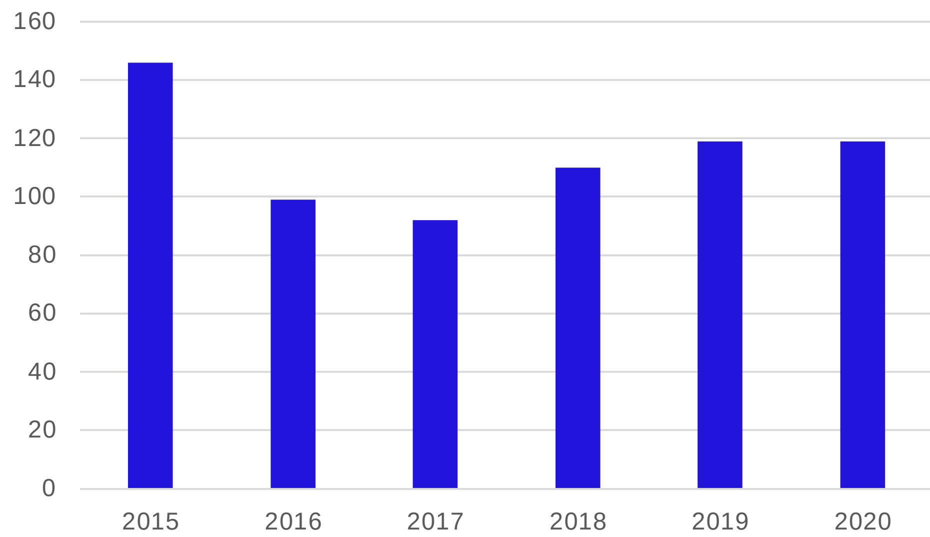
There are two relatively unique elements of military aircraft activity at BGR:

- Foreign transient military aircraft make technical stops at BGR for fuel, service, etc. The type of aircraft making these stops ranges from fighters to aerial tankers and transports. The aircraft are primarily European military units transiting the North Atlantic Ocean. The volume of foreign transient military aircraft operations at BGR varies with operational and training needs of each service.
- The U.S. military charters with civilian operators to provide troop and equipment transportation between the U.S. and overseas deployments. A number of transient troop transports flying over the North Atlantic Ocean make technical stops at BGR. The aircraft used are primarily civilian B-767-300s and 777-200s. According to data provided by BGR, these operations averaged 114 flights per year between FY 2015 and 2020 (**Table 3-10** and **Figure 3-11**). The volume of transient troop and equipment transports at BGR are dependent on U.S. Department of Defense (DoD) deployment requirements.

Table 3-10. Summary of Annual Troop Flights at BGR

Year	2015	2016	2017	2018	2019	2020	Avg/Yr
No. Flights	146	99	92	110	119	119	114

Figure 3-11. Troop Flights (July 1 through June 30)

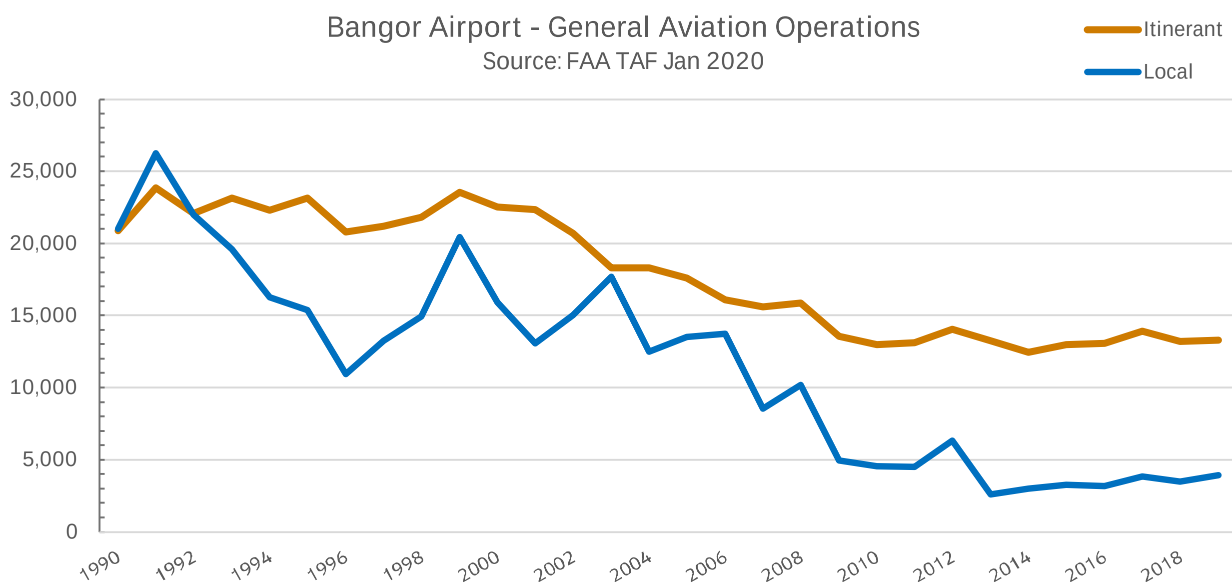


Source: Bangor International Airport

3.5 General Aviation activity and forecast

Both itinerant and local general aviation operations at BGR have experienced a long-term steady decline (**Figure 3-12**).

Figure 3-12. General Aviation Operations



General aviation operations at BGR declined by almost 59% between 1990 and 2019 (**Table 3-11**). Local operations declined by more than 81% over that same period, due to a significant decrease in training activity.

Table 3-11. General Aviation Operations

	% Change		
	Itinerant	Local	Total
1990-2019	-36.4%	-81.2%	-58.9%

Source: FAA TAF

From January through June, general aviation operations in 2020 declined by 30% compared to the same period in 2019 (**Table 3-12**). General aviation operations declined by more than 50% in April and May 2020 compared to 2019. If Maine experiences more COVID cases and the state institutes more quarantine and shutdown measures, general aviation activity could decline to April and May levels again.

Table 3-12. General Aviation Operations

	2019	2020	% Change
Jan	959	1,058	10.3%
Feb	1,020	1,079	5.8%
Mar	1,068	970	-9.2%
Apr	1,137	528	-53.6%
May	1,713	745	-56.5%
Jun	1,892	1,039	-45.1%
YTD Total	7,789	5,419	-30.4%

Source: FAA OPSNET

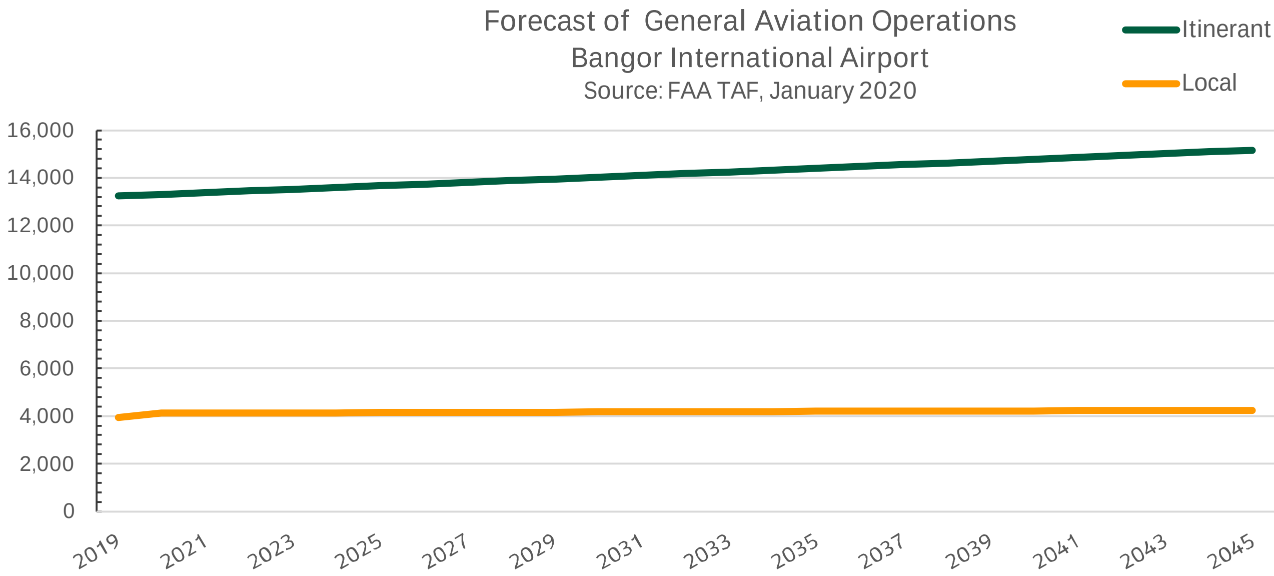
In the latest TAF, the FAA projects relatively little growth in general aviation local operations and slight growth in general aviation itinerant operations over the planning period (**Table 3-13** and **Figure 3-13**).

Table 3-13. General Aviation Operations

	% Change		
	Itinerant	Local	Total
2019-2045	14.4%	7.8%	12.9%

Source: FAA TAF

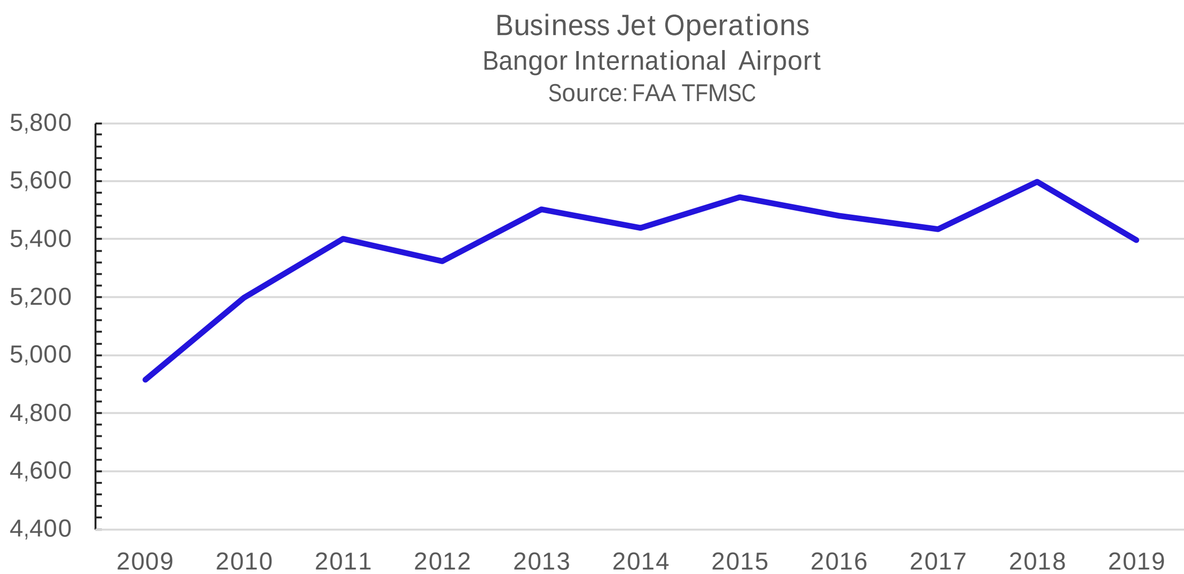
Figure 3-13. Forecast of General Aviation Operations



3.6 Business/Corporate Jet Operations

Due to its relatively close proximity to Europe, as well as the services provided (customs and immigration, fuel, maintenance, etc.), and its runway length (11,440 feet), BGR is an extremely popular transient destination for corporate jets flying to Europe as well as those flying from Europe to the U.S. The number of business jet operations at BGR has experienced approximately 10% growth over the last 10 years (**Figure 3-14**).

Figure 3-14. Business Jet Operations



The FAA has noted that nationally, business jet activity has been the highest growth segment of overall general aviation operations, and projects continuous strong growth through 2040.

From January through June 2020, however, the number of business operations at BGR declined by 52% compared to the same six-month period in 2019 (**Table 3-14**).

Table 3-14. Business Jet Operations

Month	2019	2020	% Change
Jan	302	280	-7.3%
Feb	294	292	-0.7%
Mar	331	185	-44.1%
Apr	396	96	-75.8%
May	460	139	-69.8%
Jun	670	185	-72.4%
YTD Total	2,453	1,177	-52.0%

Source: FAA Traffic Flow Management System Counts

There have been reports that a number of companies still flying domestically and internationally are increasingly using business jets because they are considered to be safer and more secure than the airlines during the pandemic. That factor, and if the economy rebounds quickly, are both likely to drive business jet activity at BGR back to the levels it experienced in 2019.

The FAA does not forecast business jet operations as a discrete activity at BGR. If business jet activity at BGR does rebound to previous levels, it could experience similar growth that it saw between 2009-2019, which was approximately 10%. Assuming that business jet activity reaches 5,400 operations in 2022, that would result in 5,940 operations by 2032, and 6,600 business jet operations by 2045.

3.7 Annual Cargo—Landed Weight

The FAA collects cargo data from airports in the form of landed weight on an annual basis. Landed weight is defined as the weight of the aircraft and its contents at landing. The cargo reporting is limited to aircraft operations dedicated to the exclusive transportation of cargo. As such, this excludes the cargo often carried in the belly of air carriers. The data for CY2019 was made available in September 2020. BGR reported 33,552,540 lbs of landed weight cargo in 2019, which is up 33% over 2018. Out of 141 airports that reported cargo, BGR ranked 130th, two places above Portsmouth International. Historically reported landed cargo weight has fluctuated greatly at BGR. Prior to 2012, the airport was reporting over 150 million pounds of landed cargo. This master plan will examine the potential for the airport to capitalize on facilities and land to maximize cargo operations. If the airport exceeds 100 million pounds of landed weight, it is eligible for additional AIP funding. However, unless additional facilities are put in place and/or the airport more strongly markets all-cargo operators, the landed cargo weight is not expected to exceed the 100 million pound threshold. The forecast relies on the FAA National Aerospace Forecast which considers both domestic and international growth in terms of the economy and GDP. In addition, several assumptions specific to the cargo industry are considered. As noted in the FAA's Aerospace Forecast for Fiscal Years 2020-2040, *"First, security restrictions on air cargo transportation will remain in place. Second, most of the shift from air to ground transportation has occurred. Finally, long-term cargo activity depends heavily on economic growth."* The all-cargo forecast assumes an increase at an average annual rate of 3.5% over the forecast period. The forecasted range of landed cargo weight is shown below in **Table 3-15.**

Table 3-15. Forecast of Landed Weight (lbs)

Year	2040	2030	2025	2021
PAL 1 (low)	33,552,540	33,552,540	33,552,540	33,552,540
PAL 2 (Recommended)	47,594,919	46,263,678	41,244,639	31,208,081
PAL 3 (High)	63,692,738	60,464,776	48,985,692	29,379,999
PAL 4 (unconstrained)	152,685,224	135,480,506	69,099,156	24,482,261

3.8 Aircraft Operations Summary

A summary forecast of aircraft operations is shown in **Table 3-16**. This includes air carrier operations, charter flight operations, and BGR's aircraft fleet mix with peaking characteristics based on historical and existing operations. The growth rates assume the FAA's TAF for air carrier, air taxi, general aviation, military flights, and business jet operations over the 20-year forecast period.

Table 3-16. Aircraft Operations Forecast Summary

	AC+AT	General Aviation	Military	Business Jets
2020	18,183	17,426	10,464	3,000
2021	17,265	17,501	10,464	4,000
2022	15,594	17,576	10,464	5,400
2023	13,352	17,652	10,464	5,454
2024	12,848	17,728	10,464	5,508
2025	12,998	17,805	10,464	5,562
2026	13,152	17,882	10,464	5,616
2027	13,313	17,959	10,464	5,670
2028	13,483	18,037	10,464	5,724
2029	13,658	18,115	10,464	5,778
2030	13,836	18,193	10,464	5,832
2031	14,020	18,272	10,464	5,886
2032	14,215	18,351	10,464	5,940
2033	14,410	18,431	10,464	5,991
2034	14,605	18,511	10,464	6,042
2035	14,802	18,591	10,464	6,093
2036	15,002	18,672	10,464	6,144
2037	15,200	18,753	10,464	6,195
2038	15,397	18,835	10,464	6,246
2039	15,594	18,917	10,464	6,297
2040	15,794	18,999	10,464	6,348

3.8.1 Based Aircraft Forecast

The forecast of based aircraft is predicated on the availability of aircraft hangar storage space. With several exceptions, all BGR's 32 based aircraft are currently stored in hangars. The airport has received numerous requests for covered aircraft storage over the last several years, primarily from corporate aircraft operators. The breakdown of based aircraft is shown in the **Table 3-17** below.

Table 3-17 Based Aircraft

Jet	Multi-engine	Single-engine	Helicopter	Total
1	2	28	1	32

Source of based aircraft data: BGR staff March 2021

The forecast of based aircraft prepared by the FAA in January 2020 shows the last current number of based aircraft at BGR to be 58 (as of 2018). Since then, the number of actual based aircraft (civilian) is reported as 32. There are also 29 military aircraft based at BGR that are not currently counted in the based aircraft inventory as they do not impact the areas of the airport that BGR is responsible to develop. The FAA anticipates based aircraft at BGR to increase at an average annual rate of 1.4% over the 20-year planning period. When the FAA growth rate of 1.4% is applied to the adjusted number of based aircraft in 2021, then 13 aircraft would be added to the based aircraft count at BGR. This seems to be a reasonable estimation of future based aircraft potential should additional aircraft storage hangar space become available. The split between aircraft type is also anticipated to remain the same, with most based airplanes being single-engine reciprocating vs multi-engine or jet. However, an increase in corporate jets is expected as the demand for additional aircraft hangars lies primarily with those operators.

3.8.2 Summary of Preferred Forecasts

Table 3-18 below provides a summary overview of the aviation forecasts by category.

Table 3-18 Summary of Aviation Forecasts

	Operations			Enplanements			Cargo	Based Aircraft
	Air Carrier/Commuter	General Aviation	Military	Annual	Peak Month	Peak Hour	Landed Weight	
2021	17,265	17,501	10,464	209,693	38,300	150	31,208,081	32
2025	12,998	17,805	10,464	337,670	39,800	244	41,244,639	34
2030	13,836	18,193	10,464	362,150	43,000	659	46,263,678	38
2040	23,794	18,999	10,464	420,517	54,350	770	47,594,919	42

4. Facility Requirements

4. Facility Requirements

This chapter examines the current infrastructure at BGR in terms of:

1. Correcting or mitigating airport design standard deficiencies;
2. Determining the ability of existing facilities to accommodate existing and forecasted levels of demand;
3. Achieving the goals and objectives identified by Airport Management and the Technical Advisory Committee for the master plan.

The facilities are analyzed in regard to accommodating the design aircraft and the FAA's airport design standards as contained in FAA Advisory Circular 150/5300-13A as described below.

4.1 Critical Design Aircraft / Airport Design Standards

A detailed analysis was provided in Chapter 2 for the critical design aircraft best suited for existing operations at BGR. It was determined that based on existing levels of operations, that the Boeing **757-300 will serve as the critical design aircraft** for both airport facility design as well as for AIP funding purposes, as it is the most demanding of the grouping of aircraft that have conducted regular operations at BGR. The Boeing 757-300 and similar aircraft fall under the FAA airport design criteria for **D-IV.**

The airfield facilities at BGR currently serve to support operations by several major air carriers as well as the Maine Air and Army National Guard. The aircraft fleet that is currently used in providing scheduled air service at BGR is comprised of mostly Regional jet aircraft (ERJ 135/145 and CRJ 200/700/900's). As noted in Chapter 3 – Forecasts of Aviation Demand, it is anticipated that the fleet may change over to the larger narrow body aircraft such as the Airbus A220 or Boeing 737Max as passenger demand picks up and airlines seek to maximize revenue and aircraft efficiencies. However, it is the it is the growing demand from large charter and corporate aircraft that will drive future facility planning requirements and the airport planning design criteria of D-IV.

These design standards apply to facility planning for the design, protection and separation standards for the single runway at BGR, Runway 15-33, as well as taxiways, aircraft parking aprons and safety areas. The design standards are shown in Table 4.1 taken from FAA Advisory Circular 150/5300-13A.

As noted in FAA's latest edition of AC 150/5300-13A, Change 1, Airport Design, the Runway Design Code (RDC) is a combination of approach speed, wingspan and tail height, and lowest runway visibility minimums. The **Runway Design Code (RDC)for Runway 15-33 is D-IV-1200.**

RDC KEY
D = Approach Speed (141 knots – 165 knots)
IV = Tail Height (45'-<60') & Wingspan (118'-<171')
1,200 = lowest visibility minimum (in feet) – lower than ¼ mile

Figure 4-1. Runway Design Standards for Group D-IV

AC 150/5300-13A
Appendix 7

9/28/2012

Table A7-10. Runway design standards matrix, C/D/E - IV

Aircraft Approach Category (AAC) and Airplane Design Group (ADG):		C/D/E - IV			
ITEM	**DIM** [1]	VISIBILITY MINIMUMS			
		Visual	Not Lower than 1 mile	Not Lower than 3/4 mile	Lower than 3/4 mile
RUNWAY DESIGN					
Runway Length	A	*Refer to paragraphs 302 and 304*			
Runway Width	B	150 ft	150 ft	150 ft	150 ft
Shoulder Width		25 ft	25 ft	25 ft	25 ft
Blast Pad Width		200 ft	200 ft	200 ft	200 ft
Blast Pad Length		200 ft	200 ft	200 ft	200 ft
Crosswind Component		20 knots	20 knots	20 knots	20 knots
RUNWAY PROTECTION					
Runway Safety Area (RSA)					
Length beyond departure end [9, 10]	R	1,000 ft	1,000 ft	1,000 ft	1,000 ft
Length prior to threshold [11]	P	600 ft	600 ft	600 ft	600 ft
Width	C	500 ft	500 ft	500 ft	500 ft
Runway Object Free Area (ROFA)					
Length beyond runway end	R	1,000 ft	1,000 ft	1,000 ft	1,000 ft
Length prior to threshold [11]	P	600 ft	600 ft	600 ft	600 ft
Width	Q	800 ft	800 ft	800 ft	800 ft
Runway Obstacle Free Zone (ROFZ)					
Length		*Refer to paragraph 308*			
Width		*Refer to paragraph 308*			
Precision Obstacle Free Zone (POFZ)					
Length		N/A	N/A	N/A	200 ft
Width		N/A	N/A	N/A	800 ft
Approach Runway Protection Zone (RPZ)					
Length	L	1,700 ft	1,700 ft	1,700 ft	2,500 ft
Inner Width	U	500 ft	500 ft	1,000 ft	1,000 ft
Outer Width	V	1,010 ft	1,010 ft	1,510 ft	1,750 ft
Acres		29.465	29.465	48.978	78.914
Departure Runway Protection Zone (RPZ)					
Length	L	1,700 ft	1,700 ft	1,700 ft	1,700 ft
Inner Width	U	500 ft	500 ft	500 ft	500 ft
Outer Width	V	1,010 ft	1,010 ft	1,010 ft	1,010 ft
Acres		29.465	29.465	29.465	29.465
RUNWAY SEPARATION					
Runway centerline to:					
Parallel runway centerline	H	*Refer to paragraph 316*			
Holding Position [8]		250 ft	250 ft	250 ft	250 ft
Parallel taxiway/taxilane centerline [2]	D	400 ft	400 ft	400 ft	400 ft
Aircraft parking area	G	500 ft	500 ft	500 ft	500 ft
Helicopter touchdown pad		*Refer to AC 150/5390-2*			

Note:

- Values in the table are rounded to the nearest foot. 1 foot = 0.305 meters.

Planning for airport design standard D-IV does not preclude operations by smaller aircraft or occasional operations by larger aircraft. The majority of operations by any single aircraft are still expected to be by the ERJ-135LR in the near-term, however it is not the most demanding, or critical aircraft for airport planning purposes.

4.2 Runway Requirements

BGR plans to rehabilitate (Mill & Overlay) Runway 15-33 in 2023-2024. Site data procurement and design is anticipated to begin in late 2021/early 2022. To determine the AIP eligible portion of the project, the critical aircraft must be defined consistent with FAA Advisory Circular 150/5000-17, Critical Aircraft and Regular Use Determination. For FAA funding purposes, annual operations for the critical aircraft determination may not include military or federally-owned aircraft. However, they do include military charters, such as troop transport flights, that are operated by commercial charter carriers and handled by the Airport. As discussed in previously, the critical design aircraft for runway length requirements is the Boeing 757-300.

4.2.1 Runway Capacity

FAA Advisory Circular 150/5060-5 provides guidance on determining runway capacity and potential delays. A runway's capacity is measured in terms of Annual Service Volume (ASV) and hourly capacity. The ASV and Hourly Capacity calculations are determined using the FAA methods provided in AC 150/5060-5 and the results are included in **Table 4-1**.

Table 4-1 Capacity – Single Runway

Metric	Result
Hourly VFR (Visual Flight Rules)	55 ops/hr
Hourly IFR (Instrument Flight Rules)	53 ops/hr
Annual Service Volume	210,000 ops/year

Source: FAA Advisory Circular 150/5060-5 Figure 2-1 Capacity and ASV for long range planning.

[1] Mix index = 85 based on 13,294 ADG C ops (64% of total ops) and 1,456 ADG D ops (7% of total ops) in 2019

Given that the forecast of operations is anticipated to be 53,257 by 2040, the demand for the runway represents only 25% of operational capacity.

The runway and taxiway system at BGR provides more than adequate capacity.

4.2.2 Runway Length

Takeoff distance, particularly for turbine powered aircraft, is determined by a number of factors, including field elevation, ambient temperature, obstacle clearance, runway slope, among other factors. The primary variable that aircraft operators use when determining takeoff distance requirements is the weight of the aircraft. In particular, payload (passengers, baggage, and cargo), as well as fuel, can be adjusted to match the available runway length. The longest non-stop domestic scheduled passenger air service to/from BGR are to St. Petersburgh Florida (PIE), which is 1,211nm, and Orlando Sanford Airport (SFB), which 1,128nm.

Currently, Runway 15-33 is 11,440' long, which allows both domestic and international air carrier and charter service to operate with little to no weight constraints.

Required runway length is primarily governed by the takeoff weight of the Aircraft. A small percentage of aircraft operations are conducted at maximum payload and maximum fuel load. 95% of Maximum Takeoff Weight (MTOW) is considered to be a realistic estimation of the majority of operations without significantly reducing allowable payload or fuel load for the majority of the routes flown to/from BGR. As such, this analysis is generally based upon reduced take off weight (TOW) = 95% of MTOW[3].

[3] Operations data from BGR Airport indicated an average between 77% to 86% load factor in CY 2019 for domestic passenger carriers. Based on the payload (passengers and baggage) for 86% LF, and mission fuel for 1,300 nm non-stop mission plus reserves, results in an average of 95% of max takeoff weight (MTOW). Aircraft manufacturers performance manuals, which are required to be used by FAA AC 150/5000-17, only provide two variables for calculating takeoff and landing distances: density altitude and takeoff weight (see Appendix A for excerpts from B757-200/300 manual). As a result, 95% of MTOW was used to calculate reduced takeoff distance. Takeoff distances at MTOW were also calculated.

To determine the runway length requirements, aircraft were grouped according to similar performance characteristics. Aircraft approach category (AAC) C & D aircraft include the aircraft with the most demanding runway length requirements.

When grouped in this manner the Boeing 757 (approach category D) can be identified as the critical aircraft for runway length requirements. As illustrated in **Figure 4-2**, there are 558 operations of group C & D aircraft that require >7,500' of runway at reduced takeoff weight. **This is the FAA's approved criteria for funding eligibility.**

The FAA determined that 7,500' of runway length is required to support civil aircraft operations via email on May 19, 2021. The Maine Air National Guard would be responsible for paving any additional pavement beyond 7,500'.

Figure 4-2. Runway Length Requirements

BANGOR INTERNATIONAL AIRPORT				
RUNWAY LENGTH REQUIREMENTS - APPROACH CAT. C&D				
Airfiled elev. = 192'. Rwy 15 slope 0.4% down				
	MGTOW	Reduced TOW[2]	2019 Ops	cumulative operations
A388 - Airbus A380-800	17,000	11,200	2	2
B77W - Boeing 777-300ER	12,100	10,200	8	10
B744 - Boeing 747-400	10,300	9,600	6	16
MD11 - Boeing (Douglas) MD 11	10,200	9,800	4	20
B748 - Boeing 747-8	10,100	9,000	4	24
A-330-200/300	11,000	8,900	42	66
B777-200ER	10,100	8,900	72	138
DC10 - Boeing (Douglas) DC 10-10/30/40	10,100	8,800	22	160
B787-9	9,900	8,800	16	176
B767-400	10,100	8,500	10	186
B738 - Boeing 737-800	9,100	8,100	62	248
B739 - Boeing 737-900	9,100	8,100	12	260
B767-200ER	9,000	7,800	16	276
B767-300ER	10,400	7,600	190	466
B757-200/300	9,600	7,500	92	558
ERJ-140/145	7,400	6,600	3930	4488
MD88 - Boeing (Douglas) MD 88	7,000	6,400	4	4492
A-300-600F	7,200	6,200	32	4524
A-310	6,200	6,000	8	4532
A-320-200/NEO	6,800	6,000	516	5048
CRJ-900	6,500	5,900	662	5710
B737-700/BBJ	6,900	5,800	72	5782
CRJ-200ER	6,300	5,700	2837	8619
ERJ-175LR	7,800	5,600	30	8649
GLF5 - Gulfstream V/500/G550	5,910	5,277	94	8743
GLF6 - Gulfstream/G-650	6,299	5,241	58	8801
A-318/319/CJ	5,800	5,200	4900	13701
CRJ-700ER	5,500	4,900	1642	15343
ERJ-135LR	5,774	4,462	776	16119

4.2.3 Runway Width

The design standard in FAA AC 150/5300-13A, *Airport Design*, Table A7-10 recommends a runway width of 150' for runways classified as ADG D-IV and served by instrument approaches with approach visibilities of less than ¾ mi. At 200' wide, Runway 15-33 at BGR exceeds the design criteria by 50'. The runway presently handles operations by several of the worlds' largest aircraft such as the AN124 (38 ops in 2019), Airbus A380 (2 ops in 2019), and Boeing 747 (10 ops in 2019). A reduction in runway width from 200’ to 150’ would reduce the safety margin, particularly in situations where the runway is contaminated (wet or snow covered) and/or in crosswind scenarios; this is especially relevant for larger aircraft with a wide outside-to-outside main gear width such as the Boeing 747 (47’), Boeing 777 (42’) and Airbus A330 (41’). As BGR seeks to attract cargo operators and enhance facilities to support those operations, maintaining the existing runway width is exceedingly important.

The effort to reduce the runway pavement width from 200’ to 150’ would include:

1. Remove the 50’ wide runway shoulder pavement on each side of the runway (total of 100’ for a total of 115,000 SY) for the length of the 11,440’ long runway
2. Reconfigure runway edge lights
3. Reconfigure / Repaint Runway markings
4. Relocate guidance signage
5. Relocate Runway Distance Remaining (RDR) signage
6. Reconfigure taxiway edge lights
7. Regrade Runway Safety Areas (RSA’)
8. Install new FAA and airfield lighting duct banks
9. New stormwater drainage system
10. Relocate PAPI’s

It is recommended that the Airport maintain the current runway width of 200’ to preserve the additional safety margin afforded by the extra 50’ of pavement until a full runway reconstruction is warranted.

4.2.4 Runway Pavement

A runway Pavement Condition Index (PCI) study was conducted in the Fall of 2020 (**Appendix G**). The runway and shoulder pavement received a rating of Fair. The last major runway rehabilitation project was completed in 2002/2003 and the runway pavement is now nearly 20 years old. BGR has had a rehabilitation project for Runway 15-33 programmed into their Capital Improvement Plan (CIP) since 2016 and is currently preparing to rehabilitate the runway in 2023 with a full-length mill and overlay.

*It is therefore recommended that BGR proceed with a **pavement rehabilitation project by 2023*** to preclude any issues with FOD (Foreign Object Debris) or excessive runway cracking/spalling as part of their ongoing preventative maintenance program.

4.2.5 Runway Safety Areas

All Runway Safety Areas and Object Free Areas at BGR meet FAA standards for width, length, and grading criteria.

Therefore, there are no further analysis or discussion required regarding the safety areas at BGR.

4.2.6 Non-standard conditions and Modification of Standards - Runway

There are several non-standard conditions that apply to Runway 15-33 related to the FAA's Airport Design Advisory Circular 150/5300-13A, Airport Design, Change 1. Those conditions are listed under **Table 4-2** below.

Table 4-2 Existing Runway MoS

Location	Description of MoS
First 123' of Runway 15	Longitudinal grade exceeds criteria set forth in FAA AC 150/5300-13A, paragraph 313 section (b).
Runway 15 Line of Sight	Large hump in the Runway restricts visibility from the Runway 15 threshold to a point just prior to Taxiway M.
Runway 15/33 Thresholds	The distance between the Runway threshold bar and the threshold markings is incorrect for both Runway 15 and 33 ends.
Runway 33	The first 2,500' of Runway 33 has a vertical curve of 800' which does not meet the minimum 1% grade change.

The issues noted above have been discussed at length with FAA personnel from the FAA's New England Regional office. The MoS for the distance between the runway threshold bars and the threshold markings will be corrected when BGR completes the Runway 15-33 rehabilitation project within the next few years.

The remaining Modification of Standards pertain to the runway profile. To correct these non-standard conditions, the entire runway profile, taxiway connections and safety areas would need to be graded to tie into one another and meet standards. In addition, there is approximately 16" of concrete base that would need to be demolished and, where there are existing box culverts that bisect the runway, those would also need to be replaced. As the FAA and BGR are considering moving forward with a runway rehabilitation to mill and overlay the existing runway surface within the next few years, it is prudent to only consider a full runway reconstruction and subsequently address the runway Modification of Standards during the next master plan update, as the pavement will then be nearing its design lifespan.

4.3 Taxiway Requirements

Taxiways serve as the designated connectors between runways and terminal area facilities. The number, location, and configuration of taxiways have a significant impact on airport traffic flows, operational capacity, as well as safety. Eliminating runway incursions is one of the highest priorities of the FAA, and a major element of that program is improving taxiway systems at airports, as well as marking and lighting. The current version of FAA Advisory Circular 150/5300-13A, Airport Design, incorporated a number of changes from the previous standards, including the main gear width of the critical design aircraft as well as the distance between cockpit and main gear to determine appropriate taxiway widths, and also new criteria for taxiway intersection design. **Figure 4-3** illustrates the current taxiway system at BGR.

Figure 4-3. Taxiway System at BGR

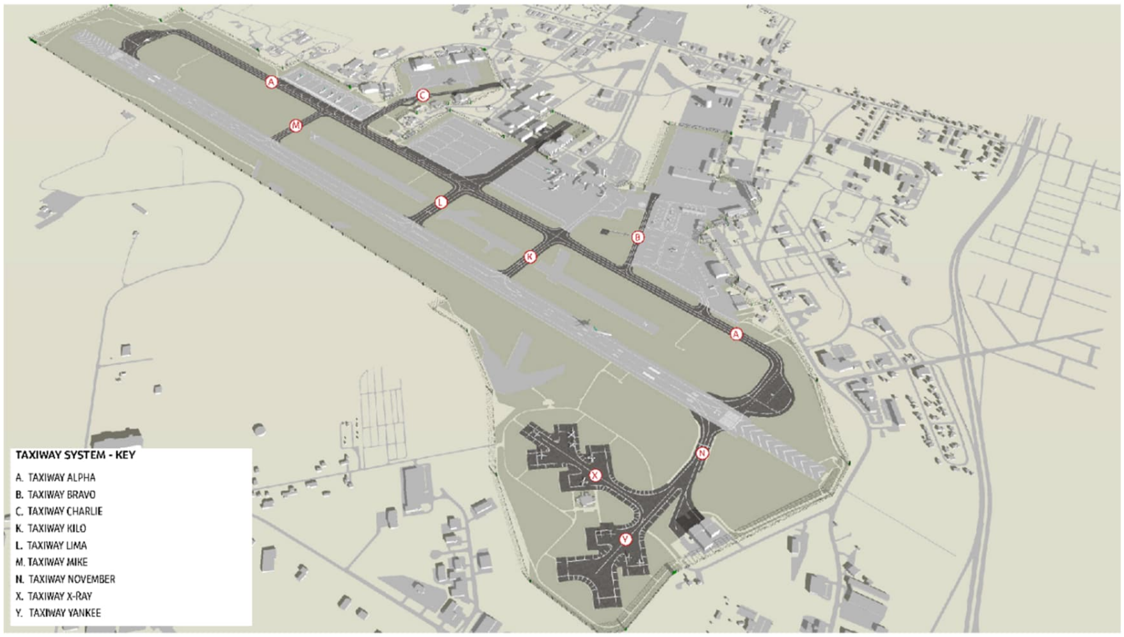


Table 4-3. Main Characteristics Of The Taxiway System at BGR

Taxiway	Width (feet)	Taxiway Design Group (TDG)	Distance from Runway 33 Threshold (feet)	Distance from Runway 15 Threshold (feet)
A	75	6	Parallel	Parallel
B	50	4	N/A	N/A
C	75	6	N/A	N/A
K	75	6	3,300	8,000
L	100	7	4,900	6,500
M	75	6	7,650	3,700
N	75	6	0	11,440
X	75 / 100	6	N/A	N/A
Y	75 / 100	6	N/A	N/A

The exit taxiways at BGR were evaluated in terms of meeting design standards for taxiway width, separation from parked aircraft, and separation from the runway centerline. In addition, the taxiway pavement was evaluated as well.

4.3.1 Taxiway Width

The taxiways at BGR (except for TWY 'B') all meet or exceed the TDG standards for the current and future design aircraft for taxiway planning (the Boeing 767) for TDG 5 which is 75' wide.

Taxiway 'B' parallels the General Aviation and Maine Army National Guard aircraft parking aprons. At a width of 50' it meets the criteria for TDG 4 aircraft. The width of Taxiway 'B' is adequate for current and anticipated operations by TDG 4 aircraft.

Taxiway 'L' is located midfield and provides direct access from the runway to the joint-use / heavy apron and the commercial apron. At 100' wide, the taxiway exceeds the width of even

TDG 7 (which is 82’). Alternatives will be developed to consider a different width and/or impacts to airfield operations if Taxiway ‘L’ is eliminated.

Taxiways A, C, K, M, N, X, and Y all meet recommended design standards of 75’ wide for TDG 5 aircraft.

4.3.2 Taxiway Separation and safety areas

Taxiways are required to meet certain standards for separation from runway centerlines, parallel taxiways and fixed or movable objects (parked aircraft, navigational aids, signage, etc.) to allow for an aircraft to safely taxi from the runway to the terminal environment unobstructed. The standards are based on the Airplane Design Group, which for BGR is defined as ADG D-IV.

All taxiways at BGR meet the separation standards as noted in Table 4-3.

Table 4-4 Taxiway Separation Criteria

Item	Standard
Taxiway Safety Area width	171’
Taxiway Object Free Area width	259’
Taxiway Centerline to Parallel Taxiway	215’
Taxiway Centerline to Fixed or Movable Object	129.5’
Taxiway Wingtip Clearance	44’
Runway Centerline to Parallel Taxiway	400’

4.3.3 Taxiway Exit Location

FAA AC 150/5300-13A, Change 1 - *Table 4-13 Exit taxiway cumulative utilization percentages* provides suggested distances to taxiway exits based on wet vs. dry conditions. The exit locations are based on the classification of an aircraft by weight. At BGR the taxiway design aircraft, a Boeing 767 is classified as a *Heavy* aircraft because it has a maximum taxiway weight of 352,000LBS. On runways that may be wet, the FAA recommends providing right angled exits a minimum of 9,000’ from the landing threshold in order for 100% of heavy aircraft to be able to utilize the exit. The distances from the landing threshold to each taxiway exit is provided in **Table 4-2**. At 8,000’ from the Runway 15 landing threshold, Taxiway ‘K’ would be utilized by 93% of heavy aircraft under wet conditions and 100% of heavy aircraft under dry conditions. At 7650’ from the Runway 33 landing threshold, Taxiway ‘M’ would be utilized by 84% of heavy aircraft when wet and 100% of heavy aircraft under dry conditions. The Taxiway ‘A’ exit at each end would achieve a utilization of 100% by all aircraft in either direction.

Therefore, no additional exit taxiways are required.

4.3.4 Non-standard conditions and Modification of Standards – Taxiways

Table 4-5 provides a summary of the existing taxiway Modification to Standards at BGR.

Table 4-5 Existing Taxiway Modification of Standards

Location	Description of MoS
Northern end of Taxiway A	Longitudinal grade exceeds the standard grade of 1.5% at the northern end.
Taxiway M	Longitudinal grade over 550' where Taxiway M connects to Taxiway A is 1.9% which exceeds the standard grade of1.5%.

Similar in nature to the runway Modification of Standards, the grading that would be required to tie the northern end of Taxiway 'A' and Taxiway 'M' to a regrading runway profile would be completed as part of a larger runway reconstruction project. Given the operational impact and cost of such a project, it is anticipated that these Modification to Standards would be addressed once the existing runway PCI values warrant a full runway reconstruction.

4.3.5 Taxiway Pavement

The pavement condition for each taxiway was assessed in the Fall of 2020. There are several large sections of Taxiway 'A' that are rated 'Very Poor' and one section that rated 'Serious' as shown in **Figure 4-4**. These sections of taxiway are expected to be addressed after the runway pavement is rehabilitated in 2023 due to funding priorities.

Sections of Taxiway 'A' and all of Taxiway 'M' are in need of new pavement.

Figure 4-4. PCI Survey - Taxiways

4.4 Aircraft Parking Aprons and Tiedowns

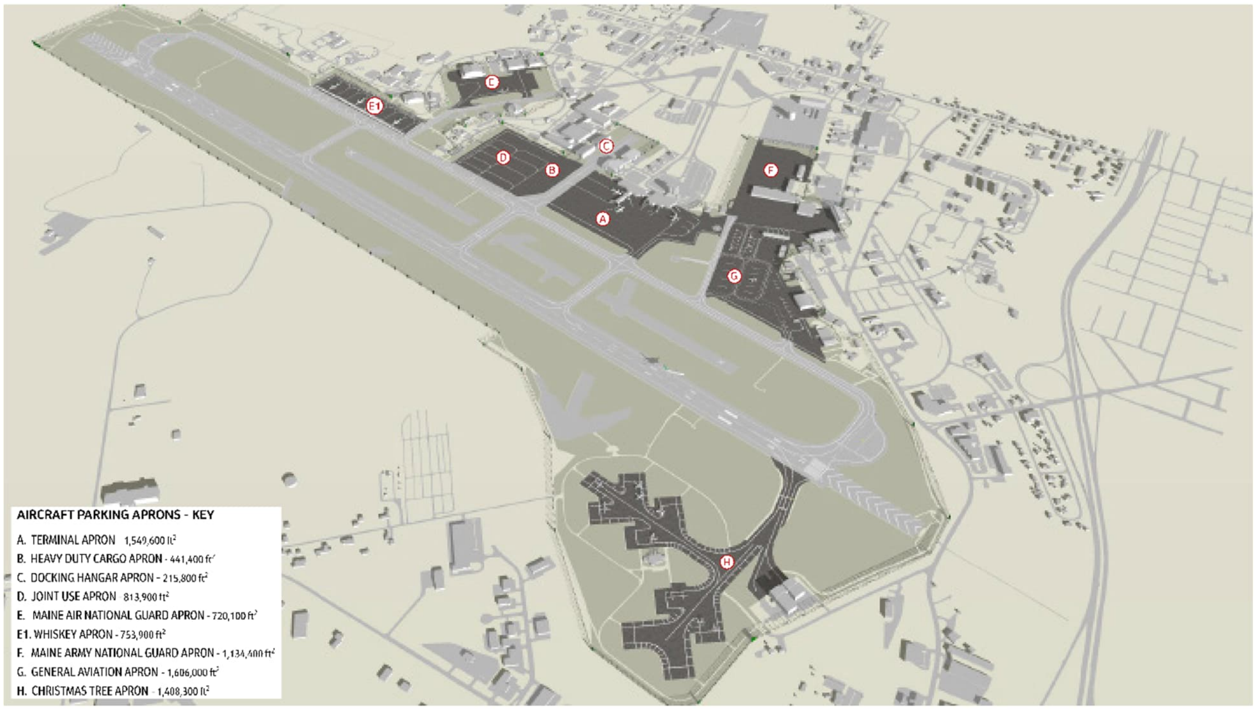
BGR essentially has several large aircraft parking aprons available for public use. They are identified in **Figure 4-5** as the Terminal Apron (A), Heavy Duty Cargo apron (B), Joint-Use (D), General Aviation (G) and Christmas Tree apron. The remaining aprons are used by the Maine Air and Army National Guard. FAA AC 150/5300-13A Airport Design provides general design guidelines for the planning and use of aircraft parking aprons based on the anticipated use such as a terminal, cargo, or general aviation parking apron. In addition, ACRP Report 25, Airport Passenger Terminal Planning and Design and AC 150/5360-13A Airport Terminal Planning provides guidance on terminal apron planning.

The aprons must provide adequate clearance for parked aircraft from runways, taxiways and associated safety areas.

There is adequate apron space for both current and future demand.

Each aircraft parking apron is addressed below.

Figure 4-5. Apron Areas at BGR



4.4.1 Terminal Apron

The terminal apron can accommodate up to Design Group VI aircraft (Airbus A-380 and B-747-800). The three gates and associated loading bridges at the domestic terminal can accommodate B-737 and A-320 aircraft. The international terminal has four gates and loading bridges that can accommodate B-767 and A-330/340 sized aircraft. Additional parking for passenger and cargo aircraft can be accommodated using remote parking. The apron capacity is not limited by current or future operations even if the fleet were to change from the current CRJ-200 and ERJ-135's to the Boeing 737 and A320 as is anticipated over the 20-year planning period.

4.4.2 Heavy Duty Cargo & Joint Use Aprons

These aprons are sized to accommodate aircraft parking for up to ADG VI aircraft and are of adequate capacity for both military and charted air cargo aircraft.

4.4.3 Docking Area Apron

This apron area has sufficient capacity to serve the tenants using the hangars located adjacent to the apron. There is adequate space available to add up to two more aircraft storage hangars and / or aircraft parking pavement.

4.5 Aircraft Storage Hangars

As of October 2020, a total of 60 aircraft were based at BGR (32 civilian based aircraft and 28 military).

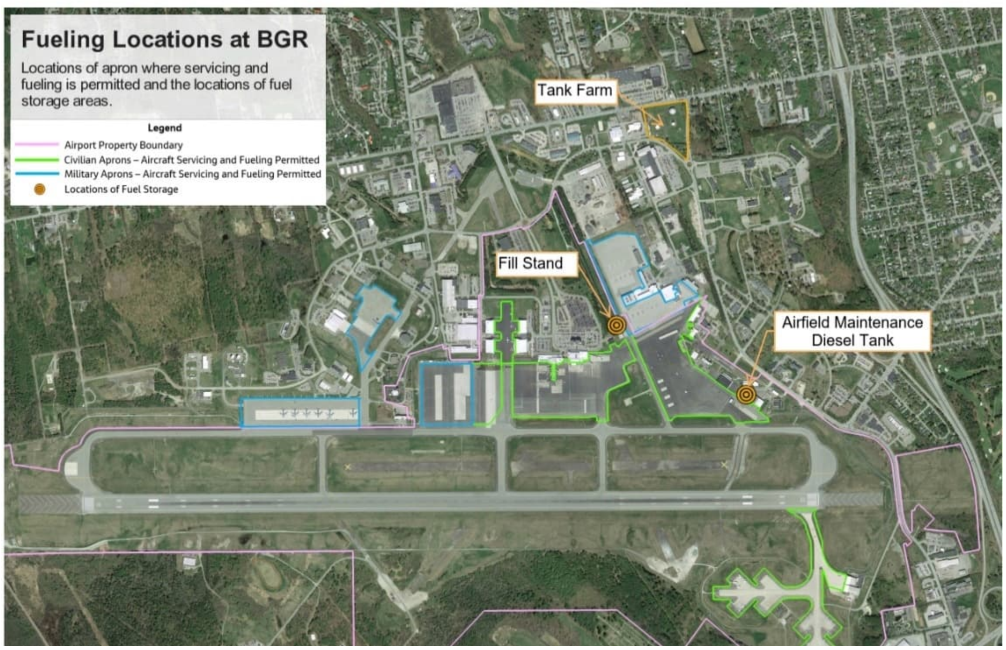
According to the forecast of based aircraft, there will be a need to accommodate 10 additional based aircraft at BGR. It is believed that of those aircraft, all will require covered storage such as a t-hangar for smaller GA aircraft or a large, climate controlled, secure hangar for larger corporate aircraft.

Additional hangar space will be required to continue to foster growth of based aircraft at BGR. Alternatives are considered to accommodate the latent demand for large corporate aircraft hangars.

4.6 Aircraft Fueling Facilities

The fuel farm has adequate capacity to serve current and projected fueling requirements, however the airport would like to consider constructing an on-airport fuel farm with the advantages being control of the facility and more easily manageable regulatory requirements. This master plan will consider various site to construct an aviation fuel farm.

Figure 4-6. Fueling Locations



4.7 Terminal Building

As summarized in Chapter 2 'Inventory', the terminal complex is comprised of a domestic terminal and international terminal. The domestic terminal is approximately 73,000 square feet and the international terminal is approximately 55,000 square feet, combined the terminal complex is roughly 128,000 square feet. The buildings are connected by a security checkpoint and secure corridors.

The terminal study that was completed in conjunction with this master plan identified several goals to enhance the passenger experience and meet current and forecast levels of demand. They are the following:

Goal 1: Improve the airside customer experience
- 1a Enhanced Airside Concessions
- 1b Improved Terminal Circulation and Accessibility
- 1c Improved Holdroom Seating
- 1d Improved Wayfinding and Signage

Goal 2: Identifying more airside concourse capacity
- 2a Interconnecting Domestic and Int'l Terminals
- 2b Leverage existing terminal real estate
- 2c Optimizing building system efficiency, performance

Goal 3: Safeguarding for future technologies and planning considerations
- 3a Passenger Security Screening Checkpoint (SSCP)
- 3b Airside Boarding Technologies
- 3c Terminal Concessions and Passenger Amenities
- 3d Future Pandemic Provisions

The capacity of the security screening checkpoints and lack of amenities in the holdrooms does not provide an adequate level of service during peak periods. The facilities required to serve current and anticipated levels of demand are discussed in the following sections.

4.7.1 Passenger Screening

The peak period for enplanements was determined to be the hour between 1050 and 1250. At present, there are five departures utilizing regional jets that have the capacity to seat a total of 260 passengers. At 85% load capacity, that would require screening 300 passengers or 212 peak hour passengers. That was the level of activity that BGR was experiencing going into the Summer 2021. Under this activity level two secure screening checkpoints are required and approximately 5,997sqft of holdroom space. The existing domestic terminal has 12,850sqft. Since the beginning of Summer 2021, BGR has seen passenger traffic increase rapidly and several flights have been added to the schedule as well. In this case a more aggressive planning forecast is relevant. If passenger enplanements continue to grow and exceed the levels previously seen in 2019 as the world recovers from the pandemic, BGR could see peak period demand increase from 212 peak hour passengers to over 600. The terminal planning concepts will consider a range of scenarios to provide flexibility in future planning. The facility requirements for current enplanements as of Summer 2020 are shown in **Figure 4-7** below. The future requirements under a high growth scenario (preferred scenario) are shown in **Figure 4-8** and **Figure** 4-9 on the following pages.

Figure 4-7. 2020 (Existing) Peak Period Analysis

Departure Time	Gate	AC Type	Seats	LF	Passengers
1251	5 (DL)	ERJ145	50	0.85	43
1241	3 (AA)	CRJ700	70	0.85	60
1240	6 (UA)	ERJ145XR	50	0.85	43
1213	4 (AA)	CRJ900	90	0.85	77
1150	6 (UA)	ERJ145XR	50	0.85	77
		Total	260		300
		Peak 60 min demand			**212**
		15% Surge			**32**
		Total Pk Hour Demand			**244**
		Required SSCP lanes			**2**
		Holdroom Reqm'ts (SF)			**5,997**

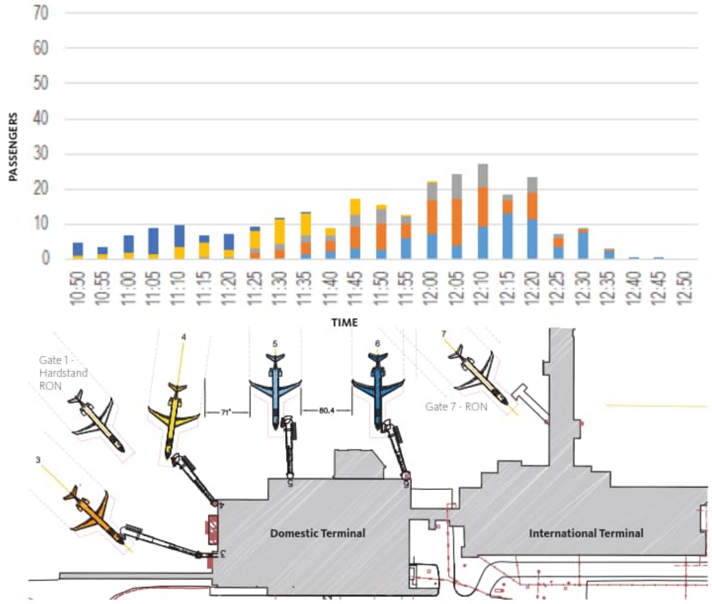


Figure 4-8. High Growth (Recommended) Peak Period Planning Activity Level

Departure Time	Gate	AC Type	Seats	LF	Passengers
1251	5 (DL)	A320	175	0.85	149
1241	3 (AA)	A320	175	0.85	149
1240	6 (UA)	A320	175	0.85	149
1213	4 (AA)	A320	175	0.85	149
1150	6 (UA)	A320	175	0.85	149
		Total	875		745
		Peak 60 min demand			**527**
		15% Surge			**80**
		Total Peak Hour Demand			**607**
		Required SSCP lanes			**4**
		Holdroom Reqm'ts (SF)			**12,409**

* NOTE: the following aircraft seat assumptions propose a "blended" conceptual seat count that does not reflect specific airline seat configurations for an Airbus A320 aircraft. Please be advised that actual seating may range from 160 seats for a 2-class operation to a single-class configuration that is more common with low-fare carriers

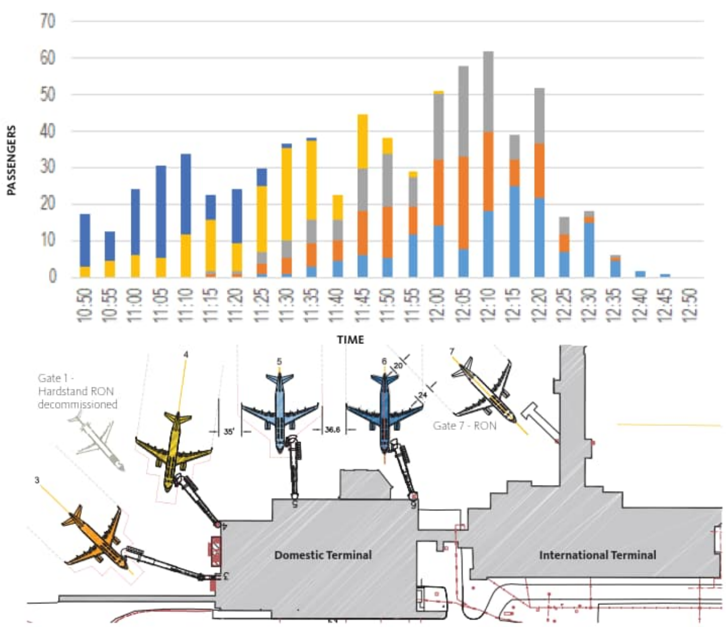


Figure 4-9. Proposed Facility Requirements Up To 2045

PASSENGER FACILITY SCOPE	PAL 1 - TODAY	PAL 2 - 2025	PAL 3 - 2030	PAL 4 - 2045+
AIRCRAFT CONTACT GATES	5	6	7	8
CHECK-IN POSITIONS	10	13	29	32
SECURITY SCREENING LANES	2	3	4	4
ARRIVALS BAGGAGE CLAIM	2	2	3	3

4.8 Ground Transportation and Parking

Ground transportation and parking requirements at Bangor International Airport are primarily based on the assessment of peak period activity in 2019 and the projected demand for each type of ground transportation mode.

4.8.1 Ground Transportation Key Assumptions

For almost all travel modes, the level of activity was assumed to increase in direct proportion to the growth in the annual passenger activity forecast. Another key assumption governing future facility requirements is the various access modes (also known as “mode share”) assumed for future years. (See **Table 4-6**) Historical mode share data for all transportation modes were not available. Therefore, the baseline mode share for parking and rental cars was estimated using 2019 transaction data. Mode shares for other user groups are assumptions.

Growth of Transportation Network Companies (TNC) such as Uber and Lyft and other emerging modes such as autonomous vehicles are expected to occur nationwide in the next 20 years. TNC and other emerging modes will trigger mode shift of other modes such as private vehicles that use curbside and parking as well as taxis and rental cars. The current utilization of TNC to and from BGR is limited, however, 10% growth over 20 years is considered as a conservative growth level compared with larger airports in more urban areas.

Table 4-6 Baseline Mode Share and Estimated Mode Shift

User Type	Baseline (2019)	Estimated Mode Shift Over 20 Years		
		Low	Medium	High
Private Vehicle Pick-Up/Drop-Off, Curbside	13%		-2%	-3%
Short-Term Parking	37%	-3%	-4%	-8%
Long-Term Parking	19%		-2%	-4%
Shuttle Lot Parking	1%			
Taxi	2%			-1%
TNC / Autonomous Vehicle	2%	+3%	+10%	+20%
Rental Car	24%		-2%	-4%

Table 4-6 Baseline Mode Share and Estimated Mode Shift

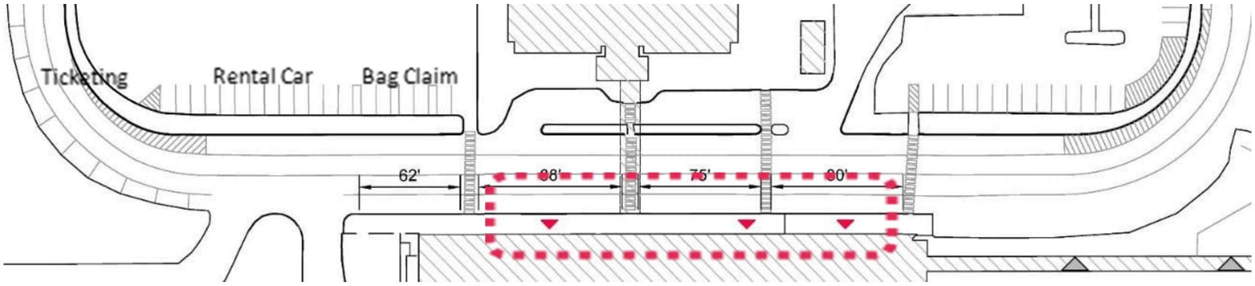
User Type	Baseline (2019)	Estimated Mode Shift Over 20 Years		
		Low	Medium	High
Public Transit	1%			
Shuttle (Hotel)	1%			
Total	100%			

The facility requirements are given in ranges due to these TNC growth scenarios.

4.8.2 Curbside Access

The curbside in front of the terminal building stretches 305 linear feet and serves as a pick-up/drop-off location for passenger vehicles, shuttle buses, taxis, TNCs, public transit, and coach buses. The dwell time study discussed in Chapter 2 Section 2.6.2.2 *Vehicle Parking* identified that during peak periods most of the congestion stems from private vehicle pick-up/drop-off. For example, passengers getting dropped off or picked up at the terminal by a friend or family member tend to have higher dwell times than those being dropped off via shuttle or via a TNC such as Uber or Lift. During peak periods the curbside is very congested, where only a portion of the 305 feet of available curbside is being used as passenger vehicles are congregating within the first 163 feet of frontage (see **Figure 4-10)** to pick up/drop off instead of pulling further down the curb and allowing additional vehicles to fill in behind.

Figure 4-10. Curbside Congestion (typical areas)



In addition to the key assumptions discussed above, **Table 4-7** summarizes the utilization rate of the curb and the dwell time of each user. It was assumed 20% of parking users use the curb to drop off passengers before they park. Shuttle Lot parkers access the curb via shuttle bus. The Airport is considering building a new consolidated rental car facility outside the terminal area. It requires that all rental car users access the curb via shuttle bus. These dwell times are industry standard for the optimum service level.

Table 4-7 Curb Utilization and Other Assumptions

User Type	% Using Curb	Dwell Time (mins)	Average Vehicle Occupancy (person)	Vehicle Length (ft)
Private Vehicle Pick-Up/Drop-Off	100	2.4	1.2	25
Short-Term Parking	20	2.4	1.1	25

Table 4-7 Curb Utilization and Other Assumptions

User Type	% Using Curb	Dwell Time (mins)	Average Vehicle Occupancy (person)	Vehicle Length (ft)
Long-Term Parking	20	2.4	1.2	25
Shuttle Lot Parking	100	1.2	15.0	40
Taxi	100	1.9	1.2	25
TNC / Autonomous Vehicle	100	1.9	1.2	25
Rental Car	100	1.2	15.0	40
Public Transit	100	1.0	15.0	40
Shuttle (Hotel)	100	1.2	10.0	40

The demand was estimated using the peak hour departing passenger forecasts and key assumptions. (See **Table 4-8**) Only peak hour departing/enplaning passenger demand forecasts were provided but the curb is shared by both arriving and departing passengers. The volume of arriving passengers in the same hour as departing passenger peak hour was estimated using the 2019 flight schedule and the number of arriving and departing aircraft seats in each hour. The curbside length requirements were estimated by applying the mode share to the vehicle demand and dividing the vehicle demand of each user by its vehicle length. (See **Table 4-9**) The number of required lanes was estimated using the total required curbside length and the industry-standard traffic flow rate at an airport passenger terminal curb. The range of requirements was provided to accommodate low and high TNC growth scenarios.

Table 4-8 Curbside Demand

	2021	2025	2030	2040
Peak Hour Departing Passenger Forecasts	150	244	659	770
Estimated Peak Hour Passenger Demand (Arrivals + Departures)	192	313	844	986
Estimated Peak Hour Vehicle Demand (Arrivals + Departures)	63	94 - 100	235 - 270	275 - 363

Table 4-9 Required Curbside Length and Number of Lanes

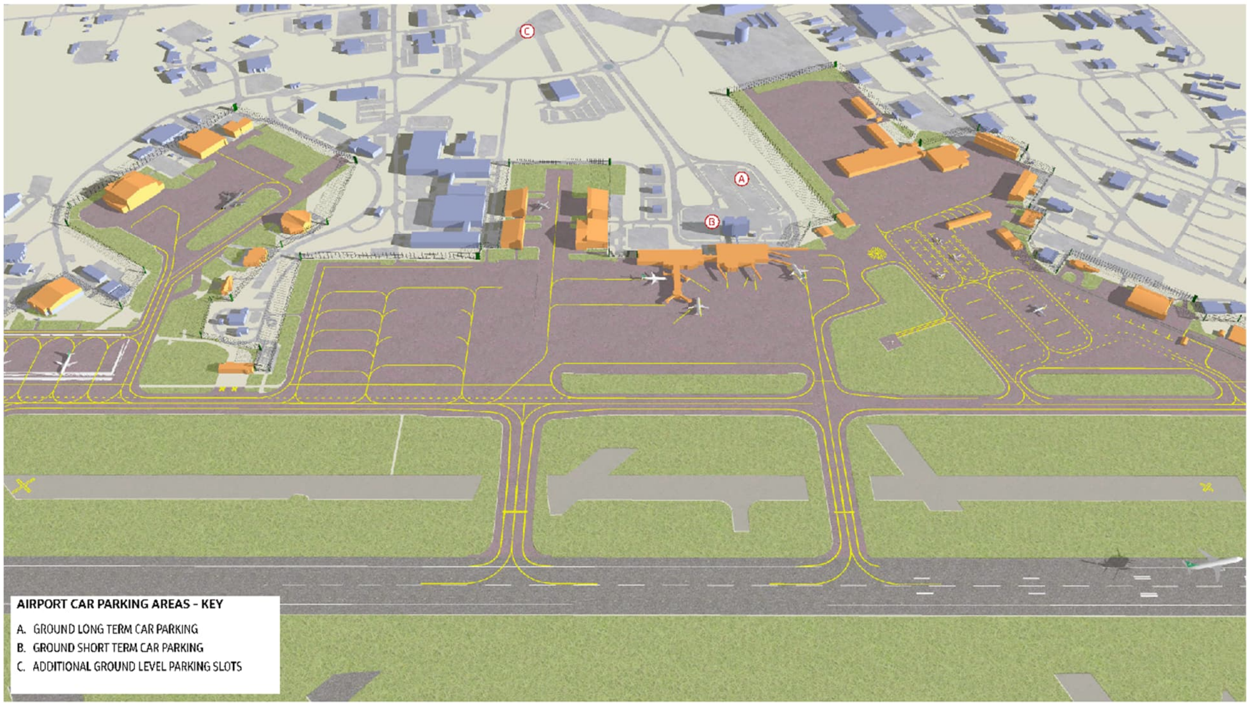
Requirements	2021	2025	2030	2040
Curbside Length (ft)	205	255 - 280	495 - 545	520 - 620
Number of Lanes	3	3	3	3

The existing curb is 305 feet as mentioned above. Therefore, the curb needs to be lengthened before the passenger demand exceeds the 2030 forecast level. The existing curbside has four lanes. Therefore, we do not anticipate the need for adding more lanes at the curbside as long as we can accommodate the required curb length in front of the terminal building.

4.8.3 Automobile Parking

There are several surface-level automobile parking lots at BGR that have a designated use such as long and short-term parking, employee parking, and parking associated with the rental car facilities (**Figure 4-11**). As previously discussed, these parking lots are reaching capacity during peak periods.

Figure 4-11. Airport Car Parking Areas



The base year utilization rate is typically used to estimate the peak hour demand of a parking lot. However, the utilization rate was not available, so it was estimated based on an analysis of the 2019 overnight occupancy data. The baseline requirement was established using the existing number of stalls at each parking lot and the estimated utilization rate of each lot. (See **Table 4-10**)

Table 4-10 Base Year Utilization and Baseline Requirements

Parking Lot	Existing Stalls	Base Year Utilization	Baseline Stalls Required
Short-Term Lot	172	90%	155
Long-Term + Shuttle Lots	1,123	75%	843
Rental Car Ready-Return	116	100%	172
Employee Lot	150	100%	200

According to the Airport, the employee lot is currently 30 to 50 stalls short. Therefore, the baseline requirements were increased by 50.

Currently, the rental car ready-return lot is located adjacent to the hotel parking lot. 56 additional ready-return spaces are accommodated at the east side of the hotel parking lot during peak time. Therefore, the baseline requirements were adjusted accordingly. In the future, these rental car stalls will be potentially accommodated at the consolidated rental car facility.

4.1.1.1 Long and Short-term Automobile Parking

Parking available to passengers includes short-term and long-term parking. Both lots offer an hourly and daily rate, long-term parking being the most economical choice of the two but in turn, it is located farther away from the terminal. Associated with the long-term parking lot is the more remote shuttle lot. During peak periods the shuttle lot is frequently utilized when the long-term lot gets full. The short-term parking lot tends to reach capacity more quickly during peak periods as it is located closest to the terminal.

The future long-term and short-term parking requirements were estimated using the baseline requirements described above, the total passenger demand forecasts, and the aforementioned key assumptions. The requirement analysis indicated that there will be a need for additional long-term and short-term lot parking spaces (see **Table 4-11**). The range of requirements was provided to accommodate low and high TNC growth scenarios.

Table 4-11 Long-term and Short-term Parking Requirements

Parking Lot	Existing Stalls	2025	2040
Short-Term Lot	172	170	200 - 210
Long-Term + Shuttle Lots	1,123	925 - 935	1,120 – 1,165

The existing parking facilities at the Airport are surface lots. The Airport recently conducted a parking study that included designs for a multilevel parking garage. A parking garage would be an efficient space-saving and revenue-generating solution to increase capacity without needing additional land. A garage will also improve the level of service to the passengers because it requires less walking distance from a car to a gate and also their cars are protected from sun, rain, and snow. Without a parking garage, it is estimated that an additional one acre of land will be needed for surface parking through the planning period. Locations for a parking garage along with designs and alternatives for additional parking will be discussed in a subsequent chapter.

Accommodations for additional passenger parking surface lots and a parking garage will be evaluated.

4.1.1.2 Employee Parking

Currently, the Airport is experiencing a shortage of employee parking. Other than Airport employees, the employee parking lot is used by the hotel employees, C&L Aviation, TSA officers, and US Customs and Border Patrol agents. The lot has 150 available spaces, but there is an immediate need for 30 to 50 more parking stalls. Therefore, the baseline requirement for employee parking was increased to 200. (See **Table 4-10**) Based on the analysis, the Airport will need additional spaces as the passenger demand forecast increases. (See **Table 4-12**) An additional one acre of land is required to support the need for more surface parking for employees through the 2040 planning period.

Table 4-12 Employee Parking Requirements

Parking Lot	Existing Stalls	2025	2040
Employee Lot	150	220	275

Options will be considered to increase employee parking.

4.8.4 Rental Car Facilities

All five of the rental car agencies that currently operate at BGR share a ready-return parking lot and a Quick Turnaround (QTA) parking lot. The ready-return lot is used for passengers to pick-up their rental car and return it. The QTA parking lot is used for servicing the vehicles in between rentals and has three buildings which are used for maintenance and storage.

As mentioned above, the return-ready lot requires overflow stalls at the hotel parking lot during peak periods. The rental car agencies need to expand their facilities to accommodate the future growth in passenger activities. The available space around the passenger terminal is limited for the rental car facilities to expand, so it is recommended to consider a remote consolidated rental car facility (ConRAC) at the Airport. A ConRAC is a complex that hosts all rental car functions and to be located away from the terminal building. A shuttle bus would take passengers to and from the ConRAC and the terminal. At the ConRAC, passengers will be able to drop off and pick up rental cars from their chosen agency. Establishing a ConRAC at BGR would be beneficial to both the rental car agencies and the Airport because the complex would provide a space for rental car agencies to expand while freeing up space in the terminal and curbside.

The estimated rental car facility requirements are summarized in **Table 4-13**. The range of requirements was provided to accommodate low and high TNC growth scenarios.

Table 4-13 Rental Car Facility Requirements

	Existing	2021	2025	2030	2040
Customer Service Area (ft²)	2,570	2,570	4,120 – 4,140	4,380 – 4,450	5,000 – 5,170
Quick Turn Around Area (acres)	1.6	1.6	2.5	2.7	3.1 – 3.2
Ready-Return Lot (acres)	1.1	0.6	1.2	1.3 – 1.4	1.6

Locations for a ConRAC will be identified and alternatives to expanding rental car facilities will be discussed.

4.8.5 Access Roads

In absence of a detailed traffic survey, the airport roadway requirements are estimated based on an analysis of the current and estimated peak-hour traffic volumes for the northbound and southbound of Godfrey Boulevard. The peak-hour traffic volume was generated with the estimated peak hour departing and arriving passengers, the mode share, and the average party size per vehicle.

The estimated peak hour traffic volume was compared to the assumed hourly link capacity to determine whether an acceptable level of service is and will continue to be provided. The maximum service flow rate was identified using the Airport Cooperative Research Program (ACRP) Report 40 *Airport Curbside and Terminal Area Roadway Operations* which provides hourly roadway capacities based on the assumed roadway free-flow speed as shown in **Table 4-14**. The free-flow speed of 35 miles per hour was used based on the existing posted speed limit on Godfrey Boulevard.

Table 4-14 Maximum Service Flow Rate

Criteria	Level of service				
	A	B	C	D	E
	Free-flow speed = 35 mph				
Minimum speed (mph)	35.0	35.0	34.0	34.0	33.0
Maximum volume/capacity ratio	0.26	0.42	0.61	0.80	1.00
Maximum service flow rate (passenger cars/ hour/lane)	410	670	980	1,280	1,600
Maximum flow (vehicles/hour/lane) (*a*)	330	540	790	1,030	1,290

Source: ACRP Report 40 Airport Curbside and Terminal Area Roadway Operations.

The requirements analysis reflects a desire to achieve the level of service (LOS) "C". LOS C is considered the standard for planning an airport roadway. The roadway requirement analysis of Godfrey Boulevard is shown in **Table 4-15**.

Table 4-15. Access Roadway Requirements

.	2021	2025	2030	2040
Peak Hour Departing Passenger Forecasts	150	244	659	770
Estimated Peak Hour Passenger Demand (Arrivals + Departures)	192	313	844	986
Estimated Peak Hour Vehicle Demand (Arrivals + Departures)	168	269 - 271	717 - 718	832 - 836
Estimated Number of Lane(s) Required for Each Way	1	1	1	2

The southbound roadway should be sufficient to the end of the planning horizon. However, the northbound roadway where currently narrows down to one lane may need to be expanded for the 2040 demand.

4.9 Airspace

An aerial obstruction survey was conducted for the Runway 15 Part 77 Approach Surface in 2020. The Runway 33 Approach Surface was surveyed in 2018 and portions of the Transitional Surface were captured as well. Data from the 2004 FAA Airport Obstruction Chart was used as a supplement to identify documented obstacles to the Conical, Horizontal, and Transitional Surfaces. Thousands of objects under the Approach Surfaces were identified by the aerial surveys, most of which were vegetation. To better manage the data captured the objects were filtered by penetration amount and separated into groups based on proximity to each other. Only objects that were within -10' of penetrating a surface or greater were considered in the analysis. The few obstruction points identified by the 2004 FAA Airport Obstruction Chart were analyzed individually.

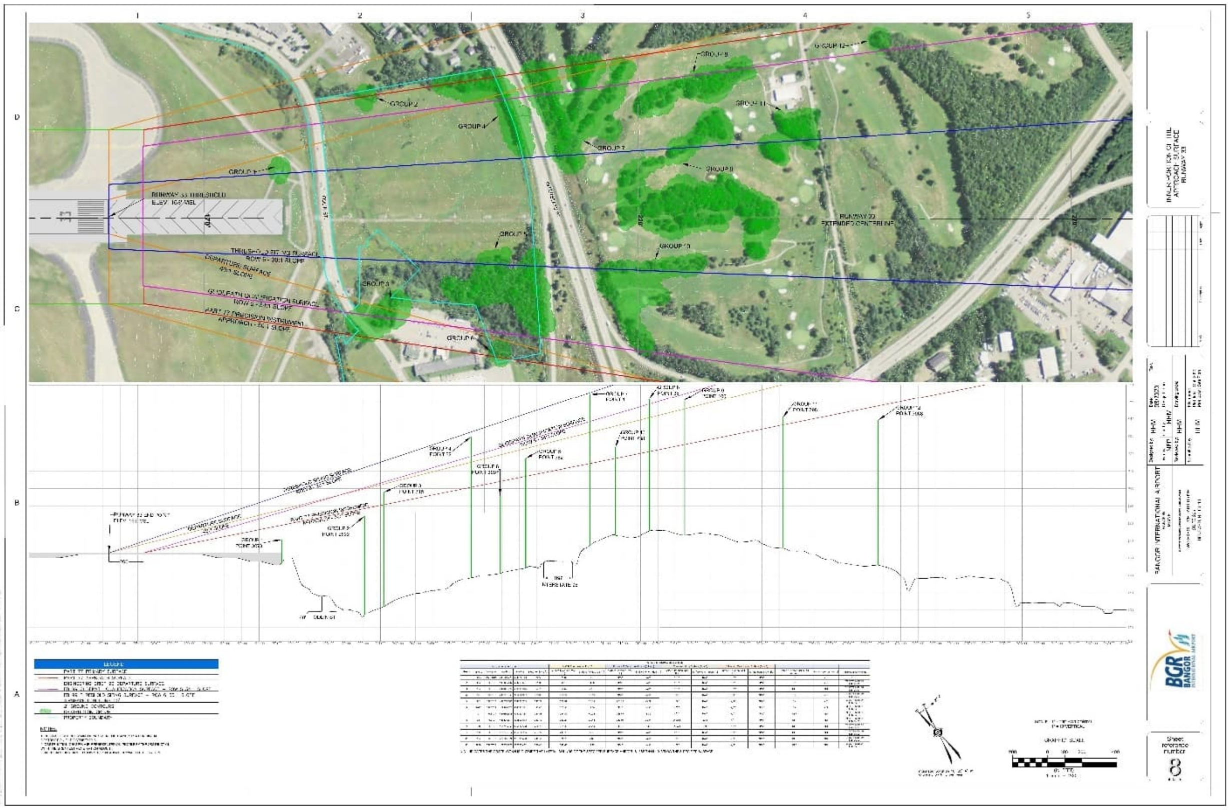
4.9.2 Part 77 Surfaces

Both Runway 15 and Runway 33 have an Approach Surface that begins 200' from the runway end point that has slope of 50:1 for the first 10,000' and a 40:1 slope for the remainder 40,000'.

This is because both runway ends are equipped with a precision instrument approach. The aerial surveys captured vegetation and manmade objects under the Part 77 Approach Surface.

The Approach surface to Runway 15 was found to be free of obstructions. There were several groups of obstructions found on Runway 33 (**Figure 4-12**).

Figure 4-12. Runway 33 Obstructions



4.9.3 TERPS Surfaces

There are three TERPS surfaces from FAA Engineering Brief 99A that apply to both ends of Runway 15-33.

The 2020 obstruction data captured for Runway 15 found that there are no penetrations to the Threshold Siting Surface, Glidepath Qualification Surface, and the Departure Surface. The 2018 obstruction data for Runway 33 did, however, result in penetrations to the Departure Surface and Threshold Siting Surface. Penetrations to the Departure Surface can potentially be mitigated through modifying the existing departure procedures for that runway end. However, penetrations to the Threshold Siting Surface will have operational impacts to the airport. If not mitigated, obstructions to the Threshold Siting Surface will result in a displaced threshold and reduced approach minimums. Further discussion about potential options for obstruction mitigation will occur in later chapters of this Master Plan.

BGR will develop a long-term plan to remove obstructions identified to the Runway 33 Departure, Threshold Siting and Glidepath Qualification Surfaces as shown in Figure 4-12.

5. Sustainability Program Initiatives

5. Sustainability Program Initiatives

As part of the Master Plan update, BGR has sought to integrate environmental sustainability in ways that reduce the environmental footprint of the airport, reduce environmental risks and drive value for tenants and the travelling public. A high-level materiality screening was performed to prioritize the specific infrastructure (vertical and horizontal) and airport operations that provide the greatest opportunities to drive environmental sustainability performance. Priority opportunities were further synthesized into thematic initiatives for incorporation into the relevant sections of the Master Plan. This process also revealed opportunities beyond the Master Plan to drive sustainability performance; these are included for future consideration.

To frame the environmental sustainability planning effort, the following guiding principles were developed:

- Environmental sustainability is above and beyond environmental compliance; the review of sustainability opportunities it is not intended to drive compliance but – as a secondary benefit – can highlight priorities in the overall compliance approach.
- Environmental sustainability drives business value through reduced risks, costs savings for BGR and tenants, and by enhancing the passenger experience. Priority is given to initiatives that drive the most value.
- BGR should have an aviation specific, locally relevant signature environmental sustainability initiative that reduces the environmental footprint of BGR, reduces risks, provides costs savings, increases employee engagement, and enhances the traveler experience. This initiative should enhance the reputation of the airport with the local community and provide a leadership opportunity for BGR in the aviation sector.
- Effective implementation of environmental sustainability requires that, in addition to the specific practices implemented as part of the Master Plan, management of these assets must be integrated into airport policy, business processes (e.g., operations and maintenance), public affairs/communications, tenant coordination and stakeholder engagement efforts.

5.1 Environmental Sustainability Vision Statement

The environmental sustainability vision statement developed for BGR that has guided these planning efforts is “Sustainability drives business value, enhances the passenger experience and betters our community and the environment.” This vision statement provides important insights regarding the role environmental sustainability in master planning can serve in the development, operations, and marketing of aviation facilities.

BGR Environmental Sustainability Vision Statement

Environmental sustainability drives business value, enhances the passenger experience and betters our community and the environment

5.2 Sustainability Mission Statement and Strategic Objectives

BGR Environmental Sustainability Mission Statement

Environmental sustainability will be integrated into all aspects of airport planning and operations to drive cost savings, reduce environmental impacts and risks while enhancing passenger airport experience

The vision statement communicates BGR's central belief regarding the importance of environmental sustainability in the development and operations of the airport. The mission statement defines how this vision will be achieved. For BGR, the environmental sustainability mission statement is "Environmental sustainability will be integrated into all aspects of airport planning and operations to drive cost savings, reduce environmental impacts and risks while enhancing passenger airport experience." The planning intent is to achieve this mission in ways that drive the best value for BGR based on the business case elements defined above. Based on this intent, the following strategic objectives were established:

- Achieve measurable progress in the areas of water stewardship and climate protection
- Leverage sustainability performance to drive cost efficiencies and manage operational and reputation risks
- Integrate sustainability performance into the passenger experience at BGR in a way that adds enjoyment for the traveling public

5.2.1 The Business Case for Sustainability

Sustainability drives business value in a variety of ways:

- ***Cost Savings and Avoidance:*** Implementing measures that improve resource efficiencies in the areas of water, energy and stormwater can reduce the environmental footprint of the airport and provide long-term cost savings and cost avoidance. Cost reductions are experienced when the efficiency improvements reduce the overall use of resources compared to current resource usage. This is preferable. In cases where resource consumption is increasing to accommodate business growth, resource efficiencies may not reduce the environmental footprint but do provide cost avoidance by lowering the resource intensity per unit of operation and slow the growth in the environmental footprint.
- ***Risk Management***: There are several ways that improved environmental sustainability performance can improve operational and reputation risk management. These risks can include:
  - *Operational Supply Reliability*: Increasing resource efficiency can increase facility resilience to disruptions and variations in supply by extending the duration that stored supplies can meet business needs.
  - *Regulatory*: Certain sustainability strategies and practices can drive sustainability performance while reducing the likelihood of some risk events that can cause regulatory compliance challenges. For example, green and natural infrastructure solutions can increase the pollutant removal capacity of the stormwater management system while creating environmental benefits and lower operational environmental footprints. This higher pollutant removal capacity can decrease the likelihood of stormwater pollutants leaving airport property. Not only can this reduce the risk of a violation of existing regulatory requirements, but it may also help BGR meet stricter regulatory requirements in the future.

- *Community Relations and Airport Reputation*: Sustainability strategies and practices that reduce the likelihood and/or consequences of an environmental risk also lower the likelihood of negatively impacting the surrounding community and creating community relations problems. Given the ubiquitous presence of social media and other communications platforms, organizations and individuals with negative perceptions have global communication capabilities that can amplify local issues to national and international attention. Depending on the specifics of any situation, these can have lasting negative impacts on the airport's relationship with the local community and its reputation.

- ***Positive Community Relations***: Sustainability strategies and practices that align with community interests and local government priorities foster positive relationships with local stakeholders. Value is increased when these actions also deliver costs savings and/or reduce risks for the airport.
- ***Passenger Experience***: There is increasing societal interest in sustainability and – by extension – the traveling public. This growing interest presents an opportunity to enhance the travel experience of passengers with sustainability strategies and practices that are tailored to the traveling public. For example, mobile device charging by renewable and clean energy sources. Another example is to create opportunities for respite in areas that leverage locally relevant and ecologically inspired designs where travelers can congregate and relax while in transit (e.g., green infrastructure that treat stormwater, create habitat and have urban design overlays that travelers can enjoy).

Each of these elements of value were considered when determining how best to integrate environmental sustainability into the master planning process, from both an infrastructure and operations perspective.

5.3 Approach to Sustainability in Airport Master Planning

The process employed to identify the optimal sustainability performance priorities for inclusion in the master plan included the following steps:

- Conduct an energy and water use assessment across BGR facilities
- Conduct a qualitative and rapid materiality screening of the environmental footprint, risks and opportunities associated with the operations and infrastructure at BGR
- Synthesize and prioritize the results of the materiality screening into a discrete set of initiatives for consideration that would improve the sustainability performance at BGR in ways that support achievement of the established strategic objectives
- Identify and further develop the highest priority initiatives for inclusion in the master plan
- Identify other recommendations to improve sustainability performance at BGR for future consideration

5.3.1 Energy and Water Use Assessment

As part of the master planning effort, an energy audit was conducted at the airport to observe current facility operations. The primary goal of the assessment was to identify energy and water conservation measures (ECMs) to enhance energy and water resource efficiency for cost savings, carbon footprint reduction and passenger benefits.

Understanding the quantity and manner in which energy and water is consumed is the first step in controlling related costs. A baseline analysis was used to estimate the distribution of energy and water consumption within each building based on historical usage data as well as observed conditions. Using the baseline analysis as well as information gathered onsite, several potential ECMs were identified. Energy and water savings estimates were developed through a combination of energy models and spreadsheet calculations, including the use of eQUEST, DOE-originated tools, vendor data, and other sources, depending on the opportunity. Conceptual level cost estimates were developed for each measure in order to evaluate economic viability based simple payback periods. Results of the evaluation were then used to develop a prioritized list of recommended measures that align with the Airport's sustainability vision, mission and goals.

Further details of the energy and water use assessment, evaluations and results are provided in The Energy Audit Report (**Appendix E**). The report provides additional detail including a summary of the findings of the energy and water audit, analysis of historical energy and water consumption data, baseline analysis and ECM development and descriptions.

This type of detailed screening or evaluation process is specific to the energy and water use assessment and initiatives; it is generally not appropriate for the other sustainability focus areas where the recommendations primarily include initiatives to conduct further studies to better define the baseline conditions, initiatives to establish programs, development of trials to determine the feasibility/effectiveness of initiatives, and initiatives that are environmental compliance and sustainability best practice for airports embarking on development of a sustainability plan.

5.3.2 Qualitative Environmental Materiality Screening of BGR Operations and Infrastructure

A qualitative rating approach was developed to screen the materiality of the potential environmental footprint, risks and passenger engagement opportunities for airport operations and infrastructure. The purpose was to identify priorities that could be synthesized into planning initiatives for inclusion in the updated BGR Master Plan and to identify additional recommendations that will not be incorporated into this Master Plan update but could be considered in the future. The list of aspects identified for consideration were categorized into two main groups:

- Airport Operations and Infrastructure
- Environmental Footprint, Risks and Opportunities

A pair-wise comparison was completed by a team of sustainability experts and airport planners. The team established a qualitative rating of the environmental footprint, risks and opportunities for each operation and infrastructure aspect. These qualitative ratings were established using the following scale:

- *High Relevance*: This rating was generally given to operations and infrastructure aspects that were judged to be a relatively large part of the airport's environmental footprint, environmental risk profile and/or represented a significant opportunity (either through passenger or tenant engagement)
- *Moderate Relevance*: This rating was generally given to operations and infrastructure aspects that were judged to have a noteworthy (but not major) contribution to the airport environmental footprint and/or risks. A moderate rating was also used if enhancing the sustainability performance of a specific operation or infrastructure aspect would create communications opportunities targeting passengers and/or tenants.
- *Low Relevance*: This rating was generally given to operations and infrastructure aspects that were judged to have minor or negligible effect on the airport environmental footprint and/or risks as well as for aspects that offered very little opportunity to engage the traveling public.

After each pair-wise comparison was rated, prioritization was developed by summing the ratings across the full range of aspects in each of the two main categories. The 65th percentile (top 1/3) in each group was established as an initial screening threshold for aspects that should receive additional consideration. The results of prioritization include a range of concepts, some of which can be addressed in the master plan and others that may be useful to inform other aspects of airport planning and ongoing environmental program management.

The following table presents the results of this prioritization. The highlighted items represent concepts that were identified for further development in the master plan. The other prioritized items listed are primarily operational aspects that are better managed through existing environmental programs. Additional initiatives were considered but did not meet the minimum screening level threshold at this time; some due the fact that the airport is already managing them well, such as water consumption. These are also shown in the table below for reference.

Table 5-1. Materiality Screening and Priority Initiatives

BGR and Tenant Operations and Infrastructure	Environmental Footprint, Risks, and Opportunities
Operations	**Environmental Footprint**
• Aircraft Fueling	✓ Carbon Emissions/Energy Use
✓ Aircraft and Pavement Deicing, and Snow Management	• Fuel Use
• Hazardous Waste Management	✓ Stormwater Runoff Quality
• Aircraft Rescue and Firefighting	- Stormwater Runoff Quantity/Flooding
- Solid Waste Management (Non-Hazardous)	- Wastewater Discharges
- Rental Vehicle Washing	- Chemical Use: Non-Hazardous
- Landside Vehicle Traffic	- Chemical Use: Hazardous
- Baggage Handling	- Solid Waste Generation
- Ground Support Equipment	- Habitat, Wildlife and Ecosystems
- Aircraft Maintenance	**Risks**
- Field Maintenance	✓ Polluted Stormwater Runoff
Infrastructure	• Stormwater Permit Compliance
✓ Terminal Buildings and airport support facilities	• Air Emissions – Title 5 Compliance
✓ Landside Parking Lots & Roads	• Spills & Leaks
✓ Airside Ramps, Roads and Runways	- Soil and Groundwater Contamination
• Car Rental Facility	- Community Perceptions
• Wastewater Collection System	**Opportunities**
✓ Stormwater Management System	✓ Passenger Sustainability Engagement
• Fuel Hydrant System	• Tenant Sustainability Engagement
- Airside Lighting	• Cost Savings
- Fuel Storage Tanks	• Risk Reduction
- Water Distribution System	

Table Legend: ✓ Identified for further development in the master plan • Priority item to be managed through existing programs - Did not meet minimum screening threshold for further consideration

It is important to emphasize that the qualitative rating approach and prioritization was designed to identify opportunities to integrate sustainability into the updated master plan for the airport. The process did not include detailed quantification of environmental footprints, detailed review of BGR's environmental compliance program or detailed review of existing infrastructure elements. It should not be inferred from this prioritization that there are environmental compliance challenges at the airport (an environmental audit would be necessary to make this determination).

5.3.3 Synthesis of Master Planning Sustainability Themes

The operations and infrastructure aspects as well as the environmental footprint, risks and opportunities that were prioritized were further developed to provide coherent planning themes for integration into the master planning process. The table below provides the summary of the priorities that were used to develop sustainability master planning themes.

Table 5-2. Sustainability Master Planning Themes

Priorities for Master Planning	Priority Focal Points		
	Footprint	Risks	Opportunities
Aircraft and Pavement Deicing and Snow Management	▪ Stormwater Runoff Quality ▪ Wastewater Discharges ▪ Chemical Use ▪ Habitat, Wildlife & Ecosystems	▪ Polluted Stormwater Runoff: Environmental Impacts & Community Perceptions ▪ Wastewater Discharge & Permit Compliance	▪ Nature-Based Solutions with Lower Operational Expenses that Provide Sustainability Co-Benefits ▪ Tenant Sustainability Engagement
Stormwater Management System	▪ Stormwater Runoff Quality ▪ Stormwater Runoff Quantity ▪ Habitat, Wildlife & Ecosystems	▪ Polluted Stormwater Runoff ▪ Stormwater Permit Compliance ▪ Community Perceptions	▪ Nature-Based Solutions ▪ Stormwater Fee Reduction ▪ Passenger Sustainability Engagement ▪ Tenant Sustainability Engagement
Terminal Buildings and Airport Support Buildings	▪ Carbon Emissions & Energy Use ▪ Water Use ▪	▪ No Material Risk Identified During Screening Process	▪ Lower Operational Expenses ▪ Passenger Sustainability Engagement
Landside Parking Lot & Roads	▪ Stormwater Runoff Quality ▪ Stormwater Runoff Quantity	▪ Polluted Stormwater Runoff ▪ Stormwater Permit Compliance ▪ Community Perceptions	▪ Nature-Based Solutions ▪ Stormwater Fee Reduction ▪ Passenger Sustainability Engagement ▪ Tenant Sustainability Engagement
Airside Ramps, Parking, Roads & Runways	▪ Stormwater Runoff Quality ▪ Stormwater Runoff Quantity	▪ Polluted Stormwater Runoff ▪ Stormwater Permit Compliance	▪ Nature-Based Solutions ▪ Stormwater Fee Reduction

5.4 Airport Sustainability Master Planning Themes

Based on the analysis approach described above, three sustainability master planning themes were developed for BGR. The following paragraphs summarize the key elements for each theme.

5.4.1 Sustainable Stormwater and Deicing Management

The objective of this planning theme is to reduce the volume and improve the quality of stormwater runoff. This theme encompasses three of the priority infrastructure aspects and would reduce environmental, regulatory and community perception risks.

- ***Target Areas:***
  - ***Operations:*** Aircraft and pavement deicing and snow management.
  - ***Infrastructure:*** Landside parking and roads; airside ramps, parking roads and runways; stormwater management system.
- ***Specific Practices to Scale in the Master Plan***: These would be integrated into or adjacent to parking lots, roads, runways, ramps and other paved impervious surfaces.
  - Impervious surface removal or conversion to pervious
  - Green stormwater infrastructure (e.g., bioswales, bioretention, filter strips, submerged gravel wetlands)
  - Natural treatment systems for stormwater impacted by deicing materials (e.g., constructed treatment wetlands)
  - Diversion of deicing pad wastewater from POTW to natural treatment systems (e.g., constructed treatment wetlands)
  - Urban design overlays to select green stormwater infrastructure to provide places of respite and relaxation to passengers and BGR/tenant employees
  - Potential improvements to existing stormwater management features (e.g., detention ponds/basins, wetland cells, swales, and channels)
  - Modernize the deicing pad

- ***Rationale:***
  - BGR currently has a stormwater utility fee of over $200k per year which is a function of the amount of impervious surface. Removal of impervious surfaces has a direct (1:1) reduction in stormwater fee (currently $11 per 1,000 SF). Green stormwater infrastructure solutions provide up to a 71% stormwater fee reduction or credit for the areas that drain to the practices as shown in Figure **5-1**.
  - Deicing activities (pavement and aircraft) can impact stormwater runoff quality creating an environmental, regulatory and community risk. The incorporation of green stormwater infrastructure and nature-based treatment systems offer an opportunity to lower operational expenses and create environmental conservation benefits.
  - When integrated with urban design, green stormwater infrastructure can provide opportunities to enhance the passenger experience as well as the workplace environment for BGR and tenant employees.

Figure 5-1. Stormwater Fee Reduction Schedule

System Description	% Credit
Subsurface Gravel Wetland	71%
Porous Asphalt with Sand Filtration	64%
Infiltration Basin/Trench	57%
Sub-surface Retention/Filtration	54%
Wooded Buffer (meets DEP criteria)	54%
Bioretention/Rain Garden	53%
Underdrained Swale/Filter Strip	53%
Meadow Buffer (meets DEP criteria)	50%
Rooftop Greening/retention	40%
Surface Retention Pond	28%
Surface Detention Pond	26%
Sweeping program (with contract)	7%
Sand & Salt Management Plan	6%
Catch Basin cleaning (with contract)	6%
Filtration (tree box or dripline)	5%
Other Low Impact Development	TBD

Source: City of Bangor stormwater program (https://www.bangormaine.gov/filestorage/422/1924/Stormwater_Credit_Calculation_Revised_20190731.pdf)

5.4.2 Building Energy and Water Use Efficiency Improvements

The primary objective of this planning theme is to reduce the carbon and water footprints of the terminal buildings and critical airport support facilities. This theme would increase energy and water resource efficiency to lower operational costs and enhance passenger experience.

- ***Target Areas:***
  - ***Operations:*** Facility management and operations and maintenance practices.
  - ***Infrastructure:*** Terminal buildings and airport support facilities
- ***Specific Practices to Scale in the Master Plan***: These would be integrated into the existing buildings either as stand-alone measures or as part of larger planned renovation projects.
  - Energy efficient lighting systems and controls, such as LED fixtures and occupancy and daylighting controls
  - Low-flow water fixtures, such as faucet aerators, and low-flow toilets and urinals
  - HVAC system upgrades, including high efficiency natural gas condensing boilers, infrared heating systems, and retrocommissioning (RCx)of existing systems.
  - Building envelop upgrades (i.e., dynamic glass at the terminal buildings)
  - Large scale Solar PV
- ***Rationale:***
  - BGR uses over 33,000 million British Thermal Units (MMBtu) of energy annually, including 4.6 megawatt-hours (MWh) of electricity, with the remaining usage primarily attributed to fossil fuels used for heating. The total annual cost is approximately

$780,000. Improving energy efficiency will reduce operational expenses as well as reduce BGR exposure to increasing energy unit costs.

- Annual potable water consumption for BGR is estimated to be 2,145 kilogallons per year, over $11,200 annually. BGR is also charged for wastewater to the sewer, which is an additional $30,300 or more per year. Improving water efficiency will reduce operational expenses as well as reduce waste streams to the municipal wastewater treatment plant.
- Energy and water efficiency improvements focused on systems that passengers interact with would offer the opportunity for sustainability messaging that enhances the travel experience and BGR's reputation
- Lowering the overall water and carbon footprint provides demonstrable sustainability performance that can be communicated and enhance BGR's reputation.

5.4.3 Passenger Sustainability Engagement.

The objective of this planning theme is to leverage the above themes to enhance the travel experience for passengers flying in and out of BGR.

- ***Target Areas:***
  - ***Operations:*** N/A
  - ***Infrastructure:*** Airport entrance roads, parking lots and terminal buildings.
- ***Specific Practices:***
  - Green stormwater infrastructure along roadways (e.g., Godfrey Blvd. median) to create a natural aesthetic and overall enhancement to the landscape architecture for public roads leading into and out of BGR property.
  - Urban design overlays onto green stormwater infrastructure practices located in areas of passenger foot traffic (e.g., parking lots). These areas would provide high sustainability performing places of nature-inspired respite.
  - Water and energy efficient utilities accessed by passengers at BGR (e.g., water fountains, sinks, toilets, charging stations, waiting areas)
  - Signage that communicates the sustainability benefits of the various practices.
- ***Rationale:***
  - Improving sustainability performance is increasingly a preference of the general public and – by extension – the traveling public.
  - Green stormwater infrastructure practices deliver multiple forms of value; including enhanced passenger experience, reduced environmental footprint, environmental benefits, operational cost efficiencies and improved risk management against stormwater pollution.

5.5 Specific Master Plan Recommendations

This section provides detailed descriptions of the specific project recommendations; some can be implemented immediately and other require additional development and analysis.

5.5.1 Solar Parking Canopies

Airport interest in solar energy as an advanced technology is growing rapidly. Currently, over 20 airports in the United States have solar projects on site including Boston Logan, Denver

International, Fresno Yosemite International, Metropolitan Oakland International, Meadows Field (Bakersfield), and Albuquerque International Sunport. Notably, the Sanford airport has the largest solar project in Maine and the largest solar array of any airport in the United States.

Solar energy at airports provides a variety of benefits, including a reduction in airport operating costs, a demonstration of the commitment to sustainable development, and an improved customer satisfaction and experience. For Bangor International Airport (BGR) in particular, solar power generation has unique business and public policy values that include:

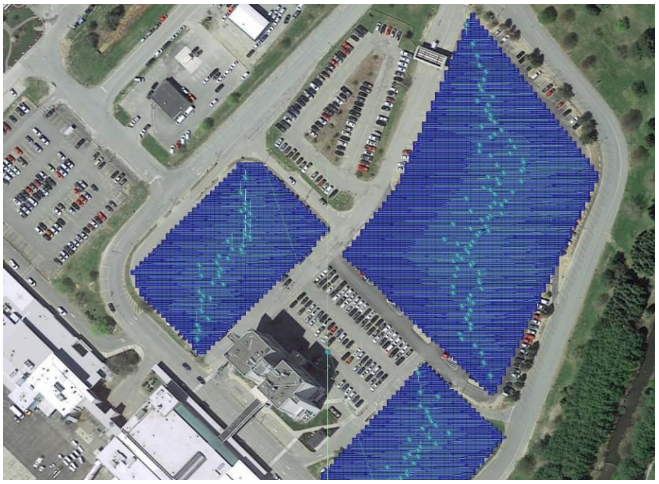
- Solar energy requires no fuel, which stabilizes long-term power prices providing economic and security benefits.
- Solar energy provides on-site power giving the user more control over power supply.
- Solar energy avoids emissions providing local and regional benefits.
- Solar energy has broad public appeal and is seen as an investment in the future.
- Solar energy installation can have secondary uses and benefits such as solar parking canopies for Airport staff and customers.

Airports may not have substantial capital for solar projects, but they are abundant in parking areas, land, and buildings connected to regional infrastructure. This can lead to cost-effective investment opportunities in solar project development for both BGR and 3rd party developers and financiers. The FAA supports solar projects at airports and has developed guidelines for its development (as example see attachment: *Technical Guidance for Evaluating Selected Solar Technologies on Airports* FAA 2018).

5.5.1.1 Solar PV Parking Canopy Installation

BGR has approximately 12 acres of parking area which is uncovered and serves staff and customers with both short-term and long-term parking. One viable option for a secondary use of this space is for the installation of solar parking canopies. Solar canopies have minimal impact to operations, utilize and enhance existing usage and are readily installed in module form. These types of canopies are now common in airport, train and commercial parking areas throughout the United States and have the additional benefit of improving customer experience by protecting vehicles from weather events.

Figure 5-2. Solar Parking Canopy Locations at BGR



The latest electric energy consumption data from Emera (Versant Power) shows BGR consumes 4.6 million kWh of electricity at $620,000/yr. Using three of the parking lots at BGR (as shown in Figure 5-2), the solar PV parking canopies at a capacity of 4.83 MW DC and 3.87MW AC could generate about 4,700,000 kWh per year of power. This is sufficient to offset all of BGR's electricity usage.

Solar parking canopies are typically 13'6" to 16' in height to allow vendor trucks and maintenance vehicle access. The facility can be full coverage of a large parking area or over specific parking lanes. Snow eventually melts or slides off into traffic lanes or into the center lane between parked cars for easy removal by plows. The dark colors of solar panels work to melt snow and ice off them, usually in at most a few days. The panels can also be translucent to allow daylighting.

The solar panels will require anti-reflective coatings to address reflectivity, glint and glare concerns for aviation due to the proximity to the airfield. An analysis of impact using the most recent version of the Solar Glare Hazard Analysis Tool (SGHAT) from Sandia Labs will be mandatory with any design submission.

5.5.1.2 Net Energy Billing (NEB) in Maine

Renewable power projects in Maine are allowed to self-generate electricity for use at a facility, and when additional power is generated that is not immediately needed by the facility the excess power is metered and sent into the local grid, and the customer credited on their monthly bill. The customer uses the local utility as a "battery" for this excess power- and the term used for this is Net Metering or Net Energy Billing (NEB).

The Maine PUC currently (as of 2019) has responsibility for regulations regarding NEB. Customers (including industrial, municipalities and other government entities) may own their own project, share a project with other customers, or be third party developed and operated. The renewable power generation facility may be located on the customer's property or on another property within the same utility service territory. There are two NEB programs that BGR qualifies for:

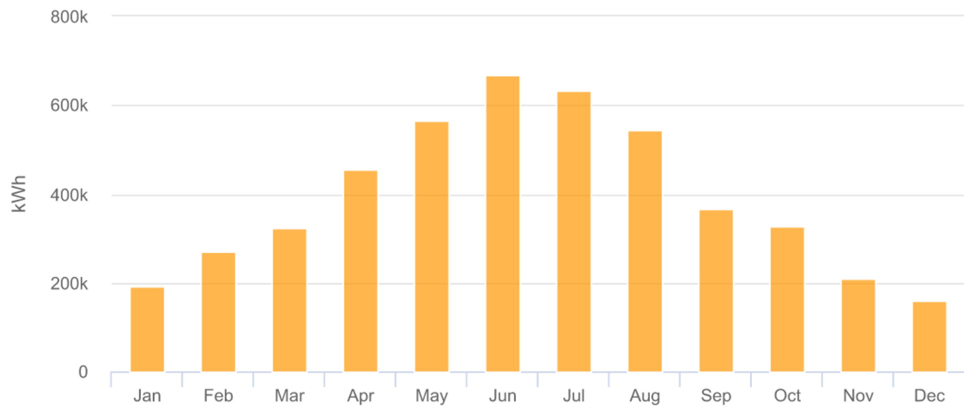
1. NEB kWh Credit Program provides *kWh credits* on electricity bills.
2. The Tariff Rate Program provides *dollar credits* on electricity bills.

The monetary value amount of these credits is determined annually by the Maine PUC. For current rates (calendar year 2021) for Versant Power, BGR electricity provider is $0.143/kWh for a medium size commercial customer and $ 0.131/kWh for large commercial customer. The renewable power project is limited to a maximum size of 5 Megawatts (MW). The credits (kWh or $) must be used within 12 months or they expire.

The renewable power project also creates ***Renewable Energy Credits*** (REC) for electricity produced. The RECs are tradable, non-tangible commodities in 1 MWh increments. They represent proof that 1 MWh of electricity was generated from a renewable energy resource and was utilized. The value of these credits is determined by the regional market for utilities to meet the Renewable Portfolio Standard requirements, which usually demands that utilities have a certain percentage of their energy mix by renewable generation.

The monthly energy production rate for the recommended Solar Canopy installation at BGR ranges from 180,000 kWh in December to over 600,000 kWh in June and July, as seen in **Figure 5-3**. Using Maine's Net Energy Billing would treat the local utility as a battery storage system, and excess kWh production in the summer would offset via credits the lower kWh production in the winter.

Figure 5-3: BGR Solar Parking Canopy Monthly Solar Output



Implementation Funding Options

The most recent (Early 2021) installed pricing for solar PV parking canopy systems installed in the Northeast US is $2.76/watt (DC). BGR could directly purchase solar projects through a bidding process and using its own financial vehicles could self-finance the projects within a 10 to 15-year term. The solar projects have a functional lifetime of at least 25 years. BGR would own the equipment and would be responsible for contracting and/or supplying O&M services.

Another option is to allow the solar project bidders to submit a Power Purchase Agreement (PPA) with a Termination Schedule of Values. In this approach the successful bidder permits, builds, finances, operates, and maintains the project and sells the RECs. BGR would contract to provide the project space and to purchase the generated electricity. This method would eliminate the need for significant BGR capital funds, should lower the cost of electricity during the term of the contract (producing savings), eliminate any risk with selling the RECs, and allow the opportunity for BGR to purchase the solar system at a greatly reduced cost at a later date (when most of the Federal Incentives are utilized). The use of a PPA would eliminate the need for BGR to obligate capital for the construction of the arrays.

If BGR choses the PPA option, it is highly recommended that similar to the Delaware River Port Authority (New Jersey), the Steam Ship Authority (Massachusetts) and other large public agency solar projects at their properties, that an Owners Program Manager (OPM) be contracted to monitor all construction activity and assist in ensuring all safety, logistical and equipment specification requirements are met.

Financially, the two financing approaches have significant differences compared to self-financing which are strongly influenced by the availability and usage of multiple incentives that include:

- **Federal Investment Tax Credit (ITC):** The Federal Investment Tax Credit (ITC) was originally established by the Energy Policy Act of 2005 to promote the installation of renewable power sources. Rather than a Deduction which is used to offset income, it is a Credit- and directly reduces income tax. There are no restrictions to the size of the project and the current value is 26% of costs.
- **Modified Accelerated Cost Reduction (MACRS)** Under the federal Modified Accelerated Cost-Recovery System (MACRS), businesses may recover investments in certain property through depreciation deductions. The MACRS establishes a set of class lives for various types of property, ranging from three to fifty years, over which the property may be depreciated. Solar photovoltaic systems are classified as five-year property. Note: The Consolidated Appropriations Act, signed in December 2015, extended the "placed in

service" deadline for bonus depreciation. Equipment placed in service during 2019 can qualify for 30% bonus depreciation. The ability to depreciate the solar project within 5 years is about equivalent to a 10% credit value of the overall capital cost.

BGR is not a for-profit entity, and as such has no federal tax burden. Therefore, BGR cannot utilize the ITC or MACRS incentives. However, a For–Profit company that structures a Power Purchase Agreement can utilize the ITC and MACRS and in doing so reduces it's after tax capital cost by about 36%.

The typical PPA structure would require no upfront capital cost from BGR, would lower the price of electricity to BGR, and would allow a buyout of the system using a predetermined termination value. The ITC requires that the owner of record possess the solar system for a minimum of 5 years, and the MACRS also is a 5-year value. So, termination values for the first five years are usually extremely high and are typically much higher than the original capital cost- which reflects the lost financial gains of the financier/owner.

5.5.2 Sustainable Stormwater and Deicing Management

Key strategies for stormwater management at BGR are focused on Green Infrastructure (GI) and pavement removal opportunities. Green infrastructure is an alternative approach to water management that protects and restores the natural water cycle. GI for stormwater management can also help to reduce potential damages property and infrastructure due to flooding during heavy rain events. GI is effective, economical, and enhances community quality of life. For BGR, implementing the proposed solutions will provide water quality pollutant load reductions, runoff volume reduction, improved water quality protection, and stormwater fee reduction (53 – 71%), as well as enhanced visitor experience (aesthetics) and Airport reputation.

For deicing management, the primary goals are to optimize infrastructure and operations to minimize compliance risk and environmental damage due to deicing focusing on the following key strategies:

- Optimize use of glycol via SMART technology, glycol recover
- Explore glycol alternatives including heating (perhaps with waste heat, seasonal thermal energy storage)
- Update SOPS's to minimize release into environment

5.5.2.1 Green Infrastructure Opportunities at BGR

To identify the key GI strategies for BGR, the airport was divided into eight project zones, A through H (**Figure 5-4**), to allow for a more focused evaluation of opportunities in each area.

Figure 5-4. Potential Green Infrastructure (GI) Locations

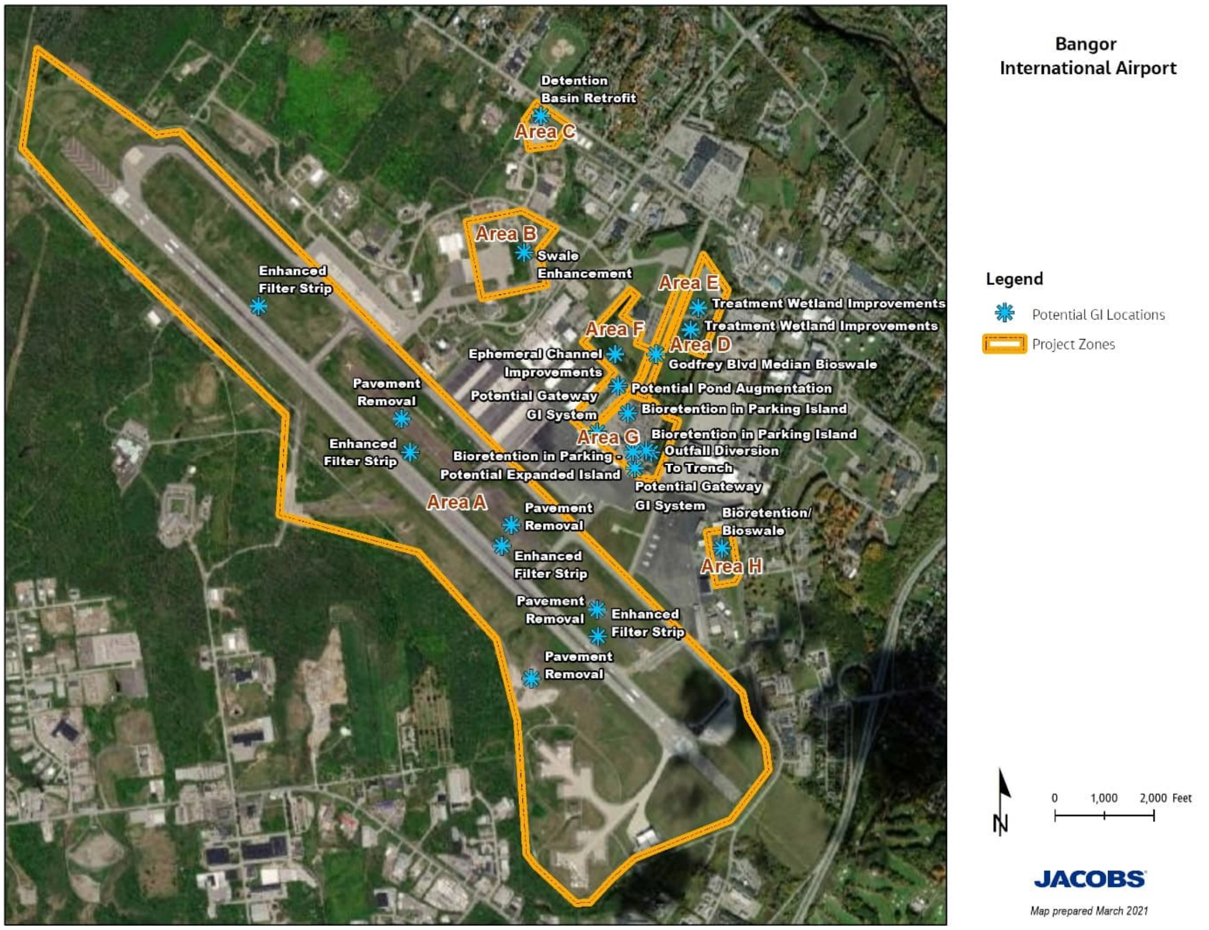


Table 5-3 below provides a summary of recommended improvements in each of the zones. The table is followed by additional details pertaining to each of the key GI strategies identified.

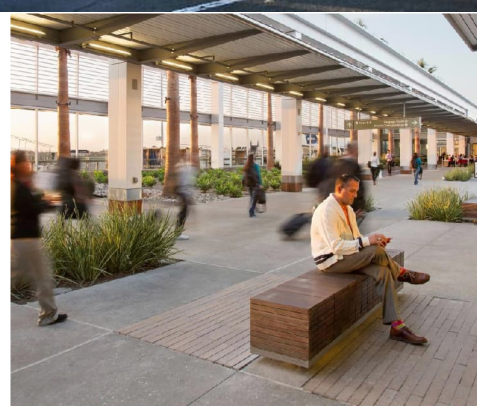
Table 5-3. Green Infrastructure Opportunity Summary

Area	Key Strategies/Projects
Area A (Runways)	Enhanced filter strips Pavement removal
Areas B, E and H	Biorentention Bioswales
Areas C and D	Detention Basin Retrofits potential for bioretention/constructed wetland systems
Area F	Pond Augmentation Ephemeral Channel Improvements
Area G	Bioretention in Parking Islands Gateway GI Outfall to Diversion Trench

- **Pavement Removal:** Removal of unnecessary pavement (old runways) and backfilling with soil and new grass. Removal provides higher volume reduction and direct 1:1 stormwater fee reduction (maximum reduction value). COST RANGE: Relatively low cost ($2 - $5/SF).

- **Enhanced Filter Strip:** Filter strips are slightly sloped vegetated buffers/bioswales used to treat runoff from roads, runways, and taxiways. COST RANGE: $1 - $3/SF depending whether seed or sod is used.
- **Bioretention:** Landscaped depressions that use plants and soil media to slow and treat stormwater runoff before it is infiltrated or discharged. COST RANGE: $20-$40/SF depending on complexity, average cost $160,000/impervious acre.
- **Bioretention in Parking Islands:** Landscaped depressions that use plants and soil media to slow and treat stormwater runoff before it is infiltrated or discharged. Refer to Bioretention costs, note that curbing increases costs.
- **Bioswales:** Vegetated shallow linear depressions that capture, treat, and infiltrate stormwater runoff while removing sediment. COST RANGE: $20 - $40/sf depending on complexity.
- **Detention Basin Retrofit and Enhancements:** Enhance and retrofit detention basins using native and wetland plantings to slow flow of runoff, enable sediment and pollutant settling and promote evapotranspiration and infiltration. COST RANGE: $6 - $10/SF (approx. 15-20 acre drainage area) depending on extent of retrofit
- **Pond Enhancements:** Bioswale upstream of pond or submerged gravel wetland; potential to assist with deicer management. Additional benefits to this solution include water quality pollutant load reductions, habitat improvement, improved water quality protection, augment deicer material removal from outfall, optimized aeration (lower energy cost), and potential to enhance passenger or tenant experience. COST RANGE: Similar to Bioretention and Detention Basin Retrofit costs
- **Ephemeral Channel Improvements:** Enhancing the ecological function and capacity of the existing ephemeral channel. COST RANGE: Varies depending on exact approach.
- **Gateway Green Infrastructure:** Green infrastructure features that are near pedestrian/vehicular entrances and can be combined with traffic calming elements, streetscape enhancements, and gateway signage and architectural elements. COST RANGE: Varies widely depending on complexity.

Figure 5-5. Gateway GI Examples



5.5.2.2 Recommended Next Steps

The following steps are recommended to proceed with the projects, either by specific project or groups of project types:

- Green Stormwater Infrastructure for non-deicing runoff – prioritize opportunities shown above and develop concepts for higher priority locations, including costs and potential stormwater fee reductions.

- Green Stormwater Infrastructure with Urban design aspects – develop first round of site-specific concepts.
- Green infrastructure for deicing removal and natural treatment systems for deicing wastewater (deicing pad) - perform feasibility studies to confirm efficacy and economic performance. Similar projects have been successfully done at other airports (e.g., Toronto Pearson and Washington Dulles).
- Deicing management – evaluate and implement the three key strategies outlined above; optimize glycol use and recovery, explore glycol alternatives, and update SOPS's.

5.5.3 Building Energy and Water Use Efficiency Improvements

The recommended Energy and Water Conservation Measures (ECMs) summarized in **Table 5-4**, offer the greatest opportunity for energy or water savings, result in SPB periods within the economic life of the associated technology or equipment and align with BGR's long-term sustainability goals. The ECMs are prioritized based on a recommended implementation schedule, whereby ECMs are identified as short-, medium-, and long-term. The recommended schedule considers the estimated simple payback range, cost and overall complexity for each measure. Simple payback (SPB) values are estimated using normalized cost values for each respective utility, based on utility information provided for 2019 and 2020. Detailed descriptions and recommended scope for each ECM are provided in the Energy Audit Report (**Appendix E**)

Table 5-4. Energy and Water Conservation Measure Analysis Results Summary

Energy and Water Conservation Measures	Simple Payback (Years)	Estimated Capital Cost	Buildings included in ECM
Short Term and Quick Wins			
Premium Efficiency Motor Replacements (Quick Win)	<3.0	$2,000	2 (DAB)
Low-Flow Water Fixtures - Aerator Replacements (Quick Win)	<1.0	$2,500	Multiple Buildings
Retro-commissioning (RCx)	<3.0	$150,000	IAB/DAB & 96
Medium Term			
High Efficiency Natural Gas Condensing Boilers	9.1	$575,000 [a]	Multiple Buildings
Infrared (IR) Heaters in High Bay Areas	8.8	$130,000 [a]	253, 600
LED Interior and Exterior Lighting Systems and Controls [b]	10.1	$580,000	Multiple Buildings
Long Term			
Low-Flow Water Fixtures - Full Fixture Replacements	15.5	$25,000	100, 271 & 600
High Efficiency Air Source Heat Pump Domestic Water Heaters	20.0	$52,000	IAB/DAB, & 121
14MW Solar PV Array on SW Side of Runway [c]	28	$70.0M+	N/A
Dynamic Glass Windows [d]	50+	$1.5M+	IAB/DAB

N/A = Not applicable

Notes:

a. Estimated cost assumes the NG utility company will install service up to and including the meter at each facility, if not already present.

Table 5-4. Energy and Water Conservation Measure Analysis Results Summary

b. Includes exterior wallpack lighting at entryway doors on several buildings; it does not include exterior parking or apron lighting, as the majority had already been upgraded to LED.

c. Solar PV evaluation is based on a screening level analysis and are presented to support informed decision making by the Airport; a more detailed study or design, not included with this study, may yield slightly different results.

d. Estimated cost is based on smart window technology, such as SmartGlass, for approximately 10,000 SF of glazing at the terminal buildings; more typical replacements, such as low e glazing, may reduce costs but will also result in lower savings potential. Several windows were observed to be in fair to poor condition, showing indication of failed seals and leakage. Window replacements not only improve occupant comfort but can also result in additional energy savings by reducing infiltration.

6. Alternatives Analysis

BGR

6. Alternatives Analysis

This chapter provides discussion on a variety of alternatives that have been derived to meet the facility needs described in Chapter 4. These alternatives address needs related to improving airside and landside facilities.

6.1 Airside

Airside improvements include:

- Relocating the existing off-airport aviation fuel farm to an area within the airport fence.
- Utilizing a branch of currently limited use apron to develop infrastructure to support expanded air cargo operations.
- Revitalizing the General Aviation Apron by reconfiguring support facilities, adding hangars, and reconfiguring tie-down space.
- Utilizing unused apron to develop corporate hangars to meet unmet demand.
- Creating a dedicated Irregular Operations (IROPs) apron.
- Adding a dedicated SRE storage building for airport maintenance.

6.1.1 Aviation Fuel Farm

The existing aviation fuel farm is located northeast of the main terminal area and outside of the airfield; this poses additional regulatory constraints for the airport fuel trucks as the vehicles must comply with Department of Transportation (DOT) standards for over the road travel. In an effort to minimize the burden on the airport and fuel handlers, several locations on the airfield were considered for relocating the aviation fuel farm. **Figure 6-1** below depicts the current fuel farm location and the three options considered for on-airport locations.

Figure 6-1 Overview of Existing and Potential Fuel Farm Sites.

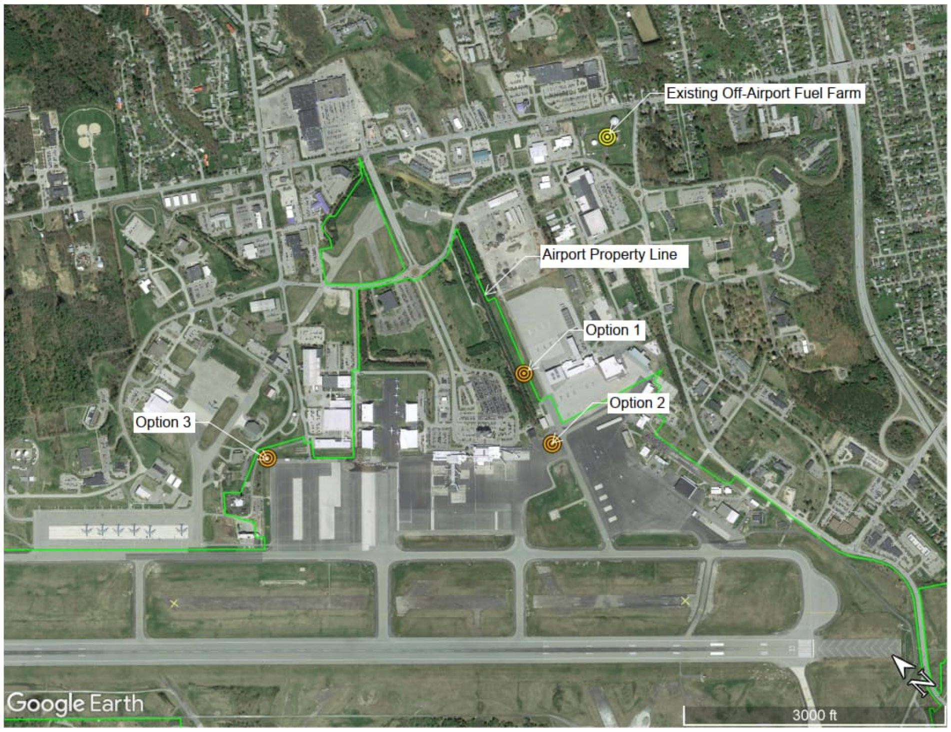
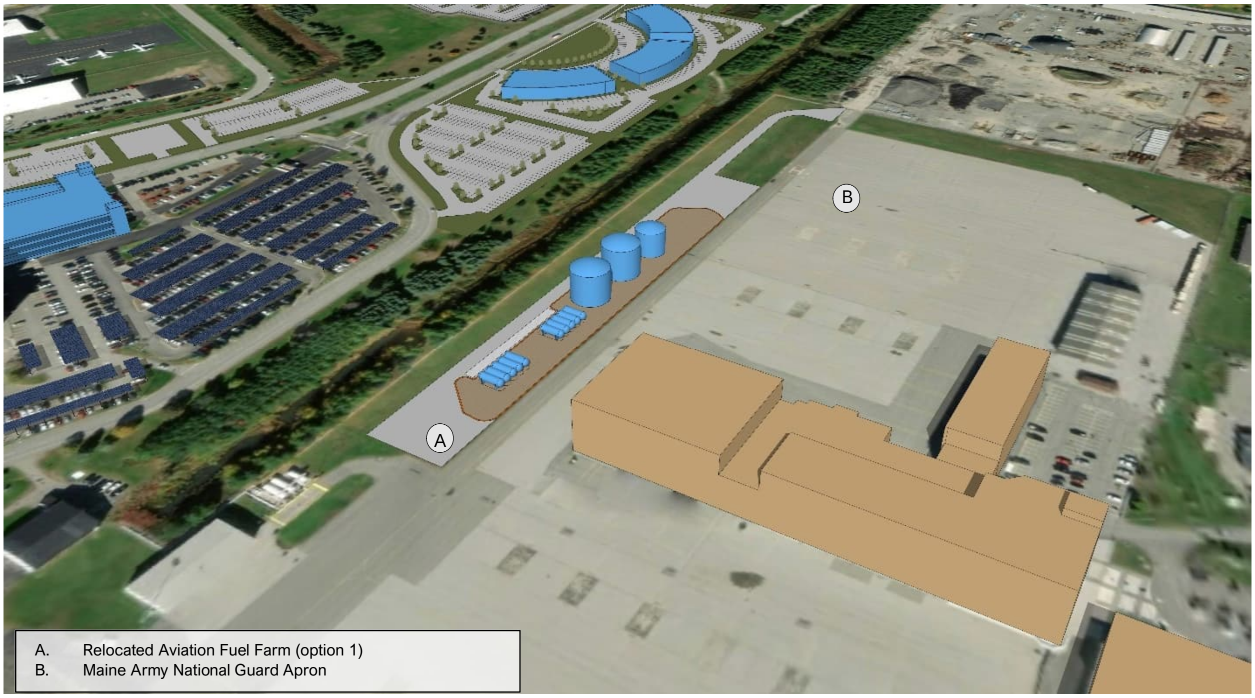


Figure 6-2 Aviation Fuel Farm - Option 1 (Preferred)



6.1.1.1 Aviation Fuel Farm - Option 1 (Preferred)

The first option considered for relocating the aviation fuel farm was on a roughly 4.5-acre piece of Airport property which abuts the Maine Army National Guard Apron (**Figure 6-2**). The grass area provides an ideal location because the existing fuel line runs through the area and down to the existing fuel stand which is located immediately south of the potential site. Landside access could be managed through a gate that is located on the northwest corner of the apron. This would require coordination with the City of Bangor Public Works Department (PWD) because fuel trucks would need to access this gate by traveling through a PWD storage area on Maine Ave.

Challenges associated with this site include providing adequate clearance between the tanks and the taxiway to the helipad. The Maine Army National Guard utilizes the apron adjacent to the proposed site for Blackhawk helicopter operations. According to Table 5-2 of UFC 3-260-01, taxiways used by rotary aircraft require a minimum of 100 feet of clearance between the centerline and fixed or mobile obstacles. By utilizing smaller vertical tanks and several horizontal tanks, the proposed fuel farm remains outside of the Object Free Area.

Creating adequate airside access to the site is another challenge considered when choosing a preferred site for the fuel farm. This site is close to a number of airside access gates near the terminal, but access through these gates would require large fuel trucks to travel through the passenger traffic around Godfrey Boulevard which could create conflicts with pedestrians, passenger vehicles and fuel trucks. To mitigate this risk, it is recommended that fuel trucks access the proposed fuel farm through a gate located on the northwest corner of the Maine Army National Guard apron. This gate is accessed through a storage yard located off Maine Ave which is currently used by Bangor PWD. Accessing the proposed site via this gate allows the fuel trucks to avoid the congested terminal area and creates easier accessibility as trucks would travel a relatively short distance from the gate to the fuel tanks.

Although the proposed fuel farm would be constructed on Airport property, additional coordination will be needed between the Maine Army National Guard and Bangor PWD to advance this concept. AS part of this master plan effort, the Maine Army National Guard unit based at BGR has stated concerns via email correspondence in Oct. 2021 over increased truck traffic impacting their apron pavement, loss of snow removal area and overflight of the tanks as potential concerns. The master plan team modified the site to reduce these risks to the extent feasible. The gate to access landside would be located on Maine Army Guard Property. A portion of an airside access road leading from the gate to the tanks will need to be constructed on Guard property. From landside, approval from Bangor PWD will be needed to allow fuel trucks to travel through their storage yard to the gate.

6.1.1.2 Aviation Fuel Farm - Option 2

A second location considered for the aviation fuel farm was in the area available between the Terminal Apron and the General Aviation Apron (**Figure 6-3**). This area can accommodate three vertical fuel tanks and is located immediately south of the existing fuel stand. Fuel trucks would access the fuel farm through the same Bangor PWD gate as Option 1. This access would still require coordination with the Bangor PWD and the Maine Army National Guard due to the gate being accessible from landside via the Bangor PWD storage yard and airside via the Maine Army National Guard Apron.

Figure 6-3. Aviation Fuel Farm - Option 2

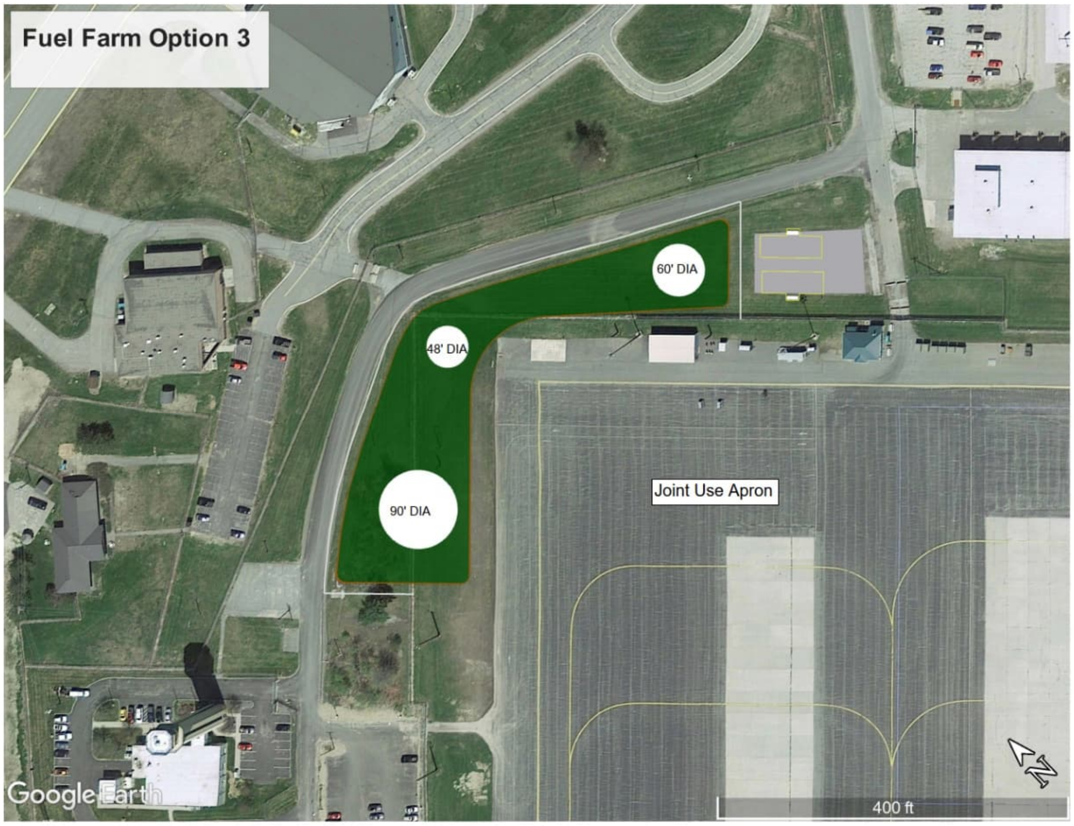
The challenges associated with this site ultimately eliminated it as an option for relocating the aviation fuel farm. A large factor was the separation created between the General Aviation Apron and the Terminal Apron. During times when Taxiway Bravo and Taxiway Juliet need to be closed for maintenance or construction activity, there would be no other access point for aircraft to reach the General Aviation Apron. Secondly, the compass rose marking would be completed covered by the fuel farm relocation and would need to be placed in an alternate location. In addition, there is a private hangar located directly west of the proposed site which may be impacted by the tank location and additional tanker truck activity.

The helicopter pad used by the Maine Army National Guard Blackhawk helicopters is located directly south of the proposed fuel farm site. The tanks would be located outside of the 100-foot clearance criteria for *taxiway centerline to fixed or moveable obstacles* noted in FAA Advisory Circular 150/5300-13.

6.1.1.3 Aviation Fuel Farm - Option 3

The third option considered for the aviation fuel farm relocation is unique in that it would move the tanks to an airside location, while the fuel trucks would drop fuel via a landside pump station. This site is located on the northwest corner of the Joint Use Apron on a portion of land near the air traffic control tower (**Figure 6-4**). The area has more than adequate space for three or more vertical fuel tanks. The airport security fence would need to be altered to encompass the fuel tanks. A pad for the fuel trucks to park landside would be located just before the airside access gate leading to the Joint Use Apron. Pumps would be located on the landside parking pad which will allow fuel trucks to unload fuel without needing to be inspected by security and escorted airside. Additionally, this site has easy access to the landside road network without needing to build additional access roads. Fuel trucks can reach the site from Griffin Road which connects with Maine Ave to allow the trucks to avoid the congested traffic near the terminal building.

Figure 6-4 Aviation Fuel Farm - Option 3



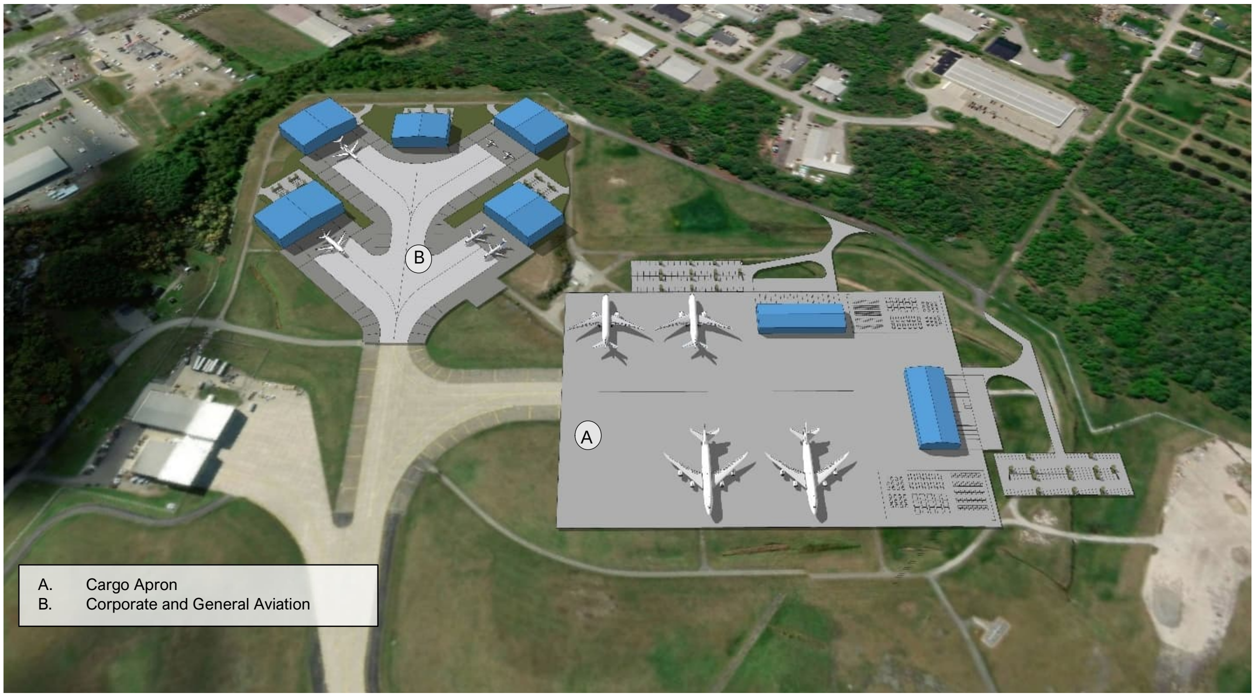
The biggest challenge associated with this proposed site is tying the new aviation fuel farm back to the fuel stand. There are fueling hydrants located on the Joint Use Apron that receive fuel from the fuel stand. To transfer fuel from the vertical tanks to the fuel stand, a line would need to be tied into the existing fuel hydrants on the apron and fuel would need to be pumped backwards through the existing pipe network to the fuel stand. Another method would be to utilize mobile refueling trucks to transport fuel from the vertical tanks to the aircraft for refueling. Because of challenges associated with connecting the proposed fuel farm to the fuel stand this option was also eliminated as a potential relocation site.

6.1.2 Cargo Apron

BGR embodies the ideal location and infrastructure to support a cargo hub. Bangor's Foreign Trade Zone (U.S. No. 58) is located on-airport which is beneficial for the import of foreign goods flown into the US. The location proposed for a cargo facility would allow cargo operations to be separate from commercial passenger operations. The western branch of the '600' Apron is well suited for a Cargo Apron due to its location and connectivity to both landside and airside facilities. The existing branch of the '600' Apron could easily be expanded to a 19-acre campus sized similarly to the cargo apron at Manchester – Boston Regional Airport (MHT). MHT has a roughly 25-acre cargo apron with three cargo facilities with associated airside GSE storage and operating space. The expanded 19-acre space at BGR would allow for two 20,000 SF to 30,000 SF cargo warehouses with approximately 1-acre of GSE storage allotted for each building and parking for two cargo aircraft. As an example, the layout in **Figure 6-5** utilized the largest aircraft operated by UPS and FedEx both of which have cargo facilities MHT. The Boeing 747-8F and Boeing 777-F are the largest aircraft in use by UPS and FedEx respectively, both aircraft are TDG 5 yet the Boeing 747-8F has an ADG of VI and the Boeing 777-F has an ADG of V. Taxiway

N which connects the Runway 33 end to the western branch of the ‘600’ Apron is currently designed to TDG 5 standards.

Figure 6-5. Cargo Apron



Connectivity to the landside road network would be though improvements to the existing access road and Hammond Street located on the lower southwest corner of the apron. Currently, there is a FedEx shipping center located directly off Hammond Street and is less than 1,000 feet to the southwest of the proposed cargo facilities. The connection to Hammond Street also has a potential access point to Banair Road which could provide cargo trucks access to Route 95 or Route 395.

There are several challenges to consider for developing this area into a successful cargo apron. This branch of the apron will need to be totally reconstructed as it has sat relatively unused for several years other than for aircraft storage. Currently, C & L Aerospace has been using the ‘600’ Apron for aircraft and parts storage. Due to the poor condition of the pavement in this area, the pavement will need to be rebuilt. This also includes demolishing an old military explosives bunker located on the southeast corner of the apron. Additionally, landside access roads and parking lots that are suitable for existing truck traffic will need to be constructed along with any associated stormwater drainage. The next biggest challenge would be to get utilities tied into the cargo facilities. The closest access points to tie in utilities such as water, sewer, and underground electrical would be from Building 600 which is located approximately 2,000 feet to the east.

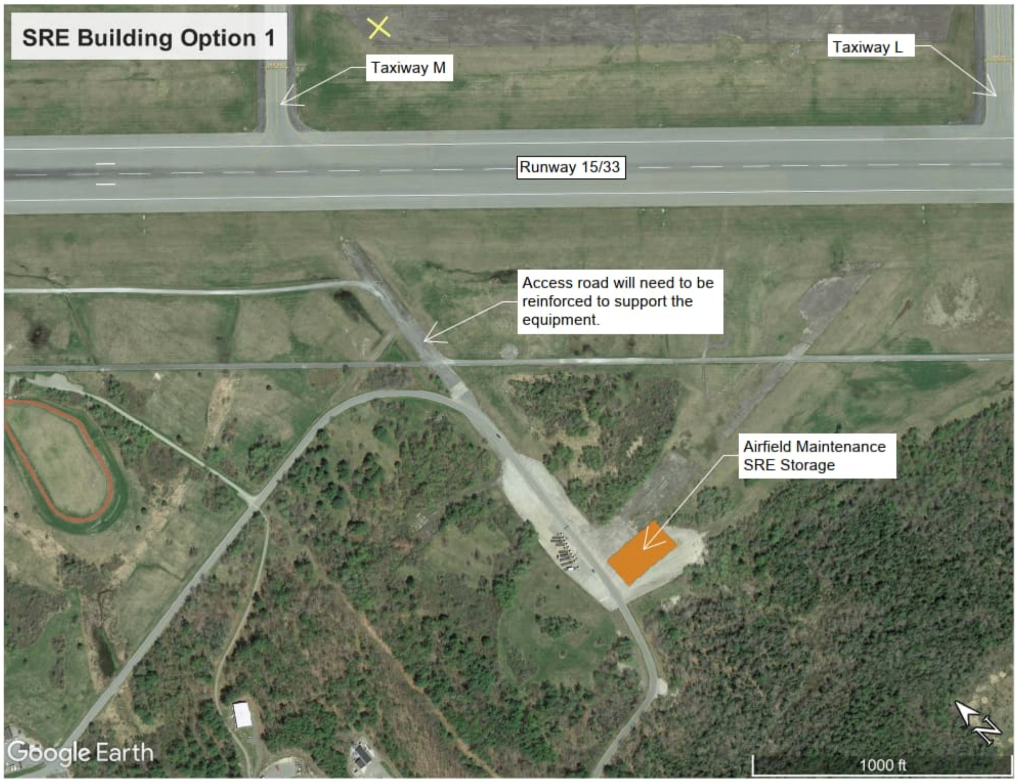
6.1.3 Maintenance / SRE (Snow Removal Equipment) Building

The existing airport maintenance building is located on the southeast corner of the GA Apron, and additional space is leased off-airport to store the SRE inside where the equipment can be protected from the elements. Two options were considered for the location of an SRE storage building.

6.1.3.1 Maintenance / SRE Building - Option 1

The initial option for placing an SRE building on the airfield was to locate it on the east side of the runway where an old portion of airfield pavement still exists. This site was considered because of the space available to place a sizable building and because of its proximity to the airfield perimeter road. The equipment could also potentially have easy access on to the mid-field of Runway 15/33 which would be favorable during snow operations.

Figure 6-6. Maintenance / SRE Building - Option 1



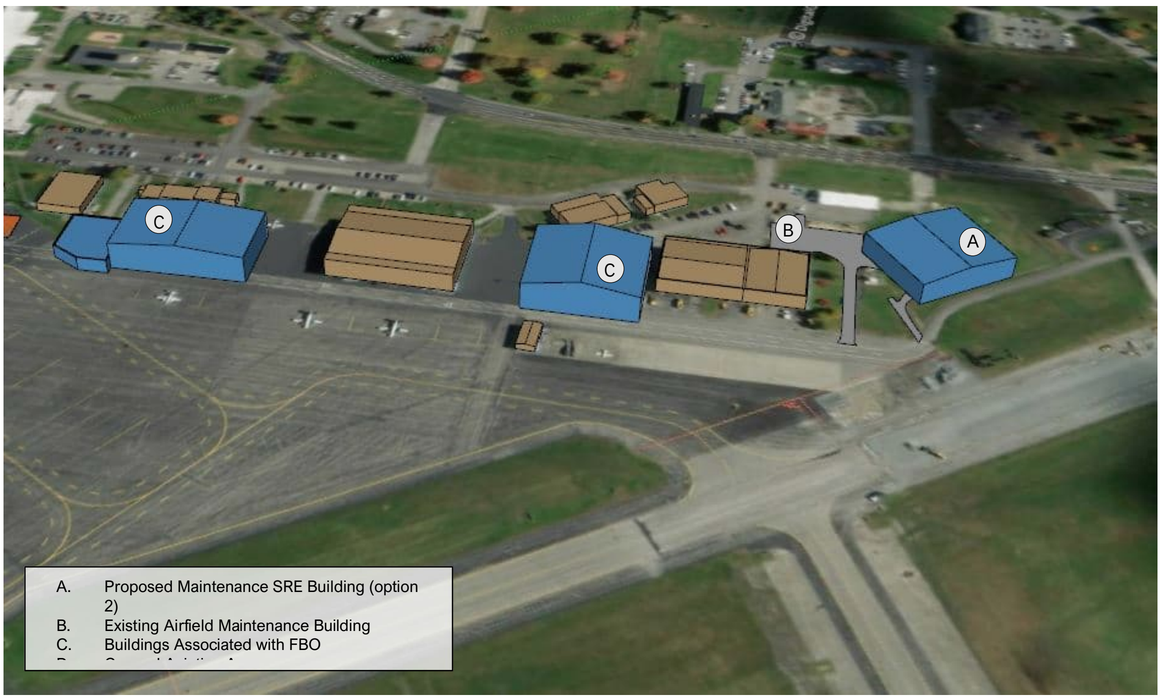
There were several challenges associated with this site that ultimately eliminated this option. First, the FAA would most likely not approve of constructing direct access to the Runway as there may be too many safety concerns such as a runway incursion or aircraft mistaking the access point as a taxiway. If mid-field access were to be denied it would be very cumbersome for the equipment operators to plow a long stretch of the perimeter road to reach the airfield. The current condition of perimeter road may need to be improved to support plowing and traveling across the access road.

Another major challenge is its remote location to the remainder of the airfield and to existing utilities. Locating the SRE building away from the main airfield operation is convenient in that there is room to have a large facility, but operationally it is not the most efficient site. Snow events at airports as large as BGR are multi-day events or longer depending on the severity of the storm. Although the runway and other priority areas are cleared of snow the remainder of the airfield including aprons, safety areas, lights, and drains need to be addressed. If the equipment is located away from the airfield more time will be needed to conduct post-storm clean up as it will take longer for the equipment to reach the areas and in turn, increase fuel consumption and time on the equipment. This remote site will also require a large effort to connect utilities to the building as the surrounding area currently does not have any existing utilities. The closest access points are over 1,000 feet away. Given these difficult challenges Option 1 has been ruled out for a potential SRE building site.

6.1.3.2 Maintenance / SRE Building - Option 2 (Preferred)

The second option for siting an SRE storage building is to place it next to the existing airport maintenance building which is located on the southern corner of the GA Apron. Currently, a small and dated building sits on this site which is occupied by the Maine Aviation Historic Society. This building would need to be demolished to construct the SRE building. This is an ideal location for the SRE storage building because of its centralized location on the airfield.

Figure 6-7. Maintenance / SRE Building - Option 2 (Preferred)



The Maine Aviation Historic Society which has occupied this site since the year 2000 would need to be relocated. The Historic Society operates the small building as a seasonal museum from June to September. A potential solution would be to relocate the museum to a portion of the old FBO terminal building or in a new facility as part of the landside technology and hospitality corridor development which will be discussed in a later section.

6.1.4 General Aviation Apron

BGR has a growing need for conditioned hangar space for general aviation aircraft as well as a need for upgraded general aviation support facilities. In May of 2021, Airport Business Solutions (ABS), conducted an FBO Performance and Operational Audit which reinforced the need for a new general aviation terminal building, aircraft storage hangar, FBO maintenance hangar, and an area for GSE storage. Conceptual layouts were prepared to address existing and future needs to serve general aviation at BGR.

6.1.4.1 General Aviation Apron – Option 1 (Preferred)

The master plan team used the initial layout proposed by ABS as a conceptual basis, but made several modifications based on feedback from airport management and operations staff. **Figure 6-8** below depicts a proposed FBO GSE storage area, FBO terminal and aircraft hangar, and an FBO maintenance and storage hangar arranged to maximize operational efficiency. It was important to airport management and operations staff to maintain apron parking capacity to accommodate the growing demand of high-end corporate jet operators as well as to meet FAA design geometry criteria for aircraft taxing and parking setbacks.

Figure 6-8. General Aviation Apron - Option 1

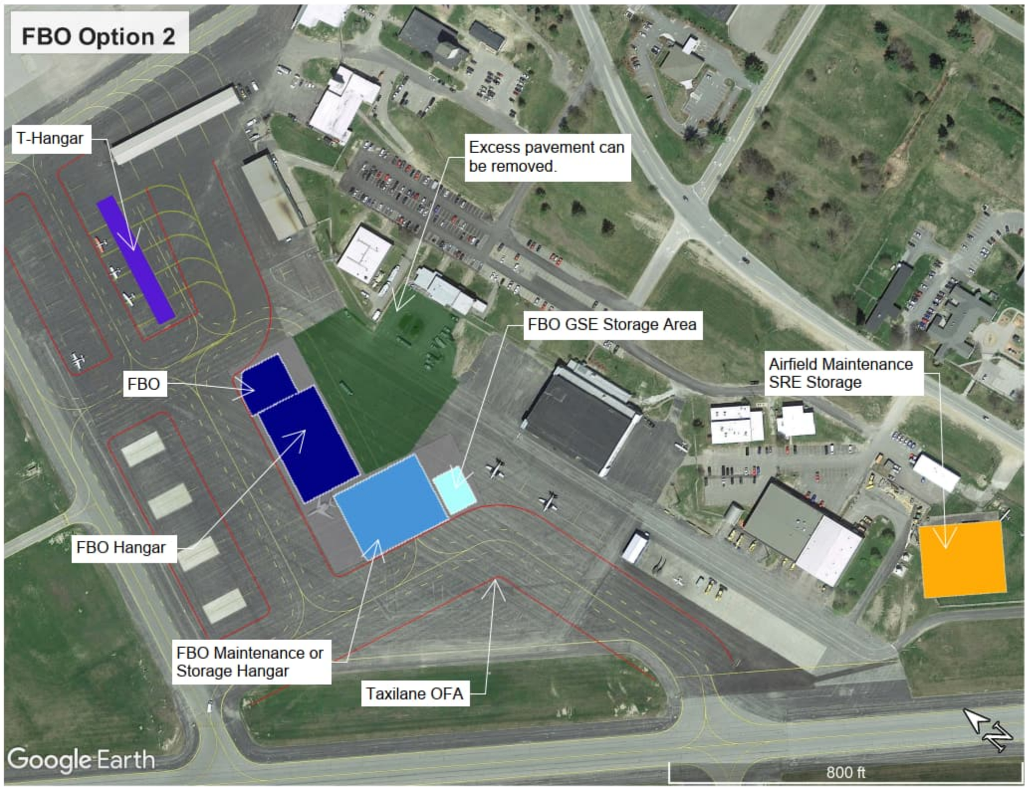
The current GA Apron has 23 tie-down spaces suitable for small single engine or small turbo prop aircraft and only one t-hangar. As aircraft hangar storage is in high demand, the layout has been revised to eliminate several of the tie-down spaces to allow for the addition of one new t-hangar on the north corner of the Apron. Currently, there are several tenants that occupy the hangars on the eastern edge of the GA Apron. The proposed buildings have been situated and sized to allow for the tenant aircraft to maintain access to their hangars.

One of the challenges associated with this layout is relocating the two US Customs aircraft parking-t's. Aircraft to be inspected park in this designated area and Customs agents drive from the terminal building over to the area for the inspection. The layout proposed in **Figure 6-8** shows the FBO GSE storage area replacing the existing customs parking area. A potential solution is to move the two parking-t's south to an unused area of the apron which is outside of the taxilane object free area and move the Customs area to where it is shown in location marked as 'G' on **Figure 6-8**.

6.1.4.2 General Aviation Apron – Option 2

A second option considered for the new GA facilities considered reducing apron space by moving the facilities closer to the larger jet aircraft parking stands and removing some of the pavement from the apron. This layout eliminates a row of tie-down spaces for smaller aircraft and replaces it with a row of t-hangars. This provides additional hangar space while still maintaining 12 tie-down spaces for smaller transient aircraft. This layout also ensures that access routes to tenant hangars would remain unobstructed and the aircraft staging area for US Customs remains untouched.

Figure 6-9. General Aviation Apron - Option 2

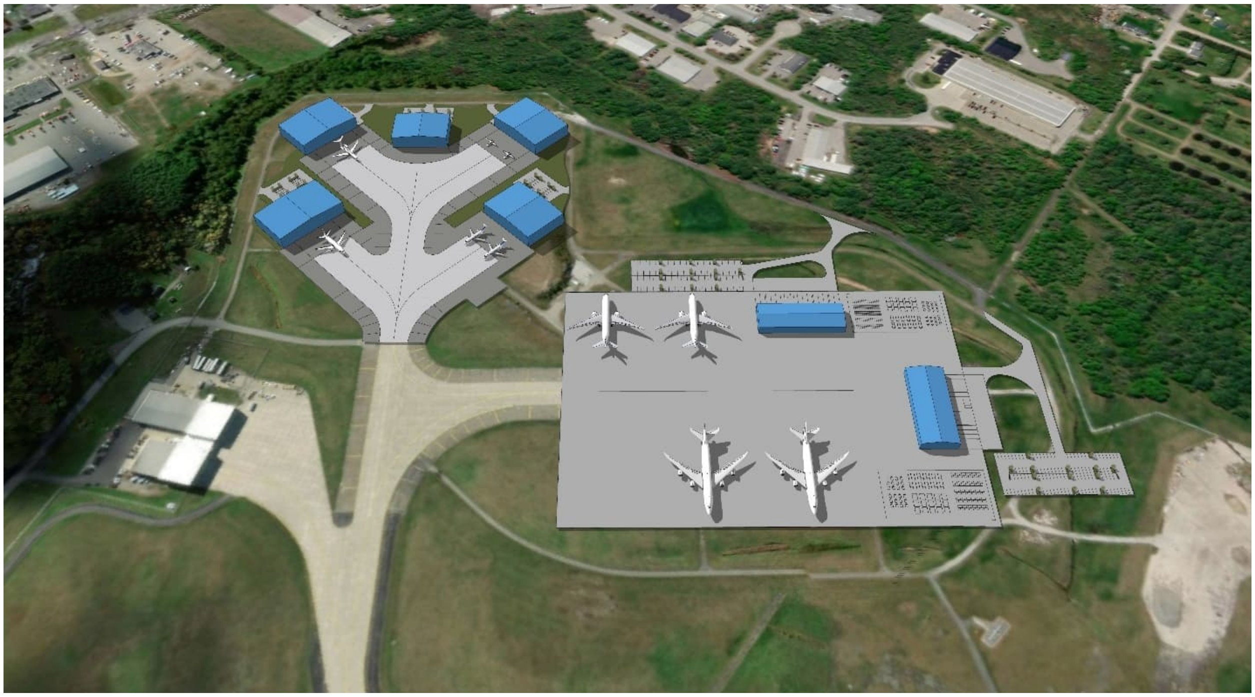


As the Airport is experiencing exponential growth and recovery from the 2019 Covid-19 pandemic it's not unrealistic that the lost pavement may be needed in the future. For these reasons Option 2 was not favored as potential layout for the General Aviation Apron.

6.1.5 General Aviation Tenant and Corporate Hangars

The second branch of the '600' Apron provides a suitable location to construct a series of general aviation and corporate hangars. Ideally, these hangars would be leased to individual tenants or utilized as overnight/transient aircraft storage for mid-sized and large jet aircraft. The current layout of the space would work well for placing hangars ranging from 20,000 SF to 31,000 SF without the need for adding pavement. The existing apron space is used by C & L Aerospace for aircraft storage and parts and may need to be repaired or replaced in order to be routinely utilized. There is also more than adequate space for fuel truck parking and GSE storage on the apron for Bangor Aviation Services to keep service equipment close by.

Figure 6-10. General Aviation Tenant and Corporate Hangars



Additional work required would be to create landside parking lots for tenants and to upgrade the existing access road. The access road provides a convenient connection to Odin Road which can also be accessed from Maine Ave. The existing road is too narrow for bi-directional traffic and would need to be rehabilitated to support more frequent use.

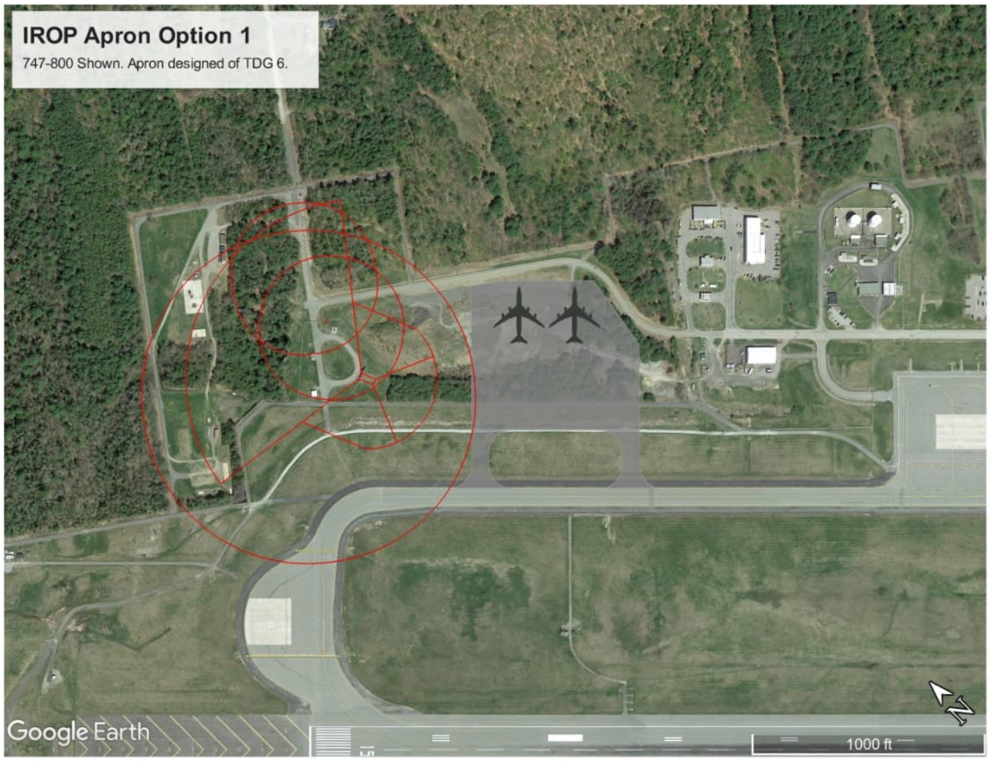
6.1.6 Irregular Operations (IROPs) Apron

Currently there is not a dedicated apron for aircraft to divert to in the case of irregular operations (IROPs). Typically, aircraft will park on an IROPs apron if there is an unruly passenger aboard or if the aircraft is carrying hazardous or explosive cargo. Due to the number of military operations and growing number of enplanements it is important to dedicate an apron for IROPs. Several locations were considered, a key factor for the IROPs site is to ensure it is located in a remote location so that any buildings or facilities are outside of a 1,500-foot blast radius. This is to minimize the impact to facilities and people in the case of an explosion.

6.1.6.1 IROPS Apron - Options 1 and 2

The initial site considered for an IROPs apron was the northwest corner of the airfield in an area that is west of the Maine Air National Guard facilities. This is a large area that is located near the existing ammunitions building which is maintained by the Guard. Option 1 depicts the aircraft pulling straight onto the apron from the south end Taxiway A; the aircraft can be pushed back by a tug to exit the apron (**Figure 6-11**).

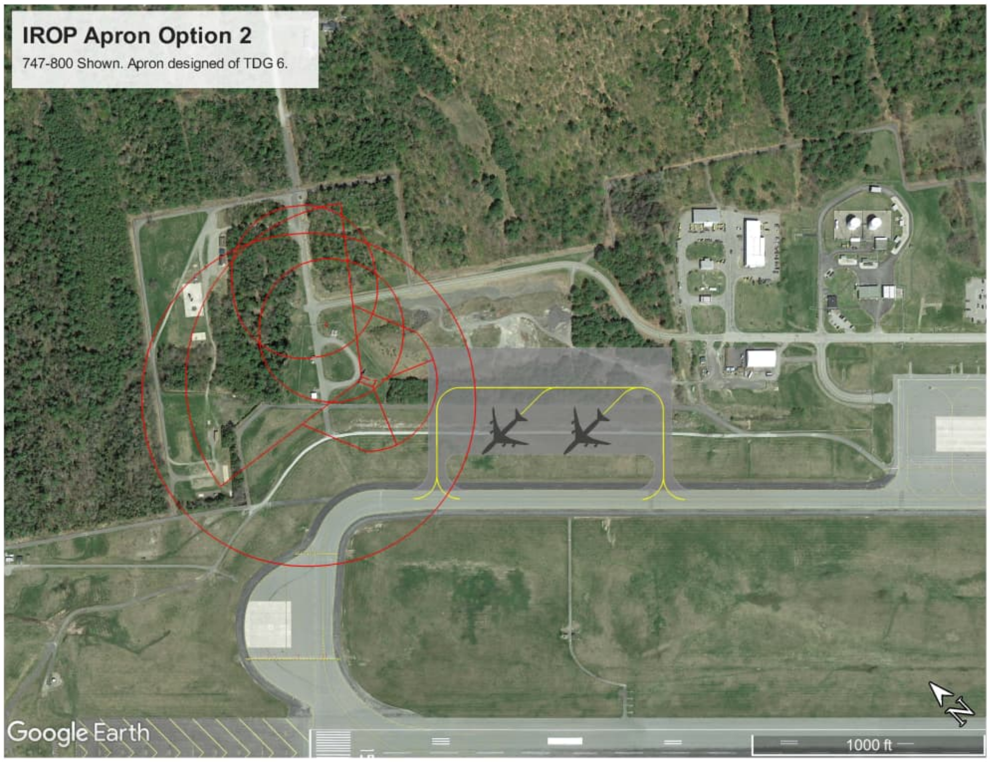
Figure 6-11. IROPs Apron Option 1



Option 2 depicts the apron in the same location, but the pavement is configured so that the aircraft can pull on to the apron and park at a 45-degree angle to power out of the apron and back on to Taxiway A (**Figure 6-12**). This location is ideal because it's located close to ARFF facilities and is a convenient location for aircraft to access after landing and prior to taking off.

The potential challenge for IROPS Options 1and 2 is the groundwork required to develop this area for the apron. There is rock ledge located in this area that will be extremely difficult and costly to prepare the site. An additional challenge is the proximity of the Maine Air National Guard buildings and the ammunitions storage building. For these reasons this site was discounted for IROPS Options 1 and 2.

Figure 6-12. IROPs Apron Option 2

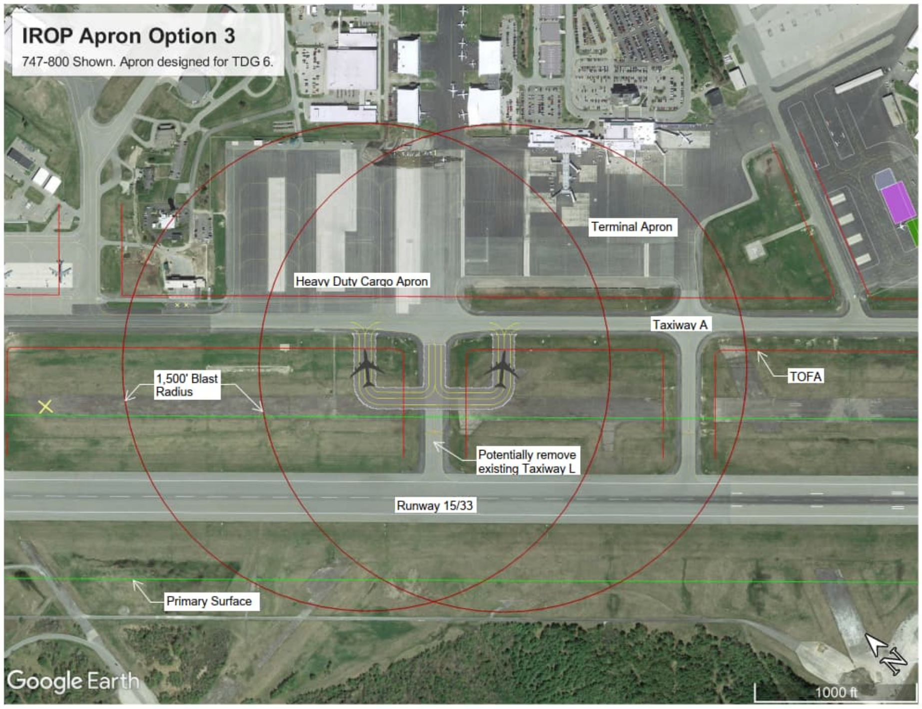


6.1.6.2 IROPS Apron - Option 3

Another option considered for the IROPS apron was to utilize Taxiway L, which is recommended in this master plan to be abandoned and removed. Option 3 is designed to fit in between the Taxiway A object free area and the Runway 15 / 33 Primary Surface. Because of this limited available space, the apron is designed so that aircraft can power-in and power-out via an existing portion of Taxiway L.

The proximity of the terminal building, air traffic control tower, and ARFF building to the potential IROPs apron make it undesirable as an IROPS pad. All three of these facilities are within the 1,500-foot blast radius if an event were to occur. The layout is shown on **Figure 6-13** on the following page.

Figure 6-13. IROPs Apron Option 3



6.1.6.3 IROPS Apron - Option 4 (Preferred)

This site for the proposed IROPs apron is located on the western side of the airfield, opposite of where the terminal building and other airport facilities are located. This is an ideal site because there are no buildings or facilities located within the 1,500-foot blast radius which was a challenge for the previous site options. This site offers terrain and subsurface that is favorable as well. **Figure 6-14** IROPS Apron – Option 4 depicts the layout.

Figure 6-14. - IROPs Apron Option 4

There are few challenges associated with this site, the most obvious being that it may not be the most convenient location to taxi to. The proposed apron is located between Taxiways L and K which could easily be access by aircraft landing Runway 15. Aircraft landing Runway 33 would need to exit the Runway taxi around to Taxiway L or K and cross the active runway to reach the IROPs apron. Similarly, aircraft departing from the terminal or any other apron will need to cross the active Runway to reach the IROPs apron. Another challenge to consider is there is currently limited development on this portion of the airfield. BGR currently has a large airfield with millions of square feet in pavement. Justifying a new apron space just for irregular operations may be difficult to get buy-in from the FAA.

6.2 Landside

Landside improvements include:

- Creating a sufficient space for cell phone lot parking and additional employee parking.
- Identifying adequate overflow parking for passenger vehicles and site a location for a future parking garage.
- Installing solar canopies in the long-term parking lot.
- Developing the land at the entrance to the BGR campus into a revenue generating technology and hospitality corridor containing office parks, light industrial manufacturing, and a service station (gas station).
- Transforming an existing unused parcel into a consolidated remote rental car facility.

6.2.1 Cell Phone Lot and Employee Parking

Figure 6-15. Cell Phone Parking Lot, Employee Parking, and Additional Overflow Parking

Both the employee parking lot and cell phone lot are located to the west of the terminal building and near the rental car maintenance buildings. The employee lot specifically is located to the south of the rental car maintenance building and directly east of the southernmost C & L Aerospace dock hangar. Currently, the employee lot offers 150 parking spaces and is operating at 100% capacity year-round. This lot is not only utilized by airport employees, but also by employees of C & L Aerospace and rental car employees. The need for additional employee parking has been identified by the Airport and verified by a parking study conducted by Jacobs as part of this master plan. In contrast, the cell phone lot was not initially identified as an area needing improvement. The existing designated cell phone parking spaces are located along the southbound side of Godfrey Boulevard and are adjacent to the existing rental car maintenance buildings. Although these parking spaces were not considered by the Airport for improvements at first, the safety concerns associated with not acting were too risky to ignore. Allowing vehicles to park on the side of Godfrey Boulevard is dangerous for numerous reasons. A major hazard being during the winter when plow trucks are attempting to clear the road while vehicles parked or maneuvering to park in the roadside spaces. It would be much easier for plow truck operators to have the roadside clear in order to move snow more efficiently off of the road. Another hazard facing the existing cell phone parking is distracted drivers and the potential for a collision to happen as vehicles are lined along the roadway approaching the terminal.

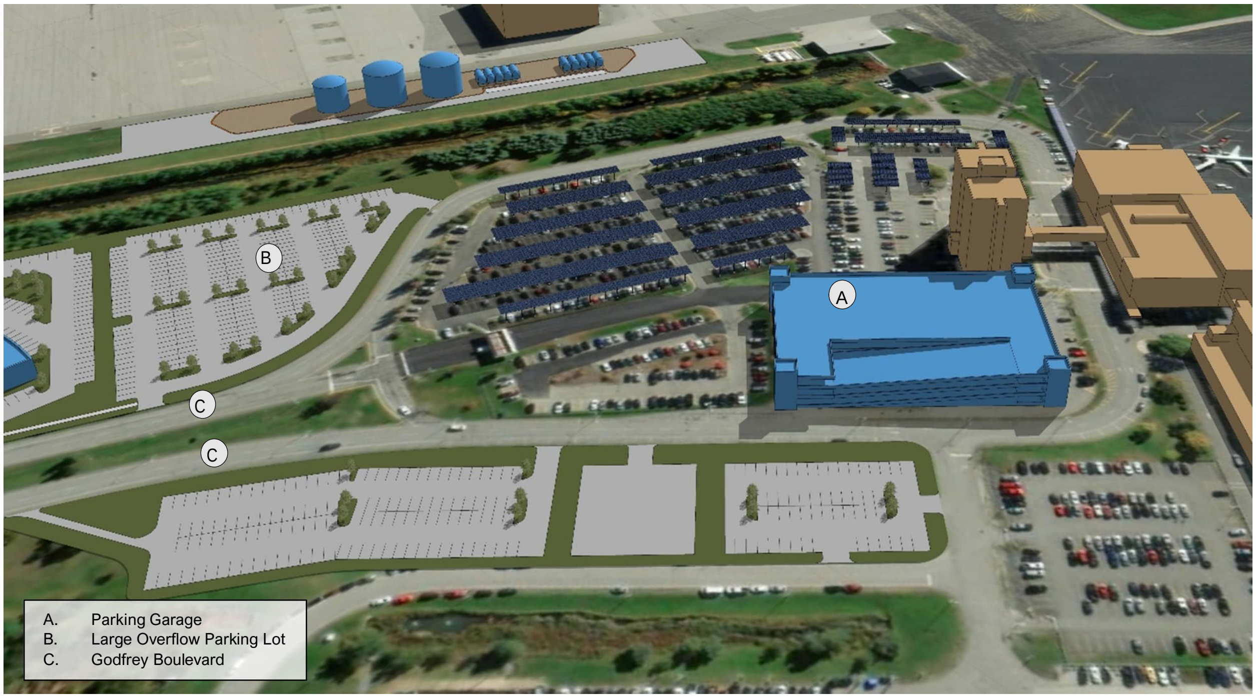
The best location identified to rehome the cell phone parking spaces and add more employee parking is the existing rental car maintenance lot. The current use of this lot would be much better suited at a consolidated remote rental car facility where vehicle maintenance and customer transactions happen all in one place for all vendors. Further discussion about creating a consolidated rental car facility elsewhere at the Airport will be discussed in a later section of this chapter. By freeing up this existing parking area the Airport can dedicate an additional half acre to employee parking and a quarter acre for a cell phone lot which will eliminate the roadside parking. The remaining acre of space could be a great opportunity for additional overflow parking for passenger vehicles without needing to construct a new parking lot.

6.2.2 Parking Garage and Additional Long-Term Parking

In 2006, a different engineering firm, Rich and Associates, Inc., had designed a parking garage for Bangor International Airport. The parking garage was to provide approximately 524 parking spaces and house rental cars, public parking, short-term parking, and monthly parking in addition to long-term parking. The proposed structure was contained four floors and was to be located in the exiting long-term parking lot to the west behind the hotel. Ultimately, the Airport did not move forward with the design because it was farther away from the terminal building than anticipated. Today, the demand for more parking continues to grow as existing parking lots are reaching capacity at the Airport. The concept for the parking garage has been revisited and modified to maximize the use of available space closest to the terminal building which is currently a long-term parking lot. The proposed site has been moved to the long-term parking lot directly west of the hotel and the structure has been rotated ninety degrees in order to fit the space and be as close to the terminal building as possible. This will require eliminating approximately 211 long-term parking spaces, but the structure will allow the Airport to gain the approximate 524 parking spaces from the original parking garage design. The parking garage is easily accessed from Godfrey Boulevard as passengers are driving inbound toward the Airport and vehicles exiting the garage can use the existing roadway in the long-term parking lot which feeds into the outbound lanes traveling away from the Airport.

In addition to the proposed parking garage, a large area has been identified to the northeast of the existing long-term parking lot where approximately two to three acres of parking can be created. This would be ideal for additional overflow parking which can be serviced by an airport shuttle that will transport passengers to and from the terminal as well as connect passengers to a proposed consolidated remote rental car facility. Combined with the parking generated by the parking garage, this proposed development will exceed the requirements for parking which were previously identified in Chapter 4.

Figure 6-16. Parking Garage and Large Overflow Parking Lot



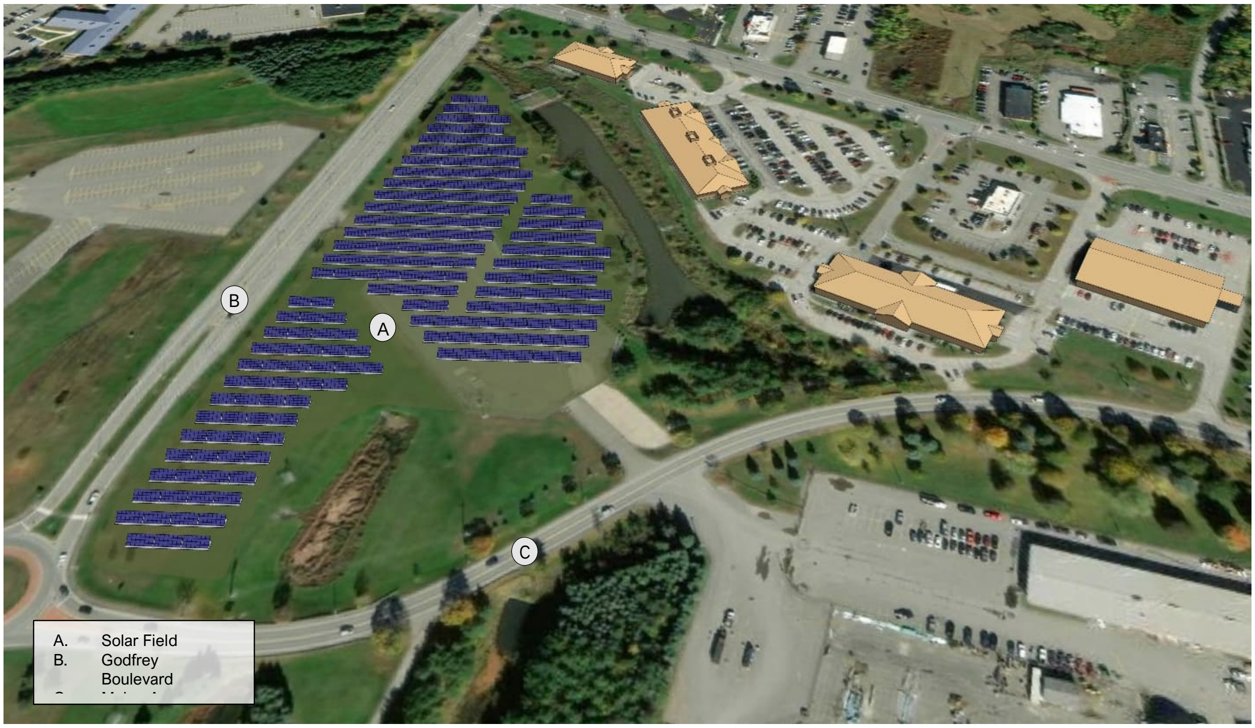
6.2.3 Long Term Parking Lot Solar Canopies

As airports and the transportation sector as a whole move towards sustainable operations solar power has become one of the most popular methods for becoming energy independent. Key figures in the aviation industry such as American Airlines and UPS are beginning to incorporate electric aircraft into their fleets and are siting facilities accordingly. Having the ability to source and store solar power would place BGR on par with the new emerging trends for sustainable operations.

Figure 6-17. Long Term Parking Lot Solar Canopies

At the time this master plan was written the City of Bangor was in the early stages of planning a roughly 10-acre solar field towards the entrance of the Airport campus. The power sourced here would be sold to utility companies through a power purchase agreement (PPA). Although this solar field is a great initiative for the City, the Airport would greatly benefit from the ability to source and store their own energy supply which could be used as a vantage point for attracting new operations.

Figure 6-18. City of Bangor Solar Field



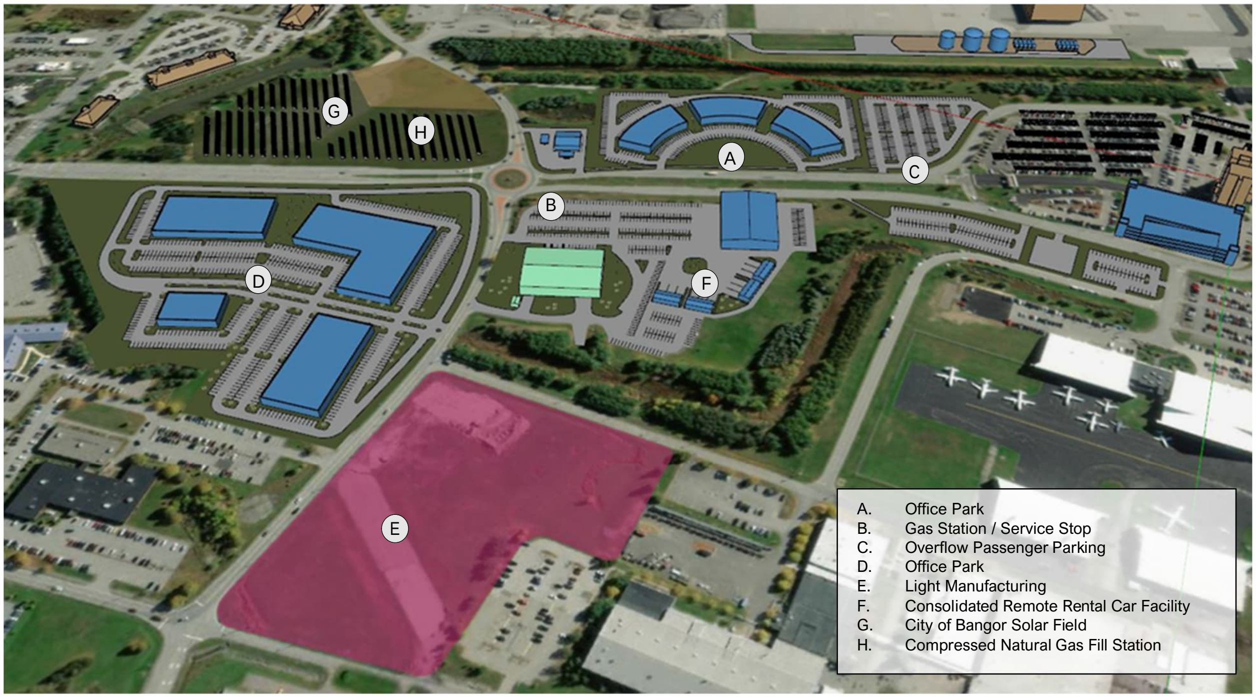
As an alternative to dedicating valuable open parcels or clearing trees on wooded parcels for an Airport-owned solar field, solar canopies can be installed over the existing parking lots. Solar canopies are elevated solar panel structures that are often installed over pavement such as parking lots. The canopies are an efficient use of space that provide shade over vehicles and reduce snow coverage over pavement. The latter is huge benefit to the Airport which averages 68.9 inches of snow a year. Passengers will also benefit from not needing to clear off snow covered vehicles after a returning from a vacation. Another benefit to solar canopies is the ability to capture and filter stormwater. This aids the Airport in the effort to create green infrastructure that is not only practical but provides benefits that are felt across numerous areas.

Because of the secondary benefits that solar canopies offer, the long-term parking lot was chosen as a prime candidate for installation. The long-term parking lot is approximately 6-acres of pavement and operates at capacity during peak seasons. Passengers will be able to take advantage being shaded from the elements while loading and unloading their vehicles. Putting the solar canopies in a high visibility area such as the long-term parking lot will put the green initiative on display for all those who are visiting the terminal to see.

6.2.4 Technology and Hospitality Corridor

The current state of Godfrey Boulevard, which is the point of entry and exit for all terminal traffic, is relatively barren and lack luster. The area around the entry to the BGR campus has a huge amount of potential to be developed into a technology and hospitality corridor. The idea around this concept is to transform the approximately 30 acres along Godfrey Boulevard into an area that adds business, creates jobs, and diversifies revenue for the Airport. **Figure 6-19** is a very high-level rendering of how the areas along both sides of Godfrey Boulevard could be developed and provides a general idea of what type of businesses can occupy the space.

Figure 6-19. Landside Business Development



Although this space can be arranged and modified to suit almost any line of business, there are two areas identified (areas A and D) which are configured for office parks. These locations would be ideal for corporate headquarters, research and development centers, or resource centers with convenient access to the Airport for transporting personnel and supplies. The office park located in area D is the site of the existing long-term overflow parking lot for the Airport. The approximate 400 existing parking spaces can be relocated to the proposed overflow parking lot (area C) and to the proposed parking garage discussed in the previous section.

The area highlighted in pink, area E, is currently underutilized but would be best suited for a tenant looking to develop a site for light manufacturing. The approximate 9-acre area can be access from Maine Ave from the east or via Griffin Road from the north providing great access for shipping and receiving cargo by ground.

In the area surrounding the Airport, a fill station or service stop for fueling cars and busses does not currently exist. Area B is depicted as a gas station or service stop for vehicles traveling along Maine Ave and Godfrey Boulevard. This is a very convenient location due to the high volume of traffic traveling through the existing roundabout which will make this area desirable for this development. In addition to standard gasoline and diesel fuel offered at gas stations, this would be an ideal opportunity to incorporate electric charging stations. Area H, located near the proposed service station and next to the City solar field, has the potential to be developed into a compressed natural gas fill station. As the City of Bangor continues to work towards reducing carbon outputs, compressed natural gas (CNG) has been identified as a green alternative to gasoline and diesel fuel because it is lead and sulfur free. It is becoming increasingly popular for cities, like Bangor, to move towards carbon reduction goals by converting city owned buses and equipment to CNG. Ideally, this fill station would be utilized by the City of Bangor to fuel their equipment with CNG or any other alternative fuels the City may move towards converting to.

6.2.5 Consolidated Remote Rental Car Facility

An area of development that will play an important role in opening up other opportunities at BGR is creating a consolidated rental car facility. Also known as a conrac, this facility is a technique used to free up valuable terminal space by taking all of the rental car providers and locating them into one central facility. A conrac is typically located away from the terminal and passengers take a shuttle or are able to walk to the facility to get their rental car. Each rental car provider leases space for customer service counters, maintenance bays, storage, and parking lot space which are all located on the same parcel.

The most suitable location that has been identified for a the conrac facility is an existing building on the corner of Maine Ave and Godfrey Boulevard. This 31,000 SF building was previously used by Wayfare as a corporate office and has an approximately 4-acre parking lot. This parcel and the abutting parcel to the south are owned by the City of Bangor. Depending on the current condition of the building renovations will be needed to transform the space into an adequate facility for several rental car vendors. There is existing access to the site from Maine Ave which would be ideal for an airport shuttle that will incorporate a stop at the conrac facility into its route which will also encompass the terminal building and overflow parking lot.

Figure 6-20. Consolidated Remote Rental Car Facility

6.3 Airspace

Airspace improvements include:

- Runway 15
  - Mitigating obstructions to the Runway 15 14 CFR Part 77 Approach Surface.
- Runway 33
  - Mitigating obstructions to the 14 CFR Part 77 Surfaces, specifically the Approach and Transitional Surfaces.
  - Mitigating obstructions to the TERPs EB 99A Departure Surface, Threshold Siting Surface, and Glidepath Qualification Surface.

6.3.1 Runway 15

The obstruction data captured in August of 2020 off the approach end of Runway 15 indicated that there were several groups of trees that could be potential obstacles. Tree clearing did take place in recent years off this end of the Runway therefore not much vegetation was expected to be identified as obstructions. The obstruction data was analyzed against the TERPs Surfaces as outlined in Engineering Brief Number 99A and vegetation was identified within ten feet of the surfaces. The data was also analyzed against the 14 CFR Part 77 Surfaces which did indicate obstacles to the Approach Surface which has a very shallow 50:1 slope.

6.3.1.1 14 CFR Part 77 Approach Surface Obstructions

The Part 77 Approach Surface at BGR is unique from the TERPs surfaces outlined in EB 99A in that is has a shallow 50:1 slope for the first 10,000 feet of the surface and then a slightly steeper 40:1 slope for the remaining 40,000 feet. When comparing this surface to the TERPs row 7 Departure Surface (40:1 slope), row 5 Threshold Siting Surface (34:1 slope), and the row 6 Glidepath Qualification Surface (30:1 slope) it is very apparent that the Part 77 Approach Surface is the most constricting and is likely to capture obstructions.

Several groups of vegetative obstructions were identified within the first 10,000 feet of the Part 77 Approach Surface where the slope is most shallow. Trees heights within the surface range from ten feet below the surface to penetrating more than eighteen feet above the surface. Although there are obstructions to the Part 77 Approach Surface there are no operational impacts that result from the obstacles. Operational impacts will only occur if the TERPs Surfaces are obstructed which could lead to restricted nighttime operations, displacing the threshold, and reduced minimums. The 14 CFR Part 77 Surfaces are used more as guides for land-use control and because the surfaces cover a vast area around the Airport it is not practical to clear every obstruction.

6.3.1.2 Options for Mitigation

There are three options for mitigating the obstructions to Part 77 Approach Surface:

1. Clear the vegetation.
2. Trim the vegetation.
3. Take no action.

Contacting property owners who live under these surfaces for vegetation clearing or trimming may not be in the Airport's best interest as it could disrupt the relationship with the surrounding community. Knowing that obstructions to the Part 77 Approach Surface cause operational impacts for the Airport, there is no added benefit to disturbing property owners for clearing or trimming vegetation. For these reasons it is recommended to take no action until the vegetation reaches heights that could obstruct the TERPs Surfaces as defined in Engineering Brief Number 99A. The cost and time required to go through the obstruction removal process would be much better saved until it was absolutely necessary to trim or clear the vegetation in order to prevent operational impacts.

6.3.2 Runway 33

The data available for analyzing obstructions to the Runway 33 end Part 77 Surfaces and the TERPs Surfaces as described in EB 99A is from 2018. Since capturing the data some vegetation has been cleared which was located on the City owned golf course. The golf course is located off the approach end of Runway 33 which is where the majority of penetrations to both the TERPs Surfaces and the 14 CFR Part 77 Surfaces. Vegetation that was found to compromise the TERPs Surfaces will need to be mitigated in order to prevent operational impacts to the Airport.

6.3.2.1 14 CFR Part 77 Surfaces

Obstructions were identified to two of the Part 77 Surfaces which are the Approach Surface and the Transitional Surface. The Runway 33 Part 77 Approach surface also has a shallow 50:1 slope for the first 10,000 feet and a 40:1 slope for the remaining 40,000 feet. This shallow and lengthy surface covers a large area capturing many obstacles. The Transitional Surface extends up and out of the sides of the Approach Surface at a steep slope of 7:1.

Several groups of vegetative obstructions were identified within the first 10,000 feet of the Part 77 Approach Surface where the slope is most shallow. Trees heights within the surface range from ten feet below the surface to penetrating more than thirty feet above the surface. Although there are obstructions to the Part 77 Approach Surface there are no operational impacts that result from the obstacles. Several groups of obstructions were also identified to the Part 77 Transitional Surface ranging from ten feet below the surface to nearly forty feet above the surface. Like the Approach Surface, no operational impacts result from penetrations to the Transitional Surface.

Operational impacts will only occur if the TERPs Surfaces are obstructed which could lead to restricted nighttime operations, displacing the threshold, and reduced minimums. The 14 CFR Part 77 Surfaces are used more as guides for land-use control and because the surfaces cover a vast area around the Airport it is not practical to clear every obstruction.

6.3.2.2 TERPs Surfaces (Engineering Brief Number 99A)

The TERPs Surface are the most critical to keep free of obstructions. As outlined in the criteria listed in Engineering Brief, those that apply to Runway 33 end are the row 7 Departure Surface (40:1 slope), row 5 Threshold Siting Surface (34:1 slope), and the row 6 Glidepath Qualification Surface (30:1 slope).

Several groups of vegetative obstructions were identified as penetrating only the Departure Surface and Threshold Siting Surface. The Glidepath Qualification surface was determined to be free of obstructions which is critical for maintaining vertical guidance to aircraft. Because of the shallower 40:1 slope the Departure Surface does have more penetrations than the steeper Threshold Siting Surface having a 34:1 slope. Obstructions to the Departure Surface off Runway 33 range from within ten feet of penetrating the surface to more than ten feet above the surface. The Departure Surface ensures safe climb out for aircraft departing from Runway 15, penetrations to this surface are typically mitigated through publish departure procedures. Obstructions identified to the Threshold Siting Surface are less severe, ranging from ten feet below the surface to penetrating nearly three feet. If not mitigated, obstacle to this surface will cause one or more operational impacts such as:

- Displacing the runway threshold leading to shorter landing distance

- Modifying the glide path angle and/or threshold crossing height
- Raising visibility minimums
- Prohibiting night operations unless the obstruction is lighted or an approve visual glide slope indicator is used

6.3.2.3 Options for Mitigation

There are three options for mitigating the obstructions to the Runway 33 Part 77 Surfaces and TERPs Surfaces:

1. Clear the vegetation.
2. Trim the vegetation.
3. Take no action.

As previously stated, penetrations to the Part 77 Surfaces do not lead to operational impacts and these surfaces are used as land-use guides not as clear to surfaces. Penetrations to the Departure Surface can be easily mitigated without clearing or trimming vegetation by publishing departure procedures for aircraft to follow. The controlling factor for acting is the Threshold Siting Surface. If not mitigated, the obstructions to this surface will affect operations to Runway 33 and could potentially limit aircraft from utilizing this end of the Runway depending on which impacts listed in paragraph 6.3.2.2 are applied. For this reason, action must be taken to either trim or clear the vegetation under the approach to Runway 33.

The vegetation obstructing the Runway 33 surfaces is located on the City owned golf course which is a sprawling 27-hole course. Clearing the vegetation would disrupt the beauty and serenity of the course which is enjoyed by both golfers and local wildlife. Totally clearing the golf course vegetation is unrealistic as it would be very difficult to get approval from the City which benefits from the golf course. Instead, it is recommended to trim the vegetation to acceptable heights which is an ideal compromise given the factors at hand.

An arborist was consulted regarding the golf course vegetation to determine growth rates of the trees under the Runway 33 approach. These growth rates will help determine when trees that are not yet penetrating the surfaces will become obstructions and help determine how long it will be before existing trees that are obstructions to grow back to heights that will require another trim. This information is helpful for being selective when it comes to trimming trees to keep the approach to Runway 33 free of restrictions while maintaining the landscaping and aesthetic of the golf course.

7. Capital Improvement Plan

BGR

7. Capital Improvement Plan

This chapter presents the Capital Improvement Plan (CIP), which was developed based on the recommendations that came out of the analysis presented in previous chapters. The CIP is one of the required products of an airport master plan, along with the approved forecasts of demand and the Airport Layout Plan (ALP). The CIP includes the cost estimate for each project, the timing for the implementation of each project, as well as the potential funding sources. CIPs are updated on a regular basis by the airport sponsor to reflect the airport's facility needs, funding availability, and other factors such as agency coordination, permitting, and approvals.

Table 7-1. Capital Improvement Plan Summary

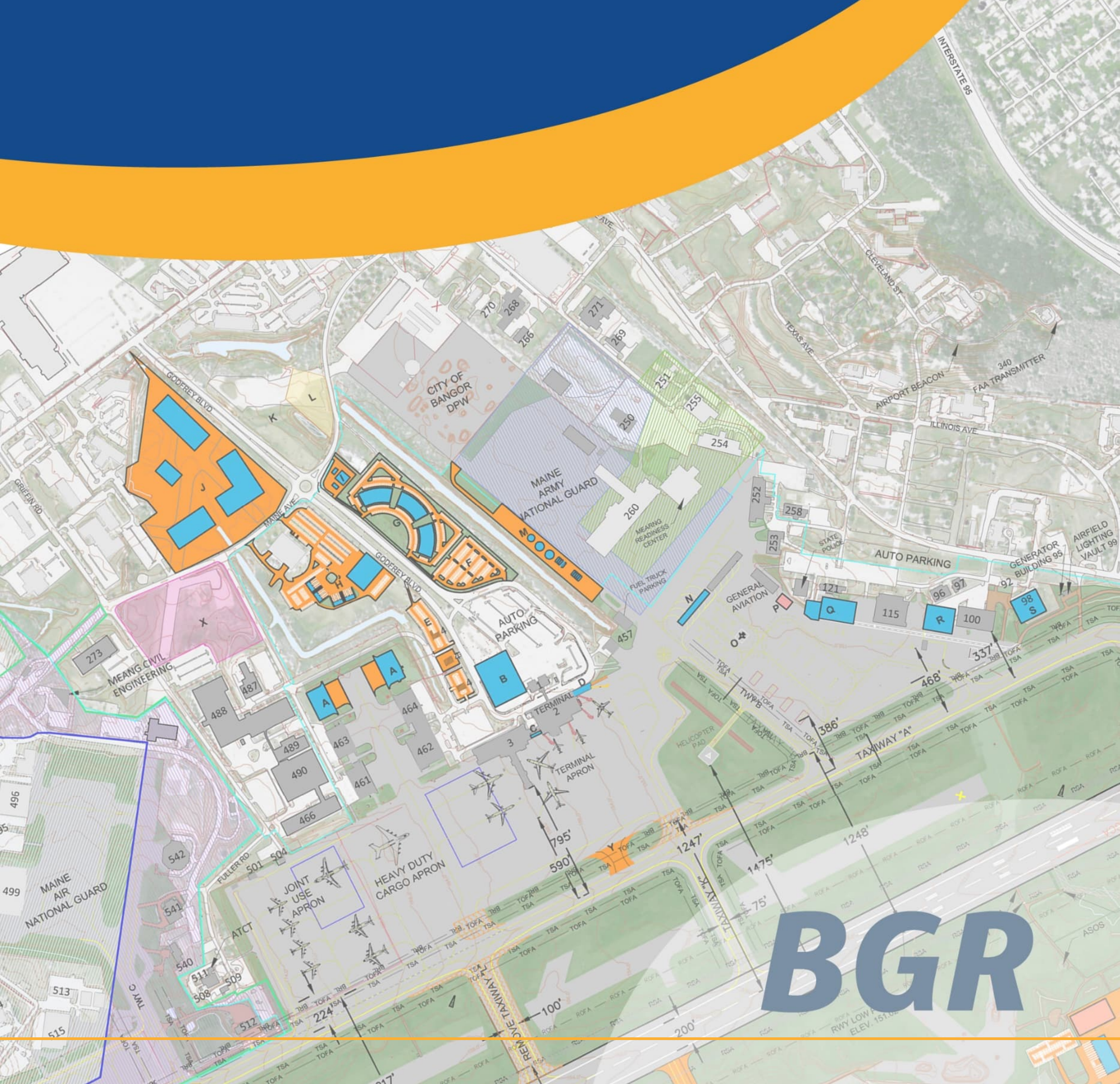
Item	Estimate	Master Plan Reference	Master Plan Page	Benefit
Solar Canopies & PV Arrays	$82,800,000	5.5.1	160	Ability to offset all of BGR's electrical needs.
Solar Parking Canopy	$12.8M or PPA			Capacity to offset all of BGR electric needs at 4.83 MW DC power generation using 3 existing auto parking lots
Solar Farm - 14MW	$70.0M or PPA			Capacity to power future fleet of electric GSE and aircraft
Green Infrastructure (pavement removal & bio retention)		5.5.2.1	164	Stormwater treatment and stormwater credits.
Pavement Removal				
Filter Strips				
Bio Retention				
Energy & Water Conservation	$3,016,500	5.5.3	166	Multiple quick win projects such as fixture replacement, HVAC improvements etc.
Premium Efficiency Motor Replacements	$2,000			Ties in and builds upon City and regional sustainability initiatives.

Item	Estimate	Master Plan Reference	Master Plan Page	Benefit
Low-Flow Water Fixtures - Aerator Replacements	$2,500			Reduces CO2 and water use /waste water.
Retro-commissioning	$150,000			Several quick win projects identified
High Efficiency Natural Gas Condensing Boilers	$575,000			
Infrared (IR) Heaters in High Bay Areas	$130,000			
LED Interior and Exterior Lighting Systems and Controls	$580,000			
Low-Flow Water Fixtures - Full Replacement	$25,000			
High Efficiency Air Source Heat Pump Domestic Water Heaters	$52,000			
Dynamic Glass Windows	$1,500,000			
GA Apron	$21,687,873	6.1.4	176	Modernizes General Aviation terminal and provides additional conditioned aircraft storage.
T-hangar	$1,510,313			
FBO Building (11,474 sq.ft.)	$2,983,240			
FBO Hangar (33,000 sq.ft.)	$8,597,160			
FBO Maintenance Hangar (33,000 sq.ft.)	$8,597,160			

Item	Estimate	Master Plan Reference	Master Plan Page	Benefit
Maintenance SRE Building (30,300 sq.ft.)	$7,578,500	6.1.3.2	175	Dedicated SRE building sized for current fleet of SRE. Better positioned to free up valuable apron space and respond to snow and maintenance events.
Relocate Fuel Farm	$39,537,504	6.1.1.1	170	Releases BGR from certain regulatory guidelines and provides more efficient fueling operations. Current fuel farm would be leased out to other fuel supplier and provide additional revenue generation.
Cargo Apron	$42,114,542	6.1.2	173	Provides modern, efficient and revenue generating opportunity for a world class and in-demand aviation use. Trends in cargo activity have been steadily increasing.
Construct Cargo Hangar #1	$6,370,000			
Construct Cargo Hangar #2	$5,491,200			
Apron pavement / Utilities / Design	$30,253,342			
IROPS Apron	$21,382,165	6.1.6.3	181	Frees up space for revenue making opportunities. Dedicated and better isolated space for hazardous operations.
Corporate Apron	$52,379,037	6.1.5	177	Increased revenue from lease agreements, property taxes, fuel sales, MRO services.
Construct Corporate Hangar - 28,314 SF	$7,361,640			
Construct Corporate Hangar - 20,674 SF	$5,375,240			
Construct Corporate Hangar - 28,314 SF	$7,361,640			
Apron pavement / Utilities / Design	$32,280,517			

Item	Estimate	Master Plan Reference	Master Plan Page	Benefit
Cell Phone Lot & Employee Parking	$1,867,550	6.2.1	183	Increased road/curbside safety, snow removal efficiencies, additional employee parking.
Consolidated Rental Car Facility	$9,774,219	6.2.5	186	Additional space in terminal building, better experience for rental car users, better facilities and operations for rental car companies. Provides consolidated all car fueling, cleaning, maintenance and admin functions.
Automobile Parking Garage (1,000 spaces)	$32,000,000			Adds auto parking spaces, covered parking, additional revenue generator.

8. Airport Layout Plan



8. Airport Layout Plan

A complete Airport Layout Plan (ALP) drawing set was produced in full conformance with FAA AC 150/5070-6B, Airport Master Plans. The FAA SOP 2.00 was used to ensure compliance with FAA standards. A total of 12 drawings constitutes the full ALP set. The ALP set drawings are included below, and a full drawing set was plotted on 24” x 36” sheets.

The ALP drawings were prepared in AutoCAD Map (versions 2014 and 2017); ArcMap Geographic Information System (GIS) and other software were also used to incorporate and graphically display data from various sources. For example, GIS files from the State of Maine, as well as aerial imagery acquired by Martinez Geospatial, were used as base maps for several drawings in the ALP set.

A brief description of the ALP drawings is presented below:

TITLE SHEET (DRAWING NO. 1)

The Title sheet includes the airport location maps, an index of drawings in the ALP set, as well as signature blocks.

AIRPORT DATA SHEET (DRAWING NO. 2)

The Airport Data sheet includes the wind roses for All Weather, IFR & VFR conditions. It also includes the data tables for building identification, runway and taxiway data and general airport data.

EXISTING ALP SHEET (DRAWING NO. 3)

This drawing was produced at a scale of 1” = 600’, and depicts the Airport facilities and edges of pavement as they exist in April 2023.

ULTIMATE ALP SHEET (DRAWING NO. 4)

The Ultimate ALP drawing depicts the existing and future airport facilities. The drawing was produced at a scale of 1” = 600’ and graphically identifies the proposed airport facilities that are included in the Capital Improvement Plan. It also includes pertinent regulatory surfaces such as the Runway Protection Zones (RPZ), and Runway Safety Areas (RSA).

TERMINAL AREA PLAN (DRAWING NO. 5)

This is a drawing at a scale of 1” = 100’ that presents a detailed layout of the future terminal facility area.

AIRPORT AIRSPACE DRAWING (DRAWING NO. 6)

This drawing depicts the protected surfaces defined in FAR Part 77. It also graphically depicts penetrations to the imaginary surfaces and location in relation to BGR. The obstructions are derived from aerial imaginary obtained by Martinez Geospatial in 2019, previous Master Plan data, and U.S.G.S. topographic maps.

INNER PORTION OF THE APPROACH SURFACE – RUNWAY 15 & 33 (DRAWINGS NO. 7 & 8)

These drawings depict penetrations to several FAR Part 77 surfaces in both plan and profile views. The Threshold Siting Surfaces are shown on these drawings as well. Ground profiles along the runway centerline and left/right of the centerline are also shown. The extent of the drawings are shown to where the Approach Surface rises 150' above the threshold elevation.

DEPARTURE SURFACE PLAN (DRAWING NO. 9)

This drawing shows the Departure Surface and any penetrations based on the surface defined in AC 150/5300-13B.

LAND USE PLAN (DRAWING NO. 10)

This drawing depicts the existing land use zoning surrounding BGR. The critical areas, Runway Object Free Area (ROFA), and Inner Approach Obstacle Free Zone (IAOFZ) are also shown. This drawing was produced at a scale of 1" = 400'. The drawing aids planners in identifying areas of compatible development and zoning.

EXHIBIT A (DRAWINGS NO. 11 & 12)

This drawing depicts the airport property lines along with adjacent roads and trails. The drawing was produced at a scale of 1" = 300'.

The ALP drawings are included in 11" x 17" format on the following pages.

BANGOR INTERNATIONAL AIRPORT

287 GODFREY BLVD, BANGOR, ME 04401

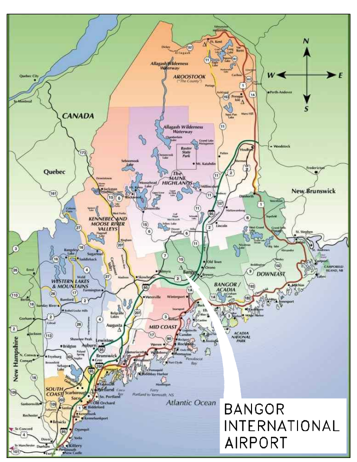
CITY OF BANGOR
BANGOR, ME 04401

MASTER PLAN UPDATE

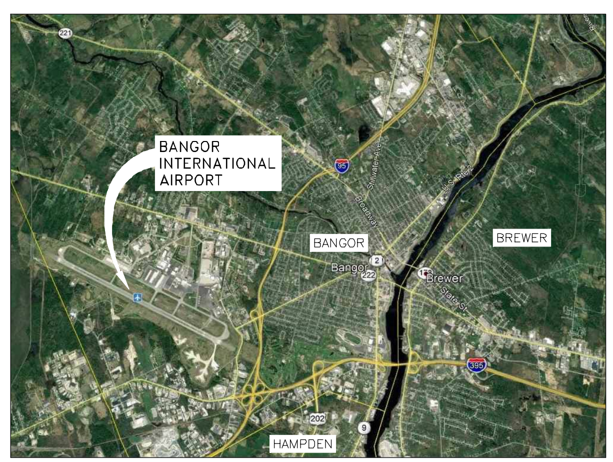
AIP No. 3-23-0005-77-2021

UPDATED APRIL 2023

LOCATION PLAN



VICINITY MAP



Jacobs

TWO EXECUTIVE PARK DRIVE
SUITE 205
BEDFORD, NH 03110

REVISED APRIL 2023

PREPARED IN ACCORDANCE WITH FAA ADVISORY CIRCULARS:
150/5300-13A AIRPORT DESIGN CHANGE 1, FEBRUARY 26, 2014
150/5070-6B AIRPORT MASTER PLANS CHANGE 2, JANUARY 27, 2015

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NEW ENGLAND REGIONAL HEADQUARTERS
AIRPORTS DIVISION – ANE 600

APPROVED: ______

DATE: ______

APPROVAL SUBJECT TO COMMENTS AND RECOMMENDATIONS LETTER

BANGOR INTERNATIONAL AIRPORT
THE CITY OF BANGOR MAINE

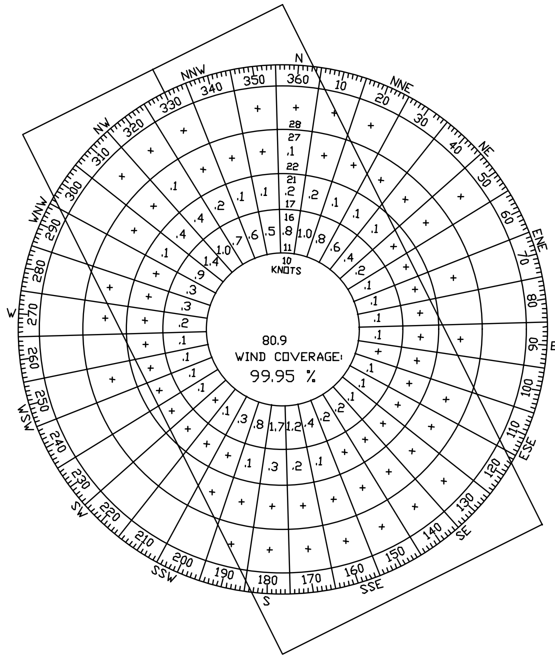
ANTHONY P. CARUSO JR. – AIRPORT DIRECTOR

DATE: ______

MAINE DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING
AVIATION PROGRAM

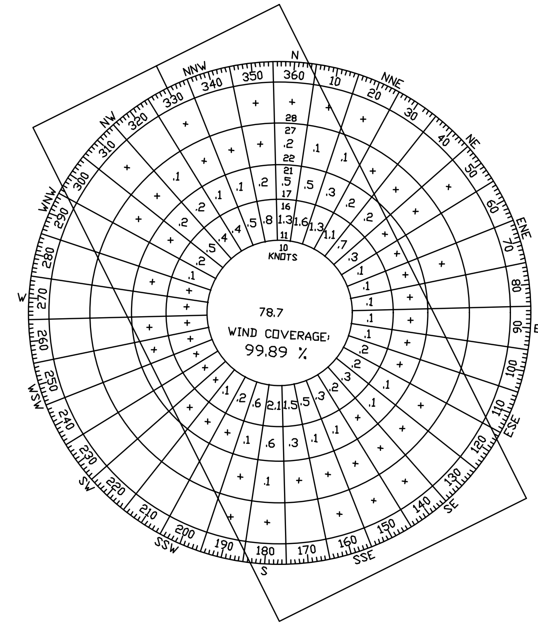
DIRECTOR

DATE: ______



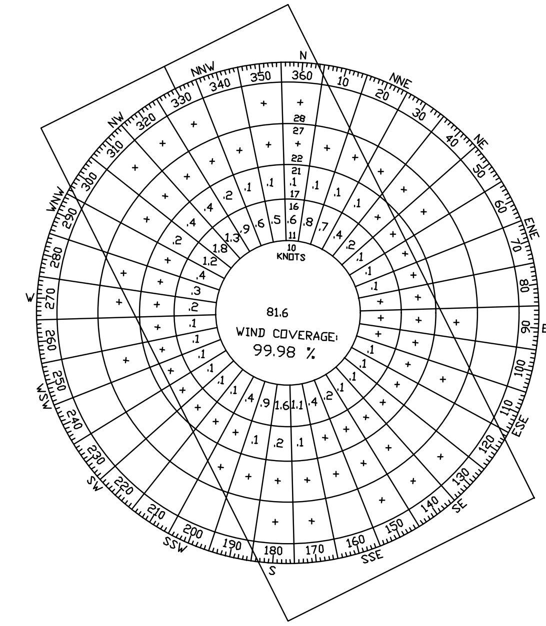
ALL WEATHER WIND ROSE
WIND COVERAGE
20 KTS
COMBINED 99.95%

SOURCE: NATIONAL CLIMATIC DATA CENTER – FEDERAL BUILDING
ASHEVILLE, NORTH CAROLINA
PERIOD: 2011 – 2020



IFR WIND ROSE
WIND COVERAGE
20 KTS
COMBINED 99.89%

SOURCE: NATIONAL CLIMATIC DATA CENTER – FEDERAL BUILDING
ASHEVILLE, NORTH CAROLINA
PERIOD: 2011 – 2020

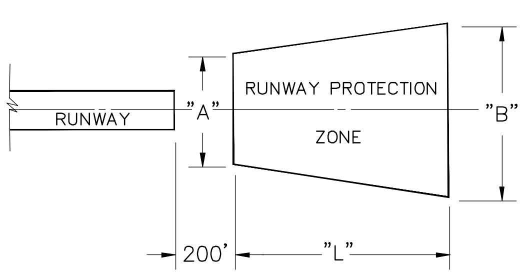


VFR WIND ROSE
WIND COVERAGE
20 KTS
COMBINED 99.98%

SOURCE: NATIONAL CLIMATIC DATA CENTER – FEDERAL BUILDING
ASHEVILLE, NORTH CAROLINA
PERIOD: 2011 – 2020

RUNWAY PROTECTION ZONE

RUNWAY	CATEGORY	SEE DIAGRAM BELOW "L"	"A"	"B"
15	PRECISION–CAT III	2,500'	1,000'	1,750'
33	PRECISION–CAT I	2,500'	1,000'	1,750'



AIRPORT DATA

ITEM	EXISTING
AIRPORT ELEVATION (U.S.G.S.–M.S.L.)	192.1
SERVICE LEVEL	COMM. SERV. PRIMARY
AIRPORT ROLE	LONG HAUL
MEAN MAX. TEMP HOTTEST MONTH	78°
TERMINAL NAVAIDS	VORTAC, NDB, LOC, GS, ASR
COMBINED WIND COVERAGE (A/W) 12 MPH / 15 MPH	91.70% / 95.70%
TAXIWAY WIDTH	75'; 100'(TWY L)
TAXIWAY LIGHTING	MEDIUM INTENSITY
TAXILANE / TAXIWAY OFA	186' / 320'
TSA	214'
OWNER	CITY OF BANGOR
MAGNETIC DECLINATION	16°–35'–4"W
AIRCRAFT DESIGN GROUP	IV (B757–300)
AIRCRAFT APPROACH SPEED CLASS	D (KC–135R)
AIRPORT REFERENCE POINT (ARP)	44°–48'–26.80"N 68°–49'–41.30"W
AIRPORT ACREAGE	1,700
ARFF INDEX	E
FAR PART 139 CERTIFICATION	FULL

AIRPORT BUILDINGS (MILITARY-LEASE)

BLDG	EXISTING	AREA (SF)
250	MAINE ARMY GUARD	14,344.8 SF
260	MAINE ARMY GUARD	108,593.3 SF
489	MAINE AIR GUARD	22,486.7 SF
512	MAINE AIR GUARD	8,862.8 SF
525	MAINE AIR GUARD	1,782.3 SF
529	MAINE AIR GUARD	722.3 SF
537	MAINE AIR GUARD	1,899.8 SF
538	MAINE AIR GUARD	6,583.8 SF
540	MAINE AIR GUARD	5,573.1 SF
541	MAINE AIR GUARD	13,314.1 SF
542	MAINE AIR GUARD	25,866.2 SF

BUILDINGS (MILITARY-OWNED)

251	MAINE ARMY GUARD	4,197.8 SF
254	MAINE ARMY GUARD	26,673.3 SF
255	MAINE ARMY GUARD	22,315.2 SF
260	MAINE ARMY GUARD	108,593.3 SF
269	MAINE ARMY GUARD	6,883.0 SF
417	MAINE AIR GUARD	16,353.2 SF
418	MAINE AIR GUARD	2,413.7 SF
420	MAINE AIR GUARD	24,059.9 SF
421	MAINE AIR GUARD	1,948.3 SF
422	MAINE AIR GUARD	2,162.4 SF
424	MAINE AIR GUARD	12,873.1 SF
425	MAINE AIR GUARD	8,204.2 SF
428	MAINE AIR GUARD	N/A
464	MAINE AIR GUARD	27,459.2 SF
491	MAINE AIR GUARD	N/A
492	MAINE AIR GUARD	65.8 SF
493	MAINE AIR GUARD	34,093.3 SF
494	MAINE AIR GUARD	4,151.1 SF
495	MAINE AIR GUARD	368.7 SF
496	MAINE AIR GUARD	44,838.6 SF
497	MAINE AIR GUARD	7,382.9 SF
499	MAINE AIR GUARD	66,442.4 SF
505	MAINE AIR GUARD	N/A
510	MAINE AIR GUARD	34,361.8 SF
513	MAINE AIR GUARD	8,495.8 SF
514	MAINE AIR GUARD	8,138.3 SF
515	MAINE AIR GUARD	37,643.5 SF
524	MAINE AIR GUARD	4,401.1 SF
528	MAINE AIR GUARD	N/A

AIRPORT BUILDINGS (CIVILIAN)

BLDG	EXISTING	AREA
1	HOTEL	9,527.6 SF
2	DOMESTIC TERMINAL BUILDING	59,785.6 SF
3	INTERNATIONAL TERMINAL BUILDING	59,137.7 SF
4	RENTAL CAR	6,919.5 SF
95	UTILITY BUILDING	N/A
96	FAA SECTOR OFFICE	8,977.4 SF
97	FESSENDEN GEO–ENVIRONMENTAL SERVICES	5,281.7 SF
100	AIRFIELD MAINTENANCE	31,539.6 SF
115	C&L AEROSPACE	38,294.9 SF
121	GENERAL AVIATION TERMINAL	7,374.4 SF
252	GENERAL AVIATION HANGAR	26,180.8 SF
253	NATIONAL CAR RENTAL/BGR FACILITIES MAINTENANCE	13,357.4 SF
258	HANNAFORD BROTHERS	10,840.7 SF
266	BAFS INC.	4,541.3 SF
268	BAFS INC.	26,208.4 SF
270	OFFICE BLDG	N/A
271	ENTERPRISE OFFICE	27,793.1 SF
272	OFFICE BLDG	N/A
340	FAA TRANSMISSION TOWER	933.1 SF
457	AIRCRAFT HANGAR–LEASE/RENT	6,148.4 SF
461	AIRCRAFT SERVICE HANGAR	27,685.9 SF
462	AIRCRAFT SERVICE HANGAR	40,026.2 SF
463	AIRCRAFT SERVICE HANGAR	27,305.7 SF
464	AIRCRAFT SERVICE HANGAR	27,459.2 SF
466	GENERAL ELECTRIC	39,804.8 SF
487	GENERAL ELECTRIC	19,140.8 SF
488	GENERAL ELECTRIC	131,210.0 SF
489	GENERAL ELECTRIC	24,044.4 SF
490	GENERAL ELECTRIC	78,378.6 SF

AIRPORT BUILDINGS (CIVILIAN)

BLDG	EXISTING	AREA
501	MAINE ANG	1,626.1 SF
504	MAINE ANG	1,955.6 SF
508	FAA	423.3 SF
509	FAA	1,627.6 SF
511	FAA ATC TOWER	7,580.2 SF
512	ARFF STATION (FIRE STATION)	8,862.8 SF
535	FAA AIRPORT SURVEILLANCE RADAR (ASR) ANTENNA	1,781.9 SF
600	C&L AEROSPACE	46,175.4 SF
610	VACANT	14,453.7 SF
612	VACANT	271.4 SF
N/A	AIRPORT FUEL FARM	N/A

RUNWAY 15-33 DATA

	EXISTING	FUTURE
LENGTH	11,440'	SAME
WIDTH	200'	SAME
SAFETY AREA WIDTH/LENGTH	500'/1,000'	SAME
PVMT. STRENGTH (x1,000 LBS)	S–100 D–210 DT–400	SAME
PAVEMENT TYPE	CONC. W/BIT. OVERLAY	SAME
RUNWAY LIGHTING	TOUCHDOWN ZONE & CENTER LINE & HIRL	SAME
RUNWAY MARKING	PRECISION	SAME
EFFECTIVE GRADIENT (%)	0.36%	SAME
APPROACH AIDS	R/W 15–ALSF–II, PAPI R/W 33–MALSR, PAPI	SAME
NAVIGATIONAL AIDS	R/W 15 CAT III ILS R/W 33 CAT I ILS	SAME
FAR 77 CATEGORY	PRECISION	SAME
APPROACH SURFACE SLOPE	50:1/40:1	SAME
ELEVATION	R/W 15 192' R/W 33 163'	SAME
RUNWAY END COORDINATES	R/W 15 N:895009.03 E:420008.00 R/W 33 N:903179.95 E:412002.93	SAME
RUWNAY DESIGN CODE	D–IV	SAME
APPROACH REFERENCE CODE	D/IV/1600	SAME
DEPARTURE REFERENCE CODE	D/VI	SAME
TYPE OF AERONAUTICAL SURVEY	VERTICALLY GUIDED	
RUNWAY DEPARTURE SURFACE	YES	SAME
OFA WIDTH/LENGTH	800'/1,000'	SAME
OFZ WIDTH/LENGTH	400'/200'	SAME
THRESHOLD SITING SURFACE	ROW 5 – SLOPE 34:1	SAME
TDZ ELEVATION	R/W 15 192' R/W 33 163'	SAME

RUNWAY 15-33 DECLARED DISTANCES

	EXISTING	FUTURE
TORA	11,440'	SAME
TODA	11,440'	SAME
ASDA	11,440'	SAME
LDA	11,440'	SAME

BGR BANGOR INTERNATIONAL AIRPORT

Mark	Description	Date	Appr.

Rev.
Date: 02/2022
Design file no.
Drawing code:
File name:
Plot date: FEBRUARY 2022
Plot scale: NTS

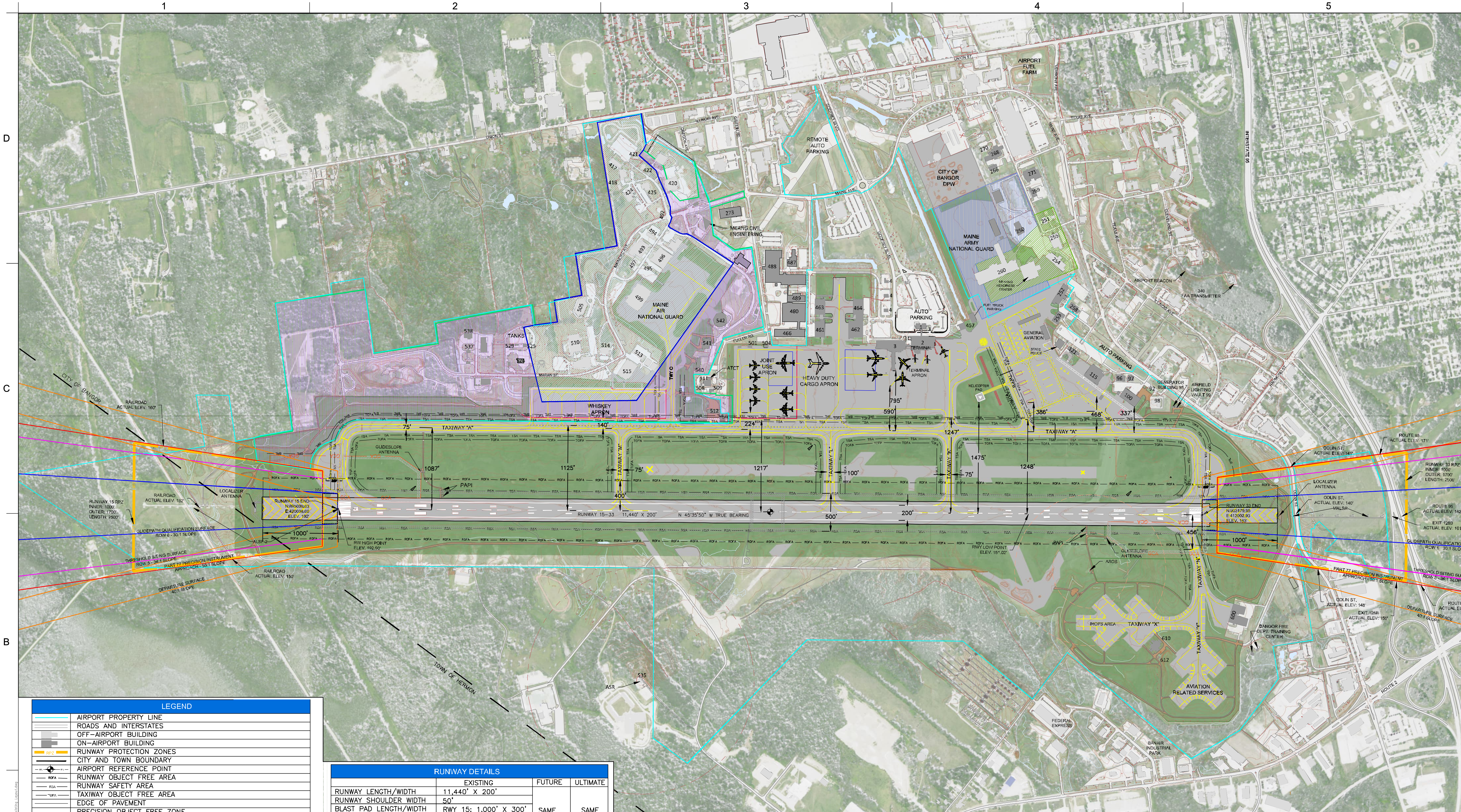
Designed by: NFP
Dwn by: SNA
Ckd by: HHM
Reviewed by: JRH
Submitted by: HHM

BANGOR INTERNATIONAL AIRPORT
BANGOR MAINE

Jacobs
TWO EXECUTIVE PARK DRIVE, SUITE 205
BEDFORD, NH 03110

AIRPORT DATA SHEET

Sheet reference number:
2
2 OF 12



LEGEND

	AIRPORT PROPERTY LINE
	ROADS AND INTERSTATES
	OFF-AIRPORT BUILDING
	ON-AIRPORT BUILDING
	RUNWAY PROTECTION ZONES
	CITY AND TOWN BOUNDARY
	AIRPORT REFERENCE POINT
ROFA	RUNWAY OBJECT FREE AREA
RSA	RUNWAY SAFETY AREA
TOFA	TAXIWAY OBJECT FREE AREA
	EDGE OF PAVEMENT
	PRECISION OBJECT FREE ZONE
	OBSTACLE FREE ZONE
	PART 77 APPROACH SURFACE 50:1 SLOPE
	EB 99 DEPARTURE SURFACE 40:1 SLOPE
	EB 99 THRESHOLD SITING SURFACE – ROW 5 34:1 SLOPE
	EB 99 GLIDEPATH QUALIFICATION SURFACE – ROW 6 30:1 SLOPE
BRL	BUILDING RESTRICTION LINE
	AIRPORT CONTROL POINT
	CONTOUR LINES (2' INTERVAL)
	GLIDE SLOPE CRITICAL AREA
	LOCALIZER CRITICAL AREA
	ME AIR NATIONAL GUARD–OWNED
	ME AIR NATIONAL GUARD–LEASE
	ME ARMY NATIONAL GUARD–OWNED
	ME ARMY NATIONAL GUARD – LEASE
	RUNWAY / TAXIWAY / APRON PAVEMENT
	SERVICE ROADS
	BODY OF WATER
	GRASS
	ASOS 500' CRITICAL AREA
	ASOS 1,000' CRITICAL AREA
	ASR 1,500' CRITICAL AREA
	WINDSOCK

RUNWAY DETAILS

	EXISTING	FUTURE	ULTIMATE
RUNWAY LENGTH/WIDTH	11,440' X 200'	SAME	SAME
RUNWAY SHOULDER WIDTH	50'		
BLAST PAD LENGTH/WIDTH	RWY 15: 1,000' X 300' RWY 33: 1,000' X 200'		
CROSSWIND COMPONENT	20 KNOTS		

TAXIWAY DETAILS

	EXISTING	FUTURE	ULTIMATE
TAXIWAY EDGE SAFETY MARGIN	A, C, K, L, M, N, X, Y: 15' B: 10'	SAME	SAME
TAXIWAY SHOULDER WIDTH	A, C, K, M, N, X, Y: 30' B: 20' L: 40'		

APRON DETAILS

	EXISTING SF	FUTURE	ULTIMATE
TERMINAL APRON	1,549,600 SF	SAME	SAME
HEAVY DUTY CARGO APRON	441,000 SF		
DOCK HANGAR APRON	215,800 SF		
JOINT USE APRON	813,900 SF		
ME AIR NATIONAL GUARD APRON	720,100 SF		
ME ARMY NATIONAL GUARD APRON	1,134,400 SF		
WHISKEY APRON	753,900 SF		
GERNAL AVIATION APRON	1,606,600 SF		
CHRISTMAS TREE APRON	1,408,300 SF	1,689,361 SF	

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NEW ENGLAND REGIONAL HEADQUARTERS
AIRPORTS DIVISION - ANE 600

APPROVED: ______________________

DATE: ______________

APPROVAL SUBJECT TO COMMENTS AND RECOMMENDATIONS LETTER

magnetic variation 16° 35' 4" W changing by 6' E per year

NOTES:

1. REFER TO DATA SHEET FOR BUILDING NUMBER LEGEND AND OTHER PERTINENT DATA.

2. RW 33– LOCALIZER IS LOG–PERIODIC, NO AREA B IS REQUIRED. CATEGORY I CRITICAL AREA DIMENSIONS USED. GLIDE SLOPE IS A CAPTURE EFFECT TYPE. LARGE AIRCRAFT CATEGORY II/III CRITERIA DIMENSIONS USED.

3. RW 15– LOCALIZER IS LOG–PERIODIC, NO AREA B IS REQUIRED. CATEGORY II/III CRITICAL AREA DIMENSIONS USED. GLIDE SLOPE IS A CAPTURE EFFECT TYPE. LARGE AIRCRAFT CATEGORY II/III CRITERIA DIMENSIONS USED.

GRAPHIC SCALE

600 0 300 600 1200

(IN FEET)
1 inch = 600 ft

BGR BANGOR INTERNATIONAL AIRPORT

BANGOR INTERNATIONAL AIRPORT
BANGOR MAINE

Jacobs
TWO EXECUTIVE PARK DRIVE, SUITE 205
BEDFORD, NH 03110

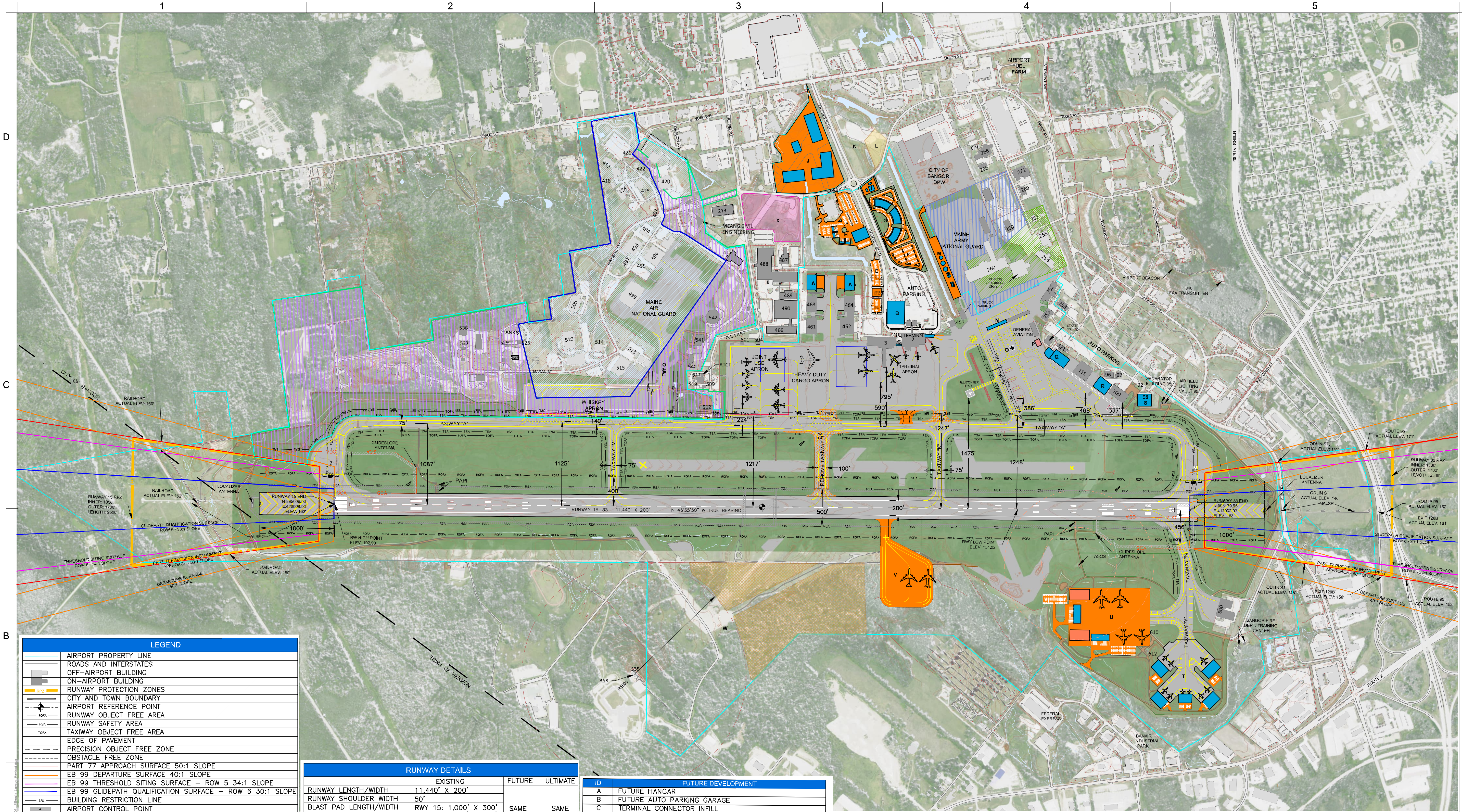
Designed by: NFP
Dwn by: SNA
Ckd by: HHM
Reviewed by: JRH
Submitted by: HHM
Date: 02/2022
Design file no.
Drawing code:
File name:
Plot date: FEBRUARY 2022
Plot scale: 1"=600'

Mark	Description	Date	Appr.

Rev.

EXISTING AIRPORT LAYOUT PLAN

Sheet reference number:
3



LEGEND
AIRPORT PROPERTY LINE
ROADS AND INTERSTATES
OFF–AIRPORT BUILDING
ON–AIRPORT BUILDING
RUNWAY PROTECTION ZONES
CITY AND TOWN BOUNDARY
AIRPORT REFERENCE POINT
RUNWAY OBJECT FREE AREA
RUNWAY SAFETY AREA
TAXIWAY OBJECT FREE AREA
EDGE OF PAVEMENT
PRECISION OBJECT FREE ZONE
OBSTACLE FREE ZONE
PART 77 APPROACH SURFACE 50:1 SLOPE
EB 99 DEPARTURE SURFACE 40:1 SLOPE
EB 99 THRESHOLD SITING SURFACE – ROW 5 34:1 SLOPE
EB 99 GLIDEPATH QUALIFICATION SURFACE – ROW 6 30:1 SLOPE
BUILDING RESTRICTION LINE
AIRPORT CONTROL POINT
CONTOUR LINES (2' INTERVAL)
GLIDE SLOPE CRITICAL AREA
LOCALIZER CRITICAL AREA
ME AIR NATIONAL GUARD–OWNED
ME AIR NATIONAL GUARD–LEASE
ME ARMY NATIONAL GUARD–OWNED
ME ARMY NATIONAL GUARD – LEASE
RUNWAY / TAXIWAY / APRON PAVEMENT
SERVICE ROADS
BODY OF WATER
GRASS
ASOS 500' CRITICAL AREA
ASOS 1,000' CRITICAL AREA
WINDSOCK
PROPOSED SOLAR FIELD
PROPOSED CNG FILL STATION
PROPOSED PAVEMENT
PROPOSED CONSTRUCTION
TO BE REMOVED
PROPOSED EQUIPMENT STORAGE AREA
PROPOSED LIGHT INDUSTRIAL MANUFACTURING AREA
ASR 1,500' CRITICAL AREA

RUNWAY DETAILS

	EXISTING	FUTURE	ULTIMATE
RUNWAY LENGTH/WIDTH	11,440' X 200'	SAME	SAME
RUNWAY SHOULDER WIDTH	50'		
BLAST PAD LENGTH/WIDTH	RWY 15: 1,000' X 300' RWY 33: 1,000' X 200'		
CROSSWIND COMPONENT	20 KNOTS		

TAXIWAY DETAILS

	EXISTING	FUTURE	ULTIMATE
TAXIWAY EDGE SAFETY MARGIN	A, C, K, L, M, N, X, Y: 15' B: 10'	SAME	SAME
TAXIWAY SHOULDER WIDTH	A, C, K, M, N, X, Y: 30' B: 20' L: 40'		

APRON DETAILS

	EXISTING SF	FUTURE	ULTIMATE
TERMINAL APRON	1,549,600 SF	SAME	SAME
HEAVY DUTY CARGO APRON	441,000 SF		
DOCK HANGAR APRON	215,800 SF		
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WHISKEY APRON	753,900 SF		
GERNAL AVIATION APRON	1,606,600 SF		
CHRISTMAS TREE APRON	1,408,300 SF	1,689,361 SF	

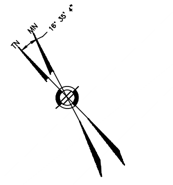
ID	FUTURE DEVELOPMENT
A	FUTURE HANGAR
B	FUTURE AUTO PARKING GARAGE
C	TERMINAL CONNECTOR INFILL
D	PASSENGER TERMINAL EXTENSION
E	CELL PHONE LOT / OVERFLOW PARKING / EMPLOYEE LOT
F	REMOTE OVERFLOW PARKING
G	TECHNOLOGY PARK / HOSPITALITY CENTER
H	REMOTE RENTAL CAR FACILITY
I	VEHICLE SERVICE STATION
J	OFFICE PARK
K	CITY OF BANGOR SOLAR FIELD
L	COMPRESSED NATURAL GAS FILL STATION
M	AVIATION FUEL FARM
N	T – HANGAR
O	US CUSTOMS AIRCRAFT INSPECTION SITE
P	FBO EQUIPMENT PARKING
Q	FBO OFFICE AND HANGAR
R	FBO MAINTENANCE HANGAR
S	AIRPORT MAINTENANCE SRE BUILDING
T	CORPORATE APRON
U	CARGO APRON
V	IROPS APRON
W	SOLAR FIELDS
X	AREA FOR LIGHT INDUSTRIAL MANUFACTURING
Y	RELOCATED TAXIWAY A CONNECTOR TO TERMINAL APRON

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NEW ENGLAND REGIONAL HEADQUARTERS
AIRPORTS DIVISION - ANE 600

APPROVED: ____________________

DATE: ____________

APPROVAL SUBJECT TO COMMENTS AND RECOMMENDATIONS LETTER



magnetic variation 16° 35' 4" W changing by 6' E per year

NOTES:

1. REFER TO DATA SHEET FOR BUILDING NUMBER LEGEND AND OTHER PERTINENT DATA.

2. RW 33– LOCALIZER IS LOG–PERIODIC, NO AREA B IS REQUIRED. CATEGORY I CRITICAL AREA DIMENSIONS USED. GLIDE SLOPE IS A CAPTURE EFFECT TYPE. LARGE AIRCRAFT CATEGORY II/III CRITERIA DIMENSIONS USED.

3. RW 15– LOCALIZER IS LOG–PERIODIC, NO AREA B IS REQUIRED. CATEGORY II/III CRITICAL AREA DIMENSIONS USED. GLIDE SLOPE IS A CAPTURE EFFECT TYPE. LARGE AIRCRAFT CATEGORY II/III CRITERIA DIMENSIONS USED.

GRAPHIC SCALE

600 0 300 600 1200

(IN FEET)
1 inch = 600 ft

BANGOR INTERNATIONAL AIRPORT
BANGOR MAINE

Jacobs
TWO EXECUTIVE PARK DRIVE, SUITE 205
BEDFORD, NH 03110

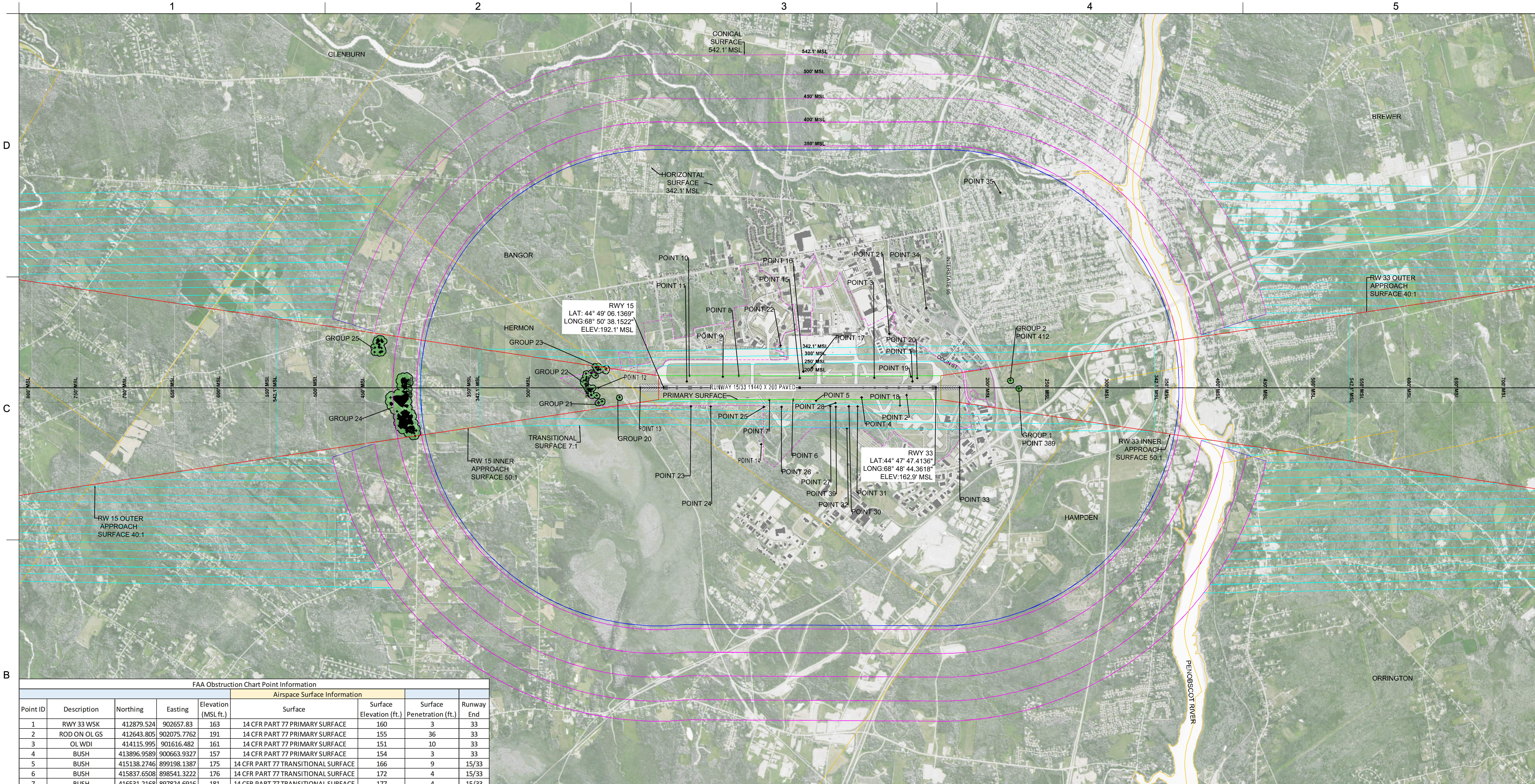
Designed by: NFP		Date: 02/2022	Rev.
Dwn by: SNA	Ckd by: HHM	Design file no.	
Reviewed by: JRH		Drawing code:	
Submitted by: HHM		File name: Plot date: FEBRUARY 2022 Plot scale: 1"=600'	

Mark	Description	Date	Appr.

ULTIMATE AIRPORT LAYOUT PLAN

Sheet reference number:
4
4 OF 12

P:\2019\E2X42727 - BGR Master Plan & Terminal Study update\700 Work\710 CADD\Drawings\2021 ALP Set\04 Ultimate Layout Revised.dwg



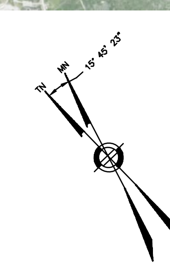
FAA Obstruction Chart Point Information

					Airspace Surface Information			
Point ID	Description	Northing	Easting	Elevation (MSL ft.)	Surface	Surface Elevation (ft.)	Surface Penetration (ft.)	Runway End
1	RWY 33 WSK	412879.524	902657.83	163	14 CFR PART 77 PRIMARY SURFACE	160	3	33
2	ROD ON OL GS	412643.805	902075.7762	191	14 CFR PART 77 PRIMARY SURFACE	155	36	33
3	OL WDI	414115.995	901616.482	161	14 CFR PART 77 PRIMARY SURFACE	151	10	33
4	BUSH	413896.9589	900663.9327	157	14 CFR PART 77 PRIMARY SURFACE	154	3	33
5	BUSH	415138.2746	899198.1387	175	14 CFR PART 77 TRANSITIONAL SURFACE	166	9	15/33
6	BUSH	415837.6508	898541.3222	176	14 CFR PART 77 TRANSITIONAL SURFACE	172	4	15/33
7	BUSH	416531.2168	897824.6916	181	14 CFR PART 77 TRANSITIONAL SURFACE	177	4	15/33
8	GRD	418152.3541	897615.0822	189	14 CFR PART 77 PRIMARY SURFACE	185	4	15
9	OL ON POLE	418590.9232	897103.6597	198	14 CFR PART 77 PRIMARY SURFACE	187	11	15
10	ROD ON OL GS	419602.5508	896136.9411	237	14 CFR PART 77 PRIMARY SURFACE	190	47	15
11	RWY 15 WSK	419508.1947	895893.1936	199	14 CFR PART 77 PRIMARY SURFACE	192	7	15
12	FAR FIELD MONITOR	421922.9958	893051.206	224	14 CFR PART 77 APPROACH SURFACE	243	-19	15
13	OL ON LOC	420687.9516	894313.08	191	14 CFR PART 77 APPROACH SURFACE	208	-17	15
14	AIRPORT RADAR	415438.5662	896271.194	N/A	14 CFR PART 77 HORIZONTAL SURFACE	342.1	N/A	15/33
15	MID FIELD RVR	416288.973	899374.3506	183	14 CFR PART 77 PRIMARY SURFACE	172	11	15/33
16	ROD ON OL WDI	416392.0958	899675.8964	197	14 CFR PART 77 TRANSITIONAL SURFACE	203	-6	15/33
17	PRIMARY WINDSOCK	416248.0338	900038.5583	196	14 CFR PART 77 TRANSITIONAL SURFACE	224	-28	15/33
18	ASOS	412523.2251	901575.6363	181	14 CFR PART 77 TRANSITIONAL SURFACE	203	-22	33
19	ELEC EQUIP	413066.6088	902757.2382	157	14 CFR PART 77 PRIMARY SURFACE	158	-1	33
20	SOUTH RVR	412840.4993	902892.5906	158	14 CFR PART 77 PRIMARY SURFACE	160	-2	33
21	STATE POLICE ANT	414987.2296	903358.8025	286	14 CFR PART 77 HORIZONTAL SURFACE	342.1	-56.1	15/33
22	ANT ON OL ATCT	417830.7099	899754.7957	327	14 CFR PART 77 HORIZONTAL SURFACE	342.1	-15.1	15/33
23	TREE	418643.907	895280.416	248	14 CFR PART 77 TRANSITIONAL SURFACE	229	19	15
24	TREE	418056.2977	895868.0149	248	14 CFR PART 77 TRANSITIONAL SURFACE	229	19	15
25	TREE	416482.9324	897454.6216	235	14 CFR PART 77 TRANSITIONAL SURFACE	225	10	15/33
26	TREE	415964.3366	897985.4792	212	14 CFR PART 77 TRANSITIONAL SURFACE	223	-11	15/33
27	TREE	414549.8774	899464.1814	223	14 CFR PART 77 TRANSITIONAL SURFACE	214	9	15/33
28	BUSH	414497.2542	899710.0857	184	14 CFR PART 77 TRANSITIONAL SURFACE	195	-11	15/33
29	TREE	414372.8251	899611.018	227	14 CFR PART 77 TRANSITIONAL SURFACE	217	10	15/33
30	TREE	414004.1067	900014.9372	218	14 CFR PART 77 TRANSITIONAL SURFACE	213	5	15/33
31	TREE	413742.0076	900280.6554	202	14 CFR PART 77 TRANSITIONAL SURFACE	212	-10	15/33
32	TREE	413396.7533	899308.5529	327	14 CFR PART 77 HORIZONTAL SURFACE	342.1	-15.1	15/33
33	OL ON LOC	411316.0715	903883.0768	169	14 CFR PART 77 APPROACH SURFACE	179	-10	33
34	ROATING BEACON	414672.872	905221.5835	326	14 CFR PART 77 HORIZONTAL SURFACE	342.1	-16.1	15/33
35	FLGPL ON OL TK	415962.5239	910832.6628	364	14 CFR PART 77 HORIZONTAL SURFACE	342.1	21.9	15/33

Obstruction Grouping Information

Obstruction Information						Airspace Surface Information			
Group	Point ID	Description	Northing	Easting	Elevation (MSL ft.)	Surface	Surface Elevation (ft.)	Surface Penetration (ft.)	Runway End
1	389	TREETOP	409551.320	905643.848	239.20	14 CFR PART 77 APPROACH SURFACE	221.48	17.72	33
2	412	TREETOP	410036.475	905626.590	233.90	14 CFR PART 77 APPROACH SURFACE	221.48	12.42	33
20	4806	TREETOP	893409.974	421011.660	218.81	14 CFR PART 77 APPROACH SURFACE	224.99	-6.18	15
21	4301	TREETOP	892610.106	421464.582	243.07	14 CFR PART 77 APPROACH SURFACE	242.76	0.31	15
22	4536	TREETOP	892837.136	422069.571	244.74	14 CFR PART 77 APPROACH SURFACE	247.98	-3.24	15
23	4198	TREETOP	893578.344	422593.857	250.09	14 CFR PART 77 APPROACH SURFACE	244.73	5.36	15
24	4137	TREETOP	426481.501	886302.057	421.58	14 CFR PART 77 APPROACH SURFACE	403.10	18.48	15
25	4512	TREETOP	429684.194	887529.102	427.48	14 CFR PART 77 APPROACH SURFACE	430.39	-2.92	15

NOTES:
1. FAA OBSTRUCTION CHART DATA SOURCE: NOAA NATIONAL GEODETIC SURVEY (NGS), U.S. DEPARTMENT OF COMMERCE IN ACCORDANCE WITH SPECIFICATIONS AND STANDARDS OF ACCURACY OF THE FAA, DEPARTMENT OF TRANSPORTATION AND NOS, PUBLISHED JANUARY 2005;
2. RUNWAY 15 OBSTRUCTION GROUPING DATA SOURCE CES INC. 2020;
3. OBSTACLE DATA SOURCE: MARTINEZ ASSOC. INC. OCT. 2018. OBSTACLE DATA WAS UPDATED BY SURVEY PERFORMED BY HALEY WARD IN MARCH 2023 TO VERIFY THE REMOVAL OF VEGETATION PREVIOUSLY IDENTIFIED AS OBSTRUCTIONS TO THE PART 77 APPROACH SURFACE;
4. POINTS DETAILED IN OBSTRUCTION GROUPING INFORMATION TABLE REPRESENT THE OBSTRUCTION WITH THE GREATEST PENETRATION.



magnetic variation 15° 45' W ± 0° 23'
changing by 7' E per year (2020)

	LEGEND
	APPROACH SURFACE - 50:1 SLOPE
	PRIMARY SURFACE
	TRANSITIONAL SURFACE
	HORIZONTAL SURFACE
	CONICAL SURFACE
	50' AIRSPACE CONTOURS (MSL)
	AIRPORT PROPERTY BOUNDARY
	MUNICIPAL BOUNDARY
	OBSTRUCTION GROUP
	FAA OBSTRUCTION CHART POINT
	AIRPORT REFERENCE POINT
	EXISTNIG BUILDINGS

0 2000.004 4000.008 8000.016 Feet
1:2000

BGR BANGOR INTERNATIONAL AIRPORT

Mark	Date	Description	Appr.

Rev.
Date: 4/18/2023
Design file no.
Drawing code:
File name:
Plot date: FEBRUARY 2022
Plot scale: AS SHOWN
Designed by: NFP
Dwn by: SNA
Ckd by: HHM
Reviewed by: JRH
Submitted by: HHM

BANGOR INTERNATIONAL AIRPORT
BANGOR MAINE

Jacobs
TWO EXECUTIVE PARK DRIVE, SUITE 205
BEDFORD, NH 03110

AIRPORT AIRSPACE DRAWING

Sheet reference number:
6
6 OF 12

	LEGEND
	ROADS
	ON-AIRPORT BUILDING
	PROPOSED PAVEMENT
	PROPOSED CONSTRUCTION
	TO BE REMOVED
	BUILDING ELEV/MSL
	CONTOUR LINES (2' INTERVAL)
	FENCE
	BUILDING RESTRICTION LINE
	DRAINAGE TRENCH

BLDG	BUILDING DATA	ELEV. (AGL)
1	HOTEL	249'
2	DOMESTIC TERMINAL BUILDING	199.3'
3	INTERNATIONAL BUILDING	215.9'
4	RENTAL CARS	168'
457	HANGAR-LEASE/RENT	171'
461	MAINTENANCE & EQUIPMENT HANGAR	206'
462	AIRCRAFT SERVICE HANGAR	215'
463	HANGAR	205'
464	AIRCRAFT SERVICE HANGAR	206'
466	GENERAL ELECTRIC	186'
489	GENERAL ELECTRIC	–
490	GENERAL ELECTRIC	–
501	MAINE ANG TRAILER	–
504	MAINE ANG TRAILER	–

BLDG	FUTURE DEVELOPMENT
A	FUTURE HANGAR
B	FUTURE AUTO PARKING GARAGE
C	TERMINAL CONNECTOR INFILL
D	PASSENGER TERMINAL EXTENSION

magnetic variation 16° 30' 4" W changing by 8' E per year

NOTES:
1. REFER TO DATA SHEET FOR BUILDING NUMBER LEGEND AND OTHER PERTINENT DATA.

GRAPHIC SCALE
100 0 50 100 200
(IN FEET)
1 inch = 100 ft

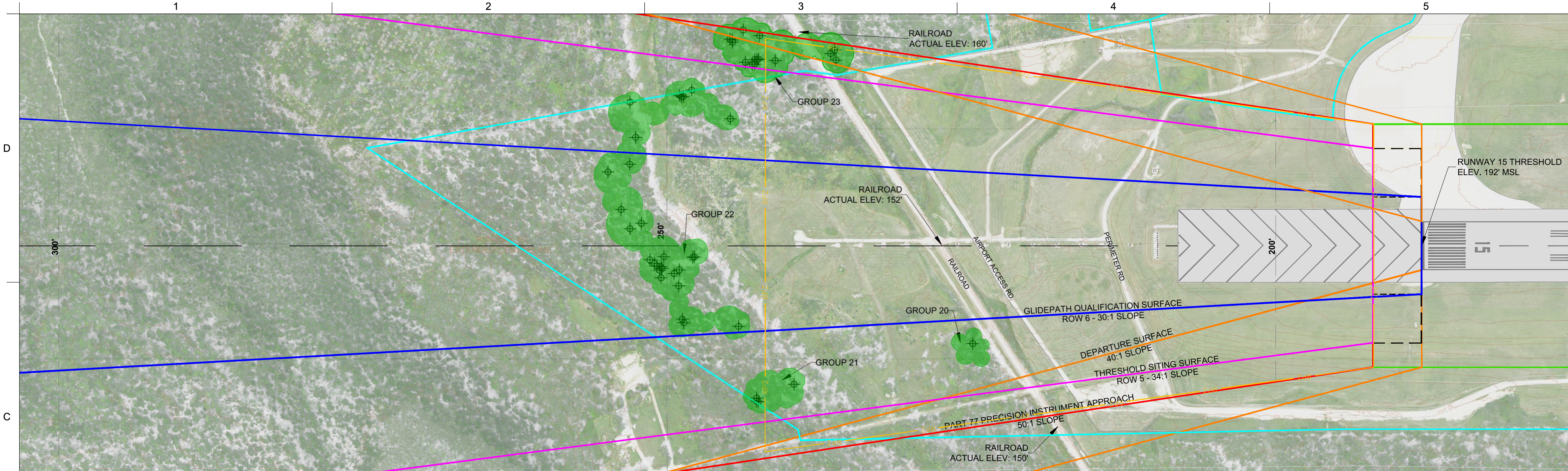
BANGOR INTERNATIONAL AIRPORT
BANGOR MAINE

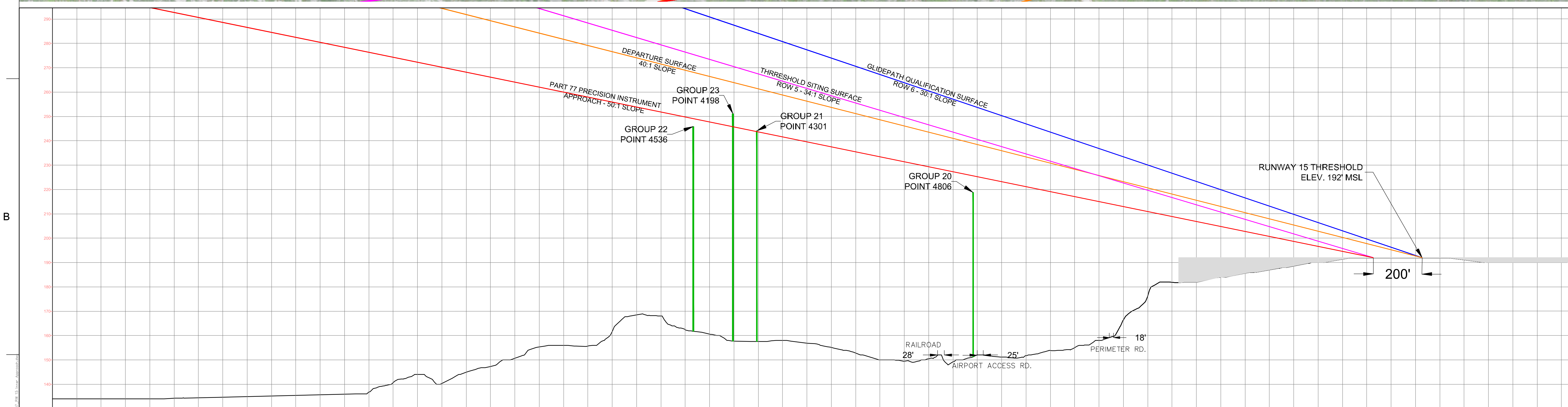
Jacobs
TWO EXECUTIVE PARK DRIVE, SUITE 205
BEDFORD, NH 03110

Designed by: NFP
Drwn by: SNA
Ckd by: HHM
Reviewed by: JRH
Submitted by: HHM
Date: 02/2022
Plot date: FEBRUARY 2022
Plot scale: 1"=100'

TERMINAL AREA PLAN

Sheet reference number:
5
5 OF 12





LEGEND

- PRIMARY SURFACE
- PART 77 APPROACH SURFACE 50:1 SLOPE
- EB 99 DEPARTURE SURFACE 40:1 SLOPE
- EB 99 THRESHOLD SITING SURFACE – ROW 5 34:1 SLOPE
- EB 99 GLIDEPATH QUALIFICATION SURFACE – ROW 6 30:1 SLOPE
- AIRSPACE CONTOURS 50'
- 2' GROUND CONTOURS
- OBSTRUCTION GROUP
- AIRPORT PROPERTY BOUNDARY
- RUNWAY PROTECTION ZONE
- PRECISION OBJECT FREE ZONE
- OBSTACLE FREE ZONE

Runway 15 Obstruction Data Table

Obstruction Information						14 CFR 77 Approach - RW 33		Runway 33 Departure Surface (15 end)		Threshold Siting Surface (Row 5)		Glidepath Qualification Surface (Row 6)				
Group	Point ID	Description	Northing	Easting	Elevation (MSL ft.)	Surface Elevation (MSL ft.)	Surface Penetration (ft.)	Surface Elevation (MSL ft.)	Surface Penetration (ft.)	Surface Elevation (MSL ft.)	Surface Penetration (ft.)	Surface Elevation (MSL ft.)	Surface Penetration (ft.)	Obstacle Located ON or OFF Airport	Under Sponsor Control	Recommended Action
20	4806	TREETOP	893409.974	421011.660	218.81	224.99	-6.18	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	ON	YES	TO BE REMOVED OR TRIMMED
21	4301	TREETOP	892610.106	421464.582	243.07	242.76	0.31	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	ON	YES	TO BE REMOVED OR TRIMMED
22	4536	TREETOP	892837.136	422069.571	244.74	247.98	-3.24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	ON	YES	TO BE REMOVED OR TRIMMED
23	4198	TREETOP	893578.344	422593.857	250.09	244.73	5.36	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	OFF	NO	TO BE REMOVED OR TRIMMED

N/A* INDICATES THE OBSTRUCTION IS OUTSIDE THE LATERAL BOUNDS OF THE SPECIFIED SURFACE AND/OR IS LESS THAN -10' BELOW THE SPECIFIED SURFACE.

NOTES:

1. OBSTACLE SOURCE CES, INC. AUGUST 2020;
2. OBSTRUCTION GROUPS ARE REPRESENTED ON PROFILE BY THE OBSTRUCTION WITH THE GREATEST PENETRATION AMOUNT;
3. APPROACH SURFACE IS SHOWN TO 100' ABOVE RUNWAY END ELEVATION.

magnetic variation 16° 35' 4" W changing by 6' E per year

GRAPHIC SCALE
200 0 100 200 400
(IN FEET)
1 inch = 200 ft

SCALE 1" = 200' HORIZONTAL
1" = 10' VERTICAL

BGR BANGOR INTERNATIONAL AIRPORT

Mark	Description	Date	Appr.

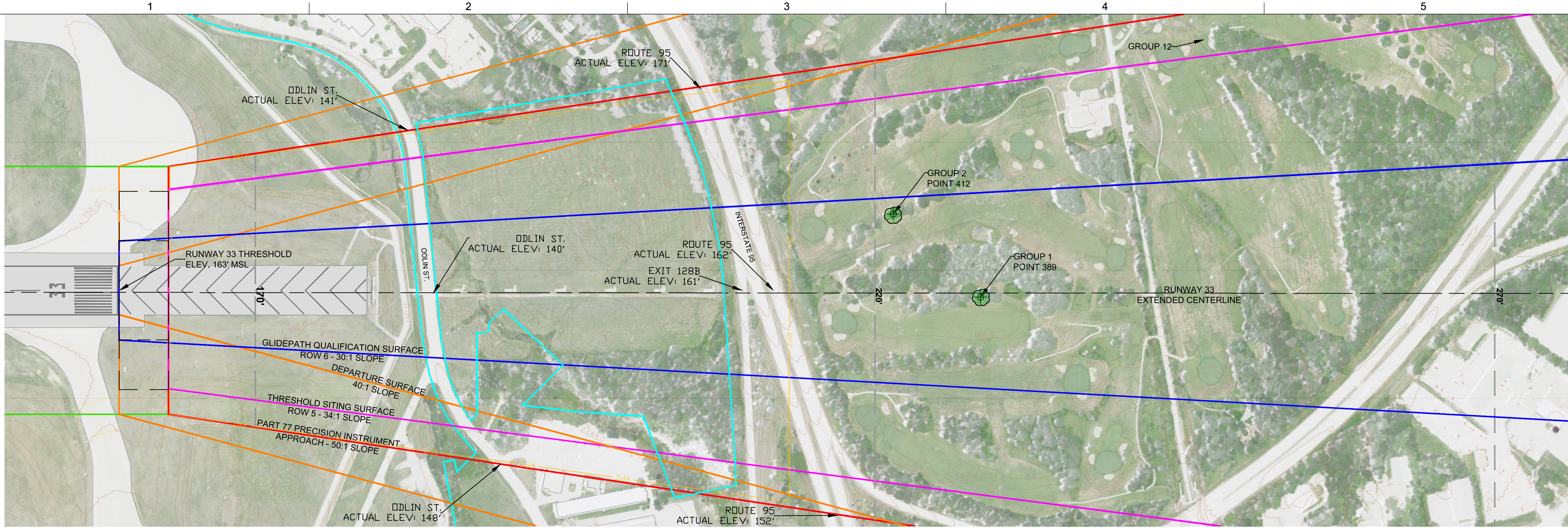
Designed by: NFP
Date: 02/2022
Dwn by: SNA
Ckd by: HHM
Design file no.
Reviewed by: JRH
Drawing code:
Submitted by: HHM
File name:
Plot date: FEBRUARY 2022
Plot scale: AS SHOWN

BANGOR INTERNATIONAL AIRPORT
BANGOR MAINE

Jacobs
TWO EXECUTIVE PARK DRIVE, SUITE 205
BEDFORD, NH 03110

INNER PORTION OF THE APPROACH SURFACE RUNWAY 15

Sheet reference number:
7
7 OF 12



LEGEND	
	PART 77 PRIMARY SURFACE
	PART 77 APPROACH SURFACE 50:1 SLOPE
	EB 99 DEPARTURE SURFACE 40:1 SLOPE
	EB 99 THRESHOLD SITING SURFACE – ROW 5 34:1 SLOPE
	EB 99 GLIDEPATH QUALIFICATION SURFACE – ROW 6 30:1 SLOPE
	AIRSPACE CONTOURS 50'
	2' GROUND CONTOURS
	OBSTRUCTION GROUP
	AIRPORT PROPERTY BOUNDARY
RPZ	RUNWAY PROTECTION ZONE
	PRECISION OBJECT FREE ZONE
	OBSTACLE FREE ZONE

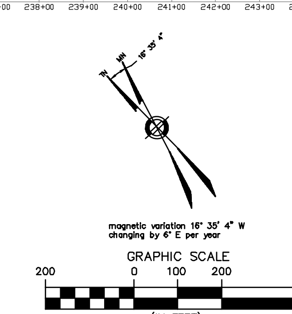
Runway 33 Obstruction Data Table

Obstruction Information						14 CFR 77 Approach - RW 33		Runway 15 Departure Surface (33 end)		Threshold Siting Surface (Row 5)		Glidepath Qualification Surface (Row 6)				
Group	Point ID	Description	Northing	Easting	Elevation (MSL ft.)	Surface Elevation (MSL ft.)	Surface Penetration (ft.)	Surface Elevation (MSL ft.)	Surface Penetration (ft.)	Surface Elevation (MSL ft.)	Surface Penetration (ft.)	Surface Elevation (MSL ft.)	Surface Penetration (ft.)	Obstacle Located ON or OFF Airport	Under Sponsor Control	Recommended Action
1	389	TREETOP	409551.320	905643.848	239.20	221.48	17.72	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	OFF	YES	TO BE TRIMED OR REMOVED
2	412	TREETOP	410036.475	905626.590	233.90	221.48	12.42	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	OFF	YES	TO BE TRIMED OR REMOVED

N/A* INDICATES THE OBSTRUCTION IS OUTSIDE THE LATERAL BOUNDS OF THE SPECIFIED SURFACE AND/OR IS LESS THAN -10' BELOW THE SPECIFIED SURFACE.

NOTES:

1. OBSTACLE DATA SOURCE: MARTINEZ ASSOC. INC. OCT. 2018. OBSTACLE DATA WAS UPDATED BY SURVEY PERFORMED BY HALEY WARD IN MARCH 2023 TO VERIFY THE REMOVAL OF VEGETATION PREVIOUSLY IDENTIFIED AS OBSTRUCTIONS TO THE PART 77 APPROACH SURFACE.
2. APPROACH SURFACE IS SHOWN TO 100' ABOVE RUNWAY END ELEVATION.



SCALE 1" = 200' HORIZONTAL
1" = 10' VERTICAL

BANGOR INTERNATIONAL AIRPORT
BANGOR MAINE

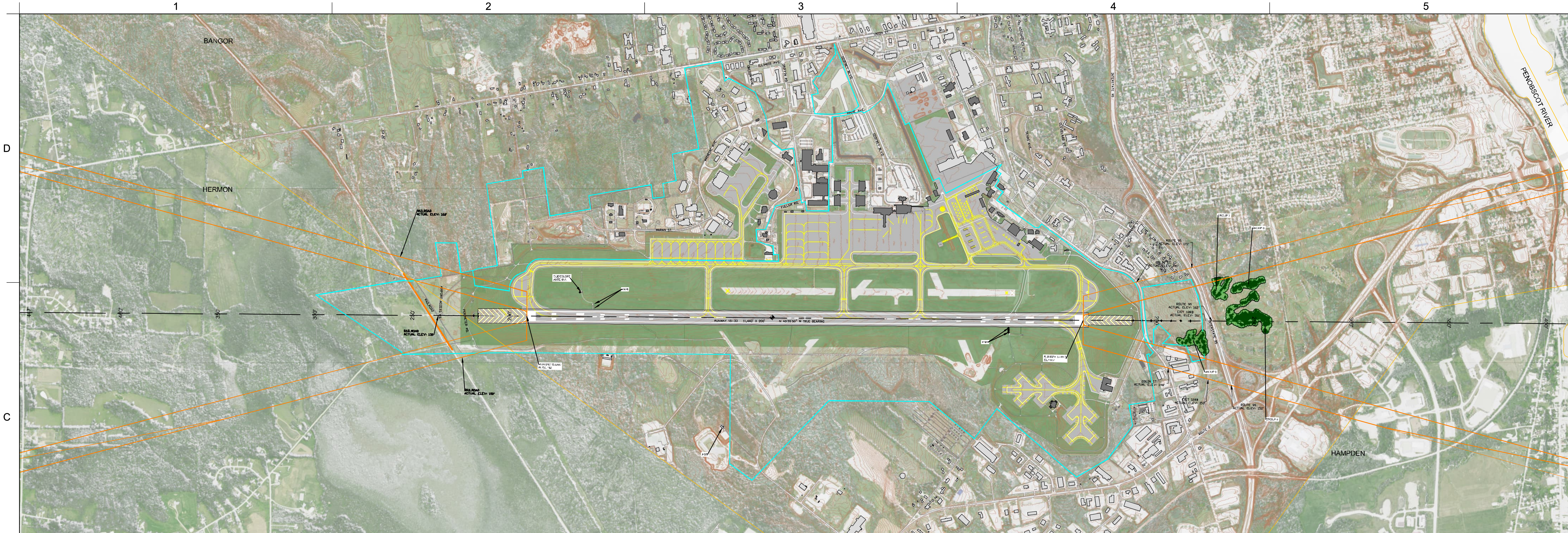
Jacobs
TWO EXECUTIVE PARK DRIVE, SUITE 205
BEDFORD, NH 03110

Designed by: NFP | Dwn by: SNA | Ckd by: HHM | Reviewed by: JRH | Submitted by: HHM
Date: 04/18/2023 | Rev. | Design file no. | Drawing code: | File name: | Plot date: APRIL 2023 | Plot scale: AS SHOWN

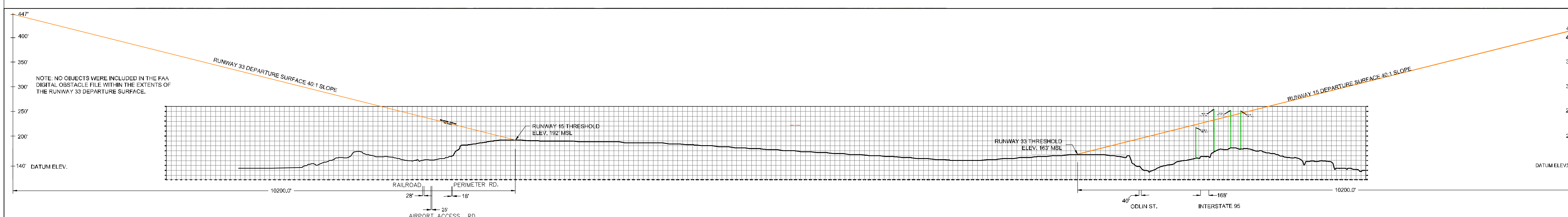
Mark | Description | Date | Appr.

INNER PORTION OF THE APPROACH SURFACE RUNWAY 33

Sheet reference number: 8



PLAN VIEW 1" = 1000'



PROFILE VIEW
1" = 1000' HORIZONTAL
1" = 100' VERTICAL

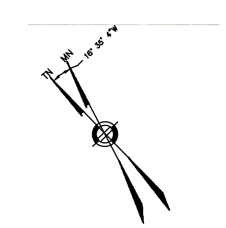
LEGEND
EB 99 DEPARTURE SURFACE 40:1 SLOPE
AIRSPACE CONTOURS 50'
2' GROUND CONTOURS
OBSTRUCTION GROUP
AIRPORT PROPERTY BOUNDARY

NOTES:

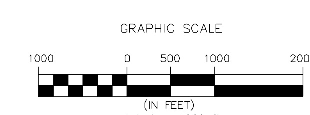
1. OBSTACLE SOURCE MARTINEZ ASSOCIATES INC., OCTOBER 2018.
2. OBSTRUCTION GROUPS ARE REPRESENTED ON PROFILE BY THE OBSTRUCTION WITH THE GREATEST PENETRATION AMOUNT.
3. DEPARTURE SURFACE IS SHOWN TO 100' ABOVE RUNWAY END ELEVATION.
4. THERE ARE NO OBSTRUCTIONS TO THE RUNWAY 33 (15 END) DEPARTURE SURFACE.

Departure Surface Obstruction Data Table

Obstruction Information						Runway 15 Departure Surface (33 end)				
Group	Point ID	Description	Northing	Easting	Elevation (MSL ft.)	Surface Elevation (MSL ft.)	Surface Penetration (ft.)	Obstacle Located ON or OFF Airport	Under Sponsor Control	Recommended Action
5	2147	TREETOP	410072.506	904653.789	217.22	223.19	-5.98	ON	YES	TO BE TRIMED OR REMOVED
7	1566	TREETOP	410693.385	905782.853	254.55	248.47	6.08	OFF	NO	TO BE TRIMED OR REMOVED
8	1600	TREETOP	410314.174	905890.873	251.71	241.08	10.64	OFF	NO	TO BE TRIMED OR REMOVED
9	1665	TREETOP	409756.268	905627.598	250.79	246.15	4.65	OFF	NO	TO BE TRIMED OR REMOVED



magnetic variation 16° 35' 4" W changing by 6' E per year



BANGOR INTERNATIONAL AIRPORT

BANGOR MAINE

Jacobs

TWO EXECUTIVE PARK DRIVE, SUITE 205
BEDFORD, NH 03110

Designed by: NFP
Dwn by: SNA
Ckd by: HHM
Reviewed by: JRH
Submitted by: HHM

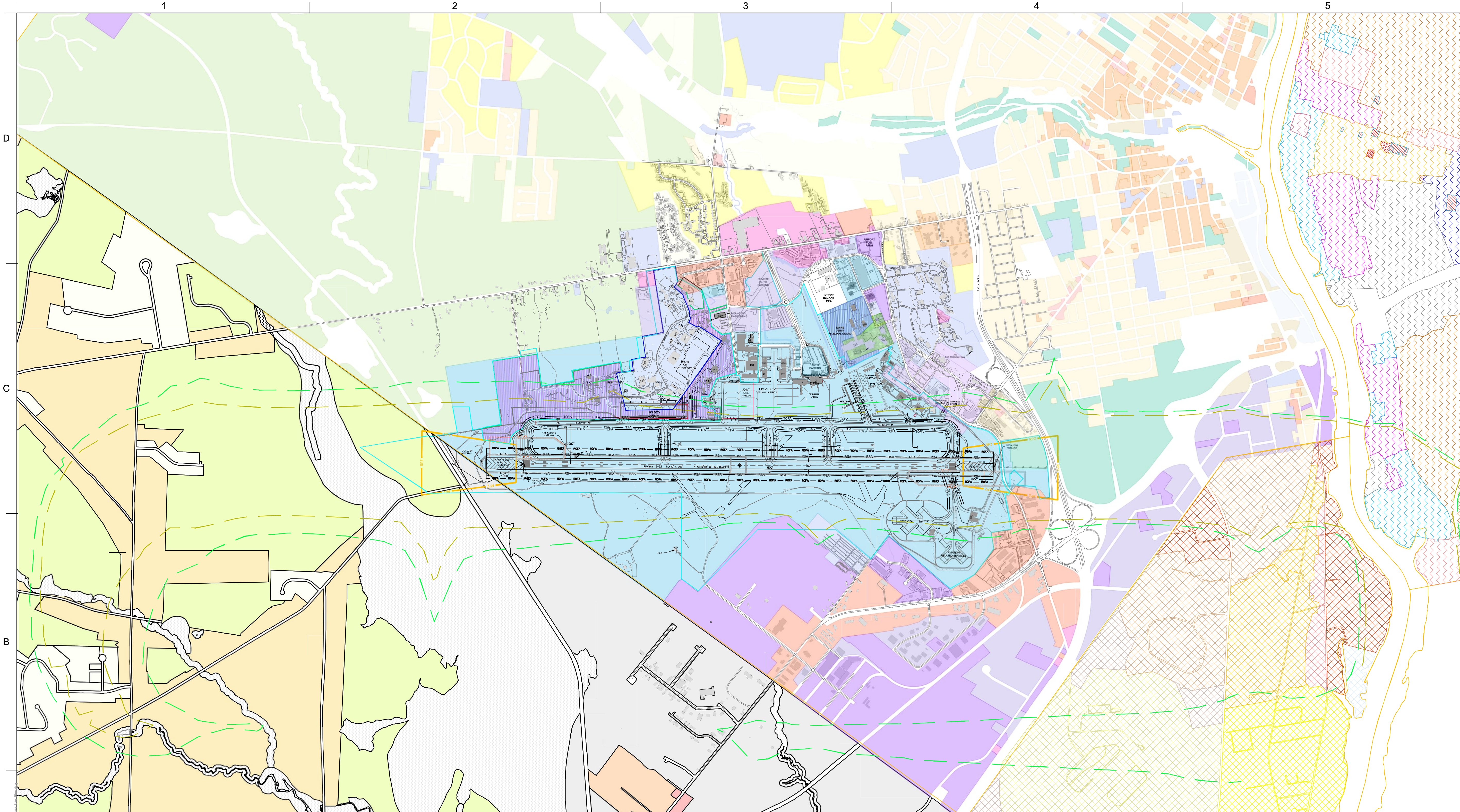
Date: 02/2022
Design file no.
Drawing code:
File name:
Plot date: FEBRUARY 2022
Plot scale: AS SHOWN

Rev.

Mark | Description | Date | Appr.

DEPARTURE SURFACE

Sheet reference number:
9
9 OF 12



	LEGEND
	AIRPORT PROPERTY LINE
	ROADS AND INTERSTATES
	OFF–AIRPORT BUILDING
	ON–AIRPORT BUILDING
RPZ	RUNWAY PROTECTION ZONES
	CITY AND TOWN BOUNDARY
	AIRPORT REFERENCE POINT
ROFA	RUNWAY OBJECT FREE AREA
RSA	RUNWAY SAFETY AREA
TOFA	TAXIWAY OBJECT FREE AREA
TSA	TAXIWAY OBJECT FREE AREA
	EDGE OF PAVEMENT
	GLIDE SLOPE CRITICAL AREA
	LOCALIZER CRITICAL AREA
	RUNWAY / TAXIWAY / APRON PAVEMENT
	SERVICE ROADS
	BODY OF WATER
	EXISTING LDN=65DBA
	FUTURE LDN=65DBA

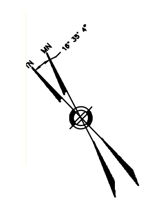
	AIRPORT RELATED LAND USE
	ME AIR NATIONAL GUARD–OWNED
	ME AIR NATIONAL GUARD–LEASE
	ME ARMY NATIONAL GUARD–OWNED
	ME ARMY NATIONAL GUARD – LEASE

	CITY OF BANGOR ZONING		
	RR&A RURAL RESIDENCE & AGRICULTURE		WDD WATERFRONT DEVELOPMENT
	LDR LOW DENSITY RESIDENTIAL		ADD AIRPORT DEVELOPMENT
	HDR HIGH DENSITY RESIDENTIAL		G&ISD GOVERNMENT & INSTITUTIONAL
	URD–1 URBAN RESIDENTIAL 1		BPD BASS PARK
	URD–2 URBAN RESIDENTIAL 2		P&O PARKS & OPEN SPACE
	M&SD MULTIFAMILY & SERVICE		RP RESOURCE PROTECTION
	NSD NEIGHBORHOOD SERVICE		SP STREAM PROTECTION
	USD URBAN SERVICE		
	GC&S GENERAL COMMERCIAL & SERVICE		
	S&PS SHOPPING & PERSONAL SERVICE		
	DDD DOWNTOWN DEVELOPMENT		
	T&S TECHNOLOGY & SERVICE		
	I&S INDUSTRY & SERVICE		
	UID URBAN INDUSTRY		

	CITY OF BREWER ZONING
	CB CONVENIENCE BUSINESS
	DD DOWNTOWN DEVELOPMENT
	GB GENERAL BUSINESS
	HDR HIGH DENSITY RESIDENTIAL
	IND INDUSTRIAL
	MDR–1 MEDIUM RESIDENTIAL 1
	MDR–2 MEDIUM RESIDENTIAL 2
	OR OFFICE RESIDENTIAL
	CONVENIENCE BUSINESS CONTRACT USE
	C–AR CONTRACT USE ADAPTIVE REUSE
	C–ARM CONTRACT USE ADAPTIVE RESIDENTIAL MULTI–USE
	CONTRACT USE

	TOWN OF HAMPDEN ZONING
	BB BUSINESS B
	B BUSINESS
	CS COMMERCIAL SERVICE
	I2 INDUSTRIAL 2
	IA INDUSTRIAL PARK
	I INDUSTRIAL
	RA RESIDENTIAL A
	RB RESIDENTIAL B
	W1 WATERFRONT 1

	TOWN OF HERMON ZONING
	AGRICULTURE – FORESTRY
	COMMERCIAL – 300'
	INDUSTRIAL
	RESIDENTIAL A
	RESIDENTIAL B
	RESIDENTIAL C
	VILLIAGE COMMERCIAL
	WATER
	WETLAND
	SHORELAND ZONE MAPPING



magnetic variation 16° 35' 4" W
changing by 6° E per year

NOTES:

1. REFER TO DATA SHEET FOR BUILDING NUMBER LEGEND AND OTHER PERTINENT DATA.

2. RW 33– LOCALIZER IS LOG–PERIODIC, NO AREA B IS REQUIRED. CATEGORY I CRITICAL AREA DIMENSIONS USED. GLIDE SLOPE IS NULL REFERENCE TYPE. LARGE AIRCRAFT CATEGORY I DIMENSIONS USED FOR CRITICAL AREA.

3. RW 15– LOCALIZER IS LOG–PERIODIC, NO AREA B IS REQUIRED. CATEGORY II/III CRITICAL AREA DIMENSIONS USED. GLIDE SLOPE IS A CAPTURE EFFECT TYPE. LARGE AIRCRAFT CATEGORY II/III CRITERIA DIMENSIONS USED.

GRAPHIC SCALE

1200 0 600 1200 2400

(IN FEET)
1 inch = 1200 ft

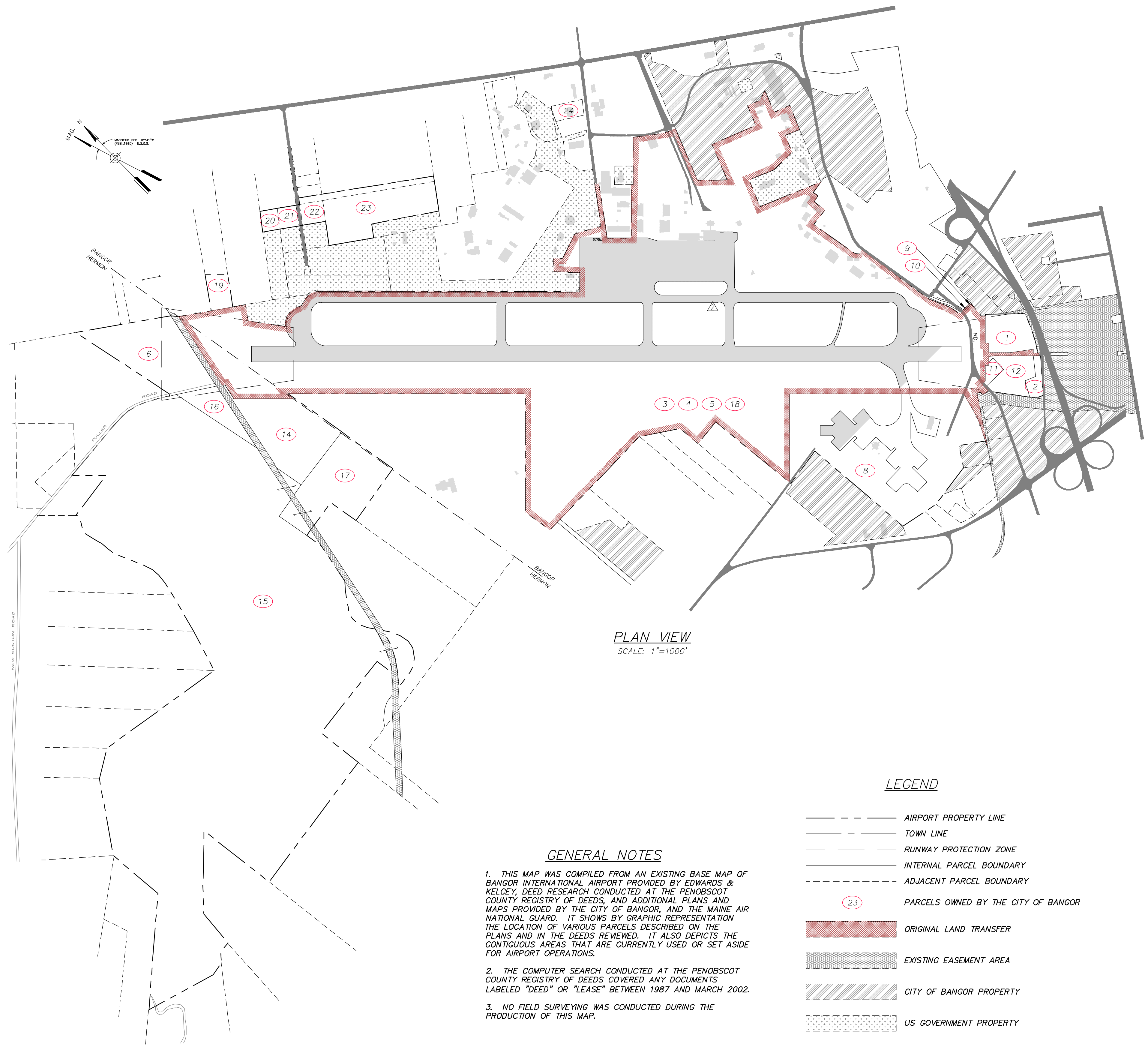
BANGOR INTERNATIONAL AIRPORT
BANGOR MAINE

Jacobs
TWO EXECUTIVE PARK DRIVE, SUITE 205
BEDFORD, NH 03110

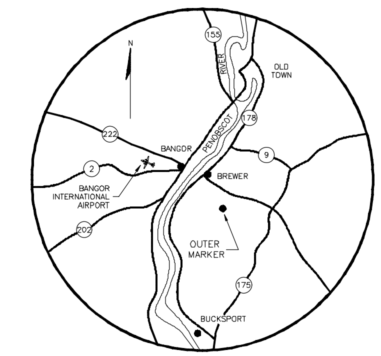
Designed by: NFP
Date: 02/2022
Dwn by: SNA
Ckd by: HHM
Reviewed by: JRH
Submitted by: HHM
Plot date: FEBRUARY 2022
Plot scale: 1"=1200'

LAND USE PLAN

Sheet reference number:
10
10 OF 12



PLAN VIEW
SCALE: 1"=1000'



KEY MAP

0 10
SCALE IN MILES

GENERAL NOTES

1. THIS MAP WAS COMPILED FROM AN EXISTING BASE MAP OF BANGOR INTERNATIONAL AIRPORT PROVIDED BY EDWARDS & KELCEY, DEED RESEARCH CONDUCTED AT THE PENOBSCOT COUNTY REGISTRY OF DEEDS, AND ADDITIONAL PLANS AND MAPS PROVIDED BY THE CITY OF BANGOR, AND THE MAINE AIR NATIONAL GUARD. IT SHOWS BY GRAPHIC REPRESENTATION THE LOCATION OF VARIOUS PARCELS DESCRIBED ON THE PLANS AND IN THE DEEDS REVIEWED. IT ALSO DEPICTS THE CONTIGUOUS AREAS THAT ARE CURRENTLY USED OR SET ASIDE FOR AIRPORT OPERATIONS.

2. THE COMPUTER SEARCH CONDUCTED AT THE PENOBSCOT COUNTY REGISTRY OF DEEDS COVERED ANY DOCUMENTS LABELED "DEED" OR "LEASE" BETWEEN 1987 AND MARCH 2002.

3. NO FIELD SURVEYING WAS CONDUCTED DURING THE PRODUCTION OF THIS MAP.

LEGEND

- AIRPORT PROPERTY LINE
- TOWN LINE
- RUNWAY PROTECTION ZONE
- INTERNAL PARCEL BOUNDARY
- ADJACENT PARCEL BOUNDARY
- 23 PARCELS OWNED BY THE CITY OF BANGOR
- ORIGINAL LAND TRANSFER
- EXISTING EASEMENT AREA
- CITY OF BANGOR PROPERTY
- US GOVERNMENT PROPERTY

GRAPHIC SCALE
1000 0 500 1000 2000
1"=1000'

BANGOR INTERNATIONAL AIRPORT
BANGOR MAINE

Jacobs
TWO EXECUTIVE PARK DRIVE, SUITE 205
BEDFORD, NH 03110

Designed by: NFP
Dwn by: SNA
Ckd by: HHM
Reviewed by: JRH
Submitted by: HHM
Date: 02/2022
Design file no.
Drawing code:
File name:
Plot date: FEBRUARY 2022
Plot scale: 1"=1000'

Mark	Description	Date	Appr.

Rev.

EXHIBIT A
PROPERTY PLAN
SHEET 1

Sheet reference number:
11
11 OF 32

KEY	GRANTOR	GRANTEE	INST.	ACREAGE	BOOK/PAGE	DATE	REMARKS
1	MCLEOD, WILLIAM C.	BANGOR	FEE	14.50	1986/79	12/17/64	
2	MCLEOD, WILLIAM C.	BANGOR	FEE	2.40	1986/79	12/17/64	
3	U.S. GOVERNMENT	BANGOR	FEE	1588.60	2148/68	12/18/68	ORIGINAL TRANSFER OF DOW A.F.B TO BANGOR
4	U.S. GOVERNMENT	BANGOR	FEE	1.52	2148/68	04/28/69	TRACT 2 OF ORIGINAL TRANSFER OF DOW A.F.B.
5	U.S. GOVERNMENT	BANGOR	FEE	0.04	2148/68	04/28/69	EXEMPTION PARCEL 1 (POL PUMPHOUSE #522) IN TRANSFER OF DOW A.F.B.
6	SHAPIRO, ABRAHAM	BANGOR	FEE	41.30	3264/236	04/28/69	ADAP 3-23-0005-06
7	U.S. HEALTH ED. WELFARE	BANGOR	FEE	6.28	2232/573	10/13/71	CORRECTED DEED BOOK 2232 PAGE 565
8	U.S. GOVERNMENT	BANGOR	FEE	188.52	2940/172	12/13/74	MAINTAIN AIRPORT CLEAR APPROACHES
9	U.S. GOVERNMENT	BANGOR	FEE	0.19	2823/172	06/23/77	REMOVE FROM NATIONAL EMERGENCY USE PROVISIONS DEEDED TO BANGOR BOOK 2148-68
10	BANGOR	SAWYER, WALDRON E.	EASEMENT	0.19	2823/175	12/19/77	ACCESS, CONSTRUCT SEWERLINE, WATER PIPES TO SAWYER PROPERTY
11	COLE, LEROY H.	BANGOR	FEE	UNKNOWN	2939/2961	12/16/78	
12	HARTSTONE, SHELDON L.	BANGOR	LEASE	11.81	3343/341	11/15/82	ADAP 3-23-0005-06
13	SHAPIRO, ABRAHAM	BANGOR	FEE	UNKNOWN	3264/234	03/09/89	ADAP 3-23-0005-06
14	DAIGLE, LORENZO J.	BANGOR	FEE	43.00	4454/196	06/08/89	ALSO INCLUDES R.O.W. FOR ALL PURPOSES ALONG NOW OR PREVIOUS FULLER ROAD
15	FORDHAM UNIVERSITY, ET. ALS.	BANGOR	FEE	UNKNOWN	4722/249	9/10/90	HERMAN BOG LOTS
16	BANGOR HYDRO-ELECTRIC CO.	BANGOR	FEE	UNKNOWN	5780/315	12/21/94	SEE ALSO 5968/85
17	BANGOR HYDRO-ELECTRIC CO.	BANGOR	FEE	UNKNOWN	5977/259	10/25/95	SEE ALSO 6033/232 & 6070/273
18	U.S. GOVERNMENT	BANGOR	FEE	UNKNOWN	6164/301	06/21/96	RELEASE OF CERTAIN RIGHTS TO LAND IN 2156/450
19	HALL, WARREN A., ET. ALS.	BANGOR	FEE	UNKNOWN	6518/162	10/09/97	BANGOR TAX MAP R5, LOT 3B
20	SPRAQUE, CHARLES W., JR.	BANGOR	FEE	12.78	5227/064	12/11/1992	PARCEL 'A-1' ON PLAN IN P.C.R.D. MAP FILE D139-92
21	SPRAQUE, CHARLES W., JR.	BANGOR	FEE	7.19	4866/076	7/01/91	PARCEL 'A' ON PLAN IN P.C.R.D. MAP FILE D139-92
22	SPRAQUE, HARVEY R.	BANGOR	FEE	UNKNOWN	4469/096	6/27/89	PARCEL 'B' ON PLAN IN P.C.R.D. MAP FILE D139-92
23	COLBURN, EDWIN W.	BANGOR	FEE	UNKNOWN	7643/220	3/30/01	PARCEL 'E' ON PLAN IN P.C.R.D. MAP FILE D139-92 & ADDITIONAL LAND BY DEED
24	BANGOR	MIRAGE HOLDINGS LLC	AGREEMENT	3.97	15436/181	4/13/2020	FAA APPROVAL OF LAND DISPOSAL IN LETTER DATED APRIL 13, 2020

PLAN REFERENCES

1. BANGOR HYDRO-ELECTRIC COMPANY PLAN, LINE NUMBER 78, HAMPDEN TO HERMON SUBSTATION, SHEETS 5 & 6 OF 8, DATED APRIL 1, 1993, REVISED OCTOBER 22, 1994.

2. CITY OF BANGOR ENGINEERING DEPARTMENT FINAL UTAH AVENUE SUBDIVISION PLAN DATED FEBRUARY 24, 1989, RECORDED IN MAP FILE D106-89.

3. JAMES W. SEWALL COMPANY PLAN OF "HERMON BOG", RECORDED OCTOBER 10, 1978 IN MAP FILE E99-78.

4. STANDARD BOUNDARY SURVEY OF LAND OF VERLE L. DRINKWATER, "PROGRESS PRINT", DATED JUNE 12, 1996.

5. PLISGA & DAY LAND SURVEYORS STANDARD BOUNDARY SURVEY, LAND OF HAROLD F. WASSON & DOROTHY E. WASSON, DATED MAY 13, 1992, REVISED FEBRUARY 5, 1993.

6. CITY OF BANGOR ENGINEERING DEPARTMENT, PLAN ENTITLED AIRPORT REVISIONARY [SIC] PARCELS, 1" = 200', SHOWING PARCELS A, B, C, & D OFF UNION STREET & GODFREY BOULEVARD.

7. CITY OF BANGOR ENGINEERING DEPARTMENT, PLAN SHOWING A PORTION OF DOW FIELD REVERSIONARY TRACT (VOL. 1205, PG. 345) TO BE RELEASED FROM FAA DEED RESTRICTIONS (VOL. 2156, PG. 450).

8. CITY OF BANGOR ENGINEERING DEPARTMENT PRELIMINARY PLAN SHOWING LAND EASTERLY OF MAINE AVENUE BETWEEN UNION STREET & HAMMOND STREET, DATED NOVEMBER 29, 2001.

9. CITY OF BANGOR ENGINEERING DEPARTMENT PLAN ENTITLED BANGOR INTERNATIONAL AIRPORT PROPERTY MAP, PLAN NO. G-791, DATED APRIL 1968, REVISED DECEMBER 10, 1968.

10. OEST ASSOCIATES, INC. PLAN ENTITLED MAINE BUSINESS ENTERPRISE PARK "AMENDED", DATED SEPTEMBER 3, 1991, REVISED OCTOBER 13, 1994, RECORDED IN MAP FILE D171-94.

11. HTA-OEST ASSOCIATES, INC. PLAN ENTITLED AMENDED PLAN OF B.I.A. COMMERCIAL INDUSTRIAL PARK, SHEET 1 OF 2, DATED SEPTEMBER 11, 1989, REVISED OCTOBER 26, 1991, RECORDED IN MAP FILE D17-94.

12. HTA-OEST ASSOCIATES, INC. PLAN ENTITLED AMENDED PLAN OF B.I.A. COMMERCIAL INDUSTRIAL PARK, SHEET 2 OF 2, DATED SEPTEMBER 11, 1989, REVISED OCTOBER 26, 1991, RECORDED IN MAP FILE D187-94.

13. ANDREW J. SHYKA, LAND SURVEYOR, PLAN ENTITLED STANDARD BOUNDARY SURVEY, AIR NATIONAL GUARD – BANGOR, MAINE, SHEETS 1, 2, & 3 OF 3, DATED NOVEMBER 1986, REVISED FEBRUARY 1990 (SH. 1), REVISED JANUARY 5, 1988 (SH. 2), REVISED FEBRUARY 23, 1990 (SH. 3).

14. CITY OF BANGOR ENGINEERING DEPARTMENT PLAN ENTITLED AMENDED SUBDIVISION PLAN, UNION STREET – MAINE AVENUE DEVELOPMENT PARCEL, DATED AUGUST 21, 1996, REVISED AUGUST 5, 1997, RECORDED IN MAP FILE 1997-65.

15. HTA-OEST ASSOCIATES, INC. PLAN ENTITLED MAINE AIR NAT'L GUARD-BANGOR, STANDARD BOUNDARY SURVEY LAND TO BE ACQUIRED, DATED MARCH 1990, REVISED MARCH 24, 1992, RECORDED IN MAP FILE D139-92 SUPERSEDES PLAN OF SAME TITLE RECORDED IN MAP FILE D109-91).

16. HOYLE, TANNER & ASSOCIATES, INC. PLAN ENTITLED BANGOR INTERNATIONAL AIRPORT EXHIBIT "A", SHEETS 1 & 2 OF 2, DATED FEBRUARY 1990, STAMPED "PRELIMINARY" AND STAMPED "RECEIVED AUGUST 1, 1996".

17. REAL ESTATE MAP OF DOW AIR FORCE BASE BY THE DEPT. OF THE AIR FORCE, SCALE 1"=1000' AND DATED JULY 1, 1958, SHEET 1 OF 11.

18. REAL ESTATE MAP OF DOW AIR FORCE BASE BY THE DEPT. OF THE ARMY, SCALE 1"=400' AND DATED JULY, 1955, DRAWING NO. NED-PA-1179.

Rev.
Date: 02/2022
Design file no.
Drawing code:
File name:
Plot date: FEBRUARY 2022
Plot scale: NTS
Designed by: NFP
Dwn by: SNA
Ckd by: HHM
Reviewed by: JRH
Submitted by: HHM

BANGOR INTERNATIONAL AIRPORT
BANGOR MAINE

Jacobs
TWO EXECUTIVE PARK DRIVE, SUITE 205
BEDFORD, NH 03110

EXHIBIT A
PROPERTY PLAN
SHEET 2

Sheet reference number:
12

Appendix A Public Participation

Appendix B
FAA Certification Activity Tracking System (CATS) Form 127
FY 2010-2019
Bangor International Airport

Bangor International Airport

Source: FAA CATS Form 127

	Fiscal Year									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1.0 Passenger Airline Aeronautical Revenue										
1.1 Passenger airline landing fees	$223,670	$242,704	$307,870	$320,371	$316,875	$325,688	$373,683	$405,522	$501,329	$520,432
1.2 Terminal arrival fees, rents, and utilities	$730,643	$665,404	$645,776	$582,548	$599,788	$627,276	$673,379	$731,259	$1,029,405	$988,381
1.3 Terminal area apron charges/tiedowns	$135,389	$112,398	$103,053	$71,924	$67,213	$59,902	$67,520	$103,032	$398,543	$410,544
1.4 Federal Inspection Fees	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
1.5 Other passenger aeronautical fees	$0	$0	$0	$0	$0	$0	$0	$0	$774,090	$942,168
1.6 Total	**$1,089,702**	**$1,020,506**	**$1,056,699**	**$974,843**	**$983,876**	**$1,012,866**	**$1,114,582**	**$1,239,813**	**$2,703,367**	**$2,861,525**
2.0 Non-Passenger Aeronautical Revenue										
2.1 Landing fees from cargo	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.2 Landing fees from GA and military	$765,910	$716,467	$592,609	$405,577	$384,524	$296,402	$289,729	$313,786	$353,684	$316,364
2.3 FBO revenue; contract or sponsor-operated	$4,938,004	$4,956,336	$4,542,711	$4,175,472	$3,953,112	$4,162,706	$1,776,436	$2,213,908	$1,789,453	$2,056,665
2.4 Cargo and hangar rentals	$180,323	$187,819	$201,868	$179,946	$195,835	$165,810	$271,552	$288,278	$793,934	$449,361
2.5 Aviation fuel tax retained for airport use	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2.6 Fuel sales net profit/loss or fuel flowage fees	$2,557,724	$2,067,282	$1,615,719	$2,139,974	$2,140,585	$1,750,653	$5,509,386	$7,039,852	$6,546,228	$7,350,647
2.7 Security reimbursement from Federal Government	$159,812	$147,017	$190,358	$70,459	$136,453	$123,075	$60,079	$94,335	$85,690	$85,100
2.8 Other non-passenger aeronautical revenue	$332,527	$223,174	$243,736	$51,829	$129,946	$105,414	$126,978	$76,604	$0	$0
2.9 Total	**$8,934,300**	**$8,298,095**	**$7,387,001**	**$7,023,257**	**$6,940,455**	**$6,604,060**	**$8,034,160**	**$10,026,763**	**$9,568,989**	**$10,258,137**
3.0 Total Aeronautical Revenue	**$10,024,002**	**$9,318,601**	**$8,443,700**	**$7,998,100**	**$7,924,331**	**$7,616,926**	**$9,148,742**	**$11,266,576**	**$12,272,356**	**$13,119,662**
4.0 Non-Aeronautical Revenue										
4.1 Land and non-terminal facility leases and revenues	$1,468,598	$1,337,270	$1,459,342	$1,413,610	$1,368,662	$1,441,095	$1,465,991	$1,512,547	$1,029,042	$1,395,705
4.2 Terminal-food and beverage	$189,810	$127,815	$182,432	$117,603	$159,297	$130,015	$140,236	$128,981	$180,622	$202,327
4.3 Terminal-retail stores and duty free	$150,575	$137,875	$113,988	$79,163	$74,091	$56,946	$43,547	$40,052	$31,926	$37,253
4.4 Terminal-services and other	$16,364	$59,901	$16,195	$22,377	$17,975	$21,477	$20,047	$18,438	$12,129	$29,908
4.5 Rental cars-excludes customer facility charges	$1,074,023	$1,078,704	$1,110,274	$1,168,641	$1,180,182	$1,233,951	$1,315,058	$1,365,715	$1,577,849	$1,924,531
4.6 Parking and ground transportation	$815,532	$1,013,853	$1,176,349	$1,214,640	$1,454,797	$1,511,343	$1,484,437	$1,531,250	$1,977,616	$2,368,384
4.7 Hotel	$0	$0	$15,761	$21,903	$38,811	$24,462	$18,345	$6,523	$5,423	$23,599
4.8 Other	$14,750	$3,509	$11,033	$81	$2,182	$0	$0	$0	$0	$0
4.9 Total	**$3,729,652**	**$3,758,927**	**$4,085,374**	**$4,038,018**	**$4,295,997**	**$4,419,289**	**$4,487,661**	**$4,603,506**	**$4,814,607**	**$5,981,707**
5.0 Total Operating Revenue	**$13,753,654**	**$13,077,528**	**$12,529,074**	**$12,036,118**	**$12,220,328**	**$12,036,215**	**$13,636,403**	**$15,870,082**	**$17,086,963**	**$19,101,369**
6.0 Operating Expenses										
6.1 Personnel compensation and benefits	$6,538,382	$6,885,446	$6,688,914	$6,435,253	$6,644,094	$6,143,335	$6,543,119	$7,283,697	$7,457,099	$7,925,718
6.2 Communications and utilities	$1,095,656	$1,225,666	$1,159,439	$1,262,421	$1,485,083	$1,539,415	$1,143,025	$1,277,837	$1,639,736	$1,718,833
6.3 Supplies and materials	$1,606,938	$1,078,716	$1,116,245	$1,292,965	$1,087,270	$835,780	$901,961	$1,075,421	$865,735	$933,102
6.4 Contractual services	$1,843,189	$2,036,004	$2,768,490	$3,023,659	$2,752,793	$2,626,120	$2,647,808	$2,664,739	$3,142,998	$3,482,818
6.5 Insurance claims and settlements	$516,821	$451,468	$395,231	$406,559	$354,371	$431,988	$400,523	$407,973	$414,281	$390,212
6.6 Other	$249,502	$191,461	$336,893	$10,580	$143,125	$690,320	$49,477	$46,991	$193,937	$283,123
6.7 Subtotal	**$11,850,488**	**$11,868,761**	**$12,465,212**	**$12,431,437**	**$12,466,736**	**$12,266,958**	**$11,685,913**	**$12,756,658**	**$13,713,786**	**$14,733,806**
6.8 Depreciation	$7,235,309	$7,546,961	$7,793,489	$7,932,523	$8,062,412	$8,305,982	$8,215,781	$8,090,205	$7,134,931	$6,895,333
6.9 Total Operating Expenses	**$19,085,797**	**$19,415,722**	**$20,258,701**	**$20,363,960**	**$20,529,148**	**$20,572,940**	**$19,901,694**	**$20,846,863**	**$20,848,717**	**$21,629,139**
7.0 Operating Income (Loss)	**$-5,332,143**	**$-6,338,194**	**$-7,729,627**	**$-8,327,842**	**$-8,308,820**	**$-8,536,725**	**$-6,265,291**	**$-4,976,781**	**$-3,761,754**	**$-2,527,770**
8.0 Non-Operating Revenue (Expenses) and Capital										
8.1 Interest Income - restricted and non-restricted.	$640,905	$522,684	$482,615	$496,332	$400,902	$156,719	$241,579	$221,981	$199,447	$623,695
8.2 Interest expense (use minus sign)	-$388,184	-$384,986	$-333,251	$-292,958	$-325,918	$-334,890	$-365,343	$-366,677	$-355,232	$-366,875
8.3 Grant receipts	$3,002,411	$3,162,592	$841,180	$5,108,576	$0	$0	$0	$0	$526,234	$3,250,798
8.4 Passenger Facility Charges	$406,532	$519,795	$949,513	$887,443	$0	$0	$0	$0	$1,203,991	$1,299
8.5 Capital Contributions (for withdraw use minus sign)	$0	$0	$0	$0	$3,477,428	$6,947,799	$8,776,331	$3,492,988	$36,308	$81,359
8.6 Special items (loss)	$0	$0	$0	$0	$0	$0	$-60,401	$-3,834	$0	$0
8.7 Other	$9,344	$0	$0	$193,963	$347,540	$0	$-107,576	$0	$0	$0
8.8 Total Non Operating Revenue (Expenses)	**$3,671,008**	**$3,820,085**	**$1,940,057**	**$6,393,356**	**$3,899,952**	**$6,769,628**	**$8,484,590**	**$3,344,458**	**$1,610,748**	**$3,590,276**
9.0 Net Assets										
9.1 Change in net assets	-$1,661,135	-$2,518,109	$-5,789,570	$-1,934,486	$-4,408,868	$-1,767,097	$2,219,299	$-1,632,323	$-2,151,006	$1,062,506
9.2 Net assets (deficit) at beginning of year	$0	$0	$0	$0	$115,344,204	$109,096,383	$107,343,225	$109,562,524	$107,620,509	$104,846,277
9.3 Net assets (deficit) at end of year	$125,379,411	$121,663,294	$115,733,172	$116,214,992	$110,935,336	$107,329,286	$109,562,524	$107,930,201	$104,846,277	$105,420,409
10.0 Capital Expenditures and Construction in Progress										
10.1 Airfield	$2,538,147	$2,993,598	$1,135,737	$5,146,264	$893,076	$287,930	$1,451,927	$214,094	$651,894	$3,608,016
10.2 Terminal	$396,099	$202,817	$0	113889	$1,091,525	5478090	$6,797,115	2416713	564293	373768
10.3 Parking	$234,913	$0	$0	$0	$0	$0	$0	$0	$760,109	$65,903
10.4 Roadways, rail, and transit	$0	$0	$0	$0	$61,073	$682,069	$2,393	$0	$0	$0
10.5 Other	$2,354,254	$401,124	$888,218	$198,802	$4,510,959	$1,121,243	$2,621,538	$1,114,344	$1,148,514	$1,395,893
10.6 Total	**$5,523,413**	**$3,597,539**	**$2,023,955**	**$5,458,955**	**$6,556,633**	**$7,569,332**	**$10,872,973**	**$3,745,151**	**$3,124,810**	**$5,443,580**
11.0 Indebtedness at End of Year										
11.1 Long Term Bonds (GA, GARB, PFC, etc.)	$7,878,269	$7,241,939	$6,582,748	$6,582,748	$7,603,543	$8,806,957	$9,236,832	$8,652,013	$8,045,255	$7,420,463
11.2 Loans and interim financing	$2,132,688	$2,879,591	$3,122,085	$5,154,483	$226,325	$2,790,775	$6,225,775	$0	$0	$0
11.3 Special facility bonds	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
11.4 Total Debt at End of Year	**$10,010,957**	**$10,121,530**	**$9,704,833**	**$11,737,231**	**$7,829,868**	**$11,597,732**	**$15,462,607**	**$8,652,013**	**$8,045,255**	**$7,420,463**

12.0 Externally Restricted Assets										
12.1 Externally Restricted Debt Reserves	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
12.2 Other Externally Restricted Assets	$314,032	$314,042	$314,402	$314,032	$1,326,678	$435,323	$0	$0	$0	$0
12.3 Total	**$314,032**	**$314,042**	**$314,402**	**$314,032**	**$1,326,678**	**$435,323**	**$0**	**$0**	**$0**	**$0**
13.0 Unrestricted Cash and Investments	$15,075,928	$13,646,901	$13,646,901	$14,469,028	$0	$0	$0	$0	$0	$0
14.0 Reporting Year Proceeds										
14.1 Bond proceeds	$0	$0	$0	$3,077,615	$0	$1,600,000	$920,000	$0	$0	$0
14.2 Proceeds from sale of property	$4,427	$2,688	$11,271	$22,500	$347,540	$0	$0	$0	$0	$0
15.0 Debt Service										
15.1 Debt service, excluding coverage	$583,914	$636,329	$659,191	$688,189	$229,193	$719,907	$852,023	$950,036	$965,093	$963,781
15.2 Debt service, net of PFCs and Offsets	$583,914	$636,329	$0	$0	$0	$0	$0	$0	$0	$0
16.0 Operating Statistics										
*Section 16.1 Enplanements	188,443	198,744	216,990	232,740	239,202	234,830	198,262	250,003	294,628	295,148
*Section 16.2 Landed weights in pounds	951,519,230	817,542,400	811,242,342	654,006,306	0	0	0	0	0	0
*Section 16.3 Signatory landing fee rate per 1,000 lbs	1	1	1	1	1	1	1	1	1	1
*Section 16.4 Annual aircraft operations	53,440	50,112	46,510	42,657	40,735	40,463	39,673	42,713	43,612	44,701
Section 16.5 Passenger Airline CPE (line 1.6/16.1)	$5.78	$5.13	$4.87	$4.19	$4.11	$4.31	$5.62	$4.96	$9.18	$9.70
*Section 16.6 Full time equivalent employees at end of year	88	90	78	85	101	103	137	0	0	0
Section 16.7 Security and law enforcement costs	$291,704	$216,988	$266,960	$273,804	$221,691	$204,277	$235,951	$213,035	$227,010	$316,940
Section 16.8 ARFF costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Section 16.9 Repairs and maintenance	$659,225	$440,930	$0	$0	$0	$0	$0	$0	$0	$0
Section 16.10 Marketing/Advertising/Promotions	$555,774	$574,667	$615,066	$618,723	$568,005	$457,673	$474,723	$459,632	$523,601	$554,2

Appendix C
Bangor International Airport
Schedule of Rates and Charges as of July 1, 2020

Bangor International Airport Rates and Charges* as of July 1, 2020

Aircraft MTOW in Pounds	0 to 5,000 lbs	5,001 to 8,000 lbs	8,001 to 12,500 lbs	12,501 to 35,000 lbs	35,001 to 70,000 lbs	70,001 to 105,000 lbs	105,000 to 190,000 lbs	190,001 to 315,000 lbs	315,001 to 430,000 lbs	430,001 to 600,000 lbs	600,000+ lbs
Landing Fee	$1.300 per 1,000 lbs. MTOW	$1.300 per 1,000 lbs. MTOW	$1.300 per 1,000 lbs. MTOW	$1.300 per 1,000 lbs. MTOW	$1.300 per 1,000 lbs. MTOW	$1.300 per 1,000 lbs. MTOW	$1.300 per 1,000 lbs. MTOW	$1.300 per 1,000 lbs. MTOW	$1.300 per 1,000 lbs. MTOW	$1.300 per 1,000 lbs. MTOW	$1.300 per 1,000 lbs. MTOW
Facilities Fee (tenants exempt) *FBO Upkeep & Support, General Airport Security, Follow Me, Courtesy Van, Flight Dispatch & Weather, Wi-Fi and Faxes*	$10.79 (Waived with purchase of 10 gallons of fuel)	$16.20 (Waived with purchase of 15 gallons of fuel)	$21.59	$32.38	$53.97	$80.96	$453.31	$653.00	$712.35	$787.91	$906.63
Ramp Parking Fees											
First 2 Hours	Waived	Waived	$10.79	$21.59	$32.38	$43.17	$94.98	$113.34	$118.72	$130.60	$166.21
Daily *(24 hours or part thereof)*	$10.79	$21.59	$32.38	$43.17	$64.76	$86.35	$189.96	$226.66	$237.45	$261.20	$332.44
Weekly *(Charges after 3 days)*	$32.38	$64.76	$97.14	$129.51	$194.28	$259.05	$569.88	$679.98	$712.35	$783.60	$997.32
Monthly *(Charges after 3 weeks)*	$97.11	$194.31	$291.42	$388.53	$582.84	$777.15	$1,709.64	$2,039.94	$2,137.05	$2,350.80	$2,991.96
Passenger Terminal Usage											
Terminal Parking (*Gate 4-12 First 2 hours Includes tug/towbar and jet bridge)*	N/A	N/A	N/A	N/A	N/A	$388.55	$443.61	$604.42	$631.41	$662.71	$813.81
Terminal Fee *(First 2 hours for passengers in Non-FIS areas includes passenger supervision*	N/A	N/A	N/A	N/A	N/A	$404.75	$496.48	$622.78	$637.89	$662.71	$783.58
Transit Lounge *(Foreign Arrivals, FIS Sterile Hold)*	N/A	N/A	N/A	N/A	N/A	$102.55	$114.41	$129.52	$134.92	$144.63	$156.51
Delayed Aircraft *Fee/IROP (Charged daily after first 3 hours)*	N/A	N/A	N/A	N/A	N/A	$388.55	$388.55	$388.55	$388.55	$388.55	$388.55
Passenger Services Fees *(per passenger as applicable)*											
Check-in per passenger	N/A	N/A	N/A	N/A	N/A	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00
Baggage Handling per passenger	N/A	N/A	N/A	N/A	N/A	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00
Deicing & Anti-Icing – *Adjusted Each Season*											
Type I Propylene per gallon plus Maine Sales Tax	$14.05	$14.05	$14.05	$14.05	$14.05	$14.05	$14.05	$14.05	$14.05	$14.05	$14.05
Type IV Anti-Icing per gallon plus Maine Sales Tax	$13.60	$13.60	$13.60	$13.60	$13.60	$13.60	$13.60	$13.60	$13.60	$13.60	$13.60
TKS – 2.5 gallons plus Maine Sales Tax	$113.34	$113.34	$113.34	$113.34	$113.34	$113.34	$113.34	$113.34	$113.34	$113.34	$113.34
Runway End Deicing – *Additional charge per 15 minutes*	$89.59	$89.59	$89.59	$89.59	$89.59	$89.59	$89.59	$89.59	$89.59	$89.59	$89.59
Call-Out Charge - if aircraft cancels after truck dispatch	$53.97	$53.97	$53.97	$53.97	$53.97	$53.97	$53.97	$53.97	$53.97	$53.97	$53.97
Cargo Handling-Non-Hazardous											
Per pound for loads greater than 6,000 lbs	$0.054 per lb	$0.054 per lb	$0.054 per lb	$0.054 per lb	$0.054 per lb	$0.054 per lb	$0.054 per lb	$0.054 per lb	$0.054 per lb	$0.054 per lb	$0.054 per lb
Minimum Cargo Handling Fee less than 6,000 lbs	$323.79	$323.79	$323.79	$323.79	$323.79	$323.79	$323.79	$323.79	$323.79	$323.79	$323.79
Cargo Storage – Ramp *(Minimum per hour)*	$32.38	$32.38	$32.38	$32.38	$32.38	$32.38	$32.38	$32.38	$32.38	$32.38	$32.38
Extra Equipment & Labor Rates on Incidental Price List											
Cold Hangar – *Subject to Availability*											
Daily *– 24 hours or part thereof*	$53.97	$83.11	$113.34	$196.44	$237.45						
Weekly *– Transient Aircraft*	$161.90	$249.32	$339.99	$589.31	$712.35						
Monthly *– Transient Aircraft*	$485.69	$747.97	$1019.96	$1,767.93	$2,137.95						
Monthly *– Based Tenant Ramp Parking*	$45.00	$45.00									
Monthly *– Based Tenant T-Hangar*	$300.00	$300.00									
Monthly *– Based Tenant Hangar 8 Single Engine*	$125.00	$125.00									
Monthly *– Based Tenant Hangar 8 Multi Engine*	$150.00	$150.00									
Heated Hangar – *Subject to Availability* **Daily October 1 to April 30** *For longer stays contact BGR Sales*	$207.23	$249.32	$291.42	$377.76	$539.66						
Aircraft Cleaning *(Optional)*											
Cleaning A – *Remove all cabin trash and upon request trash from cockpit, clean lavatory floor and cubby, hole, wipe lavatory sinks and seats, clean galleys including oven interiors, all stainless and floors), fold blankets and rearrange overhead racks, wipe arm rests, center aisle pick-up, clean under seats, clean seat pockets, clean all tray tables, vacuum and clean cabin floors and seats.*						$307.61	$377.76	$447.93	$518.07	$588.24	$658.38
Cleaning B – *Wipe lavatory sinks and seats, center aisle pick-up, remove all cabin trash and upon request trash from cockpit.*						$178.10	$215.86	$253.65	$296.82	$334.59	$377.76
Cleaning C – *Remove all cabin trash and upon request trash from cockpit.*						$80.96	$113.34	$145.72	$167.30	$188.89	$215.86

For frequency, volume and contract discounts, please contact BGR Sales at sales@flybangor.com or 207-992-4600

*Rates and Charges are Subject to Change Without Notice

Bangor International Airport Rates and Charges as of July 1, 2020

Incidental Services Price List*

Service	Unit Rate	Unit Price
90 or 140 KVA GPU	Per ½ hour or part thereof	$75.55
12/28 Volt GPU	Per ½ hour or part thereof	$21.59 < 8,000 MTOW or $44.25 > 8,000 MTOW
ADA Lift	Per ½ hour or part thereof	$27.00
Aircraft Security	Per Hour	$54.00
Airport ID Badge	Per Badge	$22.00
Airport Shuttle	Per ½ hour or part thereof	$30.00
Aircraft Towing without runway crossing	Per ½ hour or part thereof	$70.17 < 105,000 MTOW or $151.10 > 105,000 MTOW
Aircraft Towing with runway crossing	Per ½ hour or part thereof	$140.31 < 105,000 MTWO or $302.21 > 105,000 MTWO
Air Start	Each	$108.00
Aisle Chair Lift-Off	Each	$39.00
Baggage Tug	Per ½ hour or part of thereof	$27.00
Belt Loader	Per ½ hour or part thereof	$38.00
Biohazard waste disposal fee	Per Bag	$27.00
BTU 400 Heater	Per 1/2 hour or part thereof	$49.00
ETOPS Check (per agreement, per service)	Per Service	$561.25
Call Out Charge (Fuel or Deice Truck)	Per Vehicle	$22.00
Disposal Fee - Fuel Spill Cleanup Material	Per bag	$32.38
Fork Lift (2 Ton)	Per ½ hour or part thereof	$47.49
Fork Lift (10 Ton)	Per ½ hour or part thereof	$61.53
Ground Service Coordinator	Per Hour	$54.00
Hazmat Spill Kit	Per Unit	$75.55
International Trash Removal & Disposal	Per Bag	$81.00
Labor Rates		
Aircraft Mechanic	Per Hour	$99.30
Aircraft Mechanic Overtime	Hourly call-in rate – min. 3 hrs	$148.94
GSE Mechanic	Per Hour	$59.37
GSE Mechanic Overtime	Hourly call-in rate – min. 3 hrs	$89.05
Airfield Maintenance	Per Hour	$52.08
Airfield Maintenance Overtime	Per Hour	$78.11
Passenger Services Agent	Per Hour	$43.17
Ramp Labor	Per Hour	$59.37
Ramp Labor Overtime	Per Hour	$89.05
Lavatory Service	Per Aircraft	$82.00
LEO Request	Per Officer per 4 Hours or part thereof	$350.00
Light Cart	Per ½ hour or part thereof	$16.50
Lower Lobe Loader	Per ½ hour or part thereof	$70.00
Main Deck Loader	Per ½ hour or part thereof	$86.35
Manlift	Per ½ hour or part thereof	$30.00
Movement Area Escort	Per ½ hour or part thereof	$36.50
Nitrogen (3000)	Per Service	$80.96
Nitrogen (2000)	Per Service	$45.40
Oxygen (Large Bottle)	Per Bottle (Labor Extra)	$51.80
Oxygen (Small Bottle)	Per Bottle (Labor Extra)	$45.40
Passenger Stairs	Per ½ hour or part thereof	$70.00
Pre-heats	Per engine	$25.00
Private Charter Security Screening (4 Screeners and 1 GSC)	Per 4 hours or part thereof	$1,133.00
Private Charter Security Screening Additional Personnel	Per Screener per 4 hours or part thereof	$172.69
Pushback	Per push	$80.96
Tanis Plug-In	Per engine per night	$21.60
Tire/Wheel Change (Nitro)	Per Service-Labor Extra	$237.45
Water Service	Per Aircraft	$48.58 <190,001 MTOW or $70.17 > 190,001 MTOW
Wheel Chair Assist	Per Chair	$31.00

*All Incidental Prices are Subject to Change Without Notice

Service Item Price List*

Service Item	Unit	Unit Price
2389 Oil		$24.82
Absorbent Pads		$1.41
Aeroshell 15w50	Quart	$10.98
AeroShell 65, 80, 100	Quart	$7.29
AeroShell Fluid 41		$46.35
Air Vac		$42.00
BP Turbine 2197		$14.89
BP Turbine 2380		$23.30
Castrol Brayco 756		$11.56
Hydraulic 5606	Quart	$11.56
Hydraulic 5606	Gallon	$46.35
Mobil 254 Oil	Quart	$25.40
Mobil Jet II Oil	Quart	$21.70
Newspapers		
Phillips 66 20w50	Quart	$6.25
Prist Canned Fuel Additive		$10.00
Prist Cleaner		$8.50
Prist Injected At Hose	Gallon	¢.06
Royco 756		$156.00
Royco 782		$20.65
Skydrol	Gallon	$156.00
Skydrol	Quart	$39.00
Sorbent C		$29.00
Super Soper		$42.00
TKS Fluid	2.5 Gallon	$113.34

SCHEDULED DOMESTIC CARRIER INCIDENTAL PRICE LIST

Effective July 1, 2020

EQUIPMENT				
DESCRIPTION	**Per 1/2 Hour**	**DAY**	**WEEK**	**MONTH**
Baggage Cart	$2.00	$12.00	$61.00	$182.00
Baggage Tug	$19.00	$185.00	$924.00	$2,772.00
Belt Loader/Conveyor	$19.00	$185.00	$924.00	$2,772.00
Passenger Stairs	$5.00	$89.00	$446.00	$1,337.00
GPU	$66.00	$308.00	$1,540.00	$4,620.00
Aircraft Heater	$27.00			
Tug/Towbar - *Per flight*	$64.00			

SERVICES	
DESCRIPTION	**NORMAL**
Airstart - *Per Engine*	$73.00
Lav Service - *Per lav*	$31.00
Preheat - *Per engine*	$19.00
Water Service - *Per flight*	$21.00
Call Out Charge - Deicer	$50.00
Call Out Charge - Fuel truck	$20.00

**Labor rates are covered in general price list*

LABOR RATES		
DESCRIPTION	**Increment**	**Rate**
Aircraft Mechanic	Per Hour Reg	$92.00
Aircraft Mechanic	Hourly call-in (3 hr min)	$138.00
GSE Mechanic	Per Hour Reg	$55.00
GSE Mechanic	Hourly call-in (3 hr min)	$82.50
Passenger Services Agent	Per Hour Reg	$40.00
Ramp Services	Per Hour Reg	$55.00
Ramp Services	Per Hour OT	$82.50

Appendix D Passenger Terminal Study

Terminal Facility Study – Bangor International Airport

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10 APPENDIX B - Recommended Redevelopment Plan Drawings

10.1 Terminal Plans
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Terminal Facility Study – Bangor International Airport

EXECUTIVE SUMMARY

M. Arthur Gensler, Jr. and Associates ("Gensler") is pleased to present this Study summarizing the Terminal Redevelopment Vision for the Domestic and International Terminals at Bangor international Airport (BGR). This six-month study was conducted during the initial phases of the COVID-19 Pandemic – between June to December 2020. Since the commencement of this work, there remains some uncertainty as to when the aviation industry will fully return to the 2019 pre-COVID activity levels. To that end, it is important to note that airports throughout the country experienced significant air traffic recovery primarily in the summer of 2021; presumably as a result of the significant pent-up demand for discretionary travel after nearly two-years of lock-downs and global travel restrictions. These upticks in demand, while not necessarily representing a consistent trend, serve to highlight the urgency of some facility improvements previously identified prior to the Pandemic.

Additionally, the pandemic has highlighted previous concerns including the lack of holdroom space as well as amenities in the domestic that exacerbated the challenges of maintain social distancing as well as the accelerated retirement of regional jets and replacement with significantly larger narrowbody aircraft such as the Airbus A320 and Boeing B737 that provide over two to three times as many seats in the typical regional jets (see Figure 1).

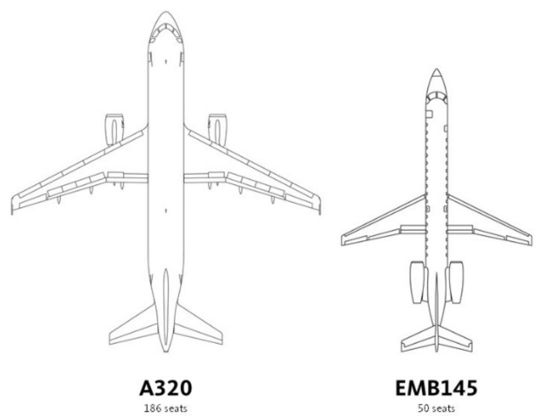


Figure 1 – comparison of a typical narrowbody jet and a regional jet

The Terminal Facility Study concluded that in this recovery progress, the overall long-term outlook for BGR remains positive - as illustrated in the record peak hour activity and monthly commercial domestic travel activity records achieved in the summer of 2021 – reinforcing the need for a sustainable vision to refresh and modernize existing airport building assets to deliver a new consolidated state-of-the -art passenger terminal facility that will immediately support the long-standing domestic travel demand at the airport, while also anticipating the potential of long-term international activity – primarily in growth in charter and military activity. This development concept is best illustrated by the diagram below showing the gradual interconnection of the existing domestic and international terminals to create a single new facility at BGR.

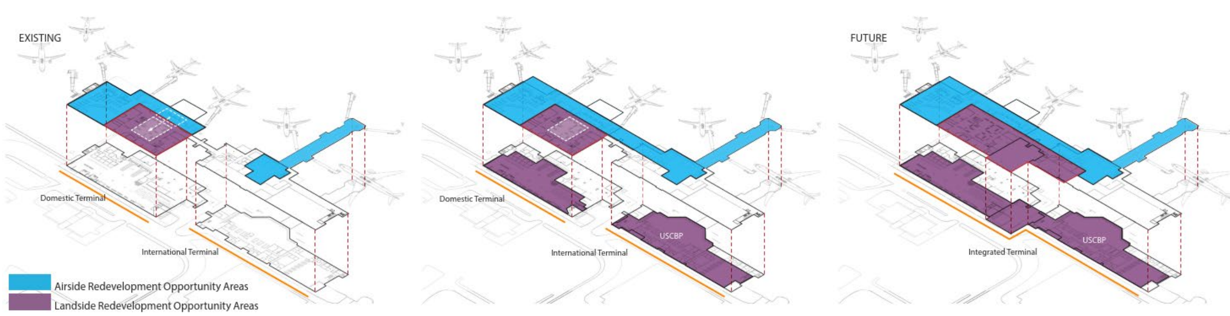


Figure 2 – diagram of axonometric floor plans illustrating the long-term vision of interconnecting the domestic and international terminal facilities

The long-term vision for the passenger terminals is comprised of connecting two existing buildings to create a single consolidated terminal facility that can efficiently serve larger aircraft and provide immediately needed airside capacity that delivers a unique sense of place representing Greater Bangor and Central Main.

Key components of the long-range overall vision are as follows:

- ✈ **28,000 SF** of new construction on the terminal airside featuring:
    - o a new connector gate and concourse expansion at Gate 4 and adjacent to Gate 6 (as shown in figure 1);

- ✈ **73,000 SF** of landside and airside renovation including:
    - o Increase of up to four (4) TSA Security Screening Checkpoint (SSCP) lanes;
    - o Consolidation and redevelopment of existing eight (8) contact jet gate positions;
    - o Increase of up to 4,500 GSF in post-security concession offerings and
    - o Improved wayfinding and concourse circulation

A lynchpin to this development is the "connector" elements that can tie the international terminal together with the domestic facilities to provide near-term gate and holdroom relief. The following conceptual image (Figure 3) from a preliminary initial connector study at the Gate 6 location.

Figure 3 – Conceptual preliminary diagrams and perspective views illustrating a connector concept for interlinking the Domestic and International Terminal buildings.

The initial release of grant funding from the Federal Bipartisan Infrastructure Act in late 2021 presents a rare opportunity to kick-start the terminal redevelopment with select enabling projects that can address immediate capacity needs with setting up the long-term plan. This redevelopment concept has been developed in a way that projects can be undertaken individually as PFC and other federal / FAA funding opportunities materialize; meaning that the terminal plan has built in flexibility for BGR to pick and choose projects and funding and timing warrants.

1.0 INTRODUCTION

This report summarizes the analysis of the current terminal facility with a specific focus on exploring the feasibility of improving Bangor International Airport's (BGR) long-term airside (primarily post-security) concourse capacity over the Master Plan Update (MPU) planning horizon. Unlike typical terminal studies that focus on the overall balancing of demand and capacity of the terminal's landside and airside facilities, this study has been limited to the *departures level concourses of the Domestic and International terminal*.

The study incorporates six months of analysis, planning and design efforts from July to December 2020. Since the last terminal study in 2007, the Airport's Domestic Terminal has experienced a number of significant additions and renovations allowing the airport to increase landside and airside capacity, culminating in their most recent Passenger Facility Charge (PFC) program completed in 2017, including the following departures and arrivals area expansions and renovations:

Figure 4 – Completed Landside Improvements – 2017 PFC Program

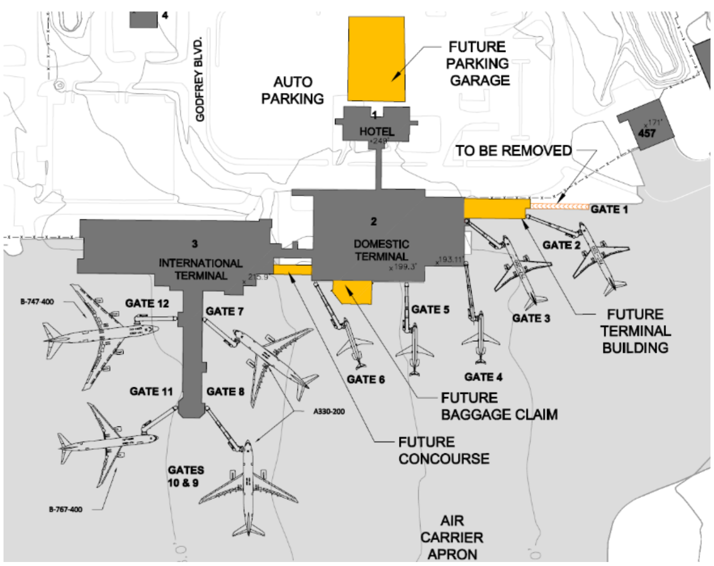


Figure 5 – Terminal Area Development Plan – 2014 Master Plan

- **Departures Level** – departures hall with customer check-in, explosives detection systems (EDS) and baggage make-up facilities, passenger boarding bridge, security checkpoint equipment upgrades as well as a significant post-security holdroom expansion, including restroom and pet relief provisions.

- **Arrivals Level** – arrivals hall with new baggage reclaim and rental car facilities (Figure 4). The previous Master Plan Update proposed an extension of the existing Domestic Terminal. As illustrated in the Jacobs Terminal Area plan (Figure 2), prepared in 2014. It should be noted that the Baggage Handling System expansion (herein identified as "future baggage claim") was completed shortly after the Master Plan Update and the overall development generally support the upward trend of domestic activity at BGR. Over this period, BGR Leadership has determined that the study should focus on capacity enhancements within existing facilities, shifting from concourse expansions previously envisaged in the 2007 Terminal Study and 2014 MPU (figure 5).

BGR Leadership selected the Jacobs Engineering Group Team in 2019, including terminal planning and design subconsultant, Gensler, to conduct an analysis of the existing terminal facilities – focusing on over 100,000 GSF of primarily "post-security" spaces - to address the potential impacts of these trends on the long-term development of the terminal area. The resultant Proposed Terminal Plan is shown below, please refer to Figures 7 and 8.

Over the 13 years between the previous study and the aforementioned terminal Passenger Facility Charge (PFC)-funded projects, a number of other global development have transpired including the Great Recession as well as historic domestic U.S. economic growth and the ongoing COVID-19 pandemic. BGR experienced significant commercial air service activity growth over this period, with considerable growth in the domestic sector.

Additionally, several significant industry transformations occurred over this period. First – prior to the pandemic of 2020 – domestic carrier activity was experiencing consistent year-over-year growth, hitting a peak annual enplanement level of more than 300,000 enplanements in 2019. Secondly, commercial air carriers have accelerated their transition from regional aircraft to larger narrow-body jets for myriad reasons, including improving operating margins with the deployment of more efficient, larger jet aircraft. This transition to larger aircraft has been accelerated over the course of this terminal study period.

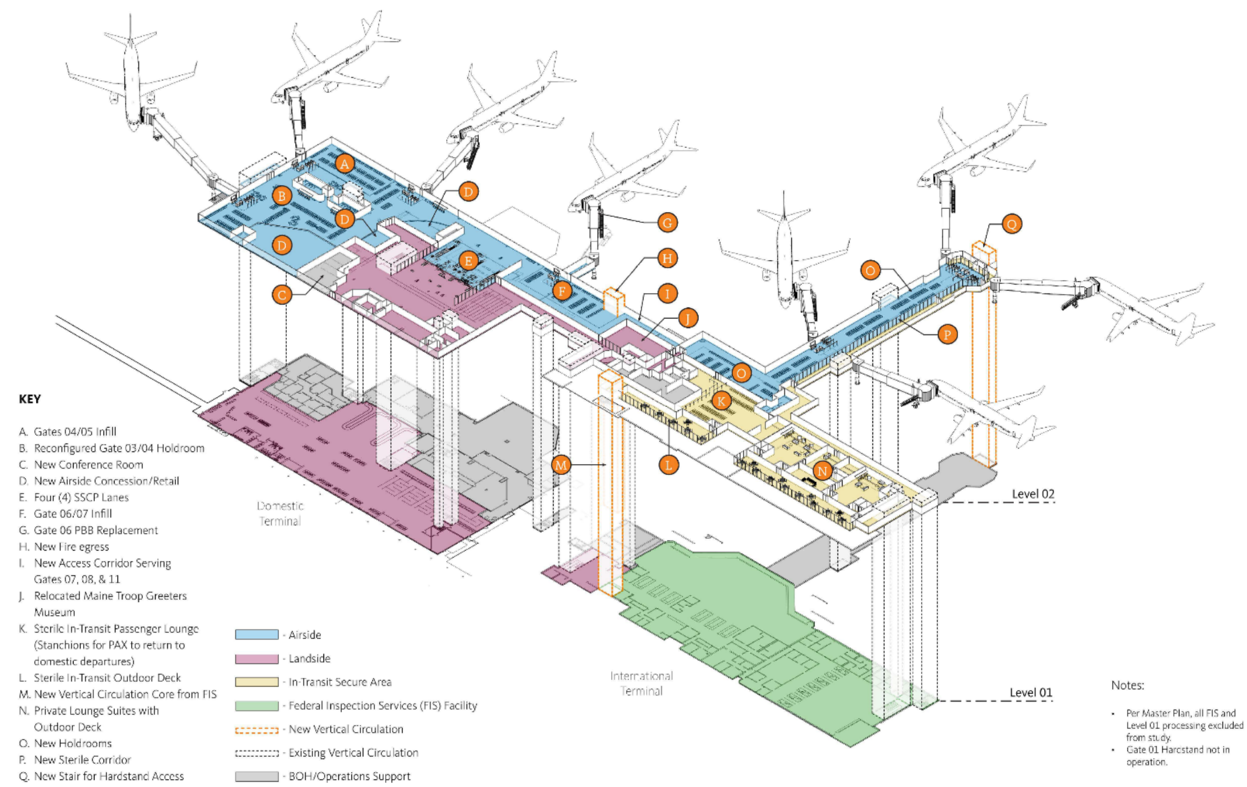


Figure 7 – Existing Domestic and International Terminals: Exploded Axonometric View

Gates 7, 8 and 11 at the International Pier has been planned to operate as "swing" gates that can serve both future international as well as domestic operations.

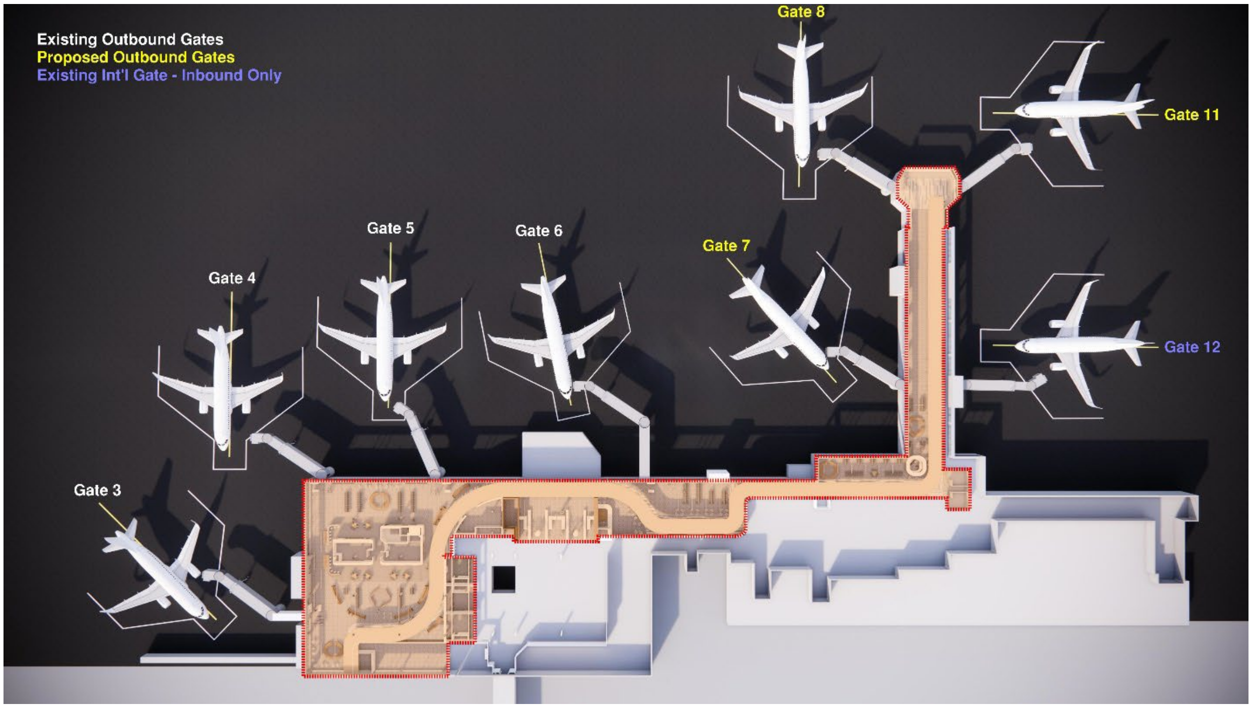


Figure 8 - Proposed Departures Level: Plan View

Key to the development plan is strategic infills within the Domestic and International Terminal and the conversion of the currently non-occupiable International Pier sterile corridors into departures concourses and holdrooms; thereby integrating existing international gates **7, 8 and 11** with the other domestic gates as illustrated in the connected departures level experience for passengers as illustrated in the departures concourse level floor plan in Figure 8, above.

2.0 STUDY GOALS & OBJECTIVES

2.1 Study Goals Defined

A series of Visioning Workshops were held in the late Summer of 2020 to capture BGR Leadership's metrics of success and expectations for the terminal airside redevelopment initiative.

Key Programming priorities for the terminal planning efforts have been identified for this study with an emphasis on ensuring safeguards for the following next-generation advances:

- Passenger Security Screening Checkpoint (SSCP)
- Airside Boarding Technologies
- Terminal Concessions and Passenger Amenities
- Future Pandemic Provisions

To confirm study objectives, the Terminal team conducted an online survey of the BGR Terminal Study Steering Group to identify goals and objectives in advance of the visioning workshops. The key expectations for this study effort, as illustrated in one of the survey results, fig 9, includes developing terminal enhancement concepts that can achieve the improved airside customer experience (listed in the order of significance):

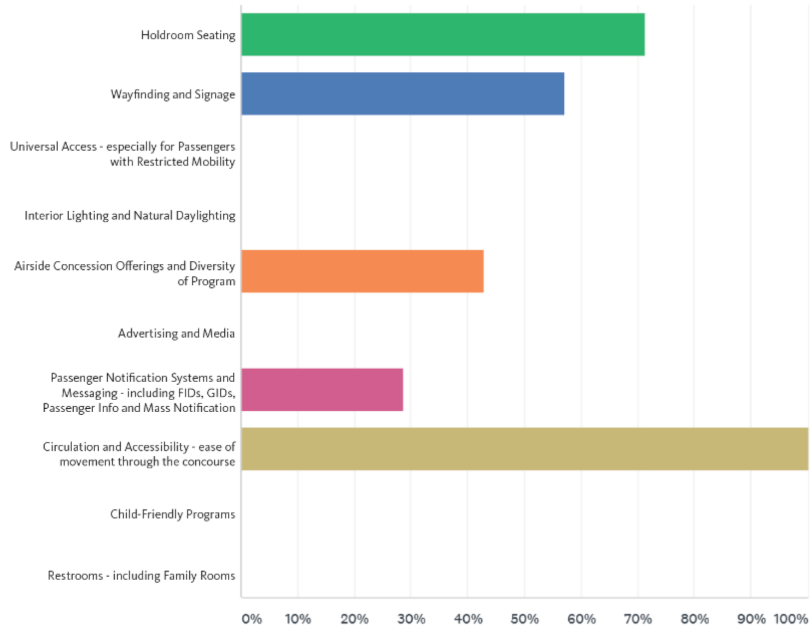


Figure 9 - Terminal "Top 3 Facilities Concern" Survey Results

1) Terminal Circulation and Accessibility;
2) Holdroom Seating;
3) Wayfinding and Signage;
4) Airside Concessions and
5) Passenger notification and messaging systems

Additionally, terminal re-use and optimization emerged as another key priority to guide this study, specifically, enhancing and identifying more airside passenger concourse capacity through:

a. Interconnecting the existing Domestic and International Terminals;
b. Leveraging available terminal area real estate and
c. Optimizing building systems, efficiency and performance.

2.2 Existing Passenger Terminal Context

Terminal area development over a two-decade period resulted in two distinct terminal facilities, the Peter D'Errico Memorial Domestic Terminal (built in 1972, and expanded in 2017) and the International Terminal and Pier (completed in 1975 and its pier extension in 1993 – see Figure 10). As the Domestic Terminal has experienced robust, consistent development, the International Terminal and Pier was not leveraged as much as its counterpart as it was primarily used for in-transit dwell and limited USCBP FIS arrivals passenger processing.

Figure 10 – Aerial of Existing Terminal Area Complex: International Pier (left) and Domestic Terminal (foreground) are not interconnected on the concourse's sterile side.

The study team has been charged to explore options to better utilize the significant amount of underutilized departures area in the International Terminal and its Pier.

As illustrated in the following diagram below (Figure 11) which captures nearly five decades of terminal area development; this study intends to help the City and Airport map a course for the next cycle of development by focusing on better utilizing the existing terminals with an emphasis on supporting the steady domestic travel demand.

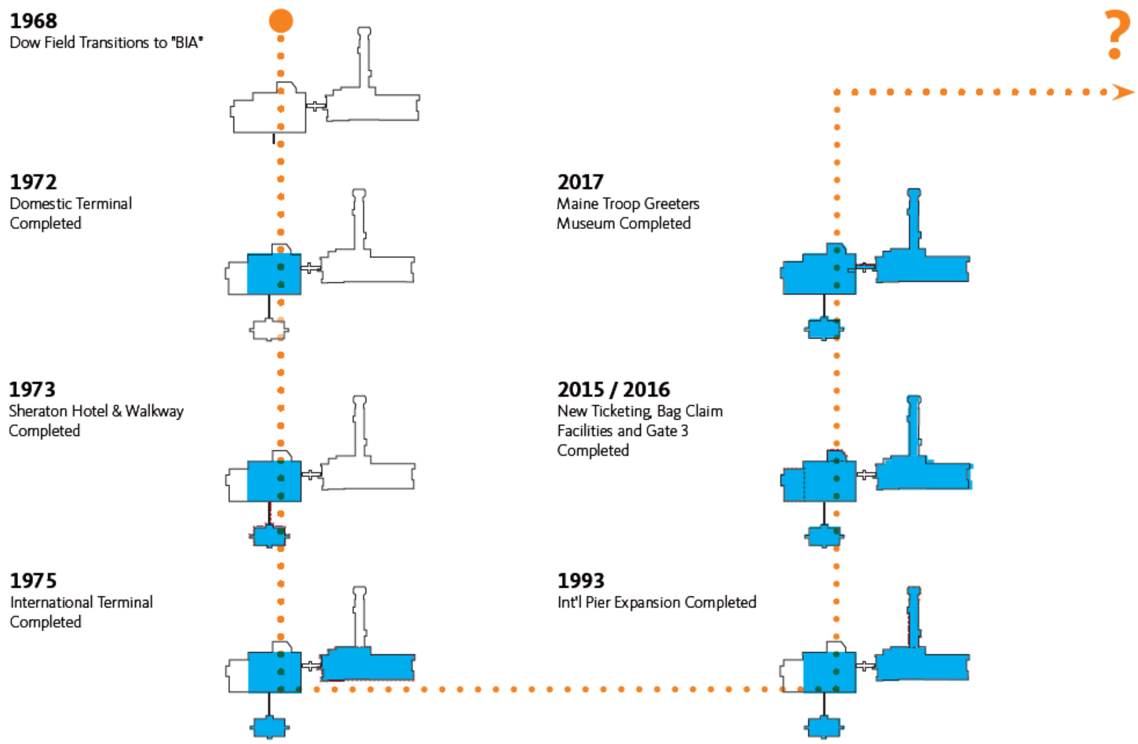


Figure 11 - Evolution of the Bangor Main Terminal Complex

2.3 Terminal Study Framework

This terminal study focuses primarily on the integration of the post-security airside concourse and holdrooms of both the International and Domestic terminal facilities to address the current shortcomings of the existing airside facilities; specifically:

1) Passenger Security Screening Checkpoint (SSCP) long-term siting;
2) Airside concessions and passenger amenities;
3) Aircraft gate holdrooms and passenger boarding bridge provisions;
4) Concourse circulation and
5) Sterile In-Transit lounges and corridors

Due to scope limitations, this study *does not analyze* the following facilities and associated processors:

Airside

- International arrivals – FIS, Baggage Reclaim and Customs

Landside

- Domestic departures – Check-in, Departures Hall and Landside Concession program
- Domestic arrivals – Baggage Reclaim, Arrivals Hall

3.0 EXISTING CONDITIONS

There are two primary building facilities supporting the commercial passenger terminal operations at Bangor International Airport – the Peter D'Errico Domestic Terminal and the International Terminal Building and Pier. The two facilities are currently <u>not</u> interconnected on the airside, but have a public (non-sterile) ramp that allows the 1968 Domestic Terminal to connect with the 1972 International Terminal. The existing terminal plan – only departures level (02) – is shown below (Figure 12); highlighting the challenge of connecting the two terminals at the public departures concourse level.

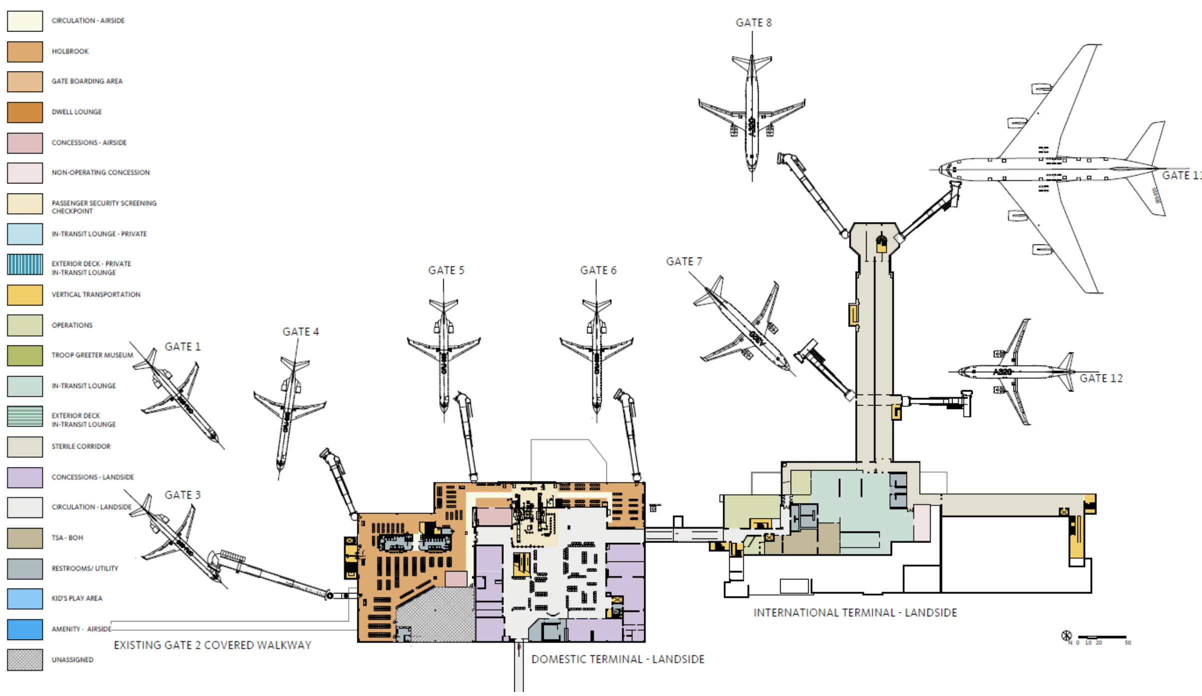


Figure 12 - Existing Terminal Departures Level: Floor Plan

3.1 Peter D'Errico Domestic Terminal

As noted previously, the existing Domestic Terminal was the initial passenger facility realized in the Main Terminal area, completed in 1968 (Figure 13). Since the original terminal structure was realized, it has been subsequently renovated and expanded – both departures and arrivals level, most recently between 2015-2017.

Figure 13 - Historic Photo: Domestic Terminal, circa 1972

Following the completion of the Domestic Terminal facility was the International Terminal facility in 1972. A pedestrian bridge on the landside was provided to connect the two.

The current domestic terminal is a two-level facility served by a single level arrivals and departure curb (figure 14). Passengers enter the building on the first floor and proceed to a ticketing area adjacent to the bag claim area and rental car counters. Passengers who are leaving from Gates 1, 3, 4, 5 and 6 use either the main escalator or elevator to the second floor where they can wait in the non-sterile (or "pre-security") public waiting area where landside concessions, the Troop Greeters Museum (J) and restroom facilities are located. They will proceed through a newly reconfigured passenger security screening checkpoint to access the sterile gate area. Gate 1 – a hardstand parking position – currently serves passenger deplanements and does not serve enplaning activities. The covered walkway to the east of the Domestic Terminal, serving hardstand position Gate 2, is intended to be de-activated and potentially fully removed from the apron.

Arriving passengers from Gates 3, 4, 5 and 6 deplane and enter the building directly using passenger boarding bridges to access the sterile domestic gate area. They will proceed to the primary manned exit to the non-sterile public waiting area and descend to the lower-level arrivals hall where they can reclaim checked baggage, order a rental car or exit directly out to the curb for ground transportation to leave the terminal facility.

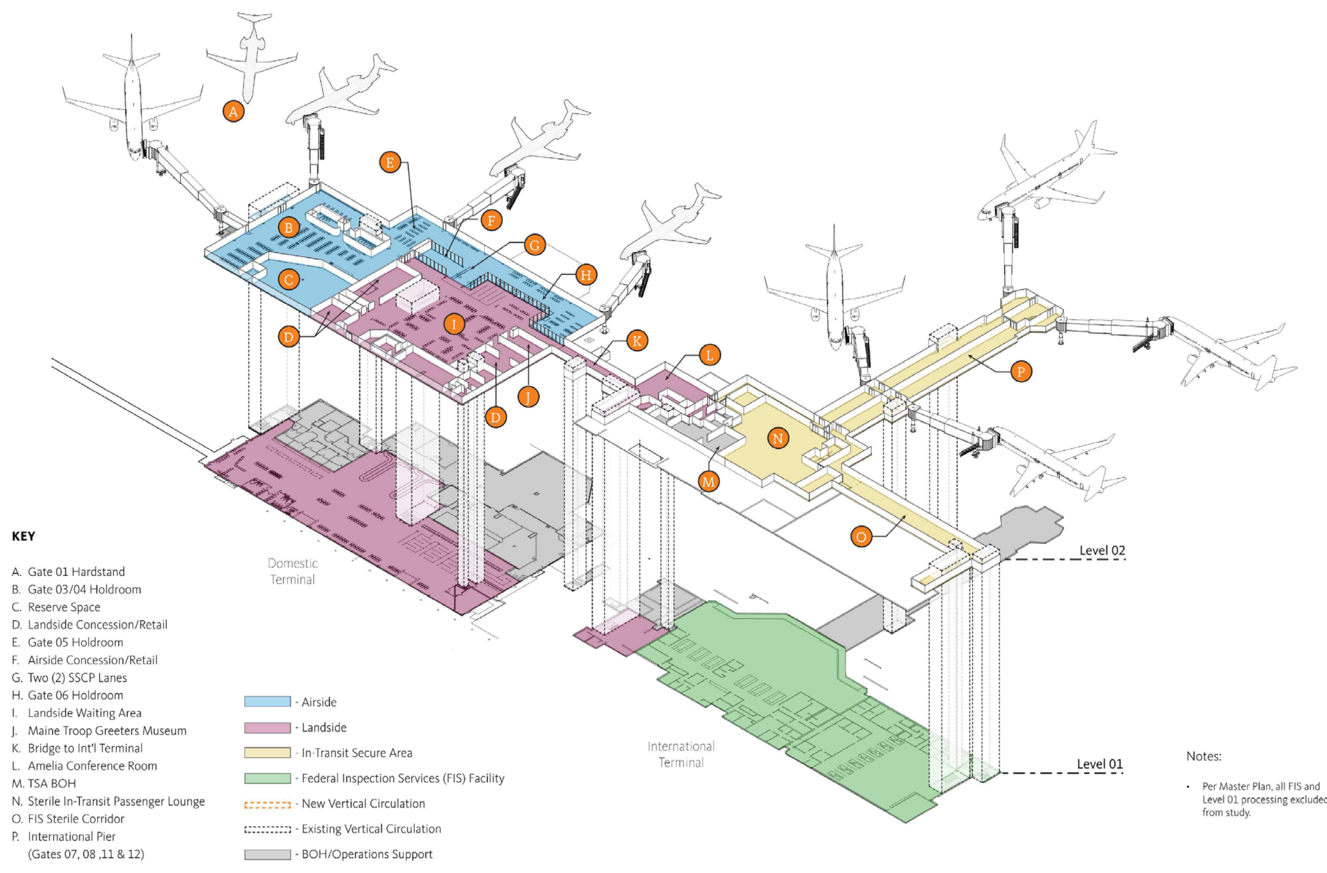


Figure 14 – Existing Domestic and International Terminals: Exploded Axonometric View

3.2 International Terminal and Pier

The international terminal is three-level facility supporting ramp control operations, a Federal Inspection Station (FIS) facility on the apron level (ground) and a sterile in-transit passenger lounge, restrooms, TSA offices on the departures (2nd) level and a majority of the Airport Administration offices on the third level. A two-level international pier provides sterile corridors serving enplaning and deplaning passengers from Gates 7, 8, 11 and 12. The International Terminal does not provide processing of outbound passengers. Inbound passengers upon arrival can either walk through the sterile corridor and into the in-transit lounge or they may proceed to the lower level FIS, baggage reclaim and Customs facility. The Terminal not been modernized since the completion of the sterile pier in the early 1990s.

12.2 Gate and Ramp Operations

The Domestic and International Terminals are currently operate serviced by third party ramp agents that are either hired by the City of Bangor or the airline tenants. The ramp agents will provide ground handling, fueling and other support services typically expected of the airlines.

The aircraft gates currently operate in the following manner and are situated as depicted in Figure 15 below:

Gate	Location within Terminal Complex	Largest Aircraft Servicable	Comments
1	Ramp	ADG II – EMB175	Usually reserved for deplaning pax only
3	Domestic Terminal	ADG IV – B757	
4	Domestic Terminal	ADG IV – B757	
5	Domestic Terminal	ADG IV – B757	
6	Domestic Terminal	ADG IV – B757	
7	International Terminal	ADG III – A320	Fixed PBB limits gate capabilities to serve other AC
8	International Terminal	ADG IV – B757	
11	International Terminal	ADG VI – A380	Gate 11 is a designated NLA reliever gate
12	International Terminal	ADG V – B757	

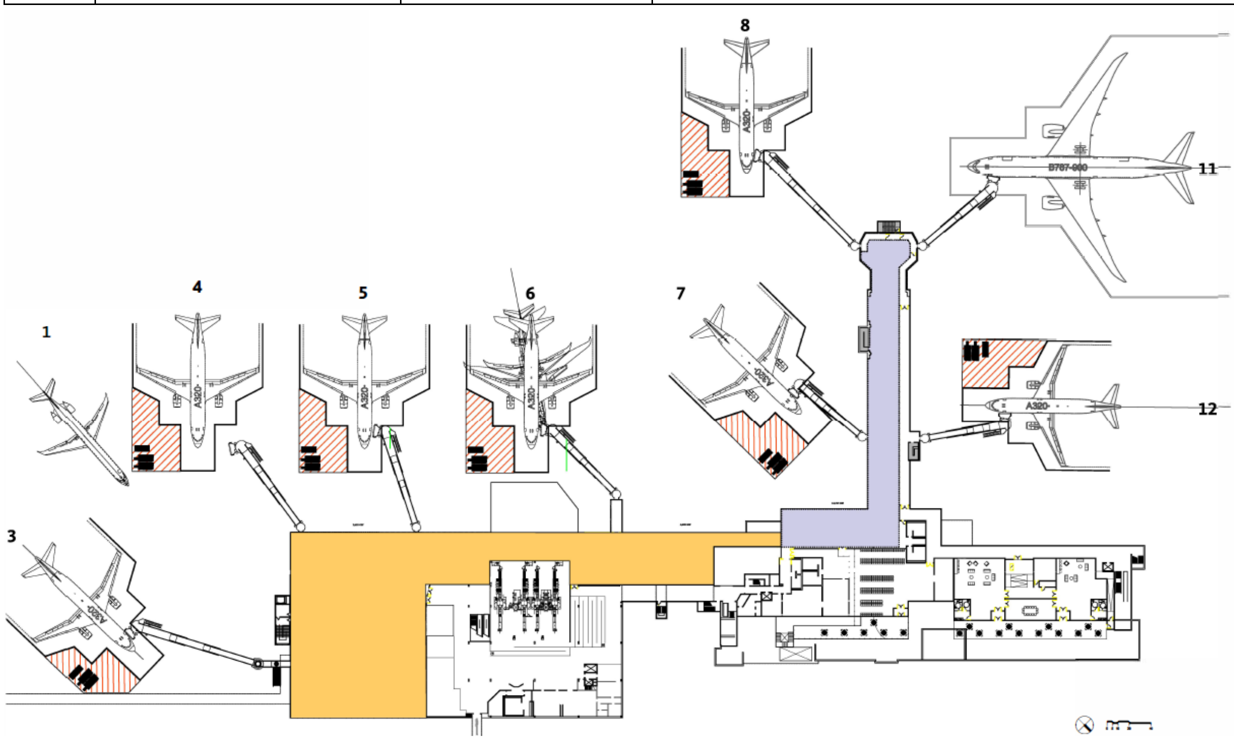


Figure 15 – Existing gate numbering designations; BGR Domestic and International Terminals

4.0 FORECAST AND PEAK PERIOD ASSUMPTIONS

4.1 Master Plan Terminal Forecast Overview

Consistent with the approved Master Plan Update forecast, the aviation forecasts for this Master Plan extend to 2045, and are divided into three development periods that coincide with the FAA Terminal Area Forecast released in the late fall of 2020; as shown below. The Master Plan team has organized the forecast periods in three development timeframes:

Short-term: 2021-2025 **Medium-term: 2026-2030** **Long-term: 2031-2045**

Four (4) passenger terminal peak period scenarios have been prepared as part of the Master Plan Update, ranging from S1 (most aggressive) to S4 (most conservative). The preferred Master Plan forecast scenario – Scenario 2 – *assumes a more aggressive and optimistic return to pre-2019 activity levels as illustrated in the forecast graphic below* – refer to S2 (green) representing Scenario 2, Figure 16.

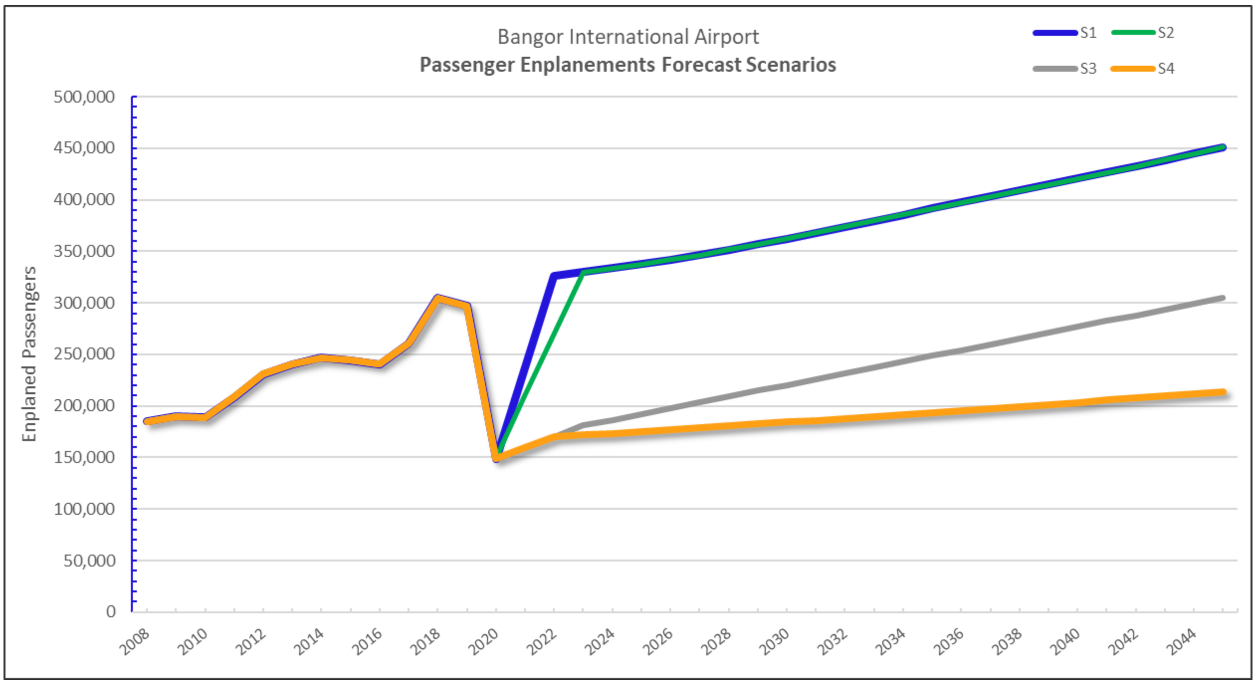


Figure 16 – BGR Forecast Scenarios

Consistent with the Master Plan Forecast section, approved by the FAA, the preferred forecast for passenger enplanements assumes BGR is able to return to pre-2019 passenger levels. Prior to the pandemic, passenger enplanements in 2019 were 304,900 with 42% of enplanements served by American Airlines.

Expanding upon the Scenario 2 (S2) forecast, Passenger Activity Levels (PALs) were developed that correspond to approximately time frames. The Master Plan will apply the following S2 growth assumptions over three (3) PALs that define the planning horizon of this study - please refer to Table 1.

Table 1

Scenario 2 (S2) - Preferred Passenger Enplanement Forecast				
	Existing 2019	**PAL 1 2025**	**PAL 2 2030**	**PAL 3 2045**
Annual enplanements	304,900	330,000	362,150	450,930
Peak month - August	38,300	39,800	43,000	54,350
Average day / peak month	1,276	1,326	1,433	1,811

1) Assume CAGR of 1.57% annually and
2) Avg. day/peak month is the peak month demand divided by 30 days

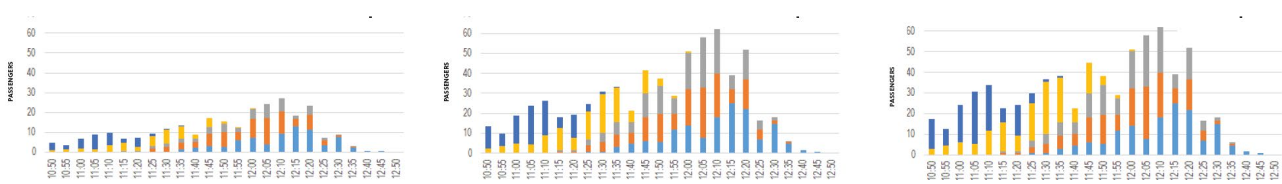
4.2 Domestic Terminal Peak Period Assumptions

Demand for facility processors, such as the SSCP, were developed based on gate peak hour scenarios. The peak hour demand in this study were developed using Pre-COVID 2019 summer flight schedules as a baseline. The following baseline peak period assumptions that have been applied to all peaking profiles are as follows:

Peak period (assume a rolling 60-minute peak)	1130 – 1230 EST
Peak period gate occupancy	Five (5) contact gates
Domestic / International gate operations?	All operations are domestic or US Pre-Clearance

In addition to the passenger assumptions, a surge factor was provided to incorporate other factors during the peak including airport staff and employees entering the terminal at the peak period. Note - Known Crew Members will not enter the SSCP and are not factored into the peak.

- PAL 1 peak hour projection assumes the current RJ-driven peak patterns with more depressed load factors, anticipating a sustained lower demand for air travel – assuming approximately 150 peak period passengers;
- PAL 2 peak hour projection assumes a transition to an all narrow-body peak, which is similar to the existing 2019 Summer peak as represented in Table 3, Figure 18 and
- PAL 3 gating scenarios assume all narrow-body operations with an 80% load factor as represented in Table 4, Figure 19.



PAL 1 – 150 pax/hr **PAL 2** – 244 pax / hr **PAL 3** – 659 pax/hr

Figure 17 – Peak Period Demand from PAL 1 to PAL 3

Table 2

Projected Peak Period Demand by Passenger Activity Levels (PALs)				
	PAL 1	**PAL 2**	**PAL 3**	**PAL 4**
Peak Hour Departing Pax	150	244	659	770
Peak Hour Arriving Pax	144	298	446	521

Table 3

Existing Peak Hour Gate Activity – August 2019					
Gate	**Aircraft**	**Air Carrier**	**Seats available**	**% load factor**	**Peak Passengers**
3	CRJ700 (RJ)	American	70	86%	60
4	CRJ900 (RJ)	American	90	86%	77
5	ERJ145 (RJ)	Delta	50	82%	41
6	ERJ145XR (RJ)	United	50	77%	39
1/2	ERJ145XR (RJ)	United	50	77%	39
				Peak 60-minute Passenger Demand	**256**

PAL 1: Peak Period "Low" Case – 5 Peak Period RJs

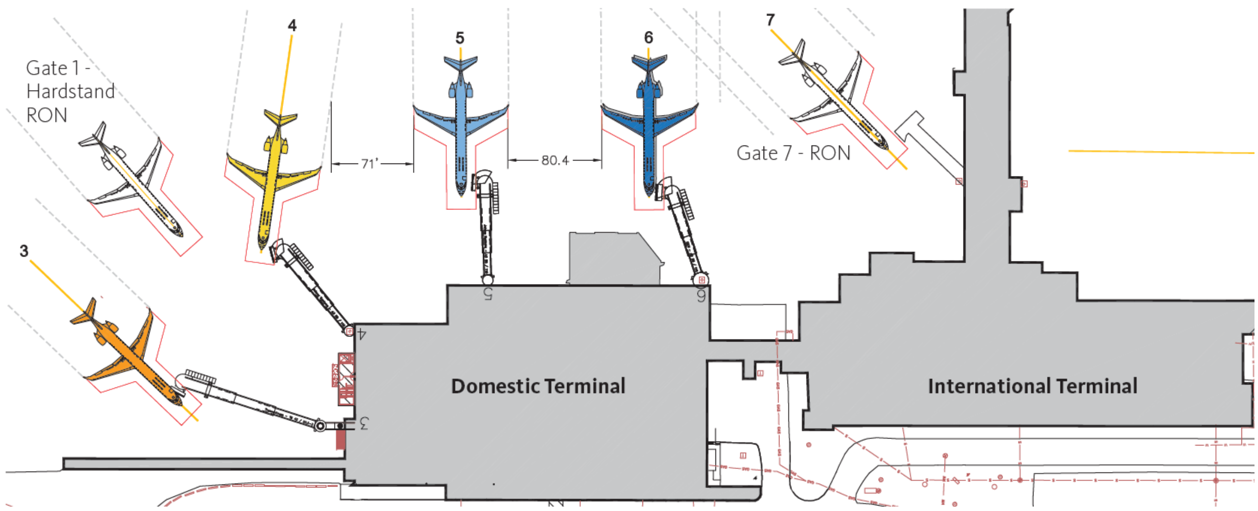


Figure 18 – PAL 1 Peak Gate Parking Plan

4.2 Peak Period Demand and Aircraft Fleet Mix

In our evaluation of multiple peak period scenarios, we have evaluated a number of peak period gating considerations that will impact gate as well as passenger security screening checkpoint (SSCP) capacity using the existing 2019 summer BGR flight schedule of all regional jet aircraft fleet mix as the "existing" case and developed a future peak period gated schedule characterizing our PAL 3 gate scenario; which is characterized by a fully narrow-body peak period fleet mix with a high passenger load factor that reflects the accelerated fleet retirements of regional jets during the pandemic of 2020.

The Pre-COVID 2019 airline schedule for the peak month of August at BGR was evaluated as the basis of the peak hour passenger demand analysis – see the Table 4 and Figure 19. The available four (4) domestic contact gates are occupied during the hour of 1150 to 1250. American Airlines occupies Gates 3 & 4, Delta occupies Gate 5 and United operates off of Gate 6.

In evaluation of the current Gate 1 hardstand position, currently occupied by American Airlines, it was identified in the study that Airport is currently using Gate 7 in the international terminal to deplane passengers and utilize Gate 7 for Remain Overnight (RON) operations. It was noted that the airport ultimately seeks to remove the hardstand and fully utilize Gate 7 in lieu of Gate 1.

Table 4

Projected Peak Hour Gate Activity – PAL 4 (Ultimate)					
Gate	Aircraft	Air Carrier	Seats available	% load factor	Peak Passengers
3	A320	TBD	177	80%	142
4	A320	TBD	177	80%	142
5	A320	TBD	177	80%	142
6	A320	TBD	177	80%	142
7	A320	TBD	177	80%	142
			Surge factor	9% of total	60
				Peak 60-minute Passenger Demand	**770**

PAL 4: Peak Period "High" Case – 5 Peak Period Narrowbody-Equivalent Gates

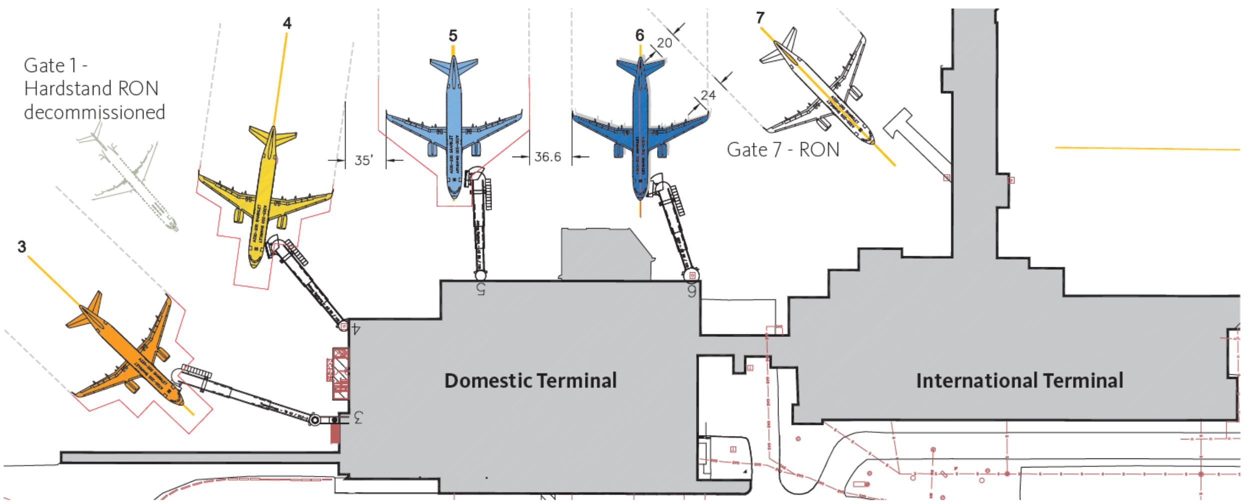


Figure 19 – PAL 3 Peak Gate Parking Plan

5.0 PROGRAMMING AND TERMINAL FACILITY REQUIREMENTS

Due to scope limitations associated with the recently completed improvements at the apron level departures and arrivals facilities, Gensler was requested to focus on evaluating and preparing programming analyses and facilities requirements for the departures level concourse area; including passenger security screening checkpoints (SSCP), concessions, gate holdrooms and departures level concourse support facilities.

Note: areas excluded in the programming analysis includes the International Terminal processor and FIS facility as well as the apron level check-in lobby, arrivals lobby and baggage handling systems .

5.1 Terminal Planning Assumptions

Planning assumptions applied to the programming study are as follows:

Table 5

Terminal Planning Assumptions (Airside)	
Aircraft Gate Utilization	
Narrowbody seating capacity	186
Regional jet seating capacity	50– 100 (varies by airlines)
International departures	Limited under the planning horizon
All aircraft served by contact gates?	Yes
In-transit Passengers served in terminal?	Yes
Departing passenger load factors	80% for ultimate development
Passenger Holdrooms	
Percent of passengers seated	70%
Percent of passengers standing	30%
Area allocated per seated holdroom passenger	15 SF
Area allocated per standing holdroom passenger	10 SF
Use of biometric boarding portals?	Yes
Area required for Gate Podium and Queue	180 SF / gate
Area required for Biometric Queues and ADA access	300 SF / gate
Passenger Security Screening Checkpoint (SSCP)	
Domestic Screening Lane throughput	150 pax / hr
TSA Precheck and Employee Lane throughput	180 pax / hr
SSCP Queue	600 SF / SSCP Lane
Travel Document Check (TDC) throughput	150 pax / hr
Use of Automated Screening Lane?	No
Use of biometrics?	No
Use of K9 unit?	TBD
Airside Restrooms	

Applicable references for restrooms include the International Building Code and the ACRP Restroom Guidelines

5.2 Terminal Facility Requirements – Airside Only

Table 6

Terminal Facilities Requirements Bangor International Airport					
	Existing	**PAL 1**	**PAL 2**	**PAL 3**	**PAL 4**
Peak hour Departing Passengers		150	244	659	770
Peak Hour Arriving Passengers*		144	298	446	521
Peak Hour Contact Gate Requirements					
Domestic – Regional Jet Aircraft	4	5	0	0	0
Domestic – Narrowbody Aircraft	1	0	5	6	7
Domestic Subtotal	**5**	**5**	**5**	**6**	**7**
Charter – Narrowbody Aircraft	0	1	1	1	1
Charter – Widebody Aircraft	0	1	1	1	1
Charter Subtotal	**0**	**2**	**2**	**2**	**2**
Domestic Terminal Requirements					
Passenger Check-in Positions	**Existing**	**PAL 1**	**PAL 2**	**PAL 3**	**PAL 4**
Passenger Security Screening Checkpoint					
SSCP Lanes (no ASLs)	2	2	3	4	4
TDC Area	70 SF	326 SF	474 SF	870 SF	965 SF
Screening and Queuing Area	3,459 SF	6,042 SF	8,077 SF	10,702 SF	10,926 SF
Subtotal	3,529 SF	**6,368 SF**	**8,551 SF**	**11,572 SF**	**11,891 SF**
Concourse Circulation					
Circulation – Domestic	7,025 SF	**5,280 SF**	**8,520 SF**	**12,780 SF**	**14,910 SF**
Circulation – International	15,200 SF	**5,700 SF**	**5,700 SF**	**5,700 SF**	**5,700 SF**
Domestic Holdrooms					
Holdroom Seats	TBD	216	448	672	784
Holdroom Area	9,202 SF	**7,004 SF**	**12,509 SF**	**18,564 SF**	**21,658 SF**
In-Transit Holdroom (Int'l Terminal)					
Holdroom Seats	TBD	150-285	150-285	150-285	150-285
Holdroom Area	7,144 SF	8,102 SF	8,102 SF	8,102 SF	8,102 SF
VIP In-Transit Lounge	0 SF	**5,875 SF**	**5,875 SF**	**5,875 SF**	**5,875 SF**
Passenger Terminal Concessions					
Landside	6,322 SF	231 SF	373 SF	399 SF	464 SF
Airside	1,095 SF	2,078 SF	3,344 SF	3,588 SF	4,165 SF
Concession Subtotal	7,417 SF	**2,309 SF**	**3,717 SF**	**3,987 SF**	**4,629 SF**
Landside Support	N/A	115 SF	185 SF	198 SF	230 SF
Airside Support	N/A	1,029 SF	1,658 SF	1,778 SF	2,064 SF
Concession Support Subtotal		**1,144 SF**	**1,843 SF**	**1,976 SF**	**2,294 SF**
Support Facilities and Customer Amenities					
Customer Service - Airside	N/A	40 SF	70 SF	170 SF	200 SF
Customer Service – Landside	N/A	20 SF	30 SF	70 SF	80 SF
Operations Support - Airside	TBD	Varies	Varies	Varies	Varies
Operations Support - Landside	TBD	200 SF	260 SF	400 SF	450 SF
Restrooms – Airside (domestic)					
Male Fixture (WC/Urinal)	4 / 4	2 / 1	4 / 1	5 / 2	6 / 2
Female Fixture (WC)	10	2	4	5	6
Unisex / ADA / Gender-neutral	1	2	2	2	2

6.0 TERMINAL PLANNING OPTIONS

The following sections are organized accordingly:

6.1 Key Planning Objectives

Prior to initiating the design and planning efforts, the Gensler team reviewed the results of the surveys and visioning efforts with BGR Airport Leadership to ensure that the study focus was aligned with their stated priorities. The proposed Airside Redevelopment Concept Planning has been developed to successfully address the Airport's established study criteria.

The planning efforts to date seek to meet the BGR Leadership priorities and planning criteria in the following manner:

Table 7

OBJECTIVE 1 : Improve the airside customer experience			
1a	Enhanced Airside Concessions	✔	Increase of overall airside concessions
1b	Improved Terminal Circulation and Accessibility	✔	Dedicated airside circulation provided
1c	Improved Holdroom Seating	✔	Increase of 30% overall holdroom area
1d	Improved Wayfinding and Signage	✔	
OBJECTIVE 2 : Identifying more airside concourse capacity			
2a	Interconnecting Domestic and Int'l Terminals	✔	Domestic and Int'l Terminals connected
2b	Leverage existing terminal real estate	✔	Int'l Terminal space partially converted
2c	Optimizing building system efficiency, performance	✔	
OBJECTIVE 3 : Safeguarding for future technologies and planning considerations			
3a	Passenger Security Screening Checkpoint (SSCP)	✔	Planning for future 4 lane-SSCP
3b	Airside Boarding Technologies	✔	Space for airside E-Gates provided
3c	Terminal Concessions and Passenger Amenities	✔	Peer reviewer assessed future trends
3d	Future Pandemic Provisions	✔	New space and flows for Troop Greeters

6.2 Proposed Redevelopment Vision

It was determined early in the visioning sessions during the terminal study that domestic terminal expansion should be an integral development priority. The approach to expanding the domestic terminal facility was determined early on to connect to and leverage the available gate capacity provided by the adjacent international terminal; ultimately creating a “consolidated” terminal facility.

Independent Terminals **Inter-dependent Terminals** **Consolidated Terminal**

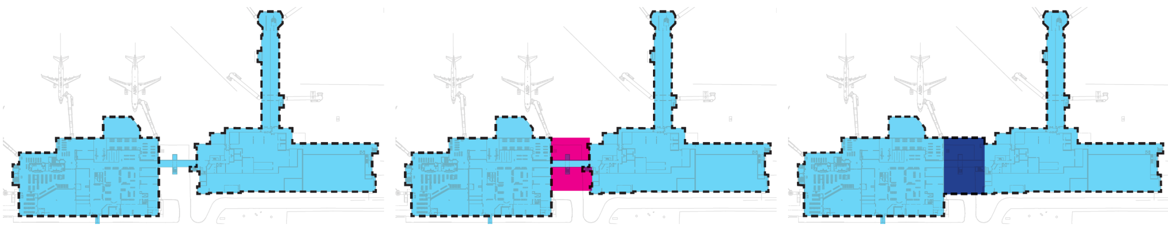


Figure 20 – consolidated terminal evolution

The following terminal phasing diagrams (Figure 21) illustrate a conceptual sequence of transforming the two terminals into a single facility over several phases of development.

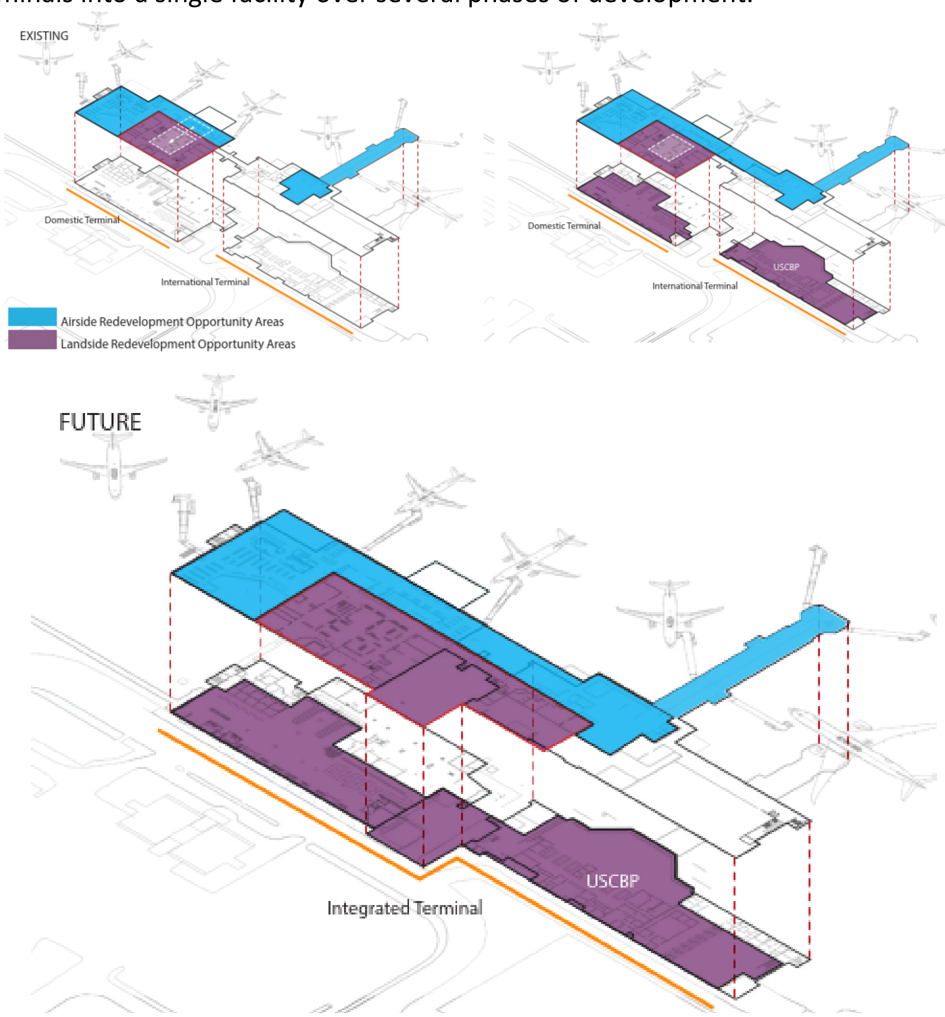


Figure 21 – conceptual terminal consolidation phasing

6.3.1 Security Screening Checkpoint (SSCP) Options

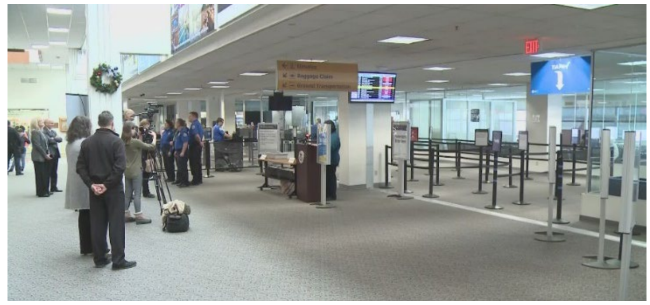


Figure 22 – Domestic Security Screening Checkpoint and Queue Area

Key to leveraging the highest and best use of the current landside waiting area is a long-term solution to accommodate the projected demand that will allow the regionally renowned "Troop Greeter" tradition to remain within the generally non-sterile areas within our adjacent to the current waiting area. It was identified that the various development scenarios have identified a long-term demand for up to four (4) SSCP lanes serving customers flying out of the domestic and international terminals. The current SSCP arrangement includes two SSCP lanes and most recently, the airport received a new scanner unit to augment the existing screening matrix. As illustrated in a recent photo of the security checkpoint, the SSCP assumes a significant portion of the existing terminal (see right image) that could have been operating as a sterile area holdroom. The following SSCP redevelopment concepts were evaluated:

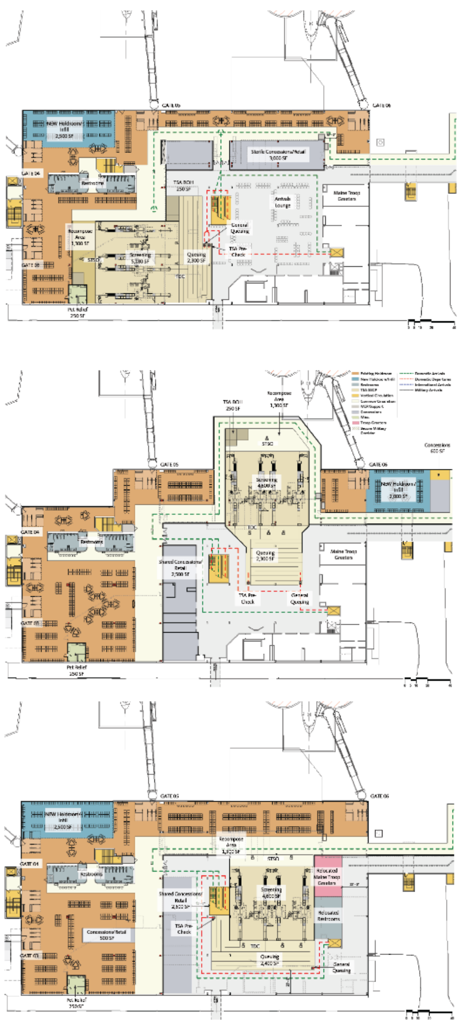


Figure 23 SSCP Options

Reserved Option - This option relocates the current SSCP to the current "reserve" area; an area previously identified for future expansion – including security checkpoint expansion, amongst other redevelopment opportunities.

While this scheme maintains a significant number of existing concessions as well as provides 2,000 GSF of new concessions, this was not advanced due to the long walking distances to the furthest gates.

Expanded Option - In this option, the SSCP would be expanded in its current location and to support this; the existing baggage make-up area would be built over and a departures concourse level building infill will be necessary to support the Gate 6 holdroom to displaced by the SSCP expansion. The SSCP queue absorbs most of the existing public seating.

This concept is the most building-intensive, but provides the most concessions area of all three options and was selected for further analysis.

Centralized Option - The SSCP is relocated from its original location in this option; returning the concourse to its holdroom functionality and as a consequence, a significant amount of the central waiting area is taken over by the SSCP and associated queuing; which may severely compromise the Troop Greeters experience.

This concept relocates the Troop Greeters Museum entirely and provides the least concession space. This concept was not initially advanced.

After the development of the aforementioned SSCP redevelopment concepts, it was determined that another concept – a hybrid – would need to be explored that builds off of the “Expanded Security” option. In order to minimize the additional building over the existing baggage make-up room and to avoid losing too much public area waiting space that would be utilized for core Troop Greeter events, a new concept was developed. The following “Hybrid” option – a planning concept that adopts the infill strategies of the Expanded option while respecting the need for more sterile area hold room seating as illustrated in the Central option - was advanced for further advancement and the shortlisted option is included below (figures 24 and 25):

Hybrid SSCP Option

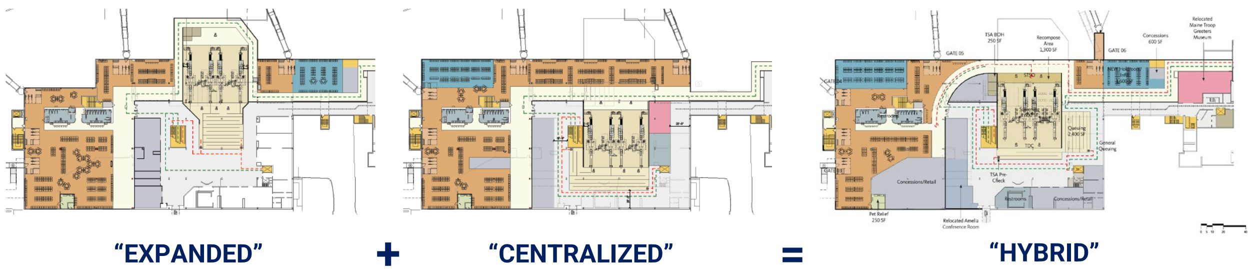


Figure 24 – Evolution of the Hybrid SSCP option

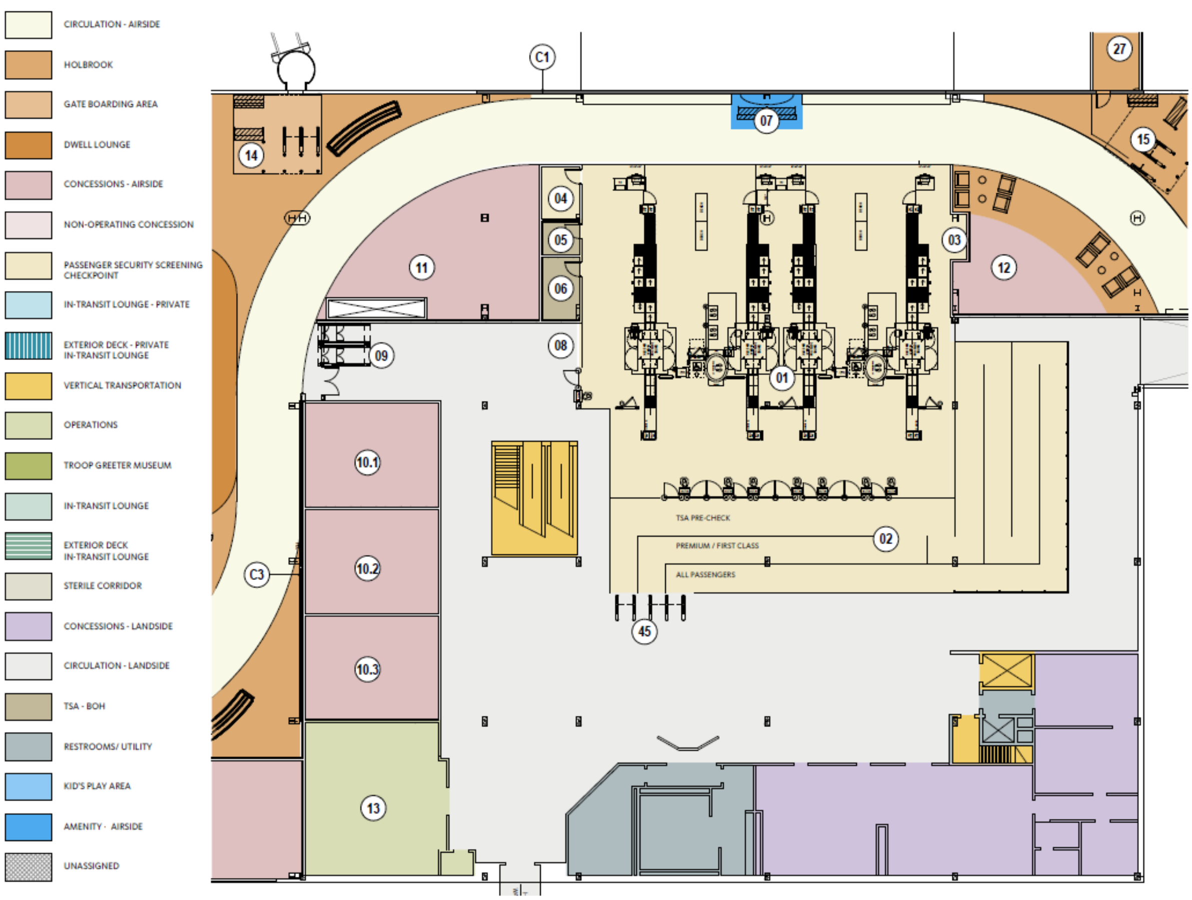


Figure 25 – Plan Detail: Proposed “Hybrid” SSCP Redevelopment Concept

6.3.2 Holdroom Options

Figure 26 – Domestic Terminal seating for Gates 1, 3

With the anticipated up-gauging of the BGR fleet mix from regional to narrow-body aircraft, considerable attention has been given to improving the overall capacity, seating, amenities. As the long-term vision of the terminal recommends the optimization of existing gates, it was determined that some expansion of the existing domestic terminal will necessary in order to take advantage of the existing flight line along the domestic terminal. The existing area shortfall to meet overall long-term PAL 3 holdroom space requirements for 6 up-gauged holdrooms serving group III narrowbody aircraft – many already replacing previous regional jet operations – is approximately 1/3 of what is required to support the terminal when all 5 gate holdrooms may be occupied in irregular operations.

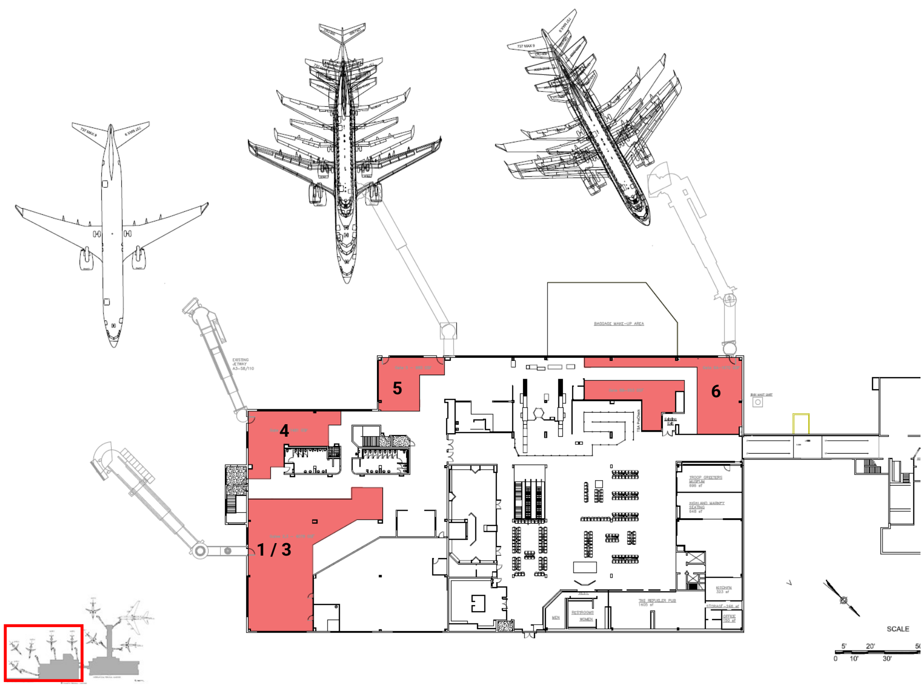


Figure 27 – Existing Holdroom Areas: Domestic Terminal

Domestic Terminal Holdroom Requirements for Group III Narrowbody Aircraft			
Gates	Area Provided (SF)	Area Required (SF)*	Shortfall (SF)
1/3	4,078	5,003	- 925
4	1,481	2,502	- 1,021
5	980	2.502	- 1,522
6	2,663	2,502	+ 161
TOTAL	**9,202**	**12,509**	**- 3,306**

Notes * Area requirements methodology is adopted from the ACRP Terminal Planning Guidebook, Volume 1. *Additionally, holdroom space requirements include those required to support contactless boarding components such as biometric entry portals.*

Key findings in the visioning session include prioritizing the refresh of the look and feel of the hold rooms as well as ensuring that the terminal can be modernized and made flexible to accommodate appropriate future technology improvements to the concourse dwell areas.

The following holdroom and concourse design strategies and applications were considered and identified for use in the development of hold room concepts, specifically the following concepts:

- **Dwell Lounges** - these departures concourse amenities blur the lines between concessions and holdroom seating. Concessions with generous public seating for all customers are placed at key locations along the concourse to help draw passengers while maximizing sight lines help reduce the tendency of passengers to spend too much time at the gate.

Figure 28 – Dwell Lounges, Boarding Area E: San Francisco Int'l

- **Blended Holdroom Area Seating** – mixing holdroom area seating typologies to create personalized areas for travelers and allow for a variety of experiences in the holdroom. This provides opportunities for passengers to define space for individual needs, including, but not limited to task-oriented, dining and more leisurely functional needs.

Figure 29 – Diverse Holdroom Seating: Delta Airlines

- **Boarding Area Contactless Technologies** - Biometric readers can improve throughput for boarding as well as ensure "touchless" boarding using facial recognition. It should be noted that "opt-out" lanes should be provided for those with restricted mobility of concerns with privacy. All holdroom options assume the inclusion of these contactless technology applications.

Figure 30 – Biometric Gate Entry: LAX Tom Bradley Int'l Terminal

The following holdroom options were developed and evaluated:

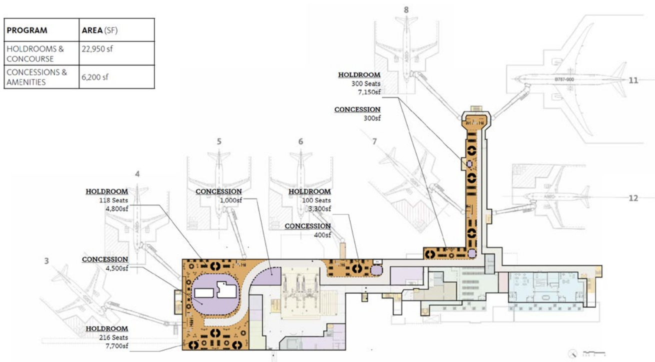


Figure 31 – Dwell Lounge Scheme

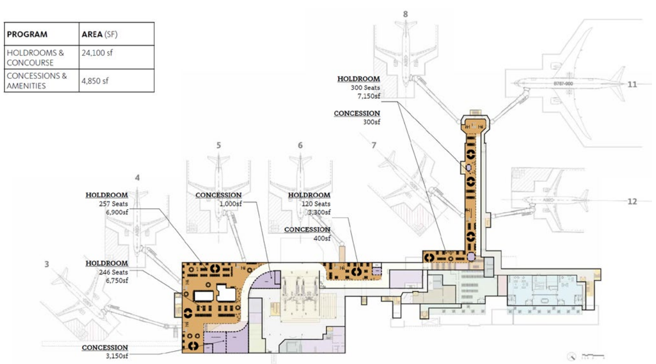


Figure 32 – Blended Seating Scheme

Dwell Lounge Option - This option maximizes concession space by blending concession zones within holdroom areas. This option provides the most airside concession space within the terminal concept – 6,200 GSF – and provides the most revenue-generation potential.

While this scheme provides the most space for concession offerings, it results in less holdroom seating. This concept was not advanced due to the reduction in holdroom capacity.

Blended Seating Option - This configuration maintains concession spaces along the perimeter and key intersections of the terminal facility, providing a conventional approach to allocating seating at the holdrooms. This option is driven by encouraging a wide diversity of seating strategies to accommodate a range of passenger needs. This layout, however, leaves only 4,850 GSF of concessions space.

This scheme provides the most holdroom spaces without compromising concession allocation. This concept was advanced for further refinement.

The proposed near and medium-term recommendations are to provide “infill” holdroom expansions at Gates 4 and adjacent to Gate 6 to increase holdroom capacity. The departures floor plan below is a summary of ultimate holdroom plan of approximately 21,000 SF serving seven (7) total aircraft gates, including two (gates 8 and 11) that are capable of serving both domestic and international operations.

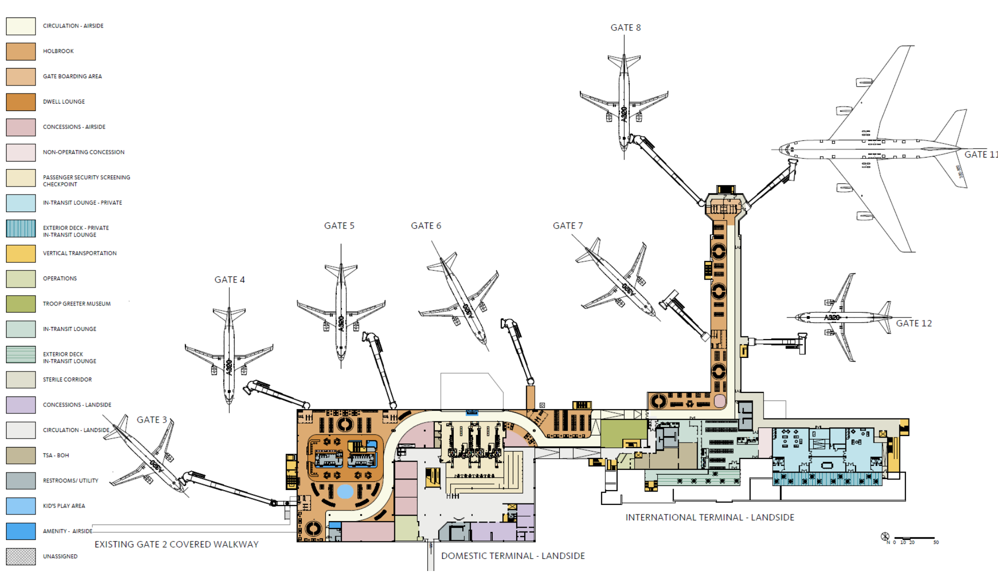


Figure 33 – Ultimate Development Plan

6.3.2 Airside Amenities and Concession Options

Concessions and amenities are critical to ensuring that the customer experience is met as well as balancing non-aviation revenue opportunities. Based on the passenger traffic projected, BGR should be anticipating approximately the following amounts of space for concessions:

Table 9

Concession Program Space Allocation		
Planning Activity Level (PAL)	Low Projection (SF)	High Projection (SF)
PAL 1	2,439	3,049
PAL 2	2,640	3,330
PAL 3	2,897	3,662
PAL 4	3,607	4,509

Concession Consultant, ICF International, reviewed the preliminary terminal concept plan and provided the following recommendations for the development of the concession plan (refer to Appendix C):

- **Concession Allocation Distribution** - The split between airside and landside and airside be approximately 75%/25%. Given the specific situation at BGR, that ratio can be adjusted, but at most, no more than 40% of the overall concession program should be allocated on the landside of the terminal.
    - Sales are currently limited because virtually the entire concession program is contained on the landside, and maintaining that split in the long term will be detrimental to the overall long-term level of sales and customer satisfaction.

- **Concession Allocation Distribution** - While the proposed plan for the development of the airside is a substantial improvement over the existing facility conditions, there are several critical issues to be addressed over the long-term planning horizon:
    - The bulk of available concession space is located on the landside;
    - The overall concession offerings will need to be evenly distributed throughout the terminal as, historically, the bulk of passengers will rarely go beyond eyesight of their gate once they find it;
    - The Terminal is further divided by the SSCP, which is a significant barrier for passengers using Gate 6 or the International Terminal and will generally preclude passengers with gate locations on that side of the Terminal from ever visiting the concessions and
    - As the terminal is bifurcated, there will be considerable duplication throughout the terminal – e.g. a kids play area in domestic and another kids play area in international.

- **Challenges with a "split" terminal configuration** - With the operational "split" between two terminal flows – as a result of the central location of the SSCP – it should be anticipated that the overall operating cost for concessionaires to provide the services (labor, inventory, facility design and construction, etc.) are significantly increased as a result of some duplication of offerings.

- **Concessions Serving Both Landside and Airside Customers** - Another possibility for economically providing increased concession services would be implementing a sally port that would allow a single airside kitchen to serve dining facilities on both the airside and landside.
    - Food can be prepared on the airside and can be sent to the landside through an opening which only allows materials to pass from the airside to the landside
    - Such a system was installed at the Rouge Valley International Medford Airport (Oregon) for both food and retail concessions in 2009. Please refer to the image below.
    - In the case of Medford Airport, food sales immediately doubled and retail sales quadrupled with only a limited increase in personnel costs.

Figure 34 – Medford Airport F&B outlet on the airside with a landside sallyport for food sales

- **Third-party concession delivery technology solutions** – on-demand applications are in their infancy in the airport marketplace, despite their prevalence throughout all other forms of food service and retail service provision. Such concession delivery services require that an employee of either the concession - or a 3rd party provider - delivered prepared food or retail goods from either side of the airport to the other. The concept calls for the use of an app on a customer's personal electronic device which presents a range of products allowing passengers to select the food/drink/merchandise they want - usually paying with a credit card on the app. A delivery person then brings the products to the customer using blue tooth or GPS to help locate the customer. The following considerations should be noted:
    - There is currently just one major company – the joint venture of *At Your Gate* and *Servy* (fka "Grab") - which provides concession ordering and delivery services in U.S. airports.
    - A potential alternative for BGR would be for ordering from one or more kiosks placed throughout the terminal facilities, concentrating more on under-served areas;
    - It should be noted that if the kitchen is on the non-secure side of the airport, then liquids, including beverages and soups, cannot be delivered to customers on the airside. Airports and their concessionaires contemplating this operation should be mindful that transferring of food products from sterile to non-sterile should be factored into the design of the new facility and
    - At airports where space concourse space is at a premium, like BGR, a "ghost kitchen," can be utilized to prepare orders for multiple service providers.

- **Third-Party Lounge Services** – third party lounges are commonly provided at airports where airlines do not have the critical daily demand to justify an airline-specific facility. Developers of these facilities noted minimum demand levels would be at least 1 million annual enplanements. Such facilities are not appropriate at BGR for the foreseeable demand levels within this study.

- **Self-service and Vending Machine Programs** – A final option for provision of concession goods would be through the implementation of a robust vending machine program:
    - Vending machines now can offer a wide variety of products, and can provide concession services without the cost of building or operating a staffed store;
    - Vending machines should be placed in locations that are not directly competitive with in-line or other staffed shops as this may deter possible vendors from considering the airport, especially considering the prominent location of the equipment;
    - Vending machines are useful in offering products during early or late aircraft operations, as well as during irregular operations when the staffed locations are closed;
    - Retail vending machines may offer specialty retail products in locations that would be unable to support staffed stores. Such machines, currently found in US airports, include Best Buy, Sephora, CVS, PPE, COVID-19 tests, baby supplies, flowers, Benefit cosmetics, smart phone charging batteries, and a variety of others and
    - Additionally, "hybrid" applications of self-service solutions include recent innovations that provide a combination of self-service check-out offerings with a fully staffed café / bar. Syracuse Hancock Airport has recently launched such an application called the SYRenity Bar + Market in partnership with its concessionaire Delaware North.

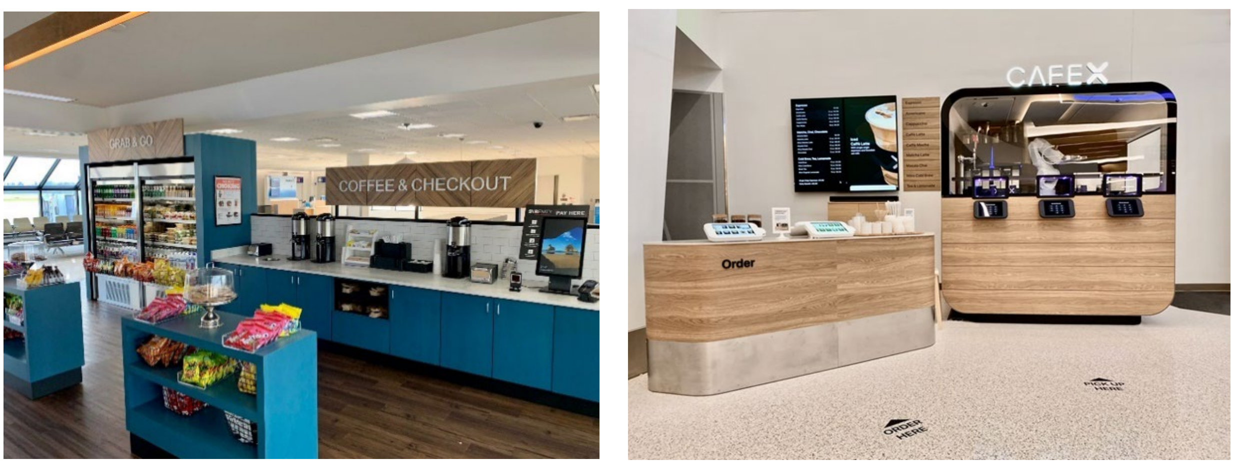


Figure 35 – Grab and Go system at SYR (left) and Cofee robot system at SFO (right)

As the airport contemplates upcoming concession redevelopment programs, it is recommended that concessions developers who are familiar with the non- and small-hub airport environment be considered. To that end, there are several national concession operating firms that serve small and non-hub airports, including, but not limited to:

- Tailwind Concessions and Air Host - https://www.tailwindconcessions.com/
- First Class Concessions - https://www.firstclassconcessions.com/
- MSE Branded Foods - http://www.msebranded.com/
- Faber, Coe & Gregg - https://faber-intl.com/

6.3.3 Sterile In-Transit Lounge Options

Figure 36 – existing in-transit lounge

The airport's international terminal currently provides a sterile in-transit lounge to serve passengers – usually military and commercial charter operations – and it is anticipated that this facility will remain a requirement for the international terminal over the planning horizon. Sterile facilities at BGR currently do not require a dedicated TSA SSCP operations as they are FAA Part-135 unscheduled operations. Part-135 charter operations may be subject to comply with future TSA requirements for scheduled charters of a particular capacity https://www.ecfr.gov/current/title-49/part-1544 Additionally, private sterile area lounges are being planned to support growing general aviation demand – the final space requirements will evolve in response to the general aviation market demand.

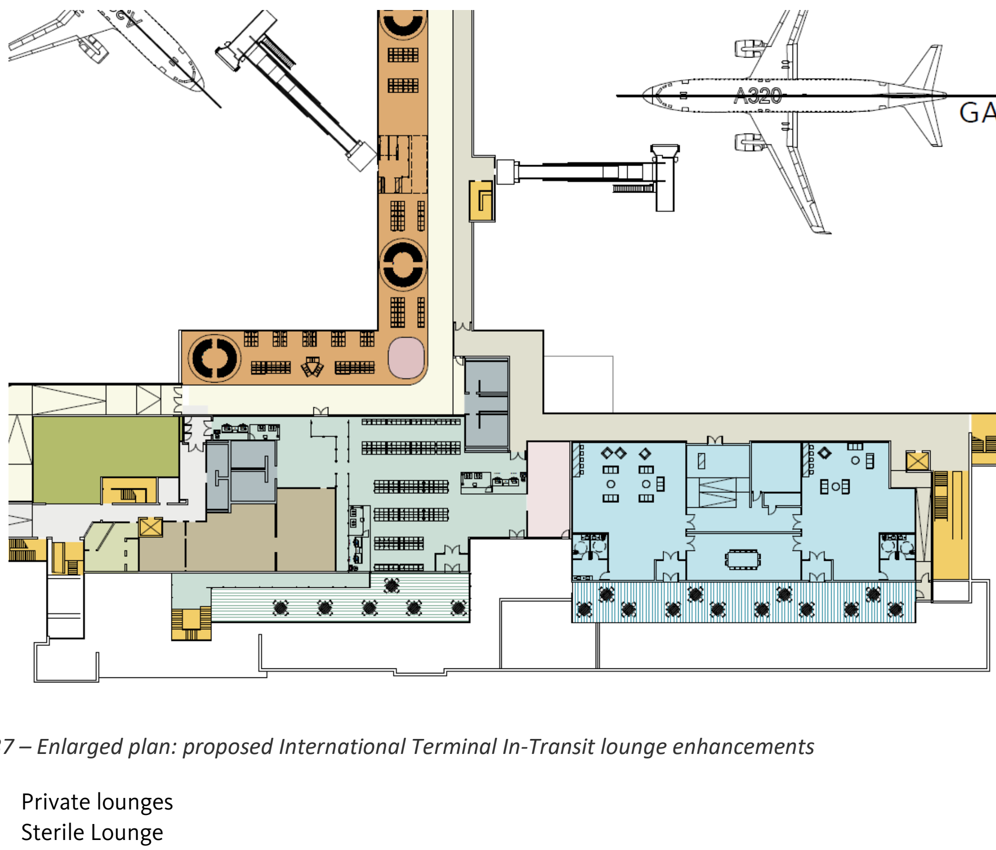


Figure 37 – Enlarged plan: proposed International Terminal In-Transit lounge enhancements

Future long-term enhancements to the International Terminal include the following modifications:

Updated Sterile Lounge

- Provide at least 150 seats for in-transit passengers;
- A semi-private lounge area for conferences or other uses;
- Exterior open-air lounge deck areas;
- Vertical circulation connection to allow select passengers (e.g. military personnel) to directly access the sterile lounge after FIS entry and
- Future areas to support TSA security screening operations (e.g. ETD stations, et al) to screen select charter operations passengers entering the international terminal.

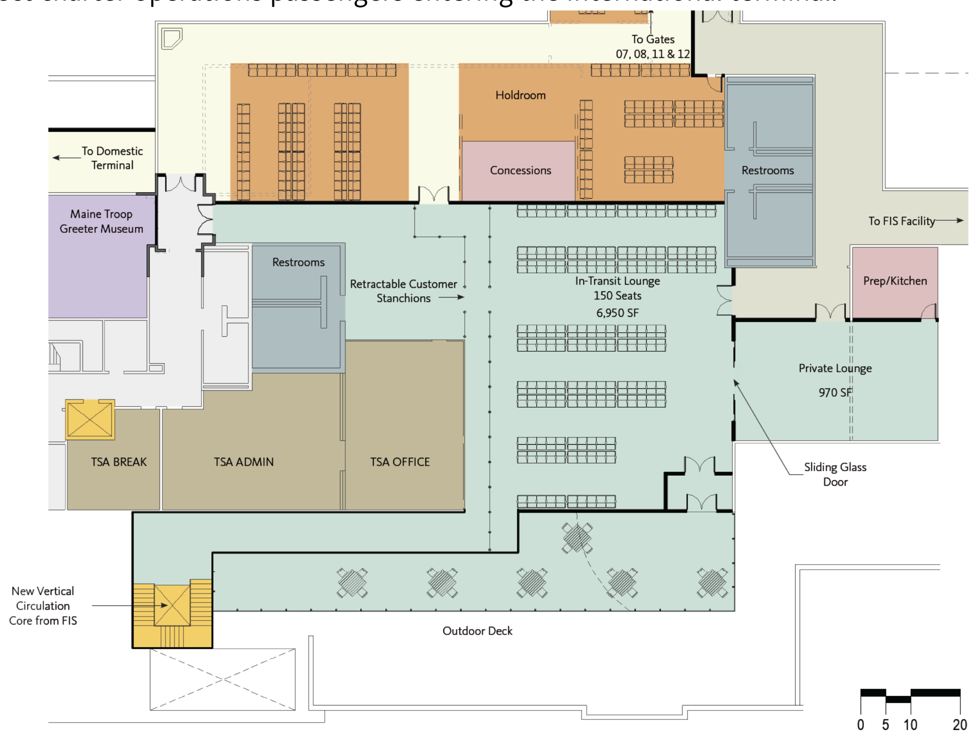


Figure 38 – Proposed modifications: In-transit Lounge

Private Sterile Lounges

- Provide at least two (2) rentable private lounges with a reception area;
- A private conference room for meetings and
- Exterior open-air lounge deck areas.

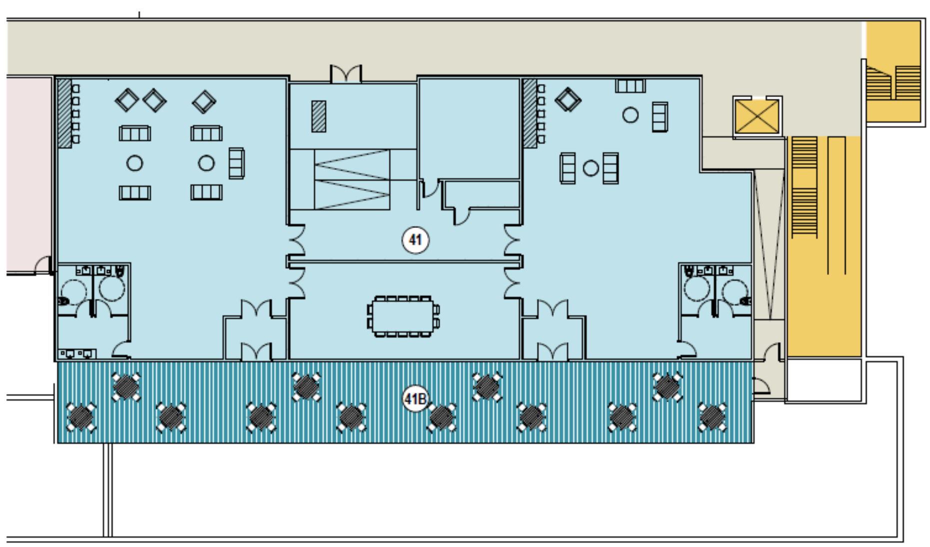


Figure 39 – Proposed Private In-transit Lounges

7.0 CONCEPT DEVELOPMENT

7.1 Terminal Interior Design Options

There were several ideas to advance a terminal development vision to connect the two terminals. Three concepts were developed for further review and consideration by the BGR Leadership Team. The three conceptual development themes seek to answer one of the fundamental questions asked by the Leadership Team, specifically, “how do we design an experience at the airport that helps customers immediately understand that they have ‘arrived’ at Bangor?”

7.1.1 Design Option 1 – Watershed Settlements

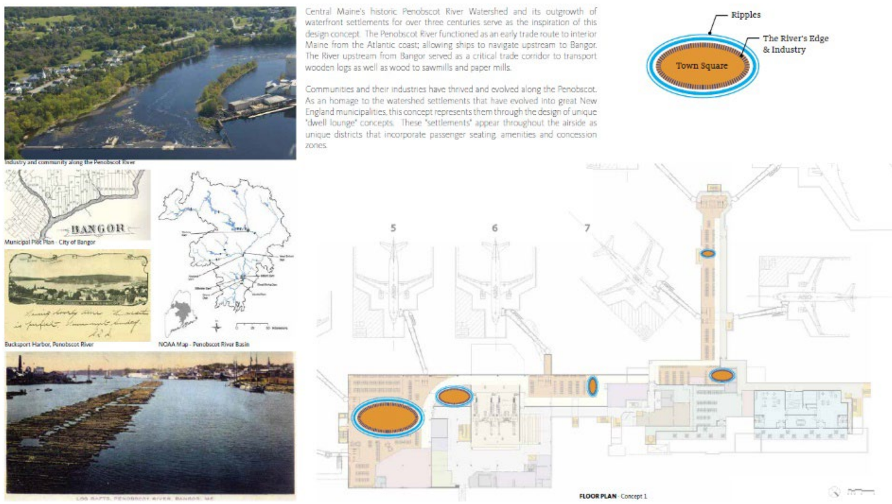


Figure 40 – Watershed Settlements design option

- This design concept represents the regional evolution of communities along the Penobscot River. through the design of unique "dwell lounge" zones scattered along the two terminal buildings. Like "settlements" along the river, the dwell lounges become unique districts dotted throughout the airside which incorporate seating and concessions.

7.1.2 Design Option 2 – Queen City of the East

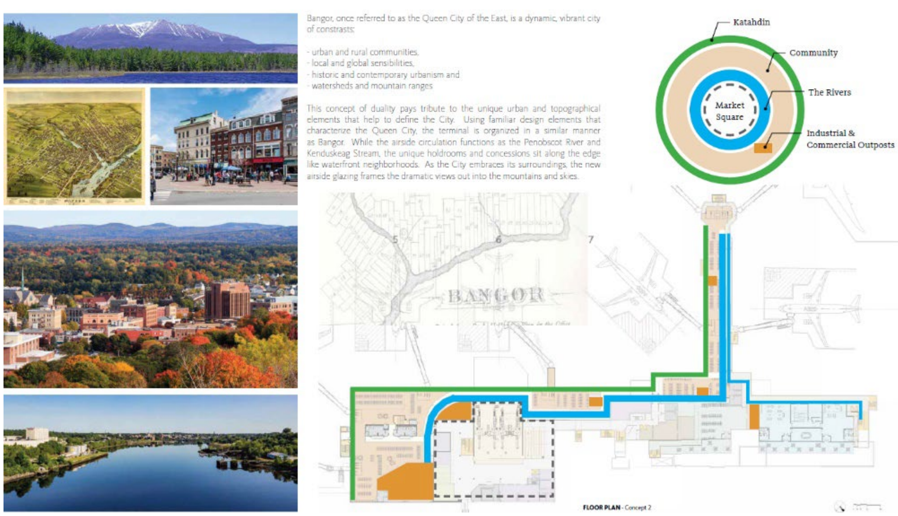


Figure 41 – Queen City design option

- Using familiar design elements that characterize the urban form of the City of Bangor, the terminal is conceived as a riverfront city with the airside circulation representing the Penobscot River. Holdrooms and concessions are interlinked like riverfront communities. At the periphery, proposed new airside glazing offers framed views of the airside and mountains, beyond.

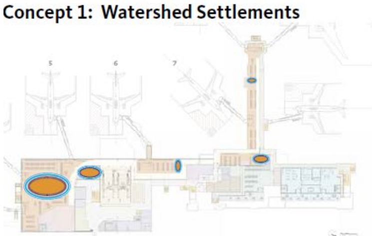
7.1.3 Design Option 3 – The Innovation Hub

Figure 42 – Innovation Hub design option

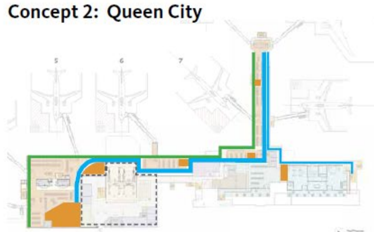
- This design concept captures the resilient and adaptive character of the local community; proposing an ever-resilient terminal future-proofed for the myriad challenges ahead. Proposing a flexible layout as resilient as the City's economic engine; the concession volumes are strategically located as swing spaces - capable of serving both airside and landside. This soft "flexible" zone allows the terminal to be able to adjust over time, self-balancing to changing conditions.

The three design concepts focused on design ideas that would be able to effectively connect the terminals and provide visual consistency from an interiors design and programmatic point of view.

Concept 1: Watershed Settlements



Concept 2: Queen City



Concept 3: Bangor Innovation Hub

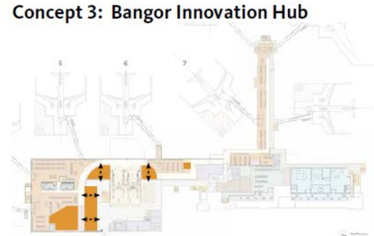


Figure 43 – Recently renovated domestic terminal check-in and arrivals area

Ultimately, *Concept 2 – Queen City* was selected for further advancement. Amongst other considerations, this concept seems to hold the most promise in aligning with the completed lower-level public area improvements (Figure 43) that are also consistent with the Penobscot River theme.

7.2 Preferred Design Advancement

The preferred design option of the Queen City is inspired by Bangor's unique set of contrasts that make it such a distinct city and regional gateway, in particular, these dualities of:

- Urban and Rural communities
- Local and Global sensibilities
- Historic and contemporary urbanism and
- Watersheds in a backdrop of mountains

This concept of duality pays tribute to the unique urban and topographical elements that help to define the City. Using familiar design elements that characterize the Queen City, the terminal is organized in a similar manner as Bangor – Figure 44. While the airside circulation functions as the Penobscot River and Kenduskeag Stream, the unique holdrooms and concessions sit along the edge like waterfront neighborhoods. As the City embraces its surroundings, the new airside glazing frames the dramatic views out into the mountains and skies.

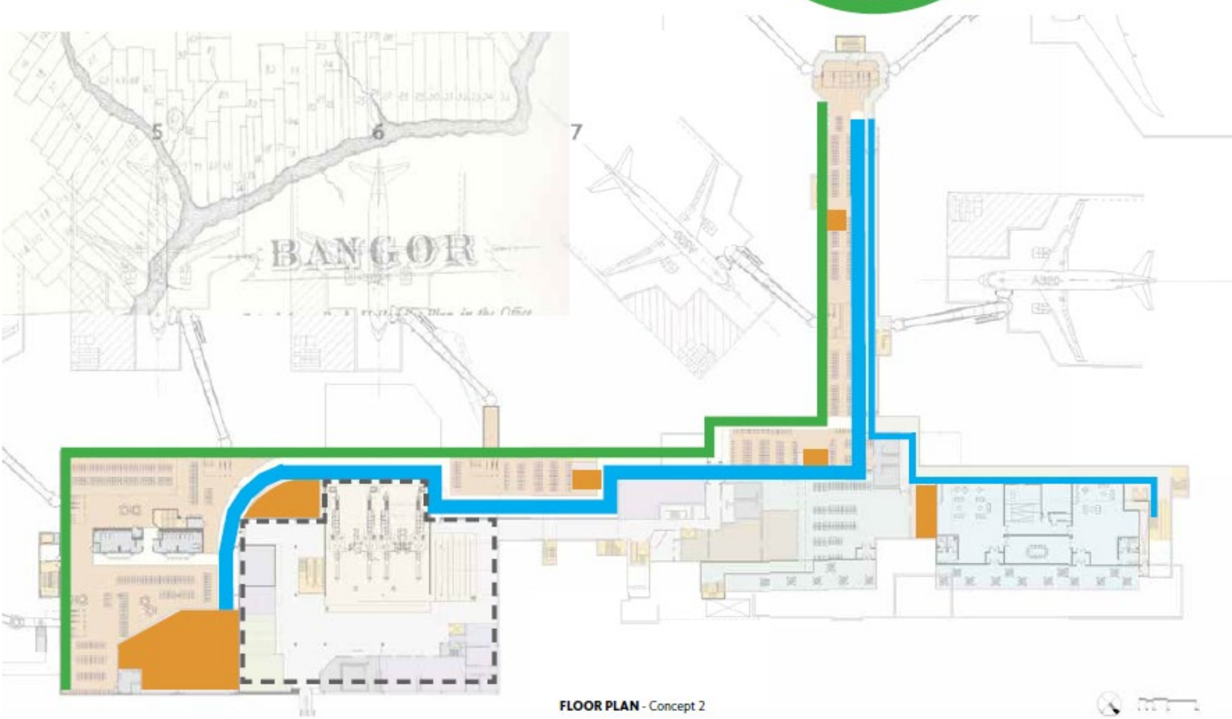


Figure 44 - Diagram illustrating the relationship between terminal and the geographic features of the Greater Bangor Region.

8.0 PREFERRED LONG-RANGE DEVELOPMENT CONCEPT

8.1 Preferred Terminal Development Concept

The preferred ultimate terminal development concept (Figure 45, below) – building off of the Queen City option - is characterized by several key component including:

- ✓ Two (2) building infills at Gates 4 and adjacent to Gate 6 to improve seating capacity,
- ✓ the Interconnection of the Domestic and International Terminals and
- ✓ Modified Sterile Areas including additional private lounges in the International Terminal.

The preferred development concept is characterized by the following design elements:

- A dominant ceiling and flooring strategy that runs from one end of the terminal to the other.
  - A ceiling soffit using a warm baffle system that juxtaposes wood, or a wood-grain equivalent blade system against a linear lighting system. The combination of a strong wood grain ceiling element coupled with a dynamic array of lighting is intended to serve as a wayfinding device for passengers;
  - The flooring will take cues from the current ceramic flooring system. Using a range of dark and light tiles that are akin to an abstraction of logs running down the Penobscot River;
- Diversity of passenger seating in holdrooms ranging from countertops, beam seating, benches to recliners;
- Introduction of biophilia in holdrooms to reflect distinctive species (either live or artificial) that are unique to Central Maine and / or the Greater Bangor Region and
- Use of dynamic glazing along the south face of the Domestic Terminal and the east face of the International Terminal.

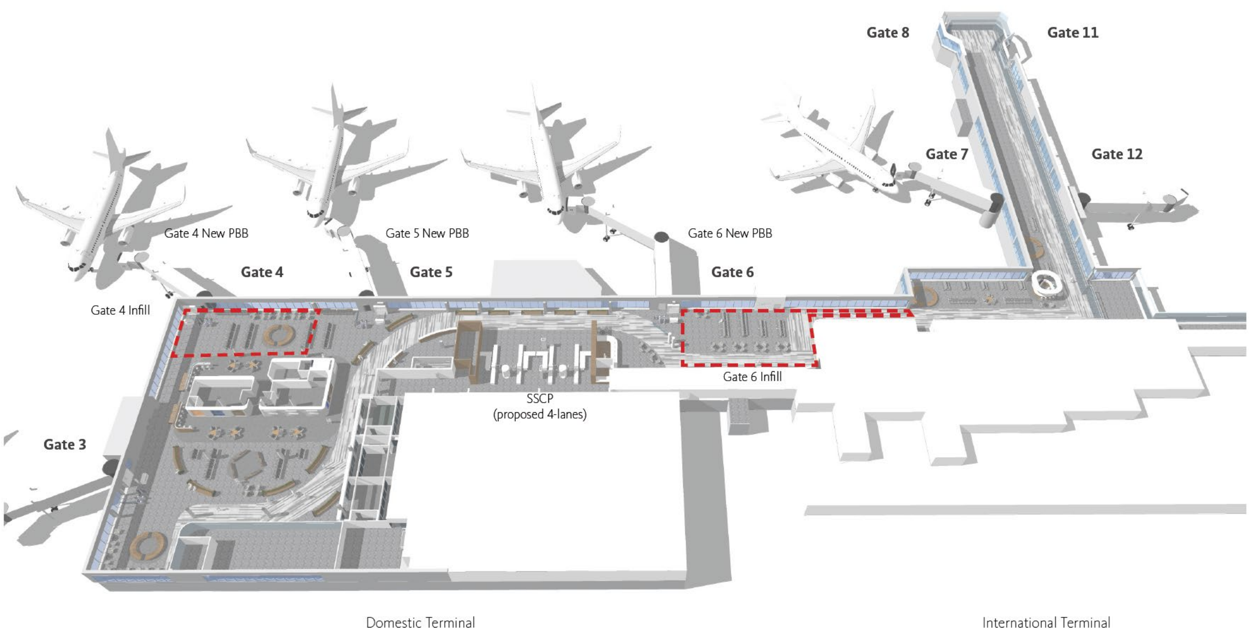


Figure 45 – Birdseye view: overall terminal development (departures concourse shown)

Figure 46 VIEW 1 – towards restroom core from Gate 3

Figure 47 VIEW 2 – towards concession spaces and terminal seating from Gate 3

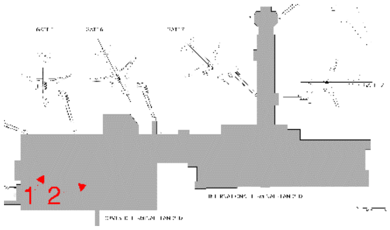


Figure 48 VIEW 3 – towards exit and restroom core from Gate 5

Figure 49 VIEW 4 – towards Gate 6 and International Terminal

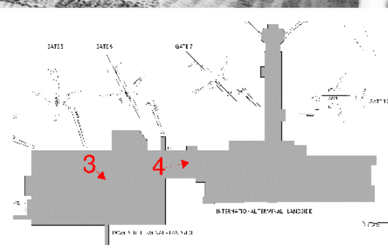


Figure 50 VIEW 5 – towards Gate 6 from International Terminal

Figure 51 VIEW 6 – towards Gate 7 seating and Domestic Terminal

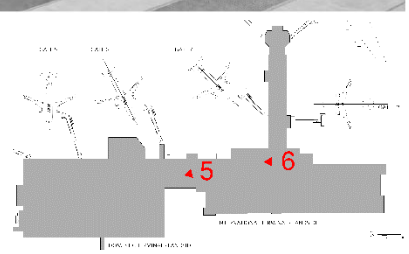
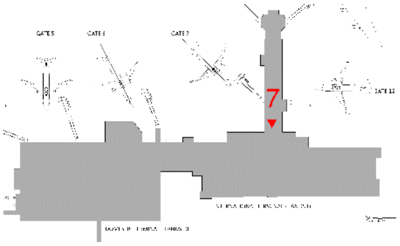


Figure 52 VIEW 7 – towards sterile lounge from Gate 7



8.2 Terminal Development Plan Preliminary ROM Cost Estimate

The overall airside concourse redevelopment program for the Domestic Terminal is a combination of "building infill and expansion" as well as the renovation and refresh of the existing terminal core and shell. Table 10 summarizes the core redevelopment scope comprised of nearly 28,000 SF of new construction on the airside and 73,000 SF of landside and airside renovation. Additionally, Figure 53 summarizes the overall ultimate development scope with the darker color representing infill areas while the pink hatch zones represent renovation scope.

Table 10

Domestic Terminal Redevelopment Scope			
#	**Description**	**Area**	**Additional Notes**
1	Gate 4 building infill (departures and apron level)	5,290 SF	
2	Gate 6 building infill (departures and apron level)	9,906 SF	
3	Existing area renovation – airside	31,430 SF	New storefront (8'-0" tall)
4	Existing area renovation - landside	15,770 SF	Light finish updates
	Domestic Terminal Scope Total	**62,396 SF**	
International Terminal and Pier Redevelopment Scope			
#	**Description**	**Area**	**Note**
1	Landside overbuild (new private in-transit lounge) + New FIS vertical circulation core	10,459 SF 2,516 SF	Reconstruction of existing roof structure to assume new live loads.
2	Existing area renovation	26,290 SF	
	International Terminal Scope Total	**39,265 SF**	
	Total	**101,661 SF**	

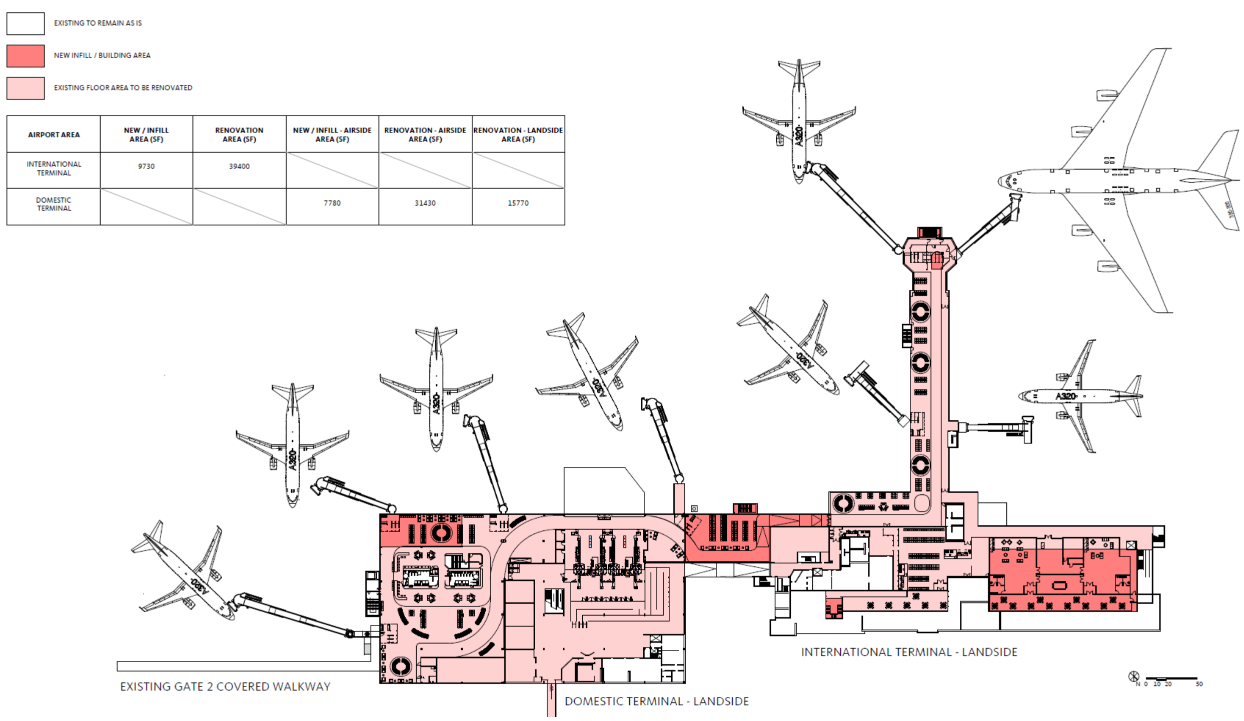


Figure 53 - Diagram of Proposed Infill and Renovation Spaces

While a definitive development plan has not been finalized, the design team has developed preliminary costs that do not provide definitive phasing time frames. In March 2021, Jacobs Engineering Group prepared a Rough Order-of-Magnitude cost estimate to provide BGR a probable cost for the various redevelopment scope in the Terminal Redevelopment plan.

A historical cost-based estimate was prepared, meaning, it was developed using historical bid data from comparable projects. Historical data will generally include overhead and profit but will have applied factors to escalate costs to current 2021 dollars; in some cases, a Location Factor index is applied. The estimate is classified as a Class 5 estimate as defined by the Association for the Advancement of Cost Engineering International (AACE). The estimating accuracy for a Class 5 estimate is *-30% to +50%* and should be used exclusively for internal budgetary analysis. The costing was based on specific scope items as illustrated in the zoning diagram below (Figure 50):

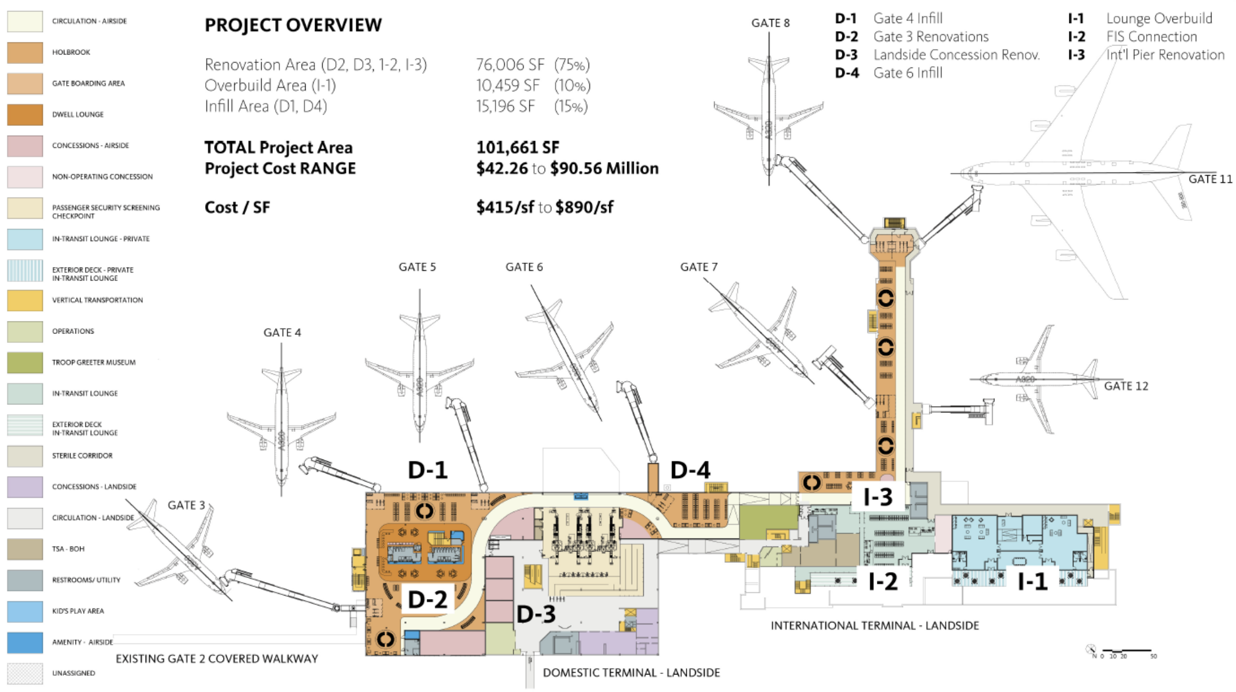


Figure 54

The following table represents the initial range of costs, enumerated by development scope areas.

Table 11

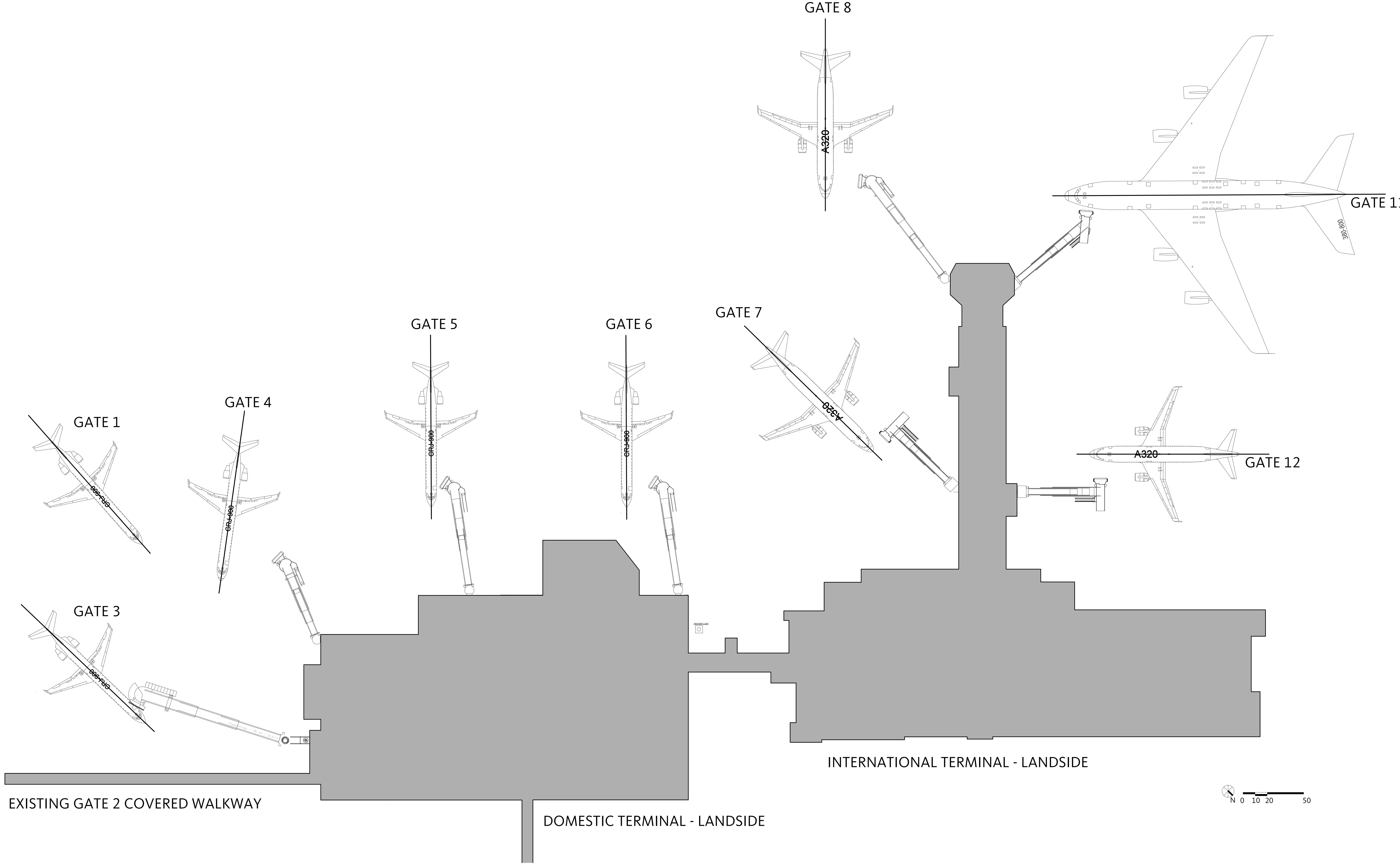
Terminal Scope	Estimate Range	
	Low	**High**
D1: Gate 4 Infill	$4.46 million	$6.70 million
D2: Existing Area Reno (airside)	$9.22 million	$19.75 million
D3: Existing Area Reno (landside)	$5.76 million	$12.34 million
D4: Gate 6 Building Infill	$4.68 million	$10.04 million
I1: Roof Deck Overbuild and Deck	$7.06 million	$15.12 million
I2: FIS Vert Transport Core and Deck	$2.06 million	$4.42 million
I3: Existing Area Reno (airside)	$10.36 million	$22.21 million
TOTAL	**$42.26 million**	**$90.56 million**

The complete ROM estimate report can is provided in Appendix D.

END

APPENDIX A

Study Presentations



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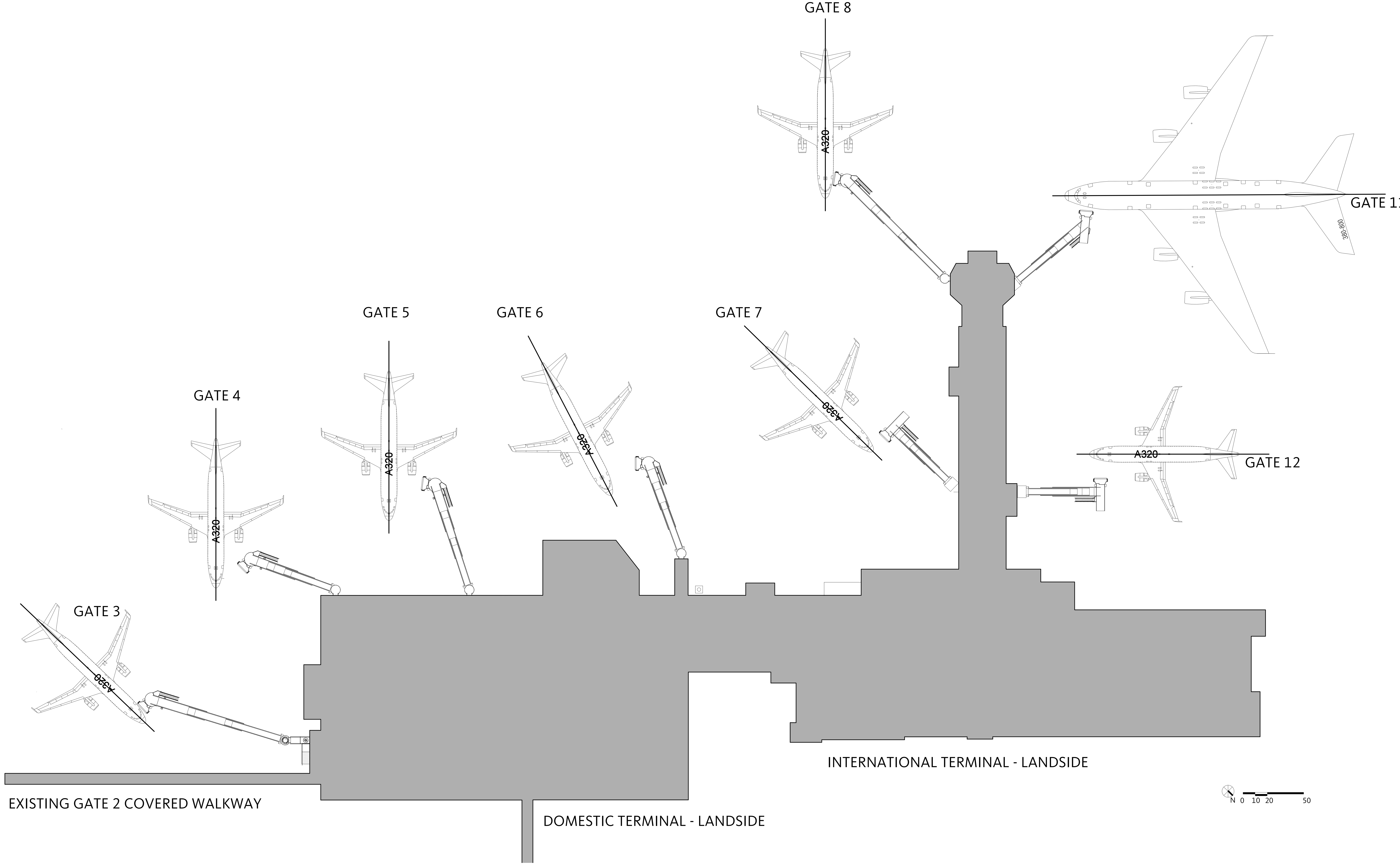
Existing Gates - EXISTING (2021)



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Proposed Gates - PAL 4

APPENDIX B

Recommended Development Plan Drawings

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Terminal Interior Plan - Existing Conditions (Level 02)

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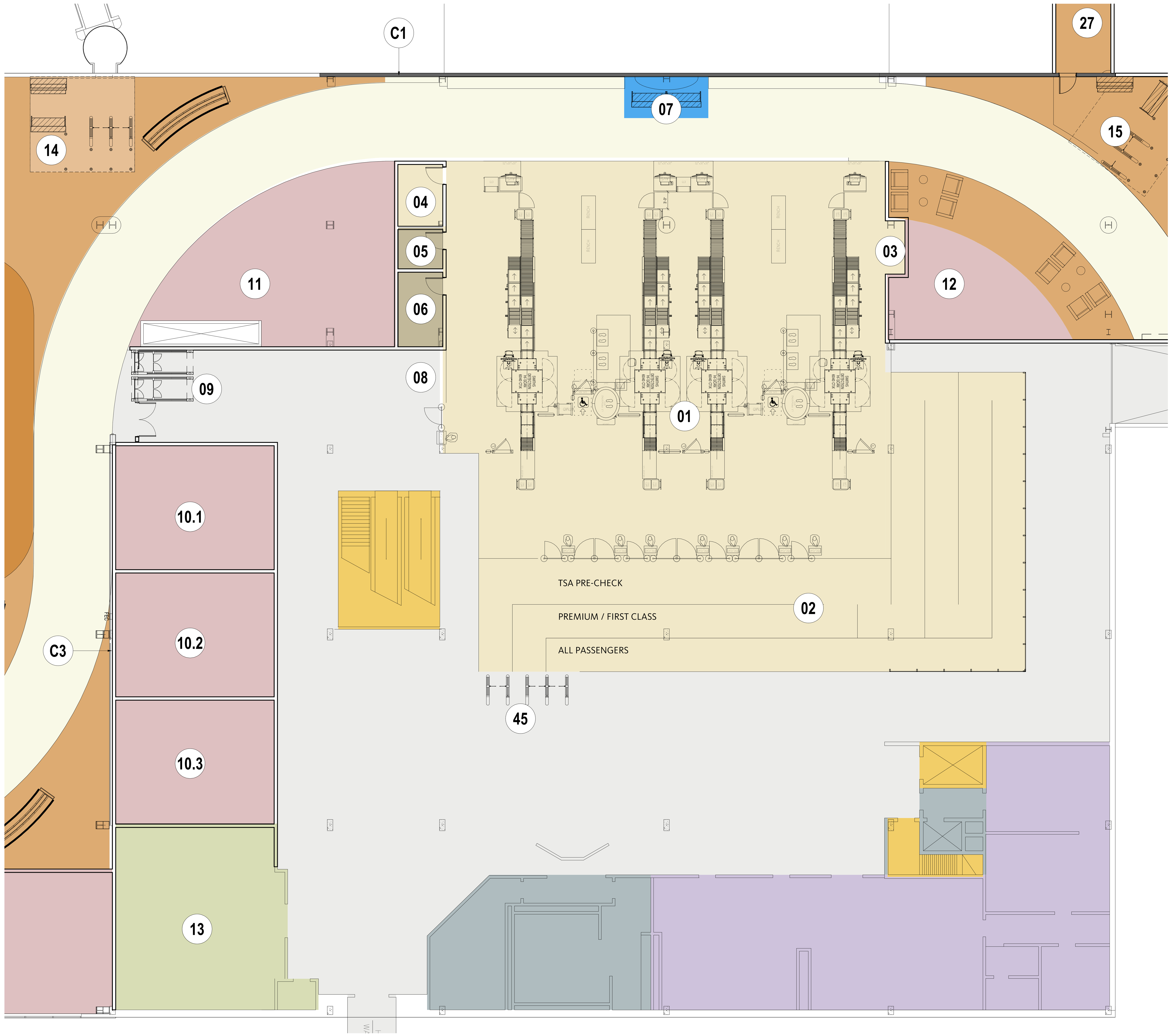
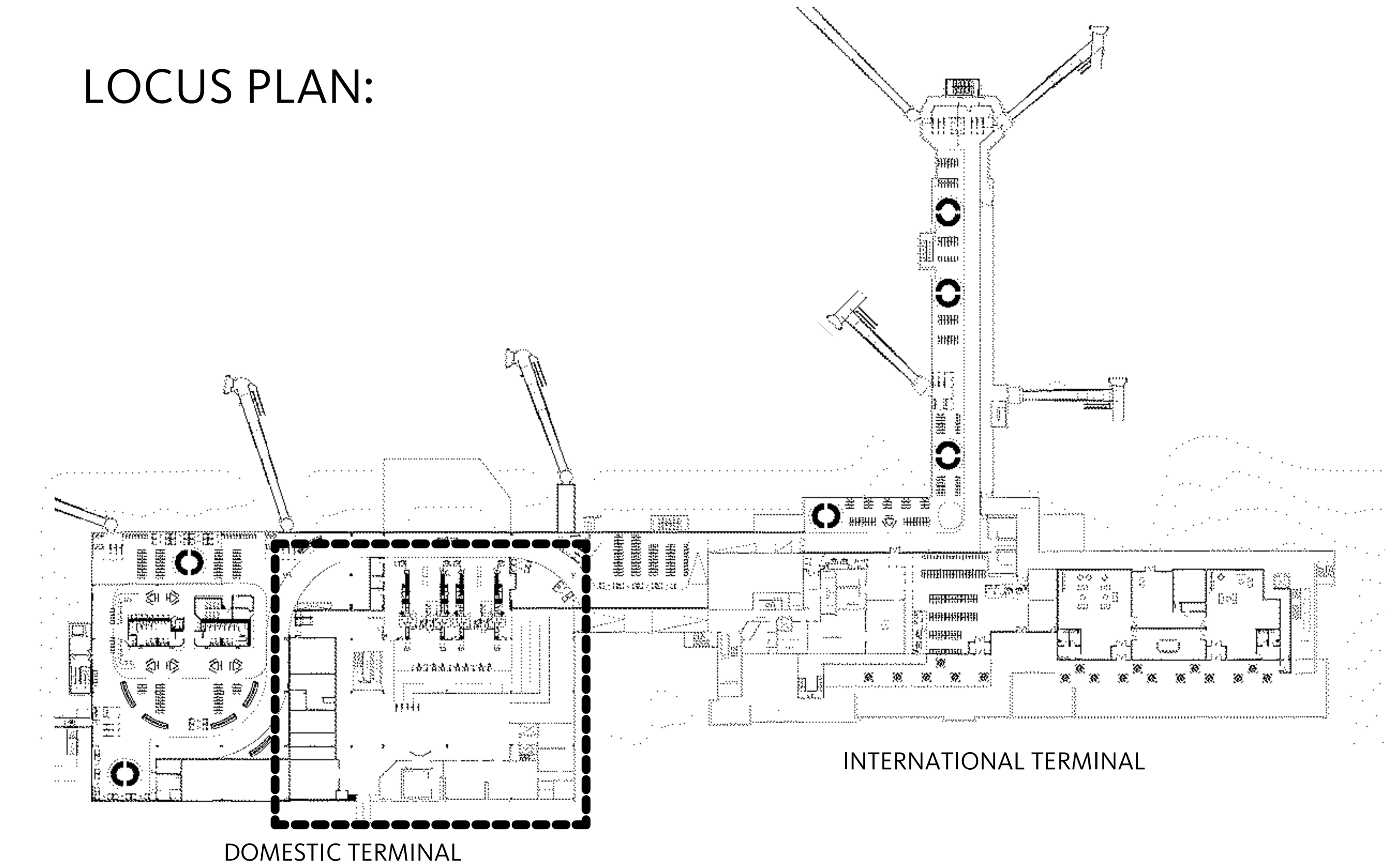
Terminal Interior Plan - Proposed Redevelopment - PAL 4

- CIRCULATION - AIRSIDE
- HOLBROOK
- GATE BOARDING AREA
- DWELL LOUNGE
- CONCESSIONS - AIRSIDE
- NON-OPERATING CONCESSION
- PASSENGER SECURITY SCREENING CHECKPOINT
- IN-TRANSIT LOUNGE - PRIVATE
- EXTERIOR DECK - PRIVATE IN-TRANSIT LOUNGE
- VERTICAL TRANSPORTATION
- OPERATIONS
- TROOP GREETER MUSEUM
- IN-TRANSIT LOUNGE
- EXTERIOR DECK IN-TRANSIT LOUNGE
- STERILE CORRIDOR
- CONCESSIONS - LANDSIDE
- CIRCULATION - LANDSIDE
- TSA - BOH
- RESTROOMS/ UTILITY
- KID'S PLAY AREA
- AMENITY - AIRSIDE
- UNASSIGNED



LOCUS PLAN:



#	DESCRIPTION	AREA (SF)
01	SSCP LANES	5470
02	SSCP QUEUE	2820
03	LEO DESK	
04	PRIVATE SCREENING	85
05	TSA TELECOM	55
06	SECURED TSA STORAGE	105
07	FLIGHT INFORMATION KIOSK	
08	KNOWN CREW MEMBER ENTRY	
09	AUTOMATED EXIT LANE BREACH CONTROL PORTAL	
10.1	AIRSIDE CONCESSION - 01.1	620
10.2	AIRSIDE CONCESSION - 01.2	620
10.3	AIRSIDE CONCESSION - 01.3	620
11	AIRSIDE CONCESSION - 02	1150
12	AIRSIDE CONCESSION - 03	470
13	AIRPORT CONFERENCE RM	1030
14	GATE 5 BOARDING AREA	
15	GATE 6 BOARDING AREA	
16	GATE 4 BOARDING AREA	
17	GATE 3 BOARDING AREA	
18	NURSING ROOM	100
19	VENDING MACHINE AREA	
20	DIGITAL DISPLAY	
21	ART GALLERY DISPLAY	

#	DESCRIPTION	AREA (SF)
22	INTERACTIVE DISPLAY	
23	KID'S PLAY AREA	300
24	SENSORY ROOM	145
25	PET RELIEF AREA	265
26	AIRSIDE CONCESSION - 04	
27	NEW PBB FIXED WALKWAY	
28	NEW FIRE STAIR - 01	
29	HISTORIC ART WALL	
30	TROOP GREETER MUSEUM	
31	AIRSIDE CONCESSION - 05	
32	GATE 7 BOARDING AREA	
33	GATE 8 BOARDING AREA	
34	GATE 11 BOARDING AREA	
35	NEW FIRE STAIR - 02	
36	NEW FIS COMMUNICATING STAIR	
37	TSA OFFICE	
38	TSA ADMIN	
39	TSA BREAK	
40	IN-TRANSIT LOUNGE	5750
41	PRIVATE IN-TRANSIT LOUNGE	7700
42	AIRSIDE RESTROOMS	
43	SIDA SCREENING STATIONS	
44	STERILE CORRIDOR	
45	E-GATES AT SSCP QUEUE	

CONSTRUCTION NOTES - ENLARGED

#	DESCRIPTION
C1	NEW EXTERIOR STOREFRONT
C2	LINEAR WOOD SLAT CEILING
C3	NEW FULL HEIGHT INTERIOR STOREFRONT
C4	EXTERIOR DECK PRIVATE IN-TRANSIT LOUNGE
C5	EXTERIOR DECK IN-TRANSIT LOUNGE
C6	RAMP FROM DOMESTIC TO INTERNATIONAL TERMINAL
C7	RECESSED CEILING AT STRETCH FABRIC LIGHTING CEILING W/ITH LED BACKLIGHTING
C8	NEW INFILL AREA
C9	EXISTING OFFICE ADMIN.
C10	CERAMIC TILE AT CIRCULAR SEATING AREA
C11	INTERNATIONAL/DOMESTIC FIRE SEPARATION DOORS

S W E N

0 10 20 50

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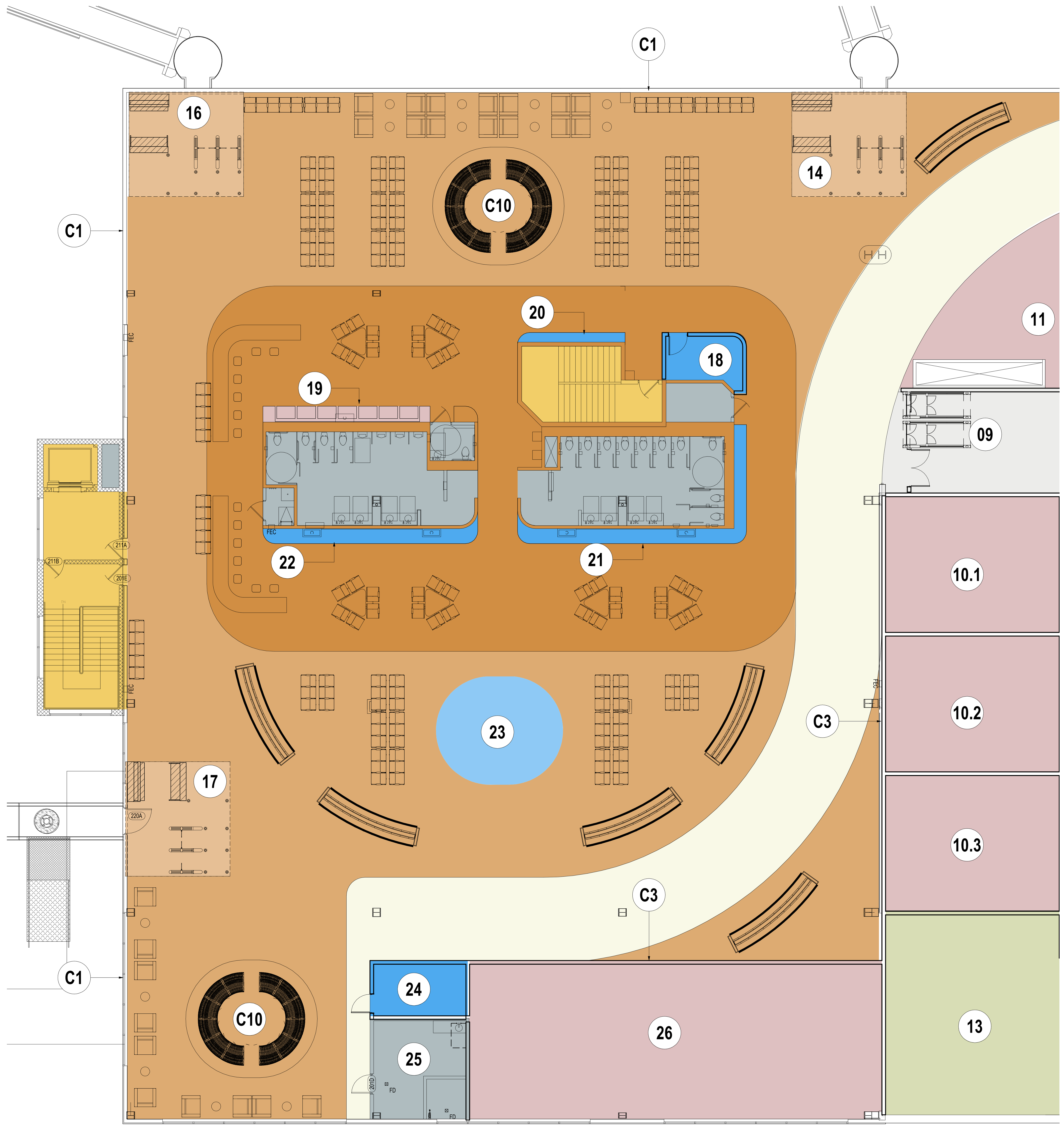
Enlarged Plan - Pre-Security / SSCP (Domestic Terminal - Level 02)

CIRCULATION - AIRSIDE
HOLBROOK
GATE BOARDING AREA
DWELL LOUNGE
CONCESSIONS - AIRSIDE
NON-OPERATING CONCESSION
PASSENGER SECURITY SCREENING CHECKPOINT
IN-TRANSIT LOUNGE - PRIVATE
EXTERIOR DECK - PRIVATE IN-TRANSIT LOUNGE
VERTICAL TRANSPORTATION
OPERATIONS
TROOP GREETER MUSEUM
IN-TRANSIT LOUNGE
EXTERIOR DECK IN-TRANSIT LOUNGE
STERILE CORRIDOR
CONCESSIONS - LANDSIDE
CIRCULATION - LANDSIDE
TSA - BOH
RESTROOMS/ UTILITY
KID'S PLAY AREA
AMENITY - AIRSIDE
UNASSIGNED



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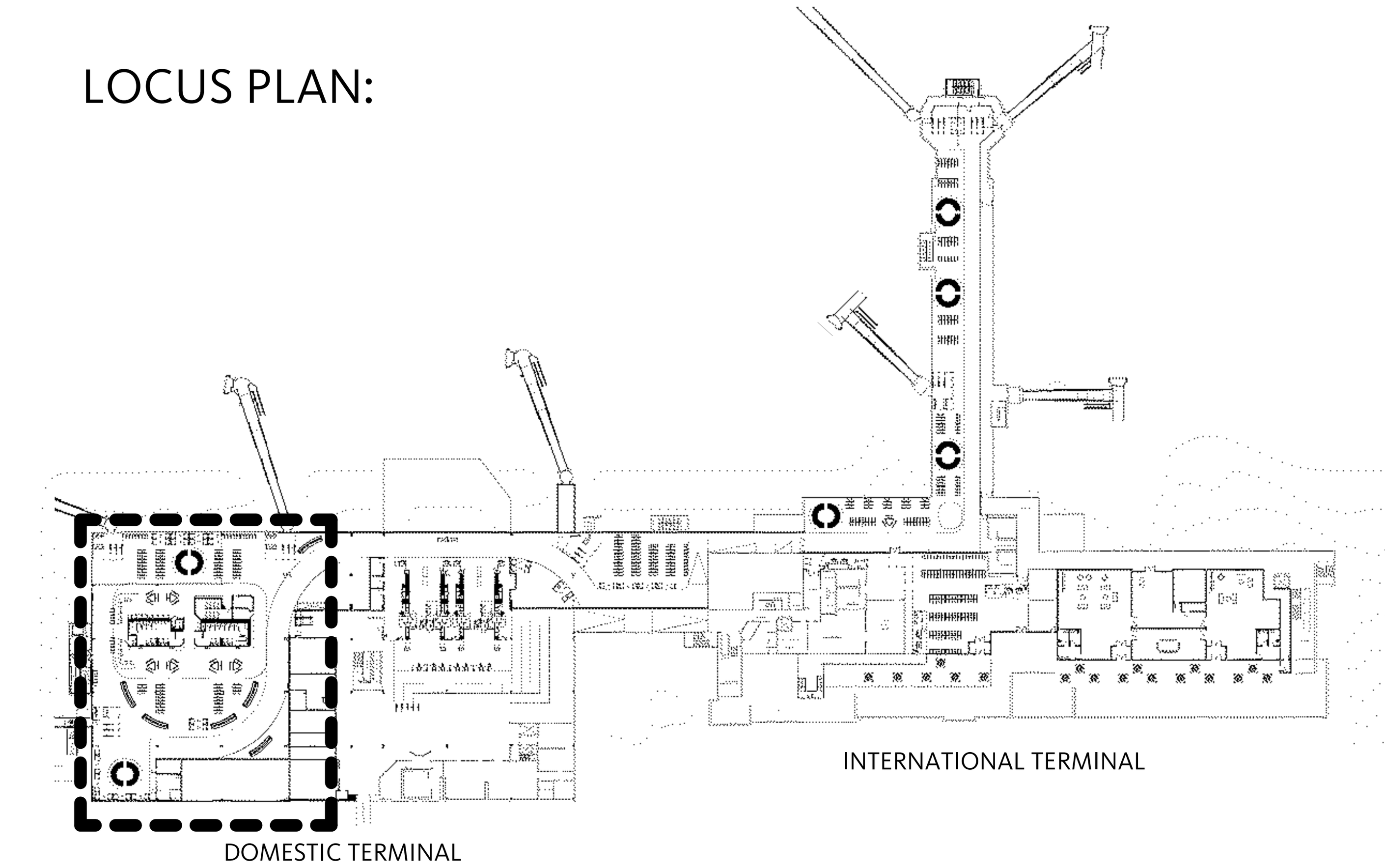

#	DESCRIPTION	AREA (SF)
01	SSCP LANES	5470
02	SSCP QUEUE	2820
03	LEO DESK	
04	PRIVATE SCREENING	85
05	TSA TELECOM	55
06	SECURED TSA STORAGE	105
07	FLIGHT INFORMATION KIOSK	
08	KNOWN CREW MEMBER ENTRY	
09	AUTOMATED EXIT LANE BREACH CONTROL PORTAL	
10.1	AIRSIDE CONCESSION - 01.1	620
10.2	AIRSIDE CONCESSION - 01.2	620
10.3	AIRSIDE CONCESSION - 01.3	620
11	AIRSIDE CONCESSION - 02	1150
12	AIRSIDE CONCESSION - 03	470
13	AIRPORT CONFERENCE RM	1030
14	GATE 5 BOARDING AREA	
15	GATE 6 BOARDING AREA	
16	GATE 4 BOARDING AREA	
17	GATE 3 BOARDING AREA	
18	NURSING ROOM	100
19	VENDING MACHINE AREA	
20	DIGITAL DISPLAY	
21	ART GALLERY DISPLAY	

#	DESCRIPTION	AREA (SF)
22	INTERACTIVE DISPLAY	
23	KID'S PLAY AREA	300
24	SENSORY ROOM	145
25	PET RELIEF AREA	265
26	AIRSIDE CONCESSION - 04	
27	NEW PBB FIXED WALKWAY	
28	NEW FIRE STAIR - 01	
29	HISTORIC ART WALL	
30	TROOP GREETER MUSEUM	
31	AIRSIDE CONCESSION - 05	
32	GATE 7 BOARDING AREA	
33	GATE 8 BOARDING AREA	
34	GATE 11 BOARDING AREA	
35	NEW FIRE STAIR - 02	
36	NEW FIS COMMUNICATING STAIR	
37	TSA OFFICE	
38	TSA ADMIN	
39	TSA BREAK	
40	IN-TRANSIT LOUNGE	5750
41	PRIVATE IN-TRANSIT LOUNGE	7700
42	AIRSIDE RESTROOMS	
43	SIDA SCREENING STATIONS	
44	STERILE CORRIDOR	
45	E-GATES AT SSCP QUEUE	

CONSTRUCTION NOTES - ENLARGED

#	DESCRIPTION
C1	NEW EXTERIOR STOREFRONT
C2	LINEAR WOOD SLAT CEILING
C3	NEW FULL HEIGHT INTERIOR STOREFRONT
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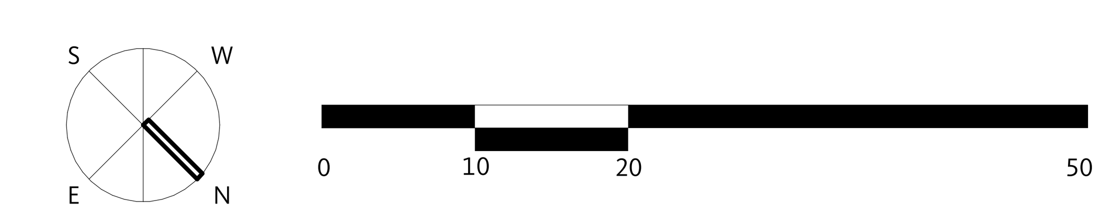
C7	RECESSED CEILING AT STRETCH FABRIC LIGHTING CEILING W/ITH LED BACKLIGHTING
C8	NEW INFILL AREA
C9	EXISTING OFFICE ADMIN.
C10	CERAMIC TILE AT CIRCULAR SEATING AREA
C11	INTERNATIONAL/DOMESTIC FIRE SEPARATION DOORS



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Enlarged Plan - Gates 3-5 (Domestic Terminal - Level 02)

- CIRCULATION - AIRSIDE
- HOLBROOK
- GATE BOARDING AREA
- DWELL LOUNGE
- CONCESSIONS - AIRSIDE
- NON-OPERATING CONCESSION
- PASSENGER SECURITY SCREENING CHECKPOINT
- IN-TRANSIT LOUNGE - PRIVATE
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- OPERATIONS
- TROOP GREETER MUSEUM
- IN-TRANSIT LOUNGE
- EXTERIOR DECK IN-TRANSIT LOUNGE
- STERILE CORRIDOR
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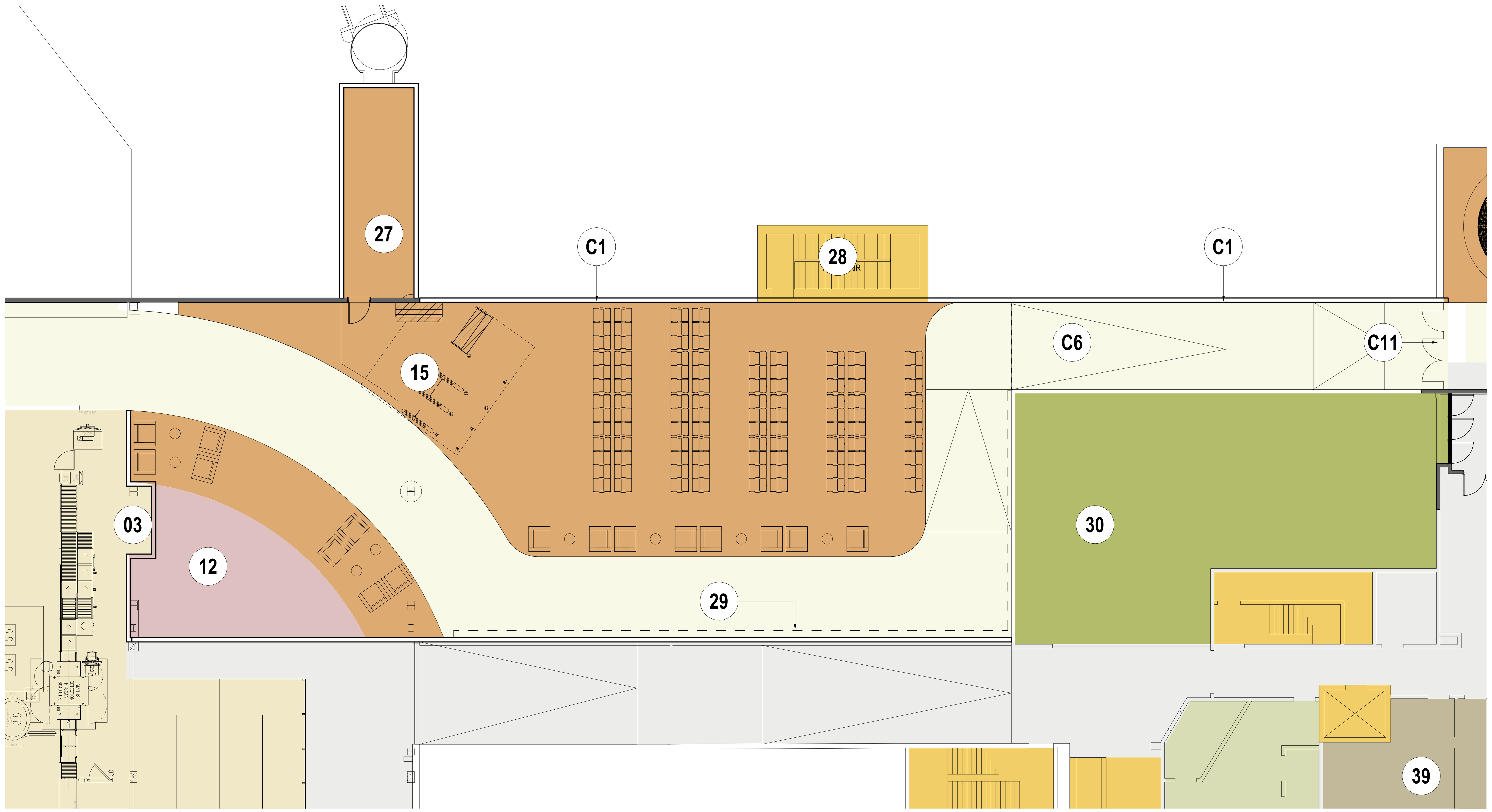
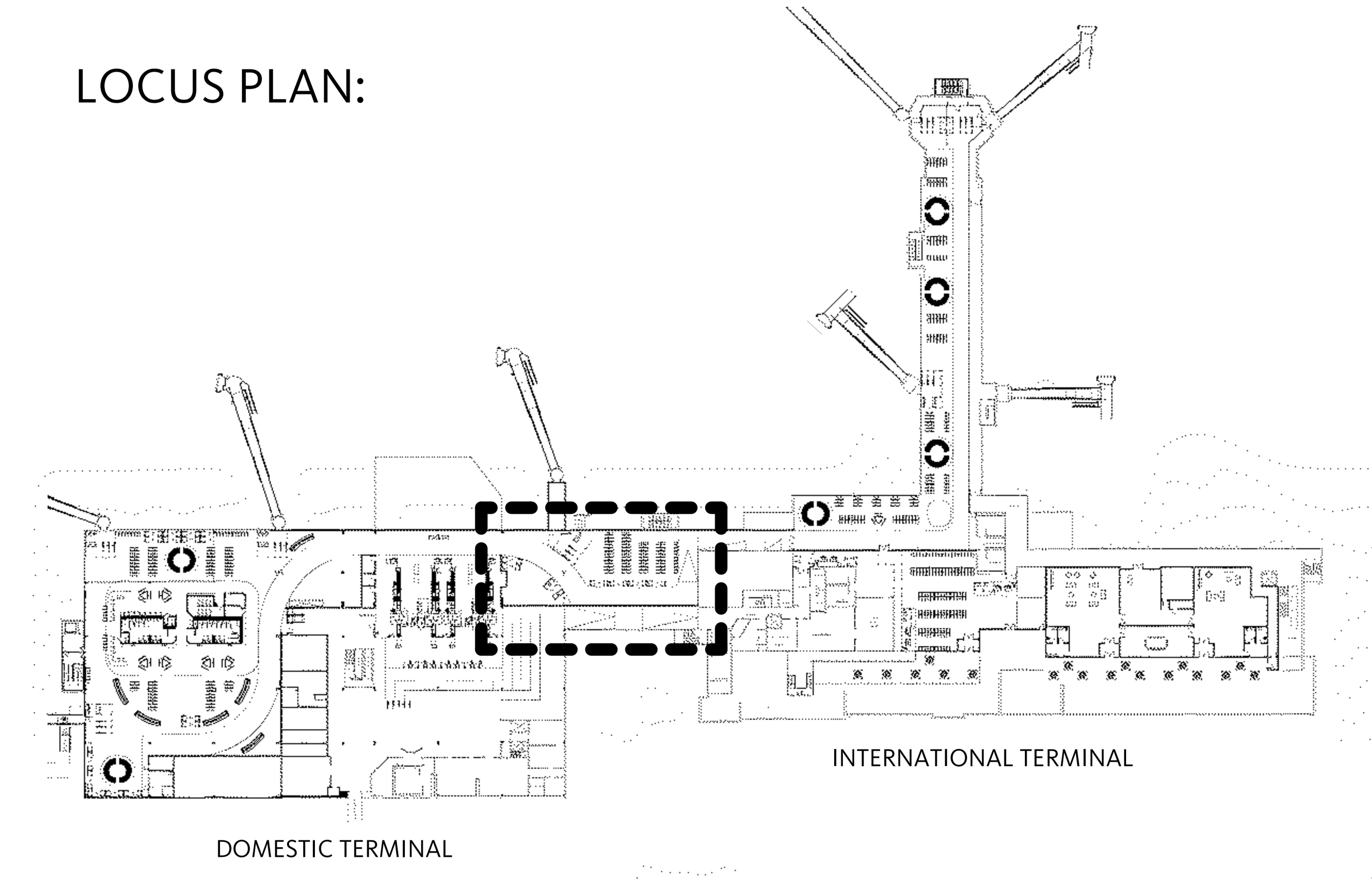
- CIRCULATION - LANDSIDE
- TSA - BOH
- RESTROOMS/ UTILITY
- KID'S PLAY AREA
- AMENITY - AIRSIDE
- UNASSIGNED



LOCUS PLAN:



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19	VENDING MACHINE AREA	
20	DIGITAL DISPLAY	
21	ART GALLERY DISPLAY	

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44	STERILE CORRIDOR	
45	E-GATES AT SSCP QUEUE	

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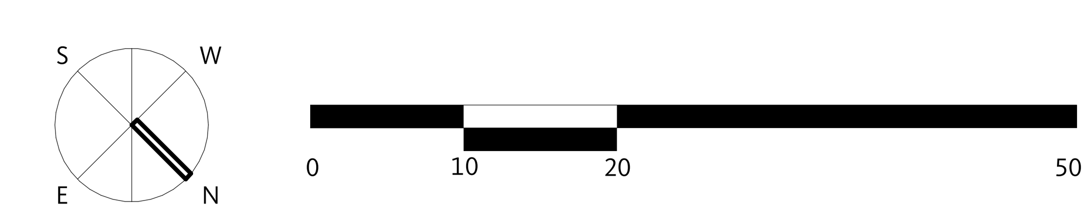
C11	INTERNATIONAL/DOMESTIC FIRE SEPARATION DOORS



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Enlarged Plan - Gate 6 (Domestic Terminal - Level 02)

- CIRCULATION - AIRSIDE
- HOLBROOK
- GATE BOARDING AREA
- DWELL LOUNGE
- CONCESSIONS - AIRSIDE
- NON-OPERATING CONCESSION
- PASSENGER SECURITY SCREENING CHECKPOINT
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- IN-TRANSIT LOUNGE
- EXTERIOR DECK IN-TRANSIT LOUNGE
- STERILE CORRIDOR
- CONCESSIONS - LANDSIDE
- CIRCULATION - LANDSIDE
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- KID'S PLAY AREA
- AMENITY - AIRSIDE
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08	KNOWN CREW MEMBER ENTRY	
09	AUTOMATED EXIT LANE BREACH CONTROL PORTAL	
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10.2	AIRSIDE CONCESSION - 01.2	620

#	DESCRIPTION	AREA (SF)
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11	AIRSIDE CONCESSION - 02	1150
12	AIRSIDE CONCESSION - 03	470
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15	GATE 6 BOARDING AREA	
16	GATE 4 BOARDING AREA	
17	GATE 3 BOARDING AREA	
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#	DESCRIPTION	AREA (SF)
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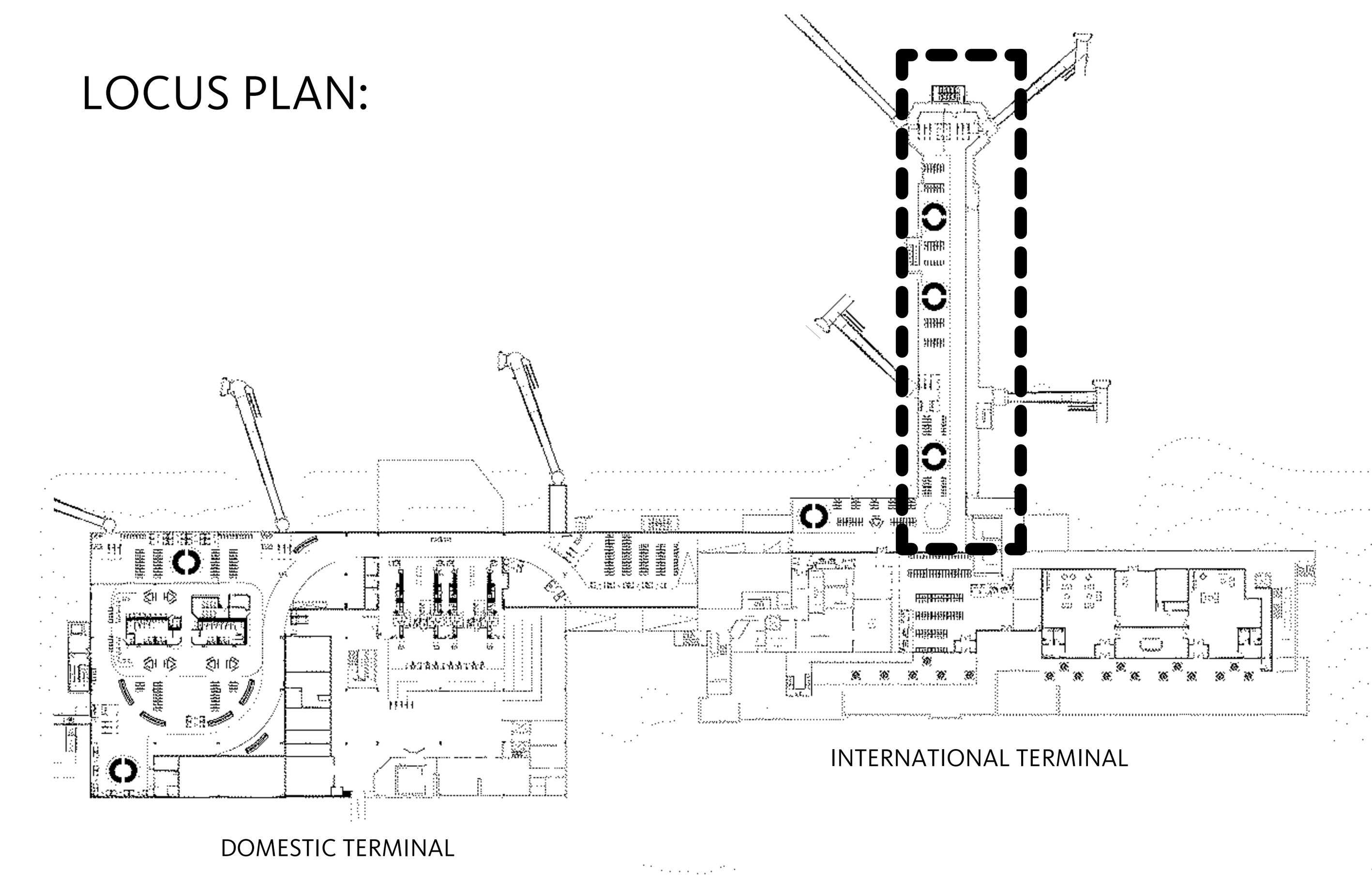
33	GATE 8 BOARDING AREA	
34	GATE 11 BOARDING AREA	
35	NEW FIRE STAIR - 02	
36	NEW FIS COMMUNICATING STAIR	

#	DESCRIPTION	AREA (SF)
37	TSA OFFICE	
38	TSA ADMIN	
39	TSA BREAK	
40	IN-TRANSIT LOUNGE	5750
41	PRIVATE IN-TRANSIT LOUNGE	7700
42	AIRSIDE RESTROOMS	
43	SIDA SCREENING STATIONS	
44	STERILE CORRIDOR	
45	E-GATES AT SSCP QUEUE	

LOCUS PLAN:



CONSTRUCTION NOTES - ENLARGED	
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C1	NEW EXTERIOR STOREFRONT
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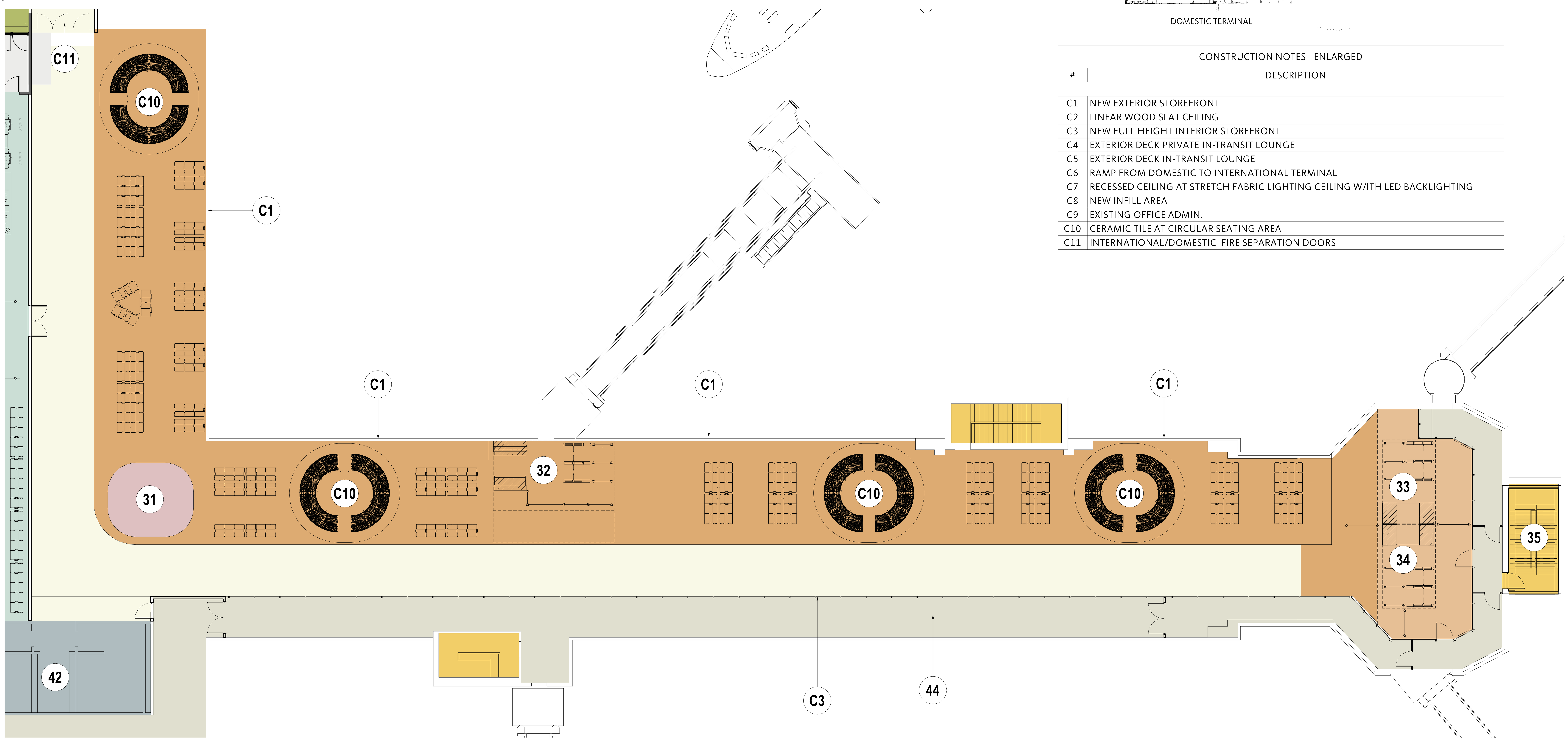
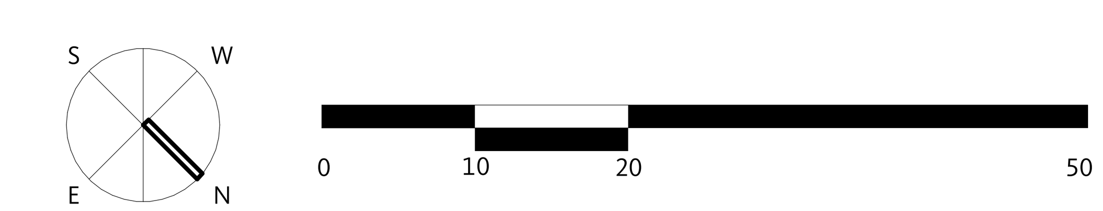
C3	NEW FULL HEIGHT INTERIOR STOREFRONT
C4	EXTERIOR DECK PRIVATE IN-TRANSIT LOUNGE
C5	EXTERIOR DECK IN-TRANSIT LOUNGE
C6	RAMP FROM DOMESTIC TO INTERNATIONAL TERMINAL
C7	RECESSED CEILING AT STRETCH FABRIC LIGHTING CEILING W/ITH LED BACKLIGHTING
C8	NEW INFILL AREA
C9	EXISTING OFFICE ADMIN.
C10	CERAMIC TILE AT CIRCULAR SEATING AREA
C11	INTERNATIONAL/DOMESTIC FIRE SEPARATION DOORS





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Master Plan Update - Terminal Airside Concourse Redevelopment Study

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Enlarged Plan - Gates 7, 8 and 11 (International Terminal - Level 02)

- CIRCULATION - AIRSIDE
- HOLBROOK
- GATE BOARDING AREA
- DWELL LOUNGE
- CONCESSIONS - AIRSIDE
- NON-OPERATING CONCESSION
- PASSENGER SECURITY SCREENING CHECKPOINT
- IN-TRANSIT LOUNGE - PRIVATE
- EXTERIOR DECK - PRIVATE IN-TRANSIT LOUNGE
- VERTICAL TRANSPORTATION
- OPERATIONS
- TROOP GREETER MUSEUM
- IN-TRANSIT LOUNGE
- EXTERIOR DECK IN-TRANSIT LOUNGE
- STERILE CORRIDOR
- CONCESSIONS - LANDSIDE
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- TSA - BOH
- RESTROOMS/ UTILITY
- KID'S PLAY AREA
- AMENITY - AIRSIDE
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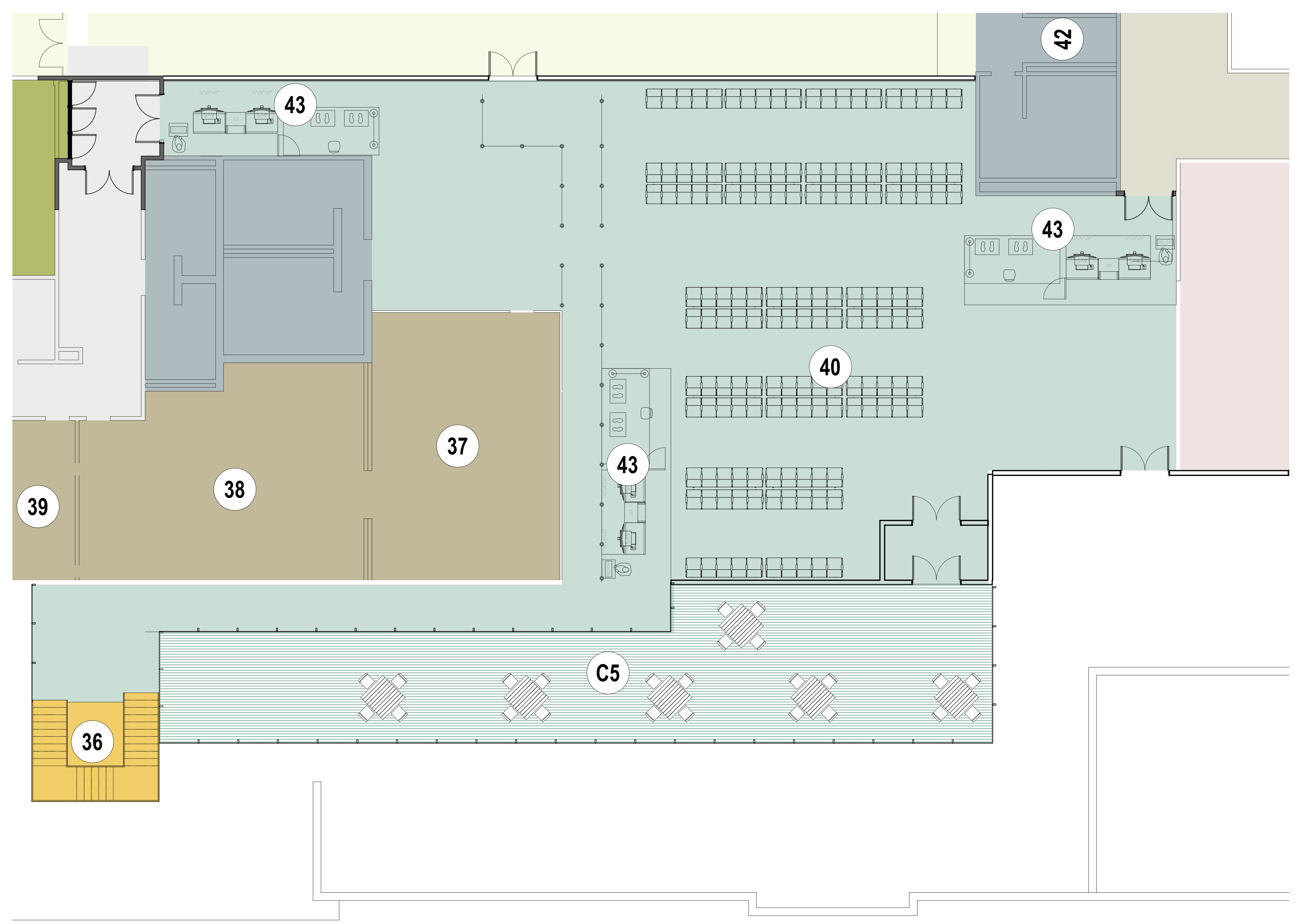
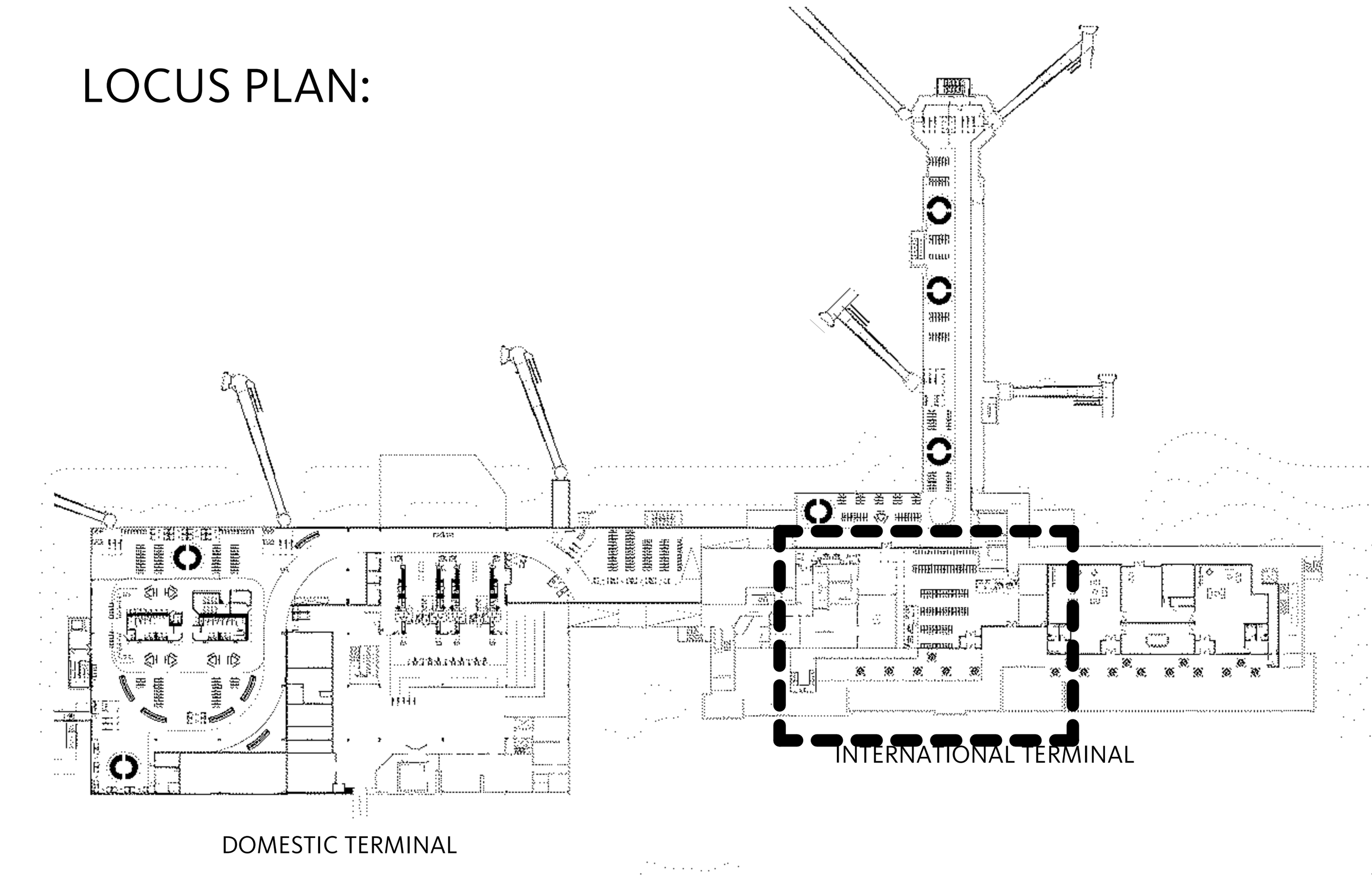


LOCUS PLAN:

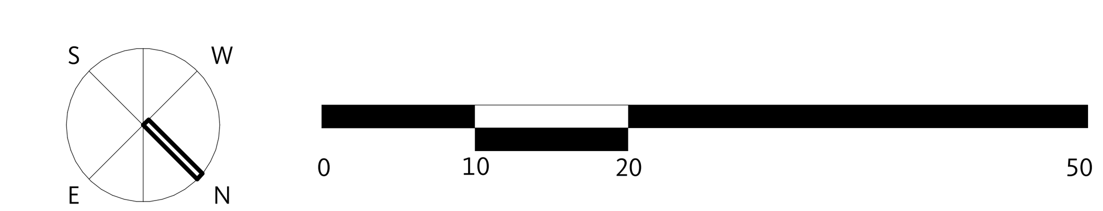


#	DESCRIPTION	AREA (SF)
01	SSCP LANES	5470
02	SSCP QUEUE	2820
03	LEO DESK	
04	PRIVATE SCREENING	85
05	TSA TELECOM	55
06	SECURED TSA STORAGE	105
07	FLIGHT INFORMATION KIOSK	
08	KNOWN CREW MEMBER ENTRY	
09	AUTOMATED EXIT LANE BREACH CONTROL PORTAL	
10.1	AIRSIDE CONCESSION - 01.1	620
10.2	AIRSIDE CONCESSION - 01.2	620
10.3	AIRSIDE CONCESSION - 01.3	620
11	AIRSIDE CONCESSION - 02	1150
12	AIRSIDE CONCESSION - 03	470
13	AIRPORT CONFERENCE RM	1030
14	GATE 5 BOARDING AREA	
15	GATE 6 BOARDING AREA	
16	GATE 4 BOARDING AREA	
17	GATE 3 BOARDING AREA	
18	NURSING ROOM	100
19	VENDING MACHINE AREA	
20	DIGITAL DISPLAY	
21	ART GALLERY DISPLAY	

#	DESCRIPTION	AREA (SF)
22	INTERACTIVE DISPLAY	
23	KID'S PLAY AREA	300
24	SENSORY ROOM	145
25	PET RELIEF AREA	265
26	AIRSIDE CONCESSION - 04	
27	NEW PBB FIXED WALKWAY	
28	NEW FIRE STAIR - 01	
29	HISTORIC ART WALL	
30	TROOP GREETER MUSEUM	
31	AIRSIDE CONCESSION - 05	
32	GATE 7 BOARDING AREA	
33	GATE 8 BOARDING AREA	
34	GATE 11 BOARDING AREA	
35	NEW FIRE STAIR - 02	
36	NEW FIS COMMUNICATING STAIR	
37	TSA OFFICE	
38	TSA ADMIN	
39	TSA BREAK	
40	IN-TRANSIT LOUNGE	5750
41	PRIVATE IN-TRANSIT LOUNGE	7700
42	AIRSIDE RESTROOMS	
43	SIDA SCREENING STATIONS	
44	STERILE CORRIDOR	
45	E-GATES AT SSCP QUEUE	

CONSTRUCTION NOTES - ENLARGED

#	DESCRIPTION
C1	NEW EXTERIOR STOREFRONT
C2	LINEAR WOOD SLAT CEILING
C3	NEW FULL HEIGHT INTERIOR STOREFRONT
C4	EXTERIOR DECK PRIVATE IN-TRANSIT LOUNGE
C5	EXTERIOR DECK IN-TRANSIT LOUNGE
C6	RAMP FROM DOMESTIC TO INTERNATIONAL TERMINAL
C7	RECESSED CEILING AT STRETCH FABRIC LIGHTING CEILING W/ITH LED BACKLIGHTING
C8	NEW INFILL AREA
C9	EXISTING OFFICE ADMIN.
C10	CERAMIC TILE AT CIRCULAR SEATING AREA
C11	INTERNATIONAL/DOMESTIC FIRE SEPARATION DOORS



Bangor International Airport

Master Plan Update - Terminal Airside Concourse Redevelopment Study

01/08/2021

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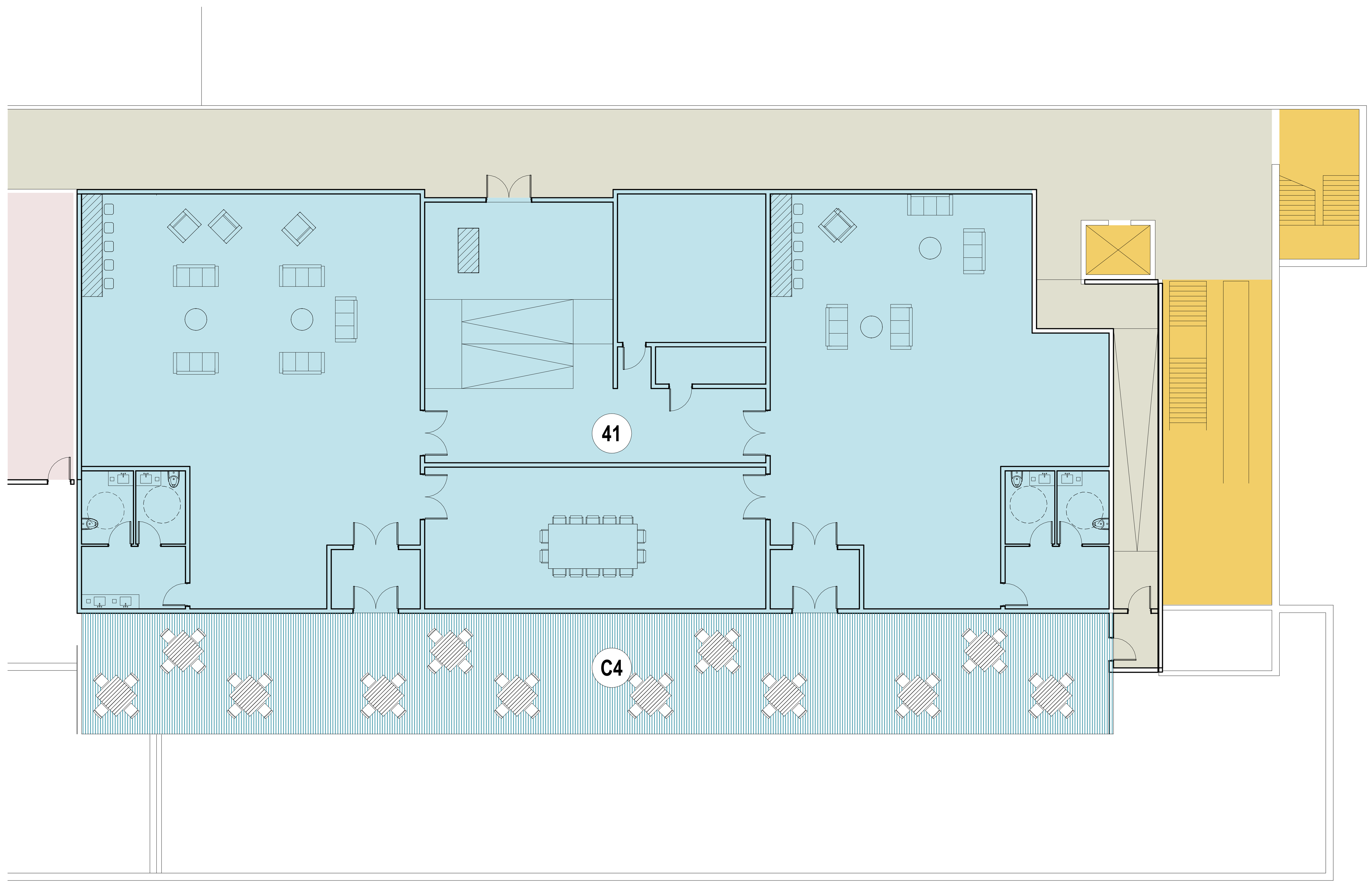
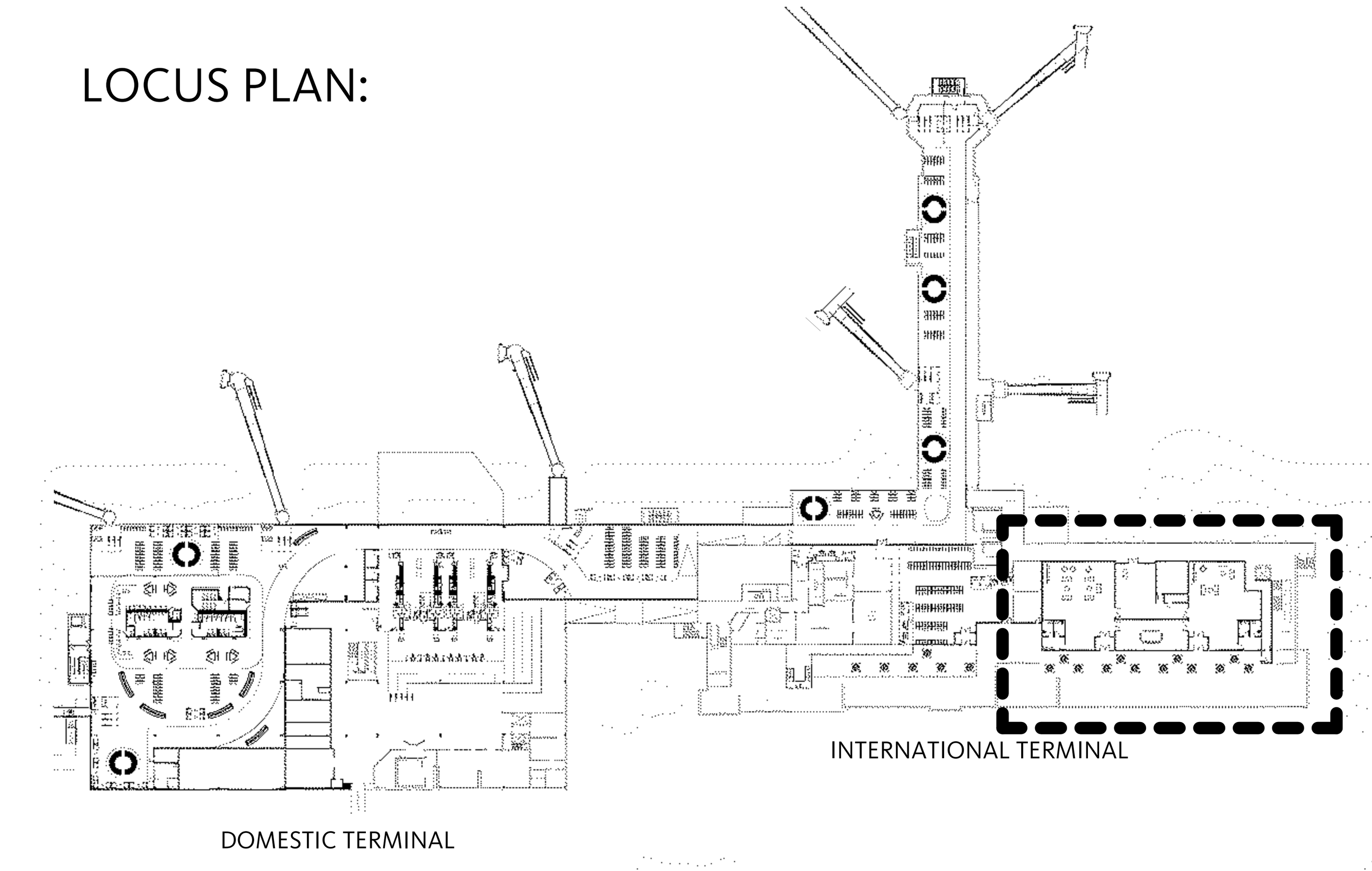
Enlarged Plan - In-Transit Lounge (International Terminal - Level 02)

	CIRCULATION - AIRSIDE
	HOLBROOK
	GATE BOARDING AREA
	DWELL LOUNGE
	CONCESSIONS - AIRSIDE
	NON-OPERATING CONCESSION
	PASSENGER SECURITY SCREENING CHECKPOINT
	IN-TRANSIT LOUNGE - PRIVATE
	EXTERIOR DECK - PRIVATE IN-TRANSIT LOUNGE
	VERTICAL TRANSPORTATION
	OPERATIONS
	TROOP GREETER MUSEUM
	IN-TRANSIT LOUNGE
	EXTERIOR DECK IN-TRANSIT LOUNGE
	STERILE CORRIDOR
	CONCESSIONS - LANDSIDE
	CIRCULATION - LANDSIDE
	TSA - BOH
	RESTROOMS/ UTILITY
	KID'S PLAY AREA
	AMENITY - AIRSIDE
	UNASSIGNED



LOCUS PLAN:



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07	FLIGHT INFORMATION KIOSK	
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19	VENDING MACHINE AREA	
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22	INTERACTIVE DISPLAY	
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26	AIRSIDE CONCESSION - 04	
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28	NEW FIRE STAIR - 01	
29	HISTORIC ART WALL	
30	TROOP GREETER MUSEUM	
31	AIRSIDE CONCESSION - 05	
32	GATE 7 BOARDING AREA	
33	GATE 8 BOARDING AREA	
34	GATE 11 BOARDING AREA	
35	NEW FIRE STAIR - 02	
36	NEW FIS COMMUNICATING STAIR	
37	TSA OFFICE	
38	TSA ADMIN	
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40	IN-TRANSIT LOUNGE	5750
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42	AIRSIDE RESTROOMS	
43	SIDA SCREENING STATIONS	
44	STERILE CORRIDOR	
45	E-GATES AT SSCP QUEUE	

CONSTRUCTION NOTES - ENLARGED

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C2	LINEAR WOOD SLAT CEILING
C3	NEW FULL HEIGHT INTERIOR STOREFRONT
C4	EXTERIOR DECK PRIVATE IN-TRANSIT LOUNGE
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C7	RECESSED CEILING AT STRETCH FABRIC LIGHTING CEILING W/ITH LED BACKLIGHTING
C8	NEW INFILL AREA
C9	EXISTING OFFICE ADMIN.
C10	CERAMIC TILE AT CIRCULAR SEATING AREA
C11	INTERNATIONAL/DOMESTIC FIRE SEPARATION DOORS

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Master Plan Update - Terminal Airside Concourse Redevelopment Study

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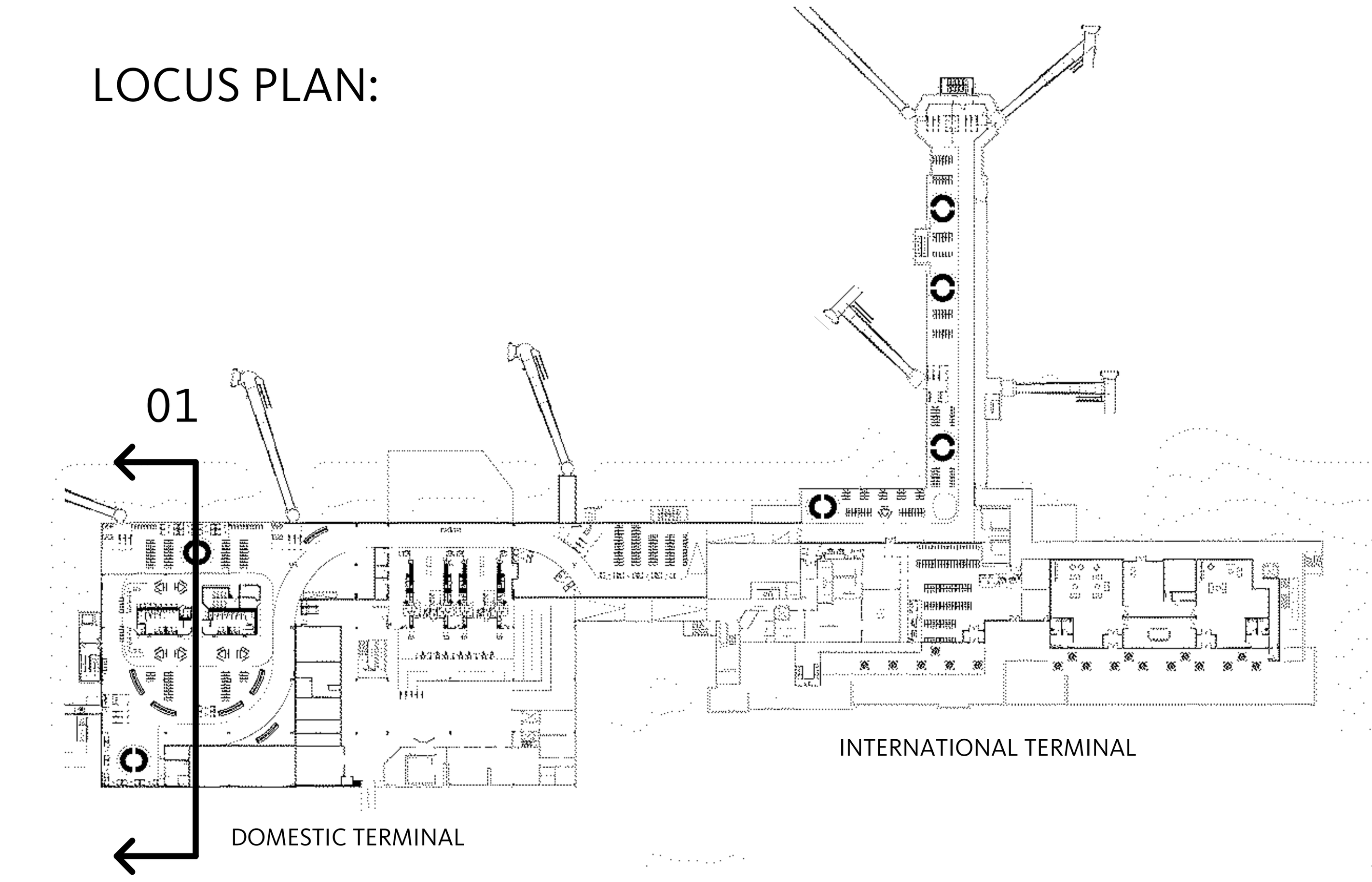
Enlarged Plan - Private Lounges (International Terminal - Level 02)

	CIRCULATION - AIRSIDE
	HOLDROOM
	GATE BOARDING AREA
	DWELL LOUNGE
	CONCESSIONS - AIRSIDE
	NON-OPERATING CONCESSION
	PASSENGER SECURITY SCREENING CHECKPOINT
	IN-TRANSIT LOUNGE - PRIVATE
	VERTICAL TRANSPORTATION
	OPERATIONS
	TROOP GREETER MUSEUM
	IN-TRANSIT LOUNGE
	EXTERIOR DECK IN-TRANSIT LOUNGE
	STERILE CORRIDOR
	CONCESSIONS - LANDSIDE
	EXTERIOR DECK - PRIVATE IN-TRANSIT LOUNGE
	CIRCULATION - LANDSIDE
	TSA - BOH
	RESTROOMS/ UTILITY
	KID'S PLAY AREA
	AMENITY - AIRSIDE
	UNASSIGNED

LOCUS PLAN:



01 BUILDING SECTION - GATES 3-4
SCALE: 3/16" = 1'-0"

CONSTRUCTION NOTES - ENLARGED	
#	DESCRIPTION
C1	NEW EXTERIOR STOREFRONT
C2	LINEAR WOOD SLAT CEILING
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C4	EXTERIOR DECK PRIVATE IN-TRANSIT LOUNGE
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C10	CERAMIC TILE AT CIRCULAR SEATING AREA
C11	INTERNATIONAL/DOMESTIC FIRE SEPARATION DOORS

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Master Plan Update - Terminal Airside Concourse Redevelopment Study

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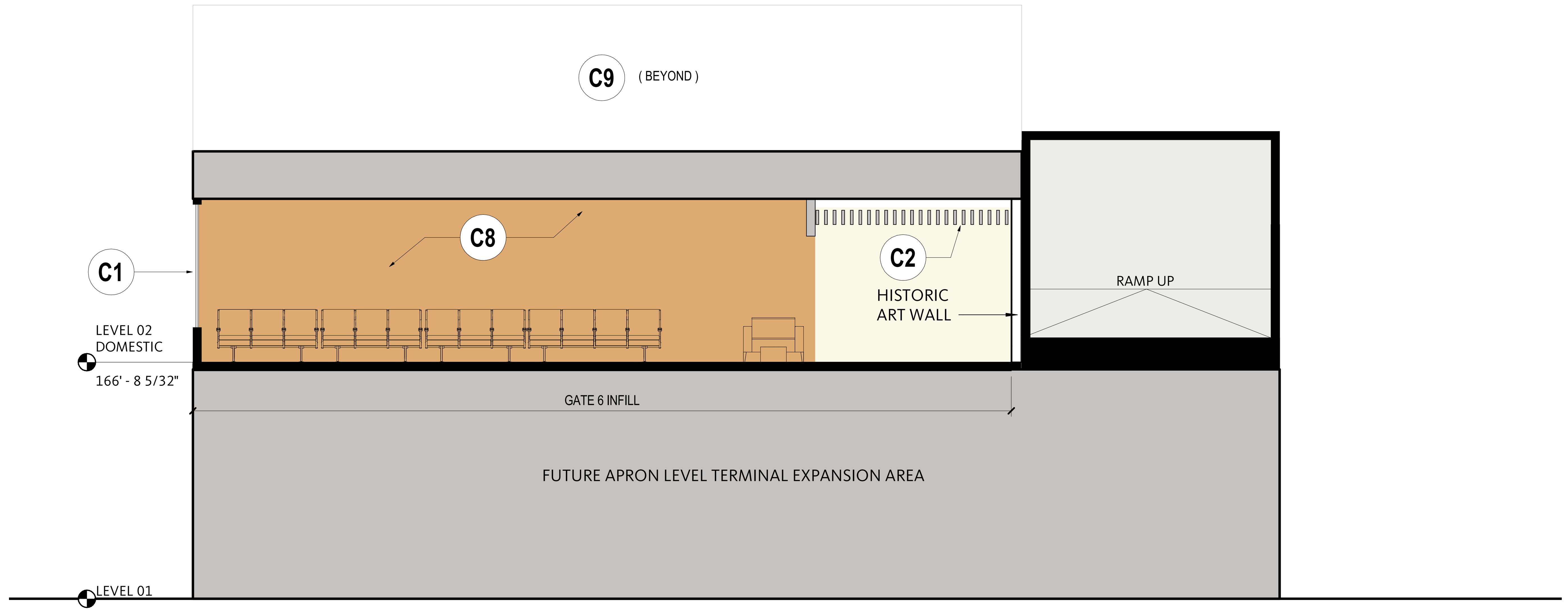
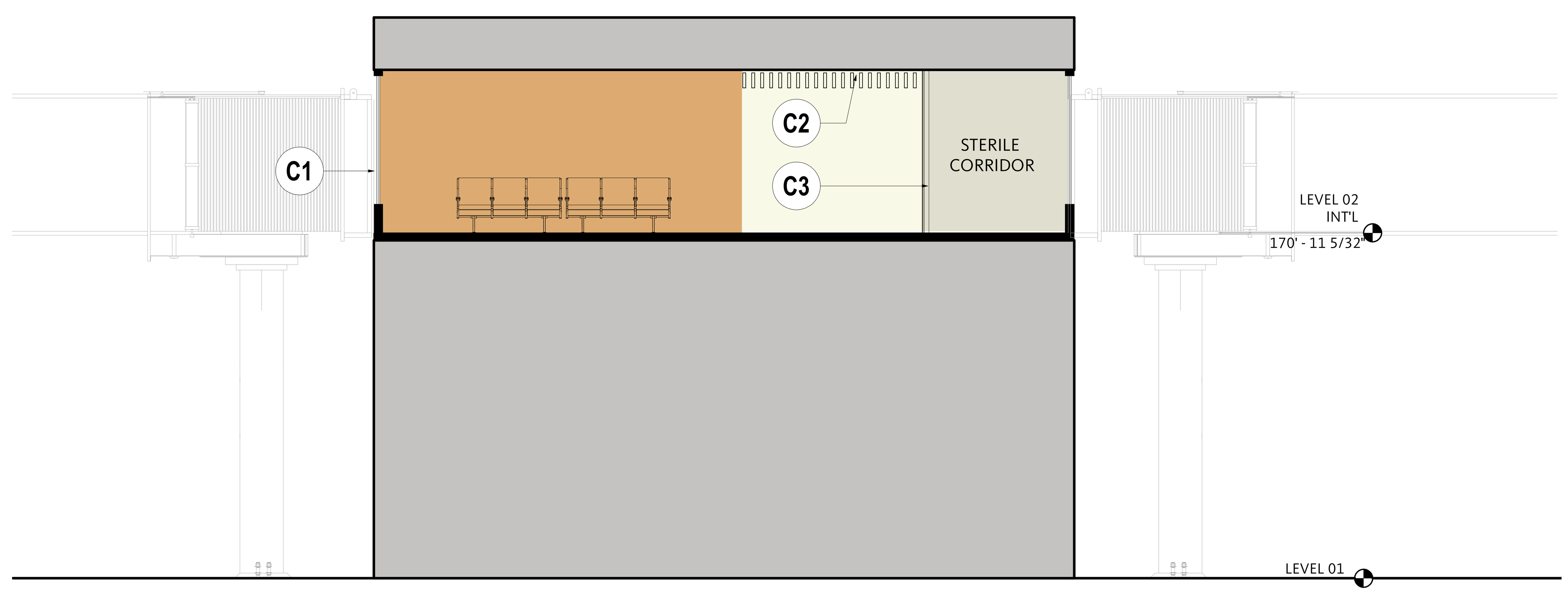
Section 01- Gates 3 - 4 (Domestic Terminal)

- CIRCULATION - AIRSIDE
- HOLBROOK
- GATE BOARDING AREA
- DWELL LOUNGE
- CONCESSIONS - AIRSIDE
- NON-OPERATING CONCESSION
- PASSENGER SECURITY SCREENING CHECKPOINT
- IN-TRANSIT LOUNGE - PRIVATE
- EXTERIOR DECK - PRIVATE IN-TRANSIT LOUNGE
- VERTICAL TRANSPORTATION
- OPERATIONS
- TROOP GREETER MUSEUM
- IN-TRANSIT LOUNGE
- EXTERIOR DECK IN-TRANSIT LOUNGE
- STERILE CORRIDOR
- CONCESSIONS - LANDSIDE
- CIRCULATION - LANDSIDE
- TSA - BOH
- RESTROOMS/ UTILITY
- KID'S PLAY AREA
- AMENITY - AIRSIDE
- UNASSIGNED



02 BUILDING SECTION - GATE 6

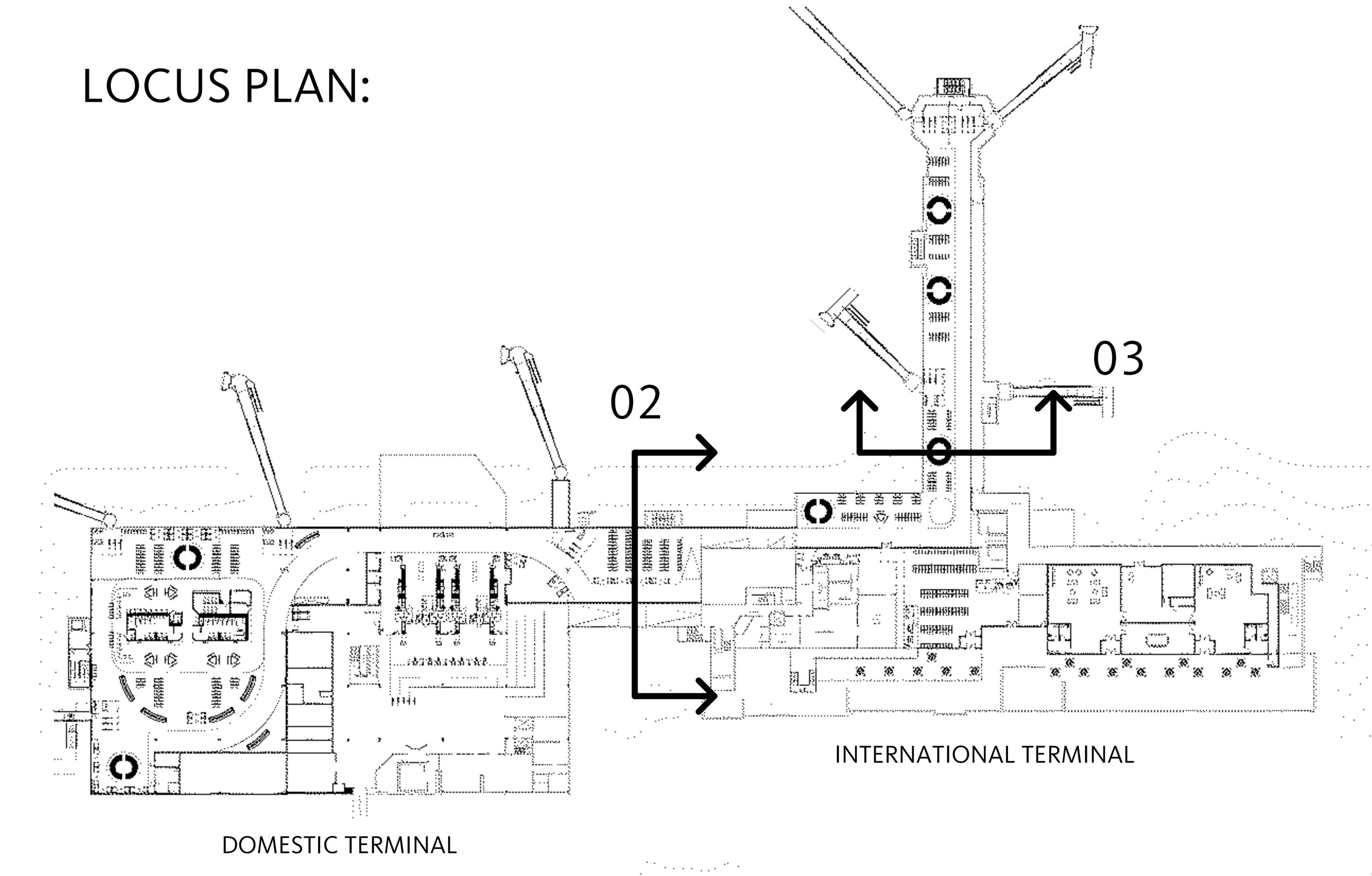
SCALE: 3/16" = 1'-0"



03 BUILDING SECTION - GATE 7/ STERILE CORRIDOR

SCALE: 3/16" = 1'-0"

LOCUS PLAN:



CONSTRUCTION NOTES - ENLARGED	
#	DESCRIPTION
C1	NEW EXTERIOR STOREFRONT
C2	LINEAR WOOD SLAT CEILING
C3	NEW FULL HEIGHT INTERIOR STOREFRONT
C4	EXTERIOR DECK PRIVATE IN-TRANSIT LOUNGE
C5	EXTERIOR DECK IN-TRANSIT LOUNGE
C6	RAMP FROM DOMESTIC TO INTERNATIONAL TERMINAL
C7	RECESSED CEILING AT STRETCH FABRIC LIGHTING CEILING W/ITH LED BACKLIGHTING
C8	NEW INFILL AREA
C9	EXISTING OFFICE ADMIN.
C10	CERAMIC TILE AT CIRCULAR SEATING AREA
C11	INTERNATIONAL/DOMESTIC FIRE SEPARATION DOORS

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Master Plan Update - Terminal Airside Concourse Redevelopment Study

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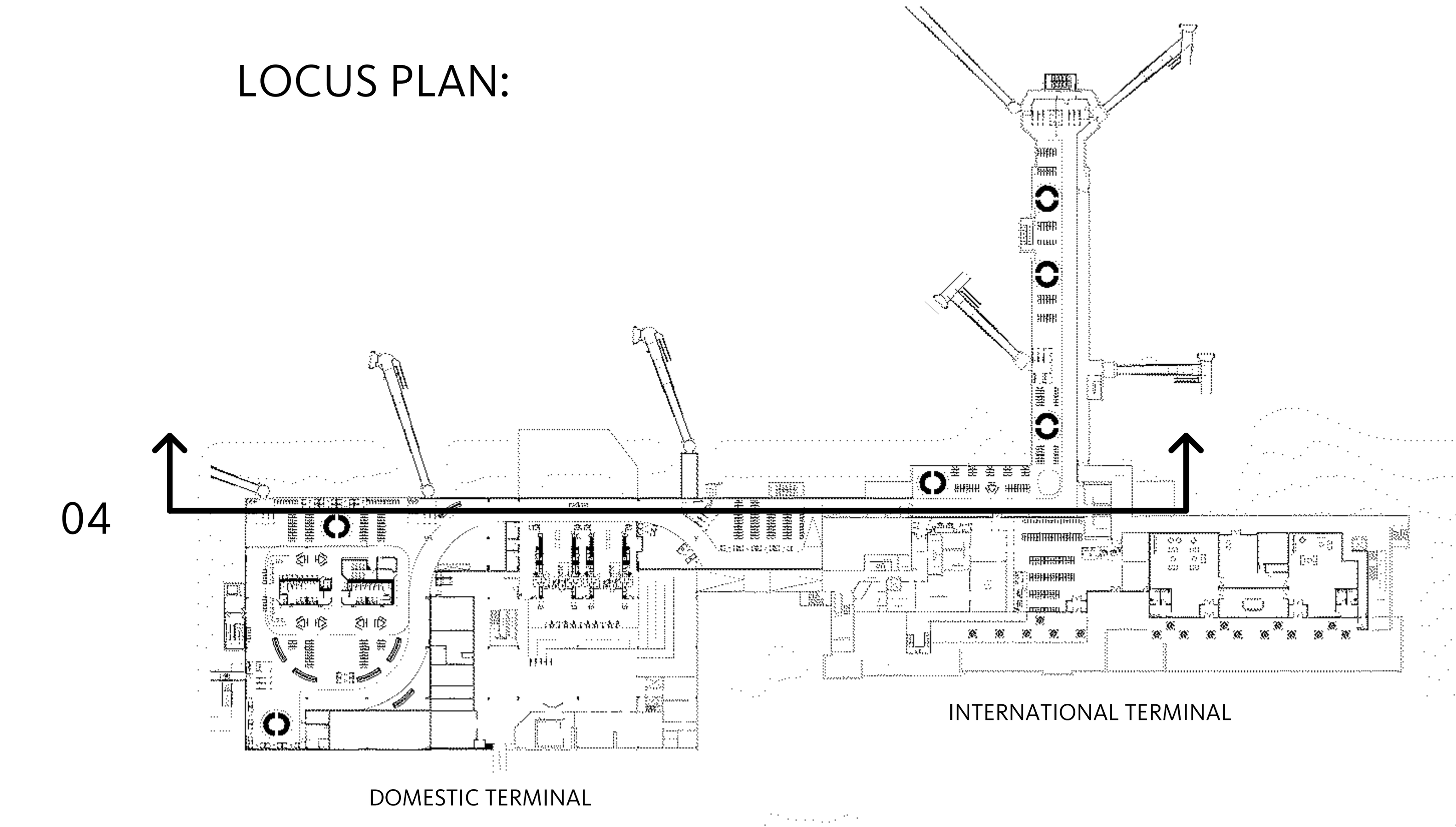
Sections 02 & 03 - Gate 6 & International Pier

CIRCULATION - AIRSIDE	VERTICAL TRANSPORTATION	CIRCULATION - LANDSIDE
HOLDROOM	OPERATIONS	TSA - BOH
GATE BOARDING AREA	TROOP GREETER MUSEUM	RESTROOMS/ UTILITY
DWELL LOUNGE	IN-TRANSIT LOUNGE	KID'S PLAY AREA
CONCESSIONS - AIRSIDE	EXTERIOR DECK IN-TRANSIT LOUNGE	AMENITY - AIRSIDE
NON-OPERATING CONCESSION	STERILE CORRIDOR	UNASSIGNED
PASSENGER SECURITY SCREENING CHECKPOINT	CONCESSIONS - LANDSIDE	
IN-TRANSIT LOUNGE - PRIVATE	EXTERIOR DECK - PRIVATE IN-TRANSIT LOUNGE	

LOCUS PLAN:



04 BUILDING SECTION - GATES 4-7

SCALE: 1" = 20'-0"

CONSTRUCTION NOTES - ENLARGED	
#	DESCRIPTION
C1	NEW EXTERIOR STOREFRONT
C2	LINEAR WOOD SLAT CEILING
C3	NEW FULL HEIGHT INTERIOR STOREFRONT
C4	EXTERIOR DECK PRIVATE IN-TRANSIT LOUNGE
C5	EXTERIOR DECK IN-TRANSIT LOUNGE
C6	RAMP FROM DOMESTIC TO INTERNATIONAL TERMINAL
C7	RECESSED CEILING AT STRETCH FABRIC LIGHTING CEILING W/ITH LED BACKLIGHTING
C8	NEW INFILL AREA
C9	EXISTING OFFICE ADMIN.
C10	CERAMIC TILE AT CIRCULAR SEATING AREA
C11	INTERNATIONAL/DOMESTIC FIRE SEPARATION DOORS

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Master Plan Update - Terminal Airside Concourse Redevelopment Study

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Terminal Exploded Axonometric- Existing

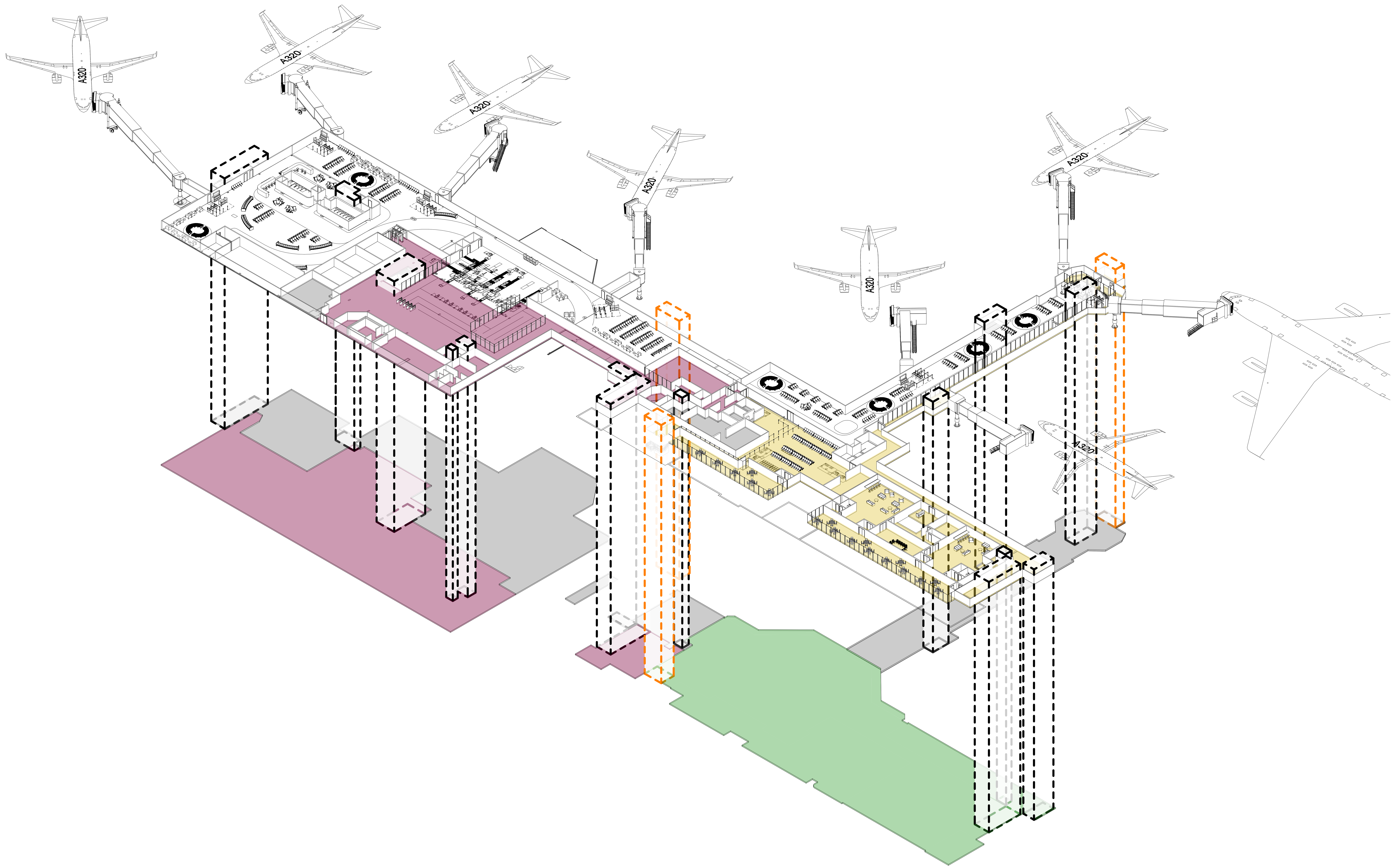
AIRSIDE STERILE AREAS

LANDSIDE NON-STERILE AREAS

IN-TRANSIT LOUNGE AND STERILE CORRIDORS

FIS & CUSTOMS

AIRPORT NON-PUBLIC AREAS



Bangor International Airport

Master Plan Update - Terminal Airside Concourse Redevelopment Study

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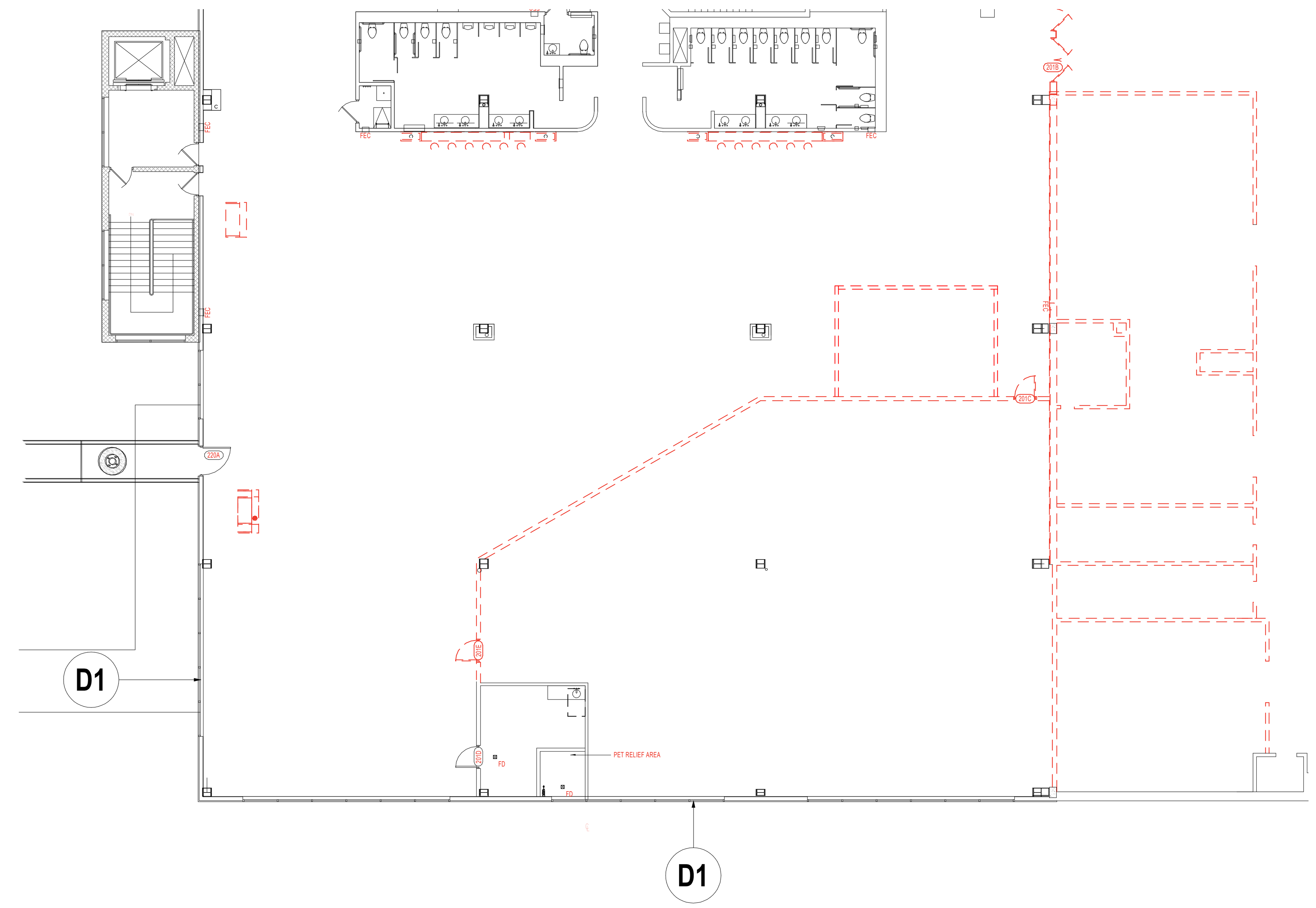
Terminal Exploded Axonometric - Ultimate (PAL 4)

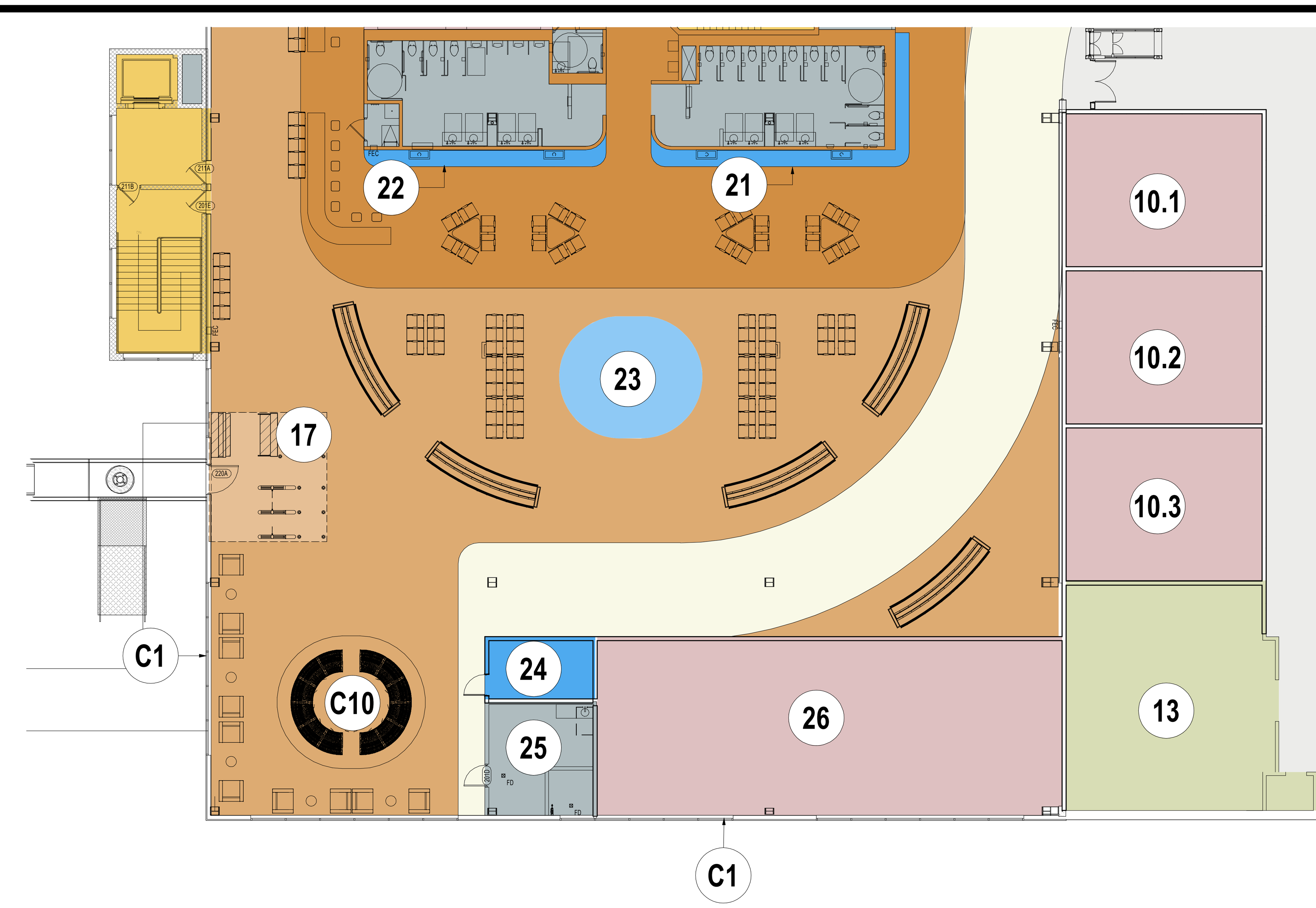
Legend
EXISTING TO BE DEMOLISHED
CIRCULATION - AIRSIDE
HOLBROOK
GATE BOARDING AREA
DWELL LOUNGE
CONCESSIONS - AIRSIDE
NON-OPERATING CONCESSION
PASSENGER SECURITY SCREENING CHECKPOINT
IN-TRANSIT LOUNGE - PRIVATE
EXTERIOR DECK - PRIVATE IN-TRANSIT LOUNGE
VERTICAL TRANSPORTATION
OPERATIONS
TROOP GREETER MUSEUM
IN-TRANSIT LOUNGE
EXTERIOR DECK IN-TRANSIT LOUNGE
STERILE CORRIDOR
CONCESSIONS - LANDSIDE
CIRCULATION - LANDSIDE
TSA - BOH
RESTROOMS/ UTILITY
KID'S PLAY AREA
AMENITY - AIRSIDE
UNASSIGNED

DEMOLITION PLAN NOTES

#	DESCRIPTION
D1	DEMOLISH EXISTING EXTERIOR WALL AS REQUIRED FOR INSTALLATION OF NEW EXTERIOR STOREFRONT SYSTEM
D2	PBB TO BE RELOCATED. INFILL EXTERIOR WALL AS REQUIRED
D3	MECH SHAFTRELOCATED
D4	RELOCATE EXISTING HIGH MAST LIGHTING IN ITS ENTIRETY.
D5	DEMOLISH EXISTING CANOPY BELOW AS REQUIRED FOR BUILDING EXPANSION.
D6	REFRAME ROOF DECK FOR NEW FLOOR AREA.
D7	DEMOLISH EXISTING STAIR AND INFILL FLOOR SLAB

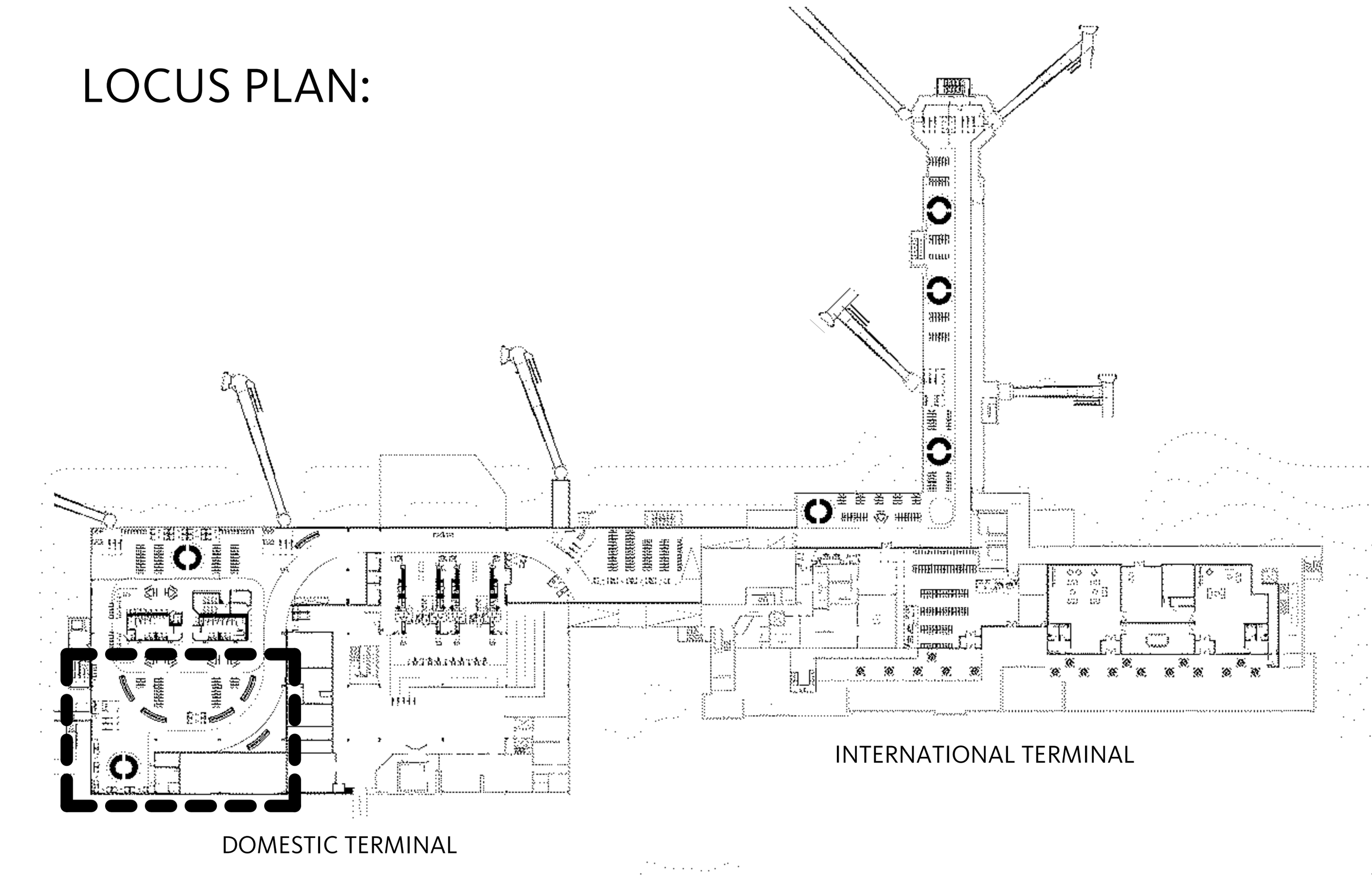


01 01 - GATE 3 - DEMO
SCALE: 1/16" = 1'-0"



02 01- GATE 3 - PROPOSED
SCALE: 1/16" = 1'-0"

LOCUS PLAN:



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02	SSCP QUEUE	2820
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04	PRIVATE SCREENING	85
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06	SECURED TSA STORAGE	105
07	FLIGHT INFORMATION KIOSK	
08	KNOWN CREW MEMBER ENTRY	
09	AUTOMATED EXIT LANE BREACH CONTROL PORTAL	
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12	AIRSIDE CONCESSION - 03	470
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15	GATE 6 BOARDING AREA	
16	GATE 4 BOARDING AREA	
17	GATE 3 BOARDING AREA	
18	NURSING ROOM	100
19	VENDING MACHINE AREA	
20	DIGITAL DISPLAY	
21	ART GALLERY DISPLAY	

#	DESCRIPTION	AREA (SF)
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30	TROOP GREETER MUSEUM	
31	AIRSIDE CONCESSION - 05	
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33	GATE 8 BOARDING AREA	
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38	TSA ADMIN	
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Bangor International Airport

Master Plan Update - Terminal Airside Concourse Redevelopment Study

01/08/2021

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1/8/2021 5:46:40 PM

Terminal Logistics Plan - Gate 3 Area Renovation

- EXISTING TO BE DEMOLISHED
- CIRCULATION - AIRSIDE
- HOLBROOK
- GATE BOARDING AREA
- DWELL LOUNGE
- CONCESSIONS - AIRSIDE
- NON-OPERATING CONCESSION
- PASSENGER SECURITY SCREENING CHECKPOINT
- IN-TRANSIT LOUNGE - PRIVATE
- EXTERIOR DECK - PRIVATE IN-TRANSIT LOUNGE
- VERTICAL TRANSPORTATION
- OPERATIONS
- TROOP GREETER MUSEUM
- IN-TRANSIT LOUNGE
- EXTERIOR DECK IN-TRANSIT LOUNGE
- STERILE CORRIDOR
- CONCESSIONS - LANDSIDE
- CIRCULATION - LANDSIDE
- TSA - BOH
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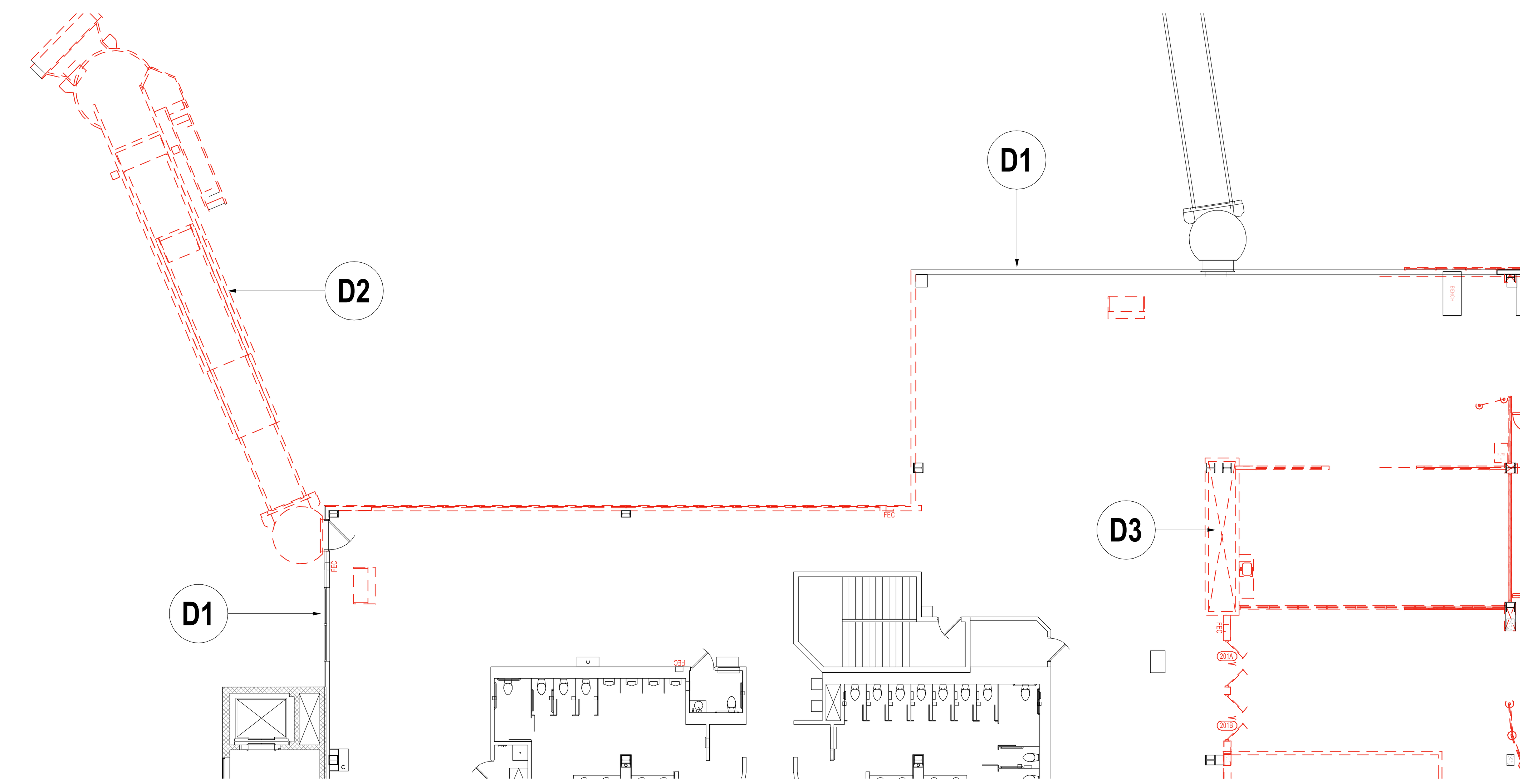
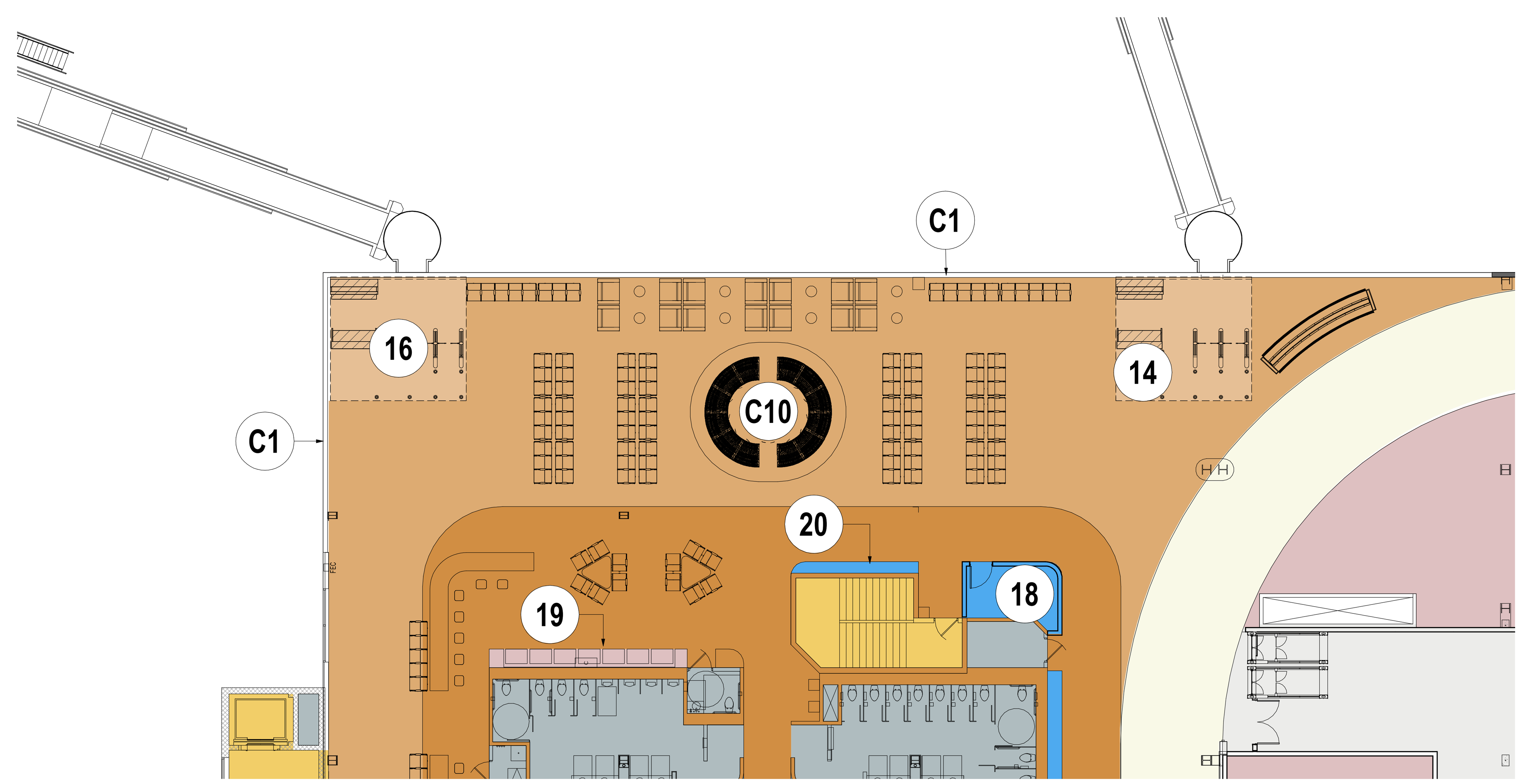
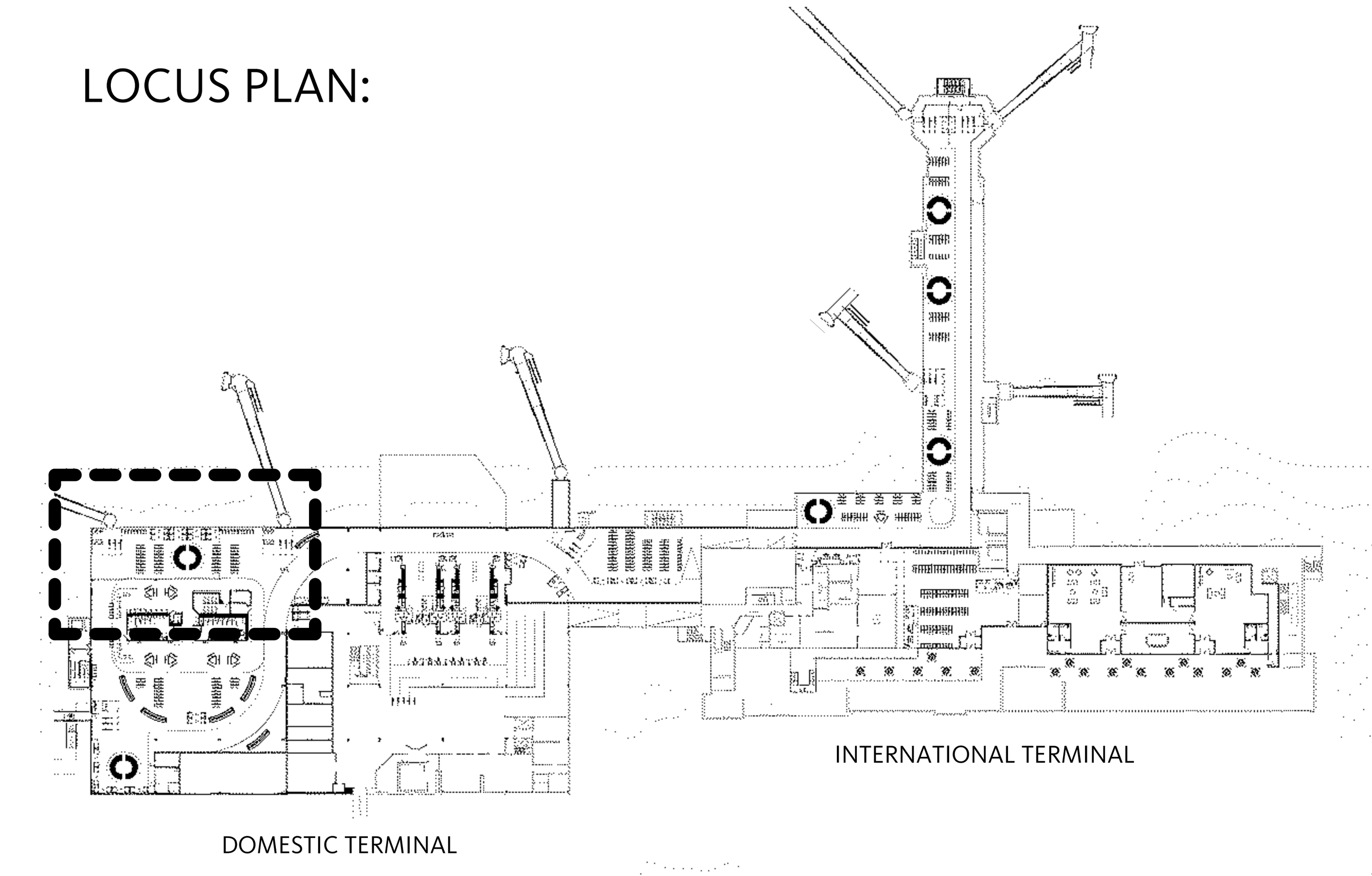


01 02 - GATE 4 INFILL - DEMO
SCALE: 1/16" = 1'-0"



02 02 - GATE 4 INFILL - PROPOSED
SCALE: 1/16" = 1'-0"

LOCUS PLAN:



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44	STERILE CORRIDOR	
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C4	EXTERIOR DECK PRIVATE IN-TRANSIT LOUNGE
C5	EXTERIOR DECK IN-TRANSIT LOUNGE
C6	RAMP FROM DOMESTIC TO INTERNATIONAL TERMINAL
C7	RECESSED CEILING AT STRETCH FABRIC LIGHTING CEILING W/ITH LED BACKLIGHTING
C8	NEW INFILL AREA
C9	EXISTING OFFICE ADMIN.
C10	CERAMIC TILE AT CIRCULAR SEATING AREA
C11	INTERNATIONAL/DOMESTIC FIRE SEPARATION DOORS

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Master Plan Update - Terminal Airside Concourse Redevelopment Study

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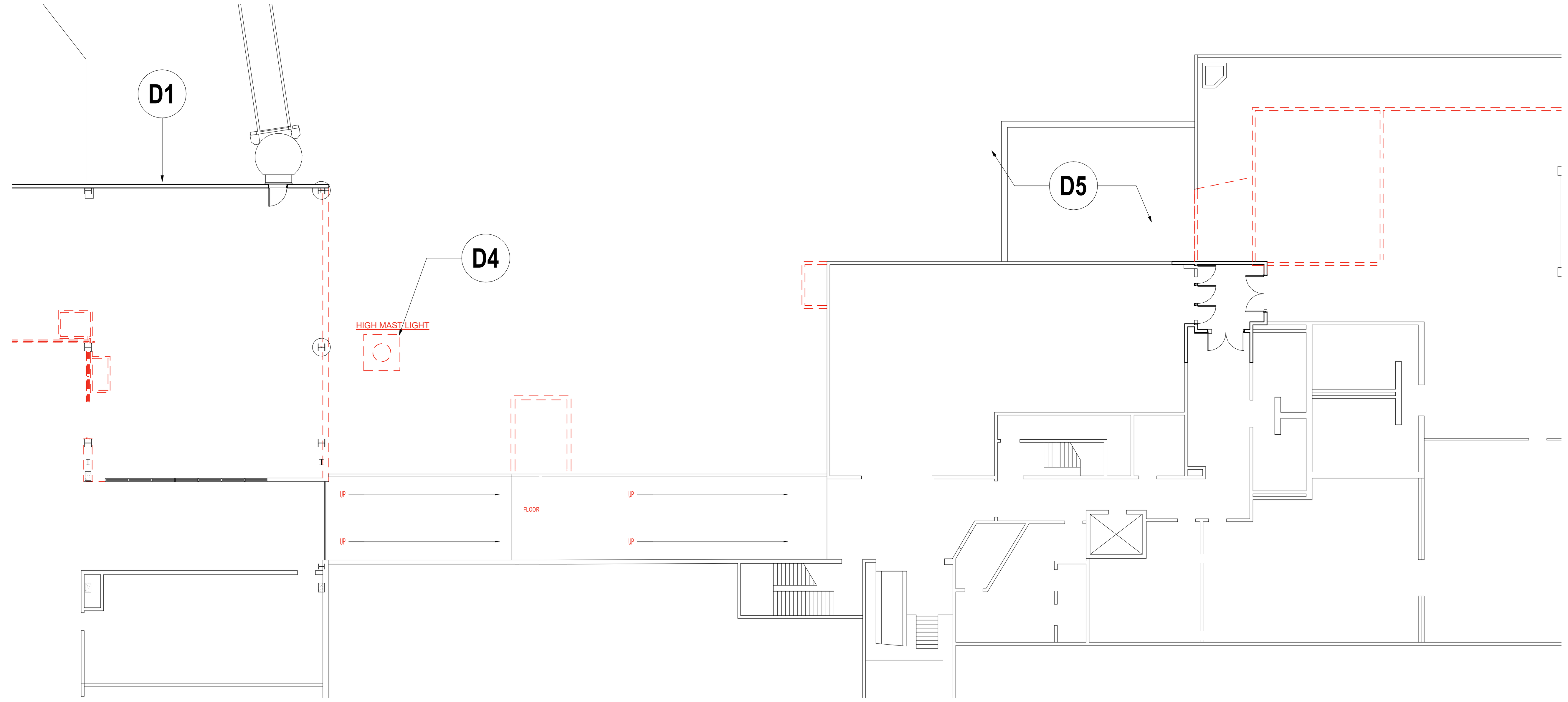
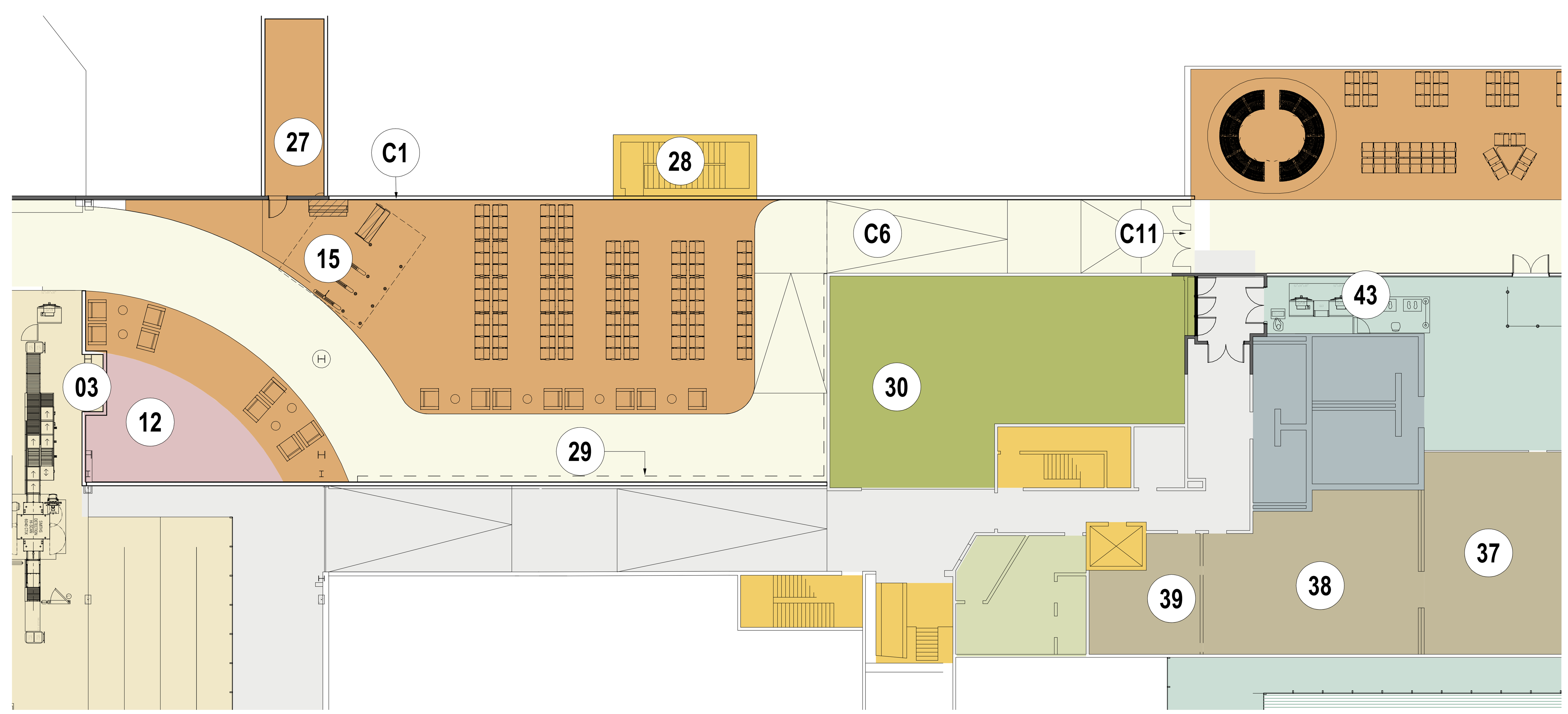
Terminal Logistics Plan - Gate 4 and 5 - Infill and Renovation

- EXISTING TO BE DEMOLISHED
- CIRCULATION - AIRSIDE
- HOLBROOK
- GATE BOARDING AREA
- DWELL LOUNGE
- CONCESSIONS - AIRSIDE
- NON-OPERATING CONCESSION
- PASSENGER SECURITY SCREENING CHECKPOINT
- IN-TRANSIT LOUNGE - PRIVATE
- EXTERIOR DECK - PRIVATE IN-TRANSIT LOUNGE
- VERTICAL TRANSPORTATION
- OPERATIONS
- TROOP GREETER MUSEUM
- IN-TRANSIT LOUNGE
- EXTERIOR DECK IN-TRANSIT LOUNGE
- STERILE CORRIDOR
- CONCESSIONS - LANDSIDE
- CIRCULATION - LANDSIDE
- TSA - BOH
- RESTROOMS/ UTILITY
- KID'S PLAY AREA
- AMENITY - AIRSIDE
- UNASSIGNED



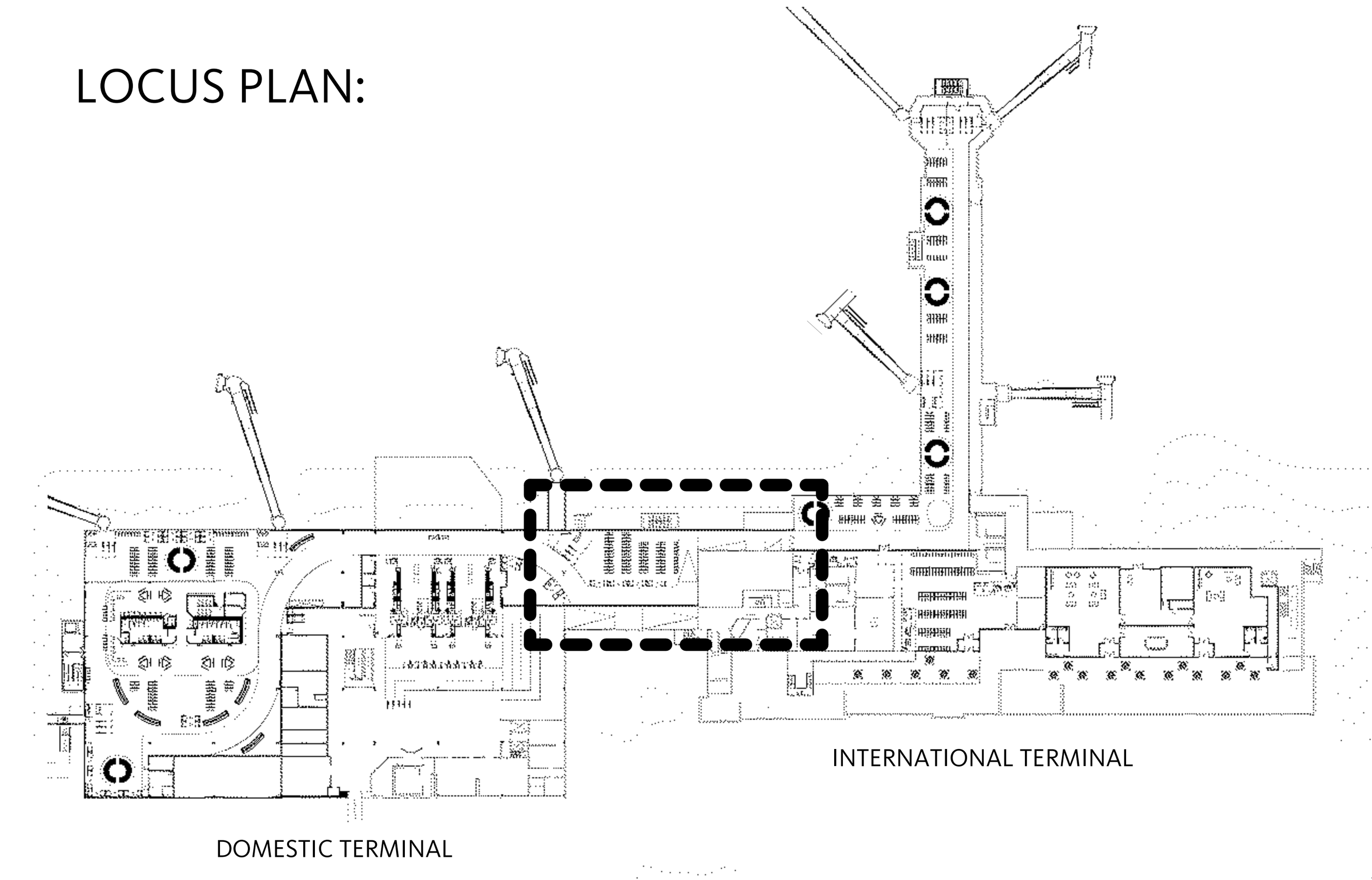
01 03 - GATE 6 - DEMO
SCALE: 1/16" = 1'-0"

DEMOLITION PLAN NOTES - 1	
#	DESCRIPTION
D1	DEMOLISH EXISTING EXTERIOR WALL AS REQUIRED FOR INSTALLATION OF NEW EXTERIOR STOREFRONT SYSTEM
D2	PBB TO BE RELOCATED. INFILL EXTERIOR WALL AS REQUIRED
D3	MECH SHAFTRELOCATED
D4	RELOCATE EXISTING HIGH MAST LIGHTING IN ITS ENTIRETY.
D5	DEMOLISH EXISTING CANOPY BELOW AS REQUIRED FOR BUILDING EXPANSION.
D6	REFRAME ROOF DECK FOR NEW FLOOR AREA.
D7	DEMOLISH EXISTING STAIR AND INFILL FLOOR SLAB



02 03 - GATE 6 INFILL - PROPOSED
SCALE: 1/16" = 1'-0"

LOCUS PLAN:



#	DESCRIPTION	AREA (SF)
01	SSCP LANES	5470
02	SSCP QUEUE	2820
03	LEO DESK	
04	PRIVATE SCREENING	85
05	TSA TELECOM	55
06	SECURED TSA STORAGE	105
07	FLIGHT INFORMATION KIOSK	
08	KNOWN CREW MEMBER ENTRY	
09	AUTOMATED EXIT LANE BREACH CONTROL PORTAL	
10.1	AIRSIDE CONCESSION - 01.1	620
10.2	AIRSIDE CONCESSION - 01.2	620
10.3	AIRSIDE CONCESSION - 01.3	620
11	AIRSIDE CONCESSION - 02	1150
12	AIRSIDE CONCESSION - 03	470
13	AIRPORT CONFERENCE RM	1030
14	GATE 5 BOARDING AREA	
15	GATE 6 BOARDING AREA	
16	GATE 4 BOARDING AREA	
17	GATE 3 BOARDING AREA	
18	NURSING ROOM	100
19	VENDING MACHINE AREA	
20	DIGITAL DISPLAY	
21	ART GALLERY DISPLAY	

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22	INTERACTIVE DISPLAY	
23	KID'S PLAY AREA	300
24	SENSORY ROOM	145
25	PET RELIEF AREA	265
26	AIRSIDE CONCESSION - 04	
27	NEW PBB FIXED WALKWAY	
28	NEW FIRE STAIR - 01	
29	HISTORIC ART WALL	
30	TROOP GREETER MUSEUM	
31	AIRSIDE CONCESSION - 05	
32	GATE 7 BOARDING AREA	
33	GATE 8 BOARDING AREA	
34	GATE 11 BOARDING AREA	
35	NEW FIRE STAIR - 02	
36	NEW FIS COMMUNICATING STAIR	
37	TSA OFFICE	
38	TSA ADMIN	
39	TSA BREAK	
40	IN-TRANSIT LOUNGE	5750
41	PRIVATE IN-TRANSIT LOUNGE	7700
42	AIRSIDE RESTROOMS	
43	SIDA SCREENING STATIONS	
44	STERILE CORRIDOR	
45	E-GATES AT SSCP QUEUE	

CONSTRUCTION NOTES - ENLARGED	
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Master Plan Update - Terminal Airside Concourse Redevelopment Study

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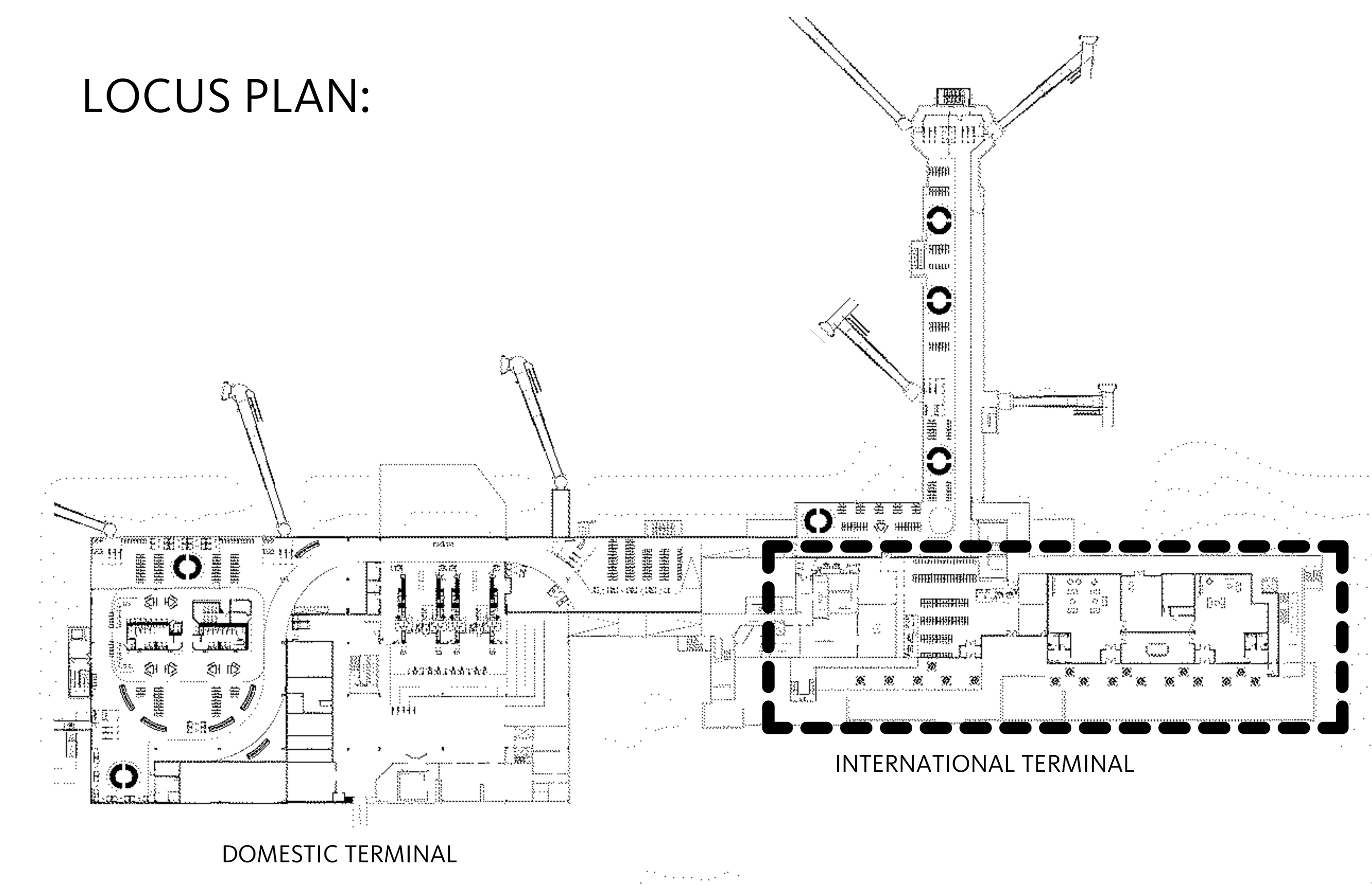
Terminal Logistics Plan - Gate 6 Infill

LOCUS PLAN:



EXISTING TO BE DEMOLISHED

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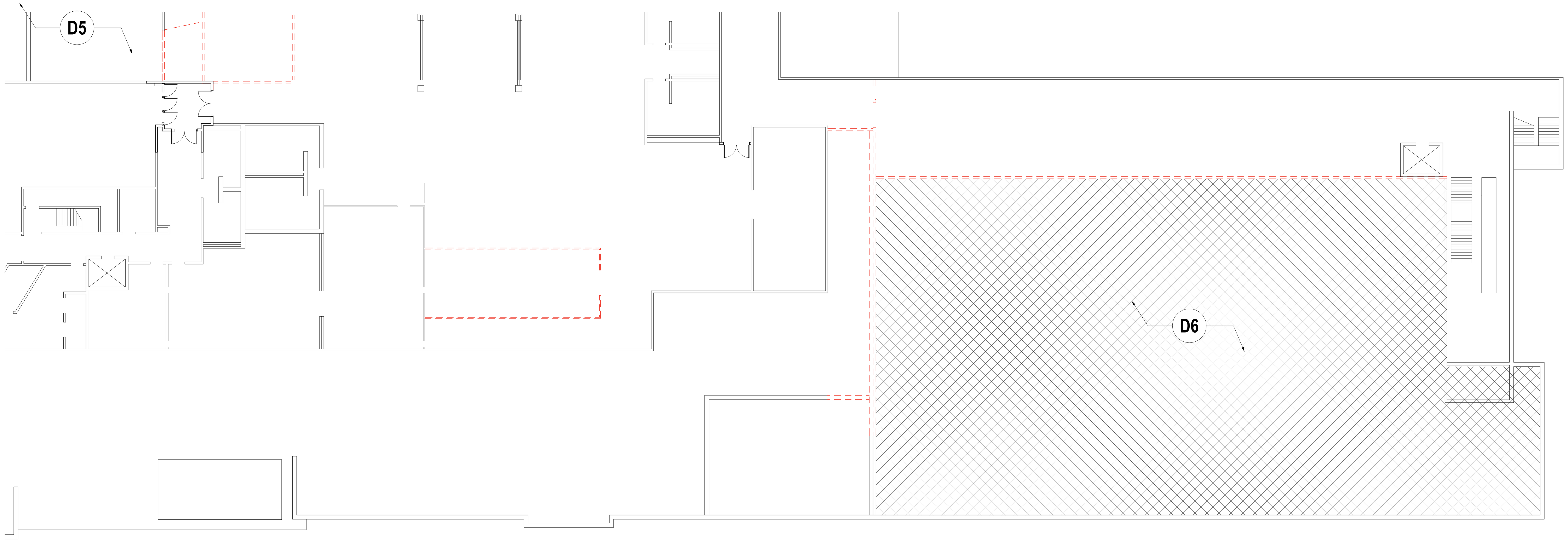

01 STERILE IN-TRANSIT LOUNGE - DEMO

SCALE: 1/16" = 1'-0"

DEMOLITION PLAN NOTES - 1

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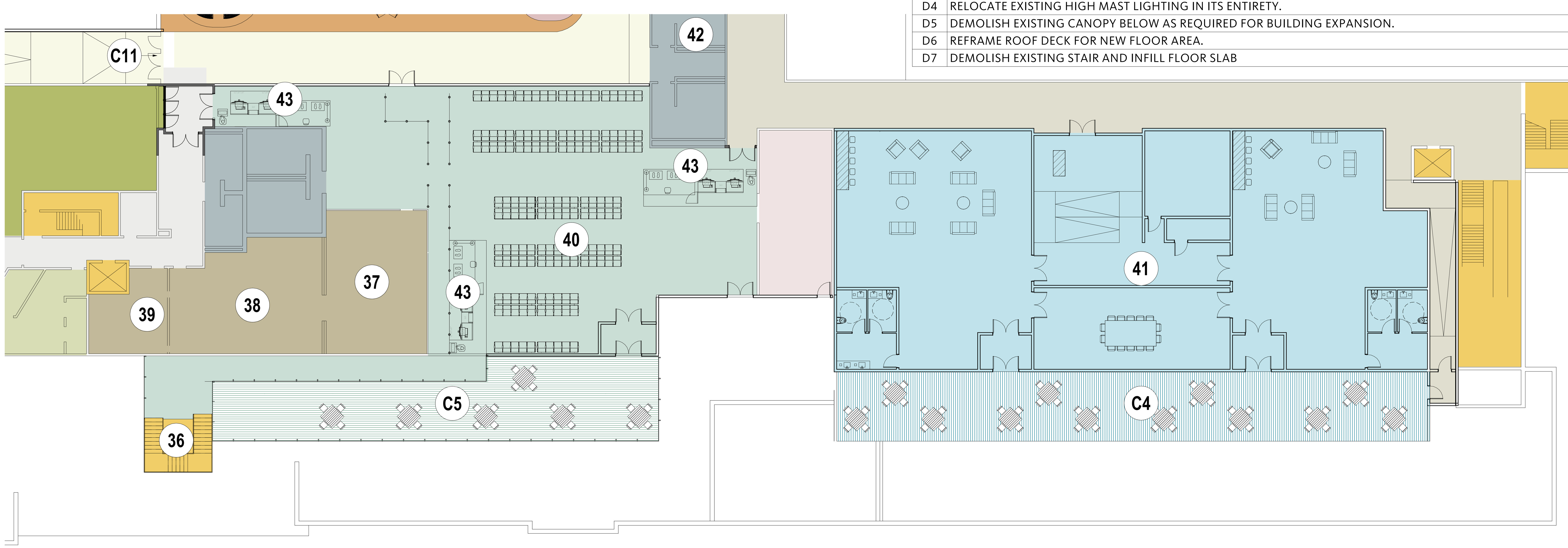

02 STERILE IN-TRANSIT LOUNGE - PROPOSED

SCALE: 1/16" = 1'-0"

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Bangor International Airport

Master Plan Update - Terminal Airside Concourse Redevelopment Study

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Terminal Logistics Plan - Sterile In-Transit Lounge Reconfiguration

- EXISTING TO BE DEMOLISHED
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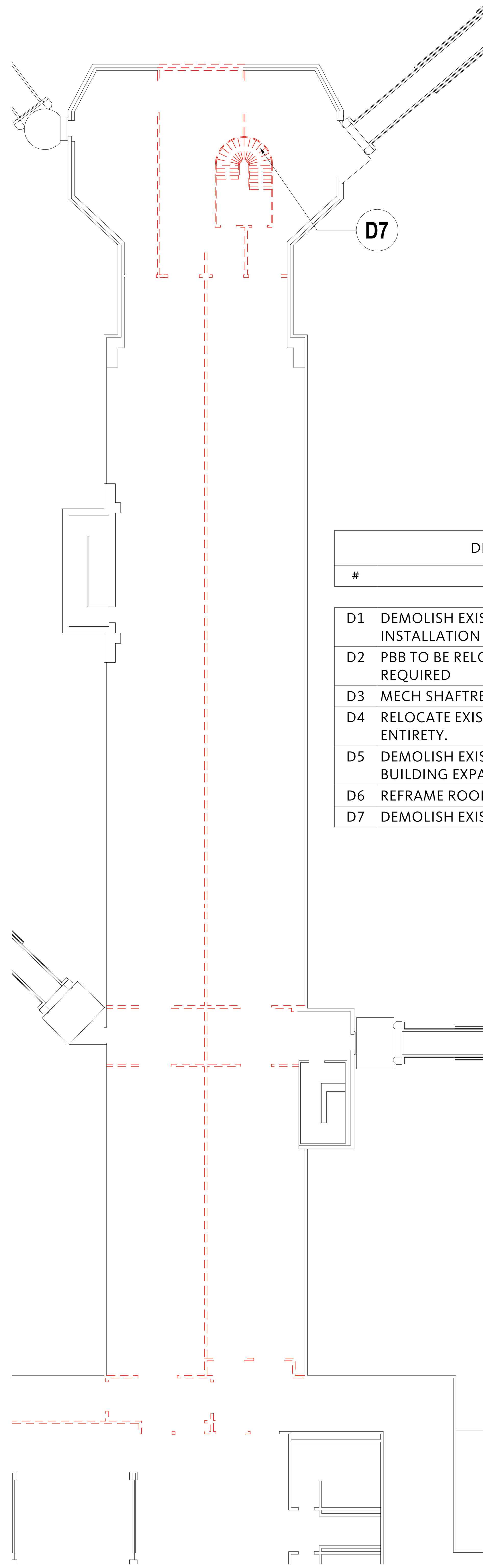

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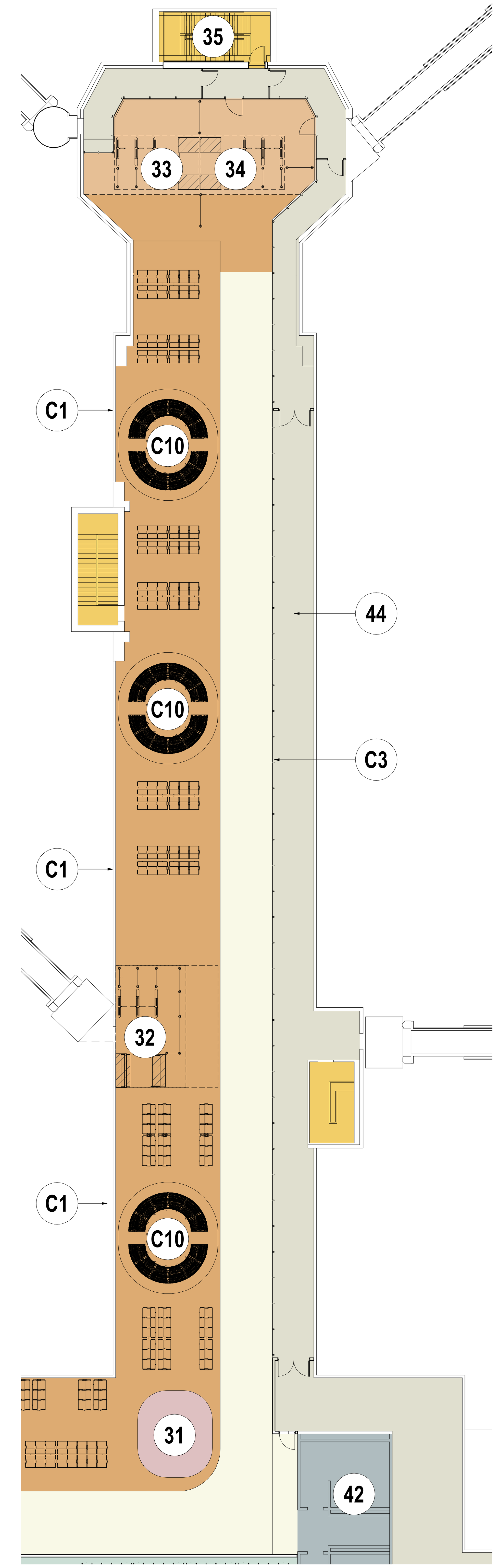
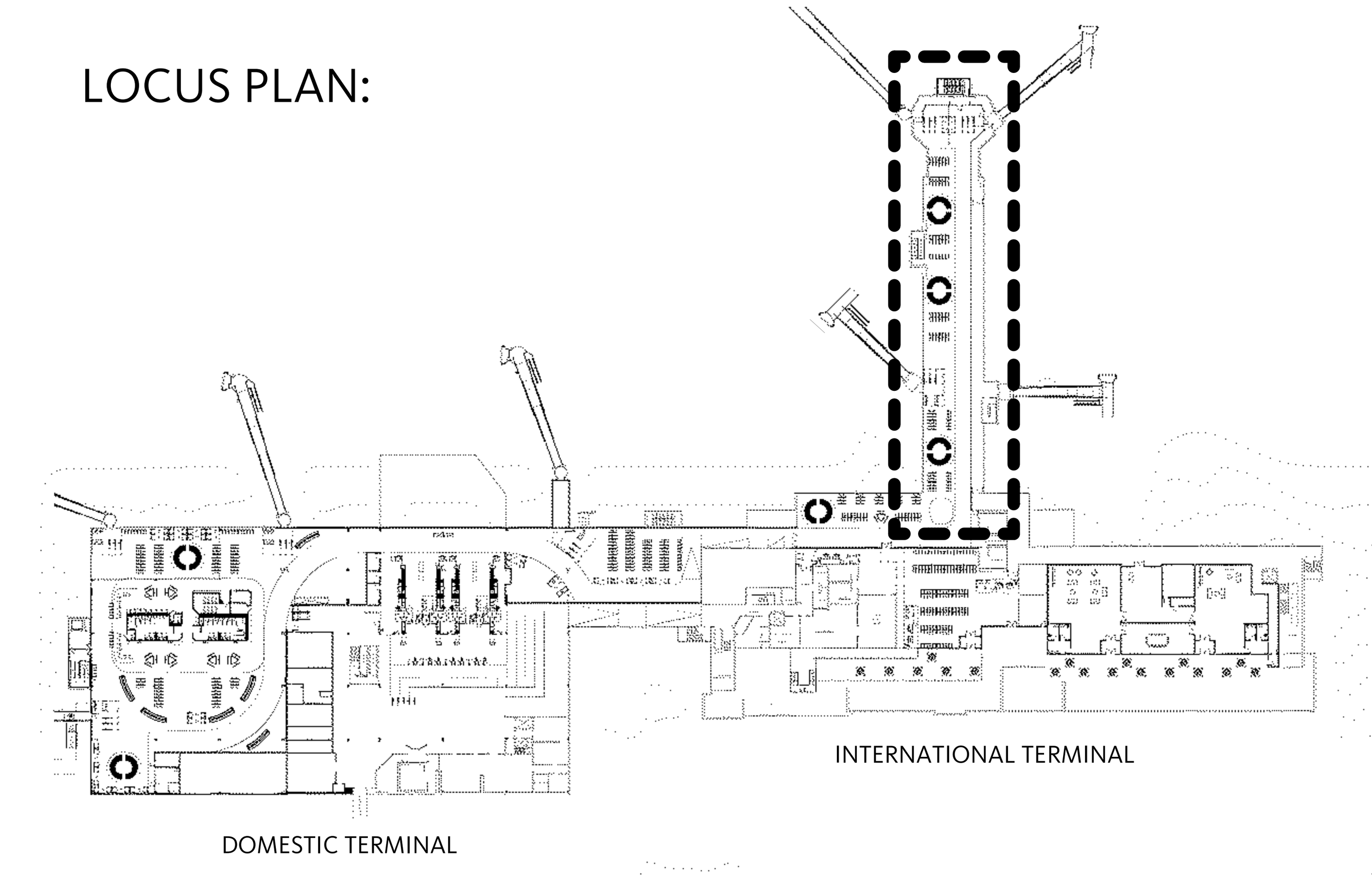


LOCUS PLAN:



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C8	NEW INFILL AREA
C9	EXISTING OFFICE ADMIN.
C10	CERAMIC TILE AT CIRCULAR SEATING AREA
C11	INTERNATIONAL/DOMESTIC FIRE SEPARATION DOORS

01 STERILE INT'L PIER - DEMO
SCALE: 1/16" = 1'-0"

02 STERILE INT'L PIER - PROPOSED
SCALE: 1/16" = 1'-0"

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Bangor International Airport

Master Plan Update - Terminal Airside Concourse Redevelopment Study

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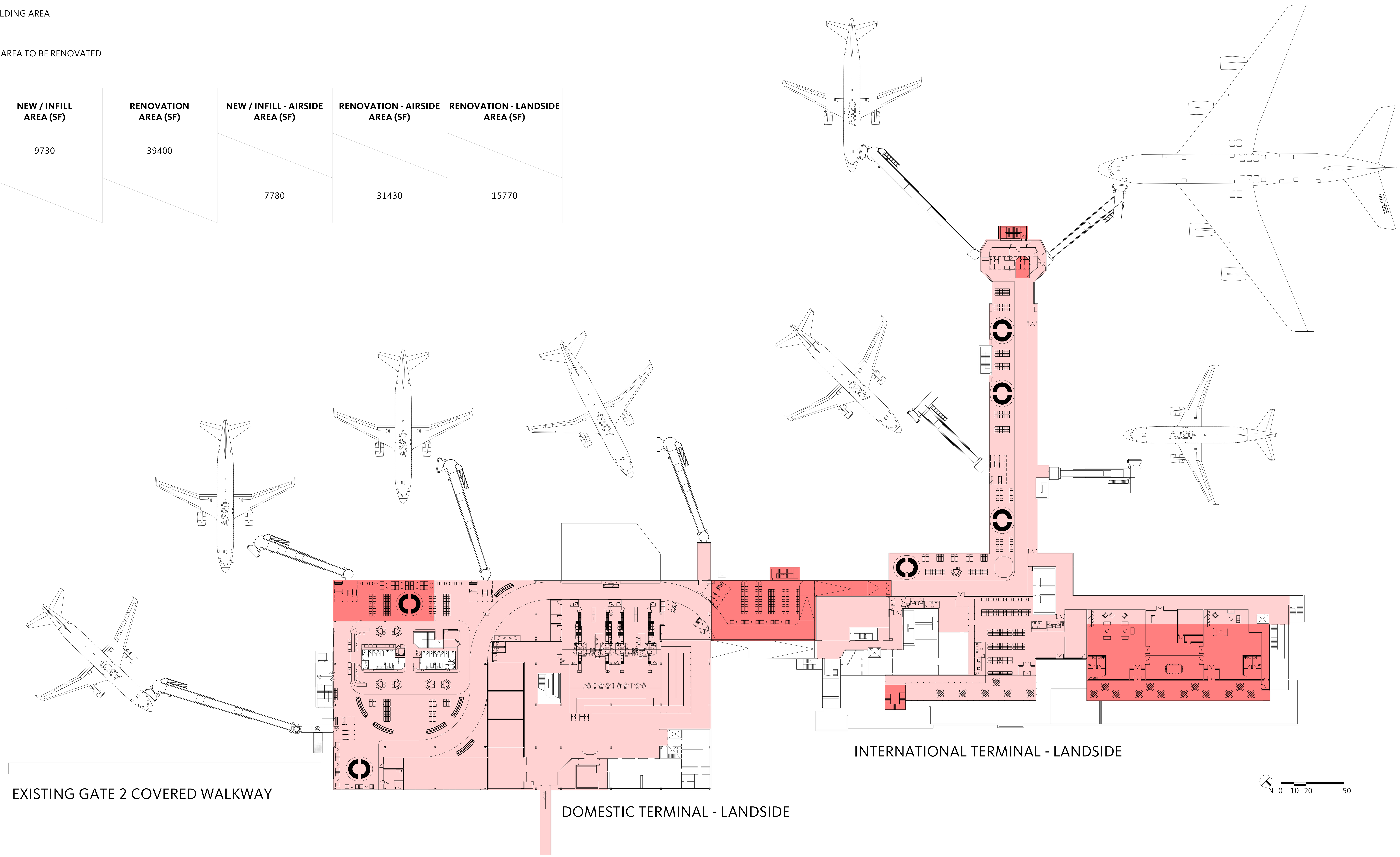
Terminal Logistics Plan - Sterile Int'l Pier Reconfiguration

EXISTING TO REMAIN AS IS

NEW INFILL / BUILDING AREA

EXISTING FLOOR AREA TO BE RENOVATED

AIRPORT AREA	NEW / INFILL AREA (SF)	RENOVATION AREA (SF)	NEW / INFILL - AIRSIDE AREA (SF)	RENOVATION - AIRSIDE AREA (SF)	RENOVATION - LANDSIDE AREA (SF)
INTERNATIONAL TERMINAL	9730	39400			
DOMESTIC TERMINAL			7780	31430	15770



Bangor International Airport

Master Plan Update - Terminal Airside Concourse Redevelopment Study

01/08/2021

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Terminal Logistics Plan - Renovation and Infill Diagram- Level 02

PROGRAM SPACE	FLOOR	WALL	GLAZING	CEILING	LIGHTING
CIRCULATION - AIRSIDE	CERAMIC TILE	GWB	STOREFRONT	WOOD CLAD SLAT W/ PAINTED ACT ABOVE	LED STRIP PENDANT
HOLDROOM	CARPET TILE	GWB	STOREFRONT	APC	LED TEGULAR STRIP LIGHTS
GATE BOARDING AREA	CARPET TILE	GWB	STOREFRONT	WOOD CLAD SLAT W/ PAINTED ACT ABOVE	LED STRIP PENDANT
DWELL LOUNGE	CERAMIC TILE	GWB	-	GWB	LED RECESSED
CONCESSIONS - AIRSIDE	CARPET TILE/ EPOXY	GWB, FRP AND CERAMIC TILE	VARIES	APC	LED TEGULAR STRIP LIGHTS AND DOWNLIGHTS
NON-OPERATING CONCESSION	-	-	-	-	-
PASSENGER SECURITY SCREENING CHECKPOINT	CARPET TILE	GWB	INTERIOR STOREFRONT	WOOD CLAD SLAT W/ PAINTED ACT ABOVE	LED STRIP PENDANT
VERTICAL TRANSPORTATION	COMPOSITE CONCRETE	FIRE RATED GWB	-	EXPOSED	LED WALL SCONCES
OPERATIONS	CARPET TILE	GWB	-	APC	LED TEGULAR STRIP LIGHTS AND DOWNLIGHTS
TROOP GREETER MUSEUM	CARPET TILE	GWB	INTERIOR STOREFRONT	APC	LED
IN-TRANSIT LOUNGE - PRIVATE	CARPET TILE	GWB	INTERIOR STOREFRONT	APC	LED TEGULAR STRIP LIGHTS
EXTERIOR DECK - PRIVATE IN-TRANSIT LOUNGE	COMPOSITE DECKING	-	TEMPERED GLASS GUARDRAIL	N/A	LED WALL SCONES
IN-TRANSIT LOUNGE	CERAMIC TILE	GWB	INTERIOR STOREFRONT	APC	LED TEGULAR STRIP LIGHTS AND DOWNLIGHTS
EXTERIOR DECK IN-TRANSIT LOUNGE	COMPOSITE DECKING	-	TEMPERED GLASS GUARDRAIL	N/A	LED WALL SCONES
STERILE CORRIDOR	CARPET TILE	GWB	INTERIOR STOREFRONT	APC	LED TEGULAR STRIP LIGHTS
CONCESSIONS - LANDSIDE	CARPET TILE / EPOXY	GWB, FRP AND CERAMIC TILE	VARIES		LED TEGULAR STRIP LIGHTS AND DOWNLIGHTS
CIRCULATION - LANDSIDE	N/A	N/A	N/A	N/A	N/A
TSA - BACK OF HOUSE	CARPET TILE	GWB	-	APC	LED TEGULAR STRIP LIGHTS AND DOWNLIGHTS
RESTROOMS/ UTILITY	CERAMIC TILE / EPOXY	GWB	-	GWB / EXPOSED	LED DOWNLIGHTS
KID'S PLAY AREA	CARPET TILE	-	-	STRETCH FABRIC LIGHTING CEILING W/ LED BACKLIGHTING	STRETCH FABRIC LIGHTING CEILING W/ LED BACKLIGHTING
AMENITY - AIRSIDE	VARIES	VARIES	VARIES	VARIES	VARIES

APC - ACOUSTIC PANEL CEILING
FRP - FIRE RESISTANT PANEL
GWB -GYPSUM BOARD
FIS- FEDERAL INSPECTION STATION
TSA - TRANSPORTATION SECURITY ADMINISTRATION

Material Schedule

APPENDIX C

Concession Plan Peer Review and Recommendations

Peer Review Key Findings

CONCESSION SPACE PROVISIONS

- Overall concession program allocation provided in the Terminal Plan is sufficient; however, the landside-to-airside concession allocation should typically be 75% airside and 25% landside. For BGR, **65% airside and 35% landside** is recommended.
- Strategic airside location of Food and Beverage operations may be critical for the serving both the landside and airside in the future.

CONCESSION ALLOCATION

- The physical layout of the proposed terminal reconfiguration will result in some inefficiencies as customers must make a decision to go either LEFT or RIGHT.
- The lack of opportunity to create a centralized concession offering that all passengers can experience will result in a need to duplicate basic concession offerings.
- Vending systems, while helpful, should be carefully placed and should not compete with other in-line concession offerings.

FUTURE PLANNING CONSIDERATIONS

- Food and Beverage locations on the terminal airside may also concurrently serve the landside using secure goods transfer solutions such as a **sallyport.**
- **App-based food delivery solutions** have seen significant popularity in 2020, but the high cost for vendors to implement and operate such solutions may result in solutions that may ultimately be too impracticable for the limited demand at the the terminal. Existing restaurant kitchens, however, can operate as **"Ghost Kitchens"** to support these delivery services.
- **Vending machines** provide a wide range of innovative product offerings today from clothing to PPE to hot / cold products to even freshly prepared offerings (e.g. custom salads). Carefully planned and inventive applications of vending solution can co-exist traditional concession.
- There may not be adequate space and traveler demand to attract **business center and third party lounge operators**; however, many smaller airports have run their own such facilities.
- As BGR looks to renewing leases, consider some concession operators who focus on serving **regional and non-hub airports.**

Comparison

Existing Airport Concessions
- Airside 690 SF
- Landside 6,925 SF[1]
- TOTAL **7,615 SF**

Gensler MPU Programming (PAL 4)
- Recommended 6,923 SF
- Provided **7,787 SF**

ICF Recommended Range (PAL 4)
- Low **3,607 SF**
- High **4,509 SF**

BGR Concession Programming Recommendations (PALs 1-4)

PLANNING PERIODS [2]	GENSLER PROPOSED (SF)	ICF RECOMMENDATION LOW (SF)	ICF RECOMMENDATION HIGH (SF)
Passenger Activity Level 1 210,000 Enplaned Passengers	3,453	2,439	3,049
Passenger Activity Level 2 338,000 Enplaned Passengers	5,560	2,640	3,330
Passenger Activity Level 3 362,000 Enplaned Passengers	5,963	2,897	3,622
Passenger Activity Level 4 421,000 Enplaned Passengers	6,923	3,607	4,509

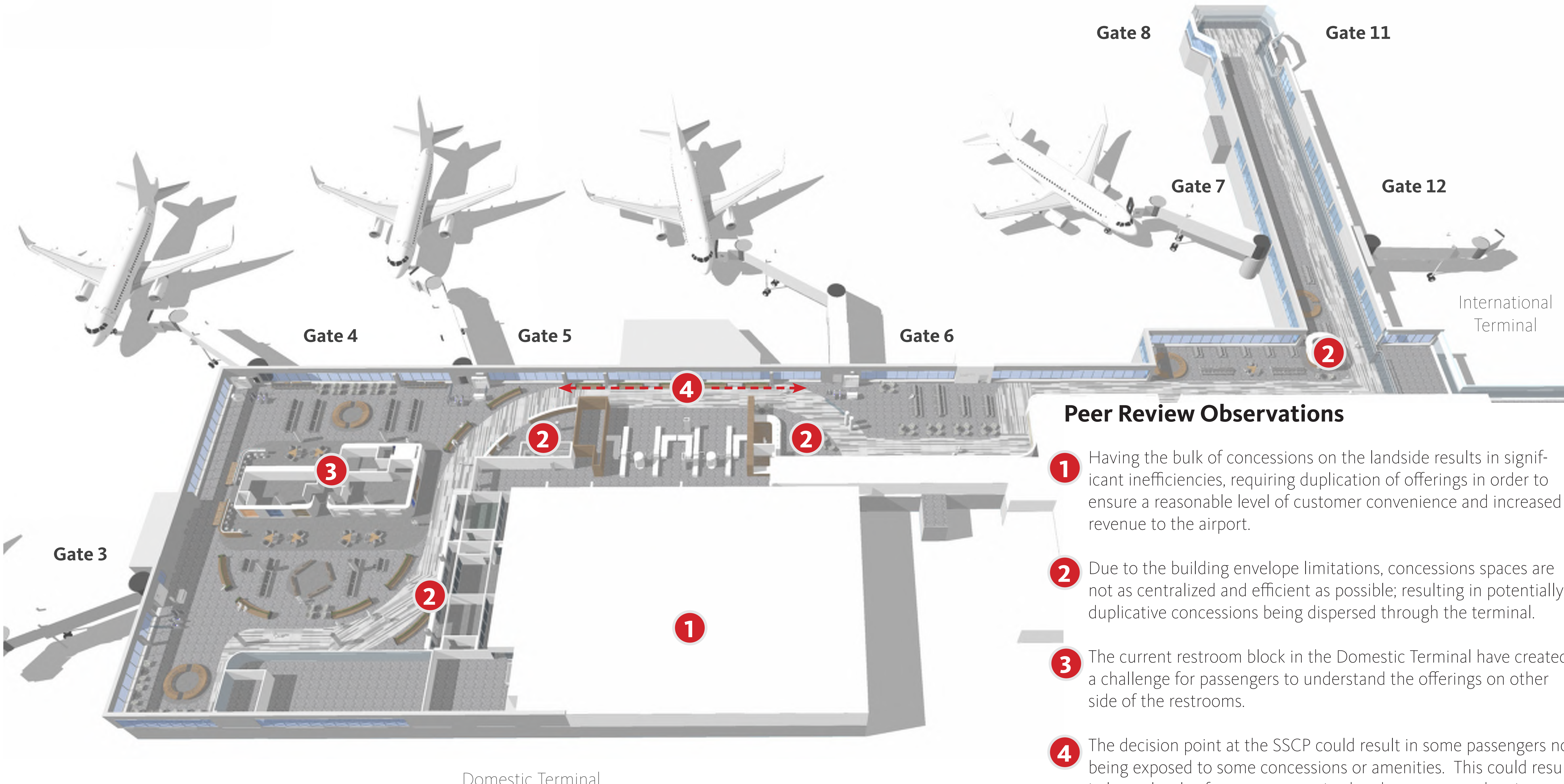
NOTES:
1 - Existing landside concession inventory includes Troop Greeter Museum space.
2 - Indicative Passenger Activity Levels (PAL) have been established as part of the Forecast scope of the Master Plan Updates. Indicative PALs (usually in the form of passenger enplanements) are used to guide Master Plans and trigger specific facility requirements.

Conclusion

- The areas provided in the Jacobs/Gensler plan are more than sufficient to meet the demands that ICF expects will be realized throughout the study period.

- However, it is important to note that due to Terminal configuration issues, slightly more space than is projected may be needed to provide appropriate levels of service in all parts of the Terminal (for example, when the International Terminal comes online).

Concession Space Review Allocation Analysis



Peer Review Observations

1. Having the bulk of concessions on the landside results in significant inefficiencies, requiring duplication of offerings in order to ensure a reasonable level of customer convenience and increased revenue to the airport.
2. Due to the building envelope limitations, concessions spaces are not as centralized and efficient as possible; resulting in potentially duplicative concessions being dispersed through the terminal.
3. The current restroom block in the Domestic Terminal have created a challenge for passengers to understand the offerings on other side of the restrooms.
4. The decision point at the SSCP could result in some passengers not being exposed to some concessions or amenities. This could result in lower levels of customers serviced and revenues to the airport, or even the need to duplicate basic concession offerings.

"FLEX-BLOCKS" and SLIDING PARTITIONS

The Gensler-recommended strategy to provide walls that can be adjusted between sterile and non-sterile has not been realized in any domestic or international facility to ICF's knowledge.

However, other similar concepts utilizing indoor "sallyport" systems used in at least three (3) U.S. Airports that allow for goods and services to be provided to both the airside and landside.

ICF RECOMMENDATION

ICF recommends considering a dedicated food and beverage concept that can benefit both landside and airside. A sallyport system allows a single airside kitchen to serve dining facilities on BOTH the airside and landside.

Key considerations include:

- Food can be prepared on the airside and can be sent to the landside through an opening which only allows goods to pass from airside to landside.
- This can be achieved, for this purpose, by utilizing a large "lazy Susan"-type set-up with a large hole and a wall that stops all materials from passing back from landside to airside.
- A large, bomb-proof waste container is located under the hole and the forward movement of the lazy Susan and the wall force anything on the turntable into the bomb-proof container which can only be emptied from the landside.

CASE STUDY: Rogue Valley Int'l Airport (Medford, OR)

- With the introduction of a the new sallyport solution to manage airside and landside demand, food sales immediately doubled; retail sales quadrupled with only limited increase in personnel costs.
- NOTE: While it is generally anticipated that the landside portion of the food service operation will have servers, it would be possible for the facility to be self-service. A kiosk ordering system with a display board showing order numbers can be utilized for self-service operations and mitigate additional labor requirements.
- Fort Wayne Airport (Indiana) and Erie Int'l Airport have also installed a sally port for this purpose.

Airside dining area of the Sky House pub - Rogue Valley International Airport

Landside materials transfer sally port for Sky House pub - Rogue Valley International Airport

Recommendations

3rd PARTY BUSINESS CENTER / AIRLINE LOUNGE

The Gensler-recommended strategy to provide a 3rd party business center or passenger lounge was considered challenging from the perspective of supportable demand. As no single airline at BGR has sufficient passenger traffic to support a dedicated passenger lounge, the options for such a facility include:

- A 3rd party-operated lounge
  - 3rd party lounges are popular across the U.S.
  - Airports are paid either a concession fee or a per SF rent
  - One vendor noted that their *minimum volume* was 1 - 1.5 million enplanements.

- Airport-operated lounge
  - The costs of operating such lounge fall to the airport. Most self-operated lounges either have limited staff, or do not have any staff, but that limits the types of services which may be offered.

ICF RECOMMENDATION

ICF recommends the following considerations:

- The facility may provide limited amenities, including comfortable seating, Internet service, workstations, and a staffed location may offer limited food and drink (likely packaged snacks and beverages, based on current sanitation and health departments requirements), and/or a children's play area (if the facility is not business-traveler focused)

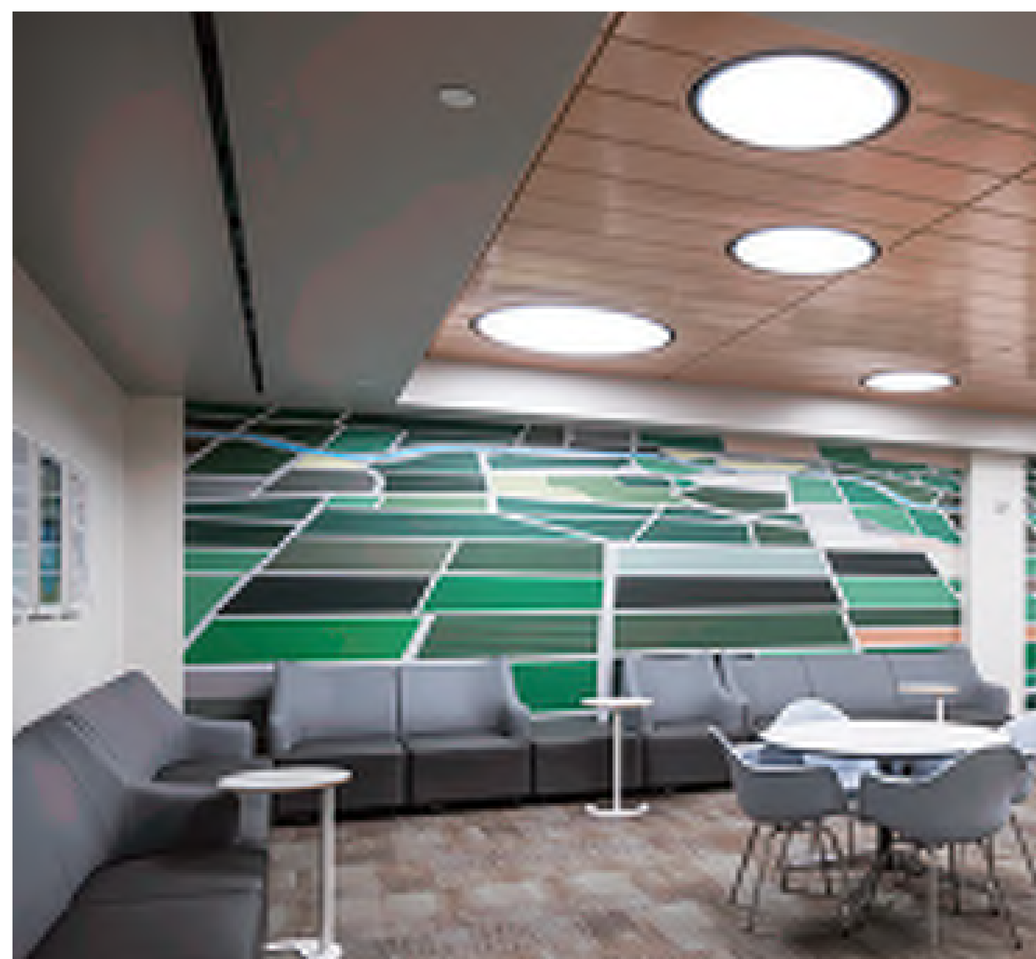
- The lounge or business center may be operated on a pay-per-use basis or be provided as a complimentary offering for Airport users.

CASE STUDY: Gerald Ford Int'l Airport Welcome and Business Center (Grand Rapids, MI)

- The GRR Airport Authority, as part of their $17 million phase 1 terminal overhaul in 2018, developed an independent business center from which they operate and generate revenue from. While services like seating, work surfaces and charging are complimentary, the use of the International Conference Room and 5 other conference and assembly spaces located at the Main Terminal's is by pre-arranged rental.
- The business centers were outfitted by West Michigan office furniture behemoths Steelcase and Herman Miller.
- Additionally, a separate military welcome center was also constructed as part of the Phase 1 improvements. The facility was created in partnership with local grocery distributor, SpartanNash.
- For more information, please try the Airport at 616-233-6000.

Military Welcome Center - Gerald Ford International Airport

Business Center - Gerald Ford International Airport



Recommendations

CONCESSION DELIVERY OPTIONS

The Gensler-recommended strategy to provide a 3rd party delivery services were considered potentially viable, but must consider operational and financial factors prior to implementing these systems in the terminal. These "app-based" systems require that an employee of either the concession or a 3rd party carry prepared food / retail goods from on side of the airport to the other.

- There is currently only one company, **At Your Gate**, which provides concession ordering / delivery services in U.S. airports.
- A second, **Fetchy Fox** is currently beginning to establish itself in the U.S. after a successful proof of concept in Scotland.
- **Servy** (formerly "Grab") the most well-known app in this space does not provide product delivery services, but has teamed with At Your Gate to provide delivery and is now experimenting with robots to complete deliveries.

ICF RECOMMENDATIONS

ICF suggests the following considerations:

- Consider if the overall (airport staff and customer) demand can justify the potential significant up-front costs required to get these app-systems and providers up and running.
- Consider the use of a "ghost kitchen" to prepare and deliver food orders to the airside.
  - Common kitchen serving Refueler and the Highland Market might serve as a ghost kitchen for future concession delivery systems and
  - The SIDA access and costs for a vendor to establish and operate such services need to be factored into the evaluation of these services.

VENDING MACHINES and OTHER SELF-SERVICE OPTIONS

The Gensler-recommended strategy is to provide a vending machines as a means of enhancing the customer experience. This could be especially viable during IROPs or after hours operating conditions. Vending technologies now can offer a wide variety of products and can provide concession services without the cost of building or operating a staffed store.

Next-generation retail vending machines can be found in US airports; offering products from Best Buy, Hudson News, Sephora Uniqlo and CVS - including PPE, COVID-19 tests, baby supplies, flowers, cosmetics, smart phone charging batteries, and a variety of others. Additionally, current food service vending machines offer fresh ground and brewed coffee as well as other hot beverages, hot ramen, and freshly prepared salads, for example.

ICF RECOMMENDATION

ICF recommends the following considerations:

- Careful placement of vending machines is critical as they should not compete with existing in-line, staffed concession offerings;
- An overly prominent vending machine presence may potential deter future concessionaires from entering the BGR marketplace and
- Vending machines may be best suited to offer bespoke specialty offerings that would otherwise not be available in convenience retail offerings.

ACTION ITEMS

SALLYPORT SOLUTION FOR FUTURE FOOD & BEVERAGE

- Explore the viability of a sallyport in the future food and beverage outlet the airside location previously identified in the Terminal Study for the "Innovation Hub Flex Blocks."

3RD PARTY LOUNGE / BUSINESS & WELCOME CENTER

- Consider conducting a survey as passenger activity to understand the level of interest between commercial service customers as well as returning troops.

CONCESSION DELIVERY OPTIONS

- Consider reaching out to *At Your Gate* to understand their implementation requirements. They have worked with Gensler recently and can discuss their delivery program with the airport.

Recommendations

SPECIALTY CONCESSION OPERATORS

As the airport contemplates future concession redevelopment options, there are a few national concession operators that serve small and non-hub airports to consider, including:

Tailwind Concessions

- http://www.tailwindconcessions.com/
- Their smallest airport is Erie International Airport (which is using a sally port for their concessions): 107,000 enplanements (2019 data)

First Class Concessions

- https://www.firstclassconcessions.com/
- Their smallest airport is San Luis Obispo County Regional Airport: 259,000 enplanements (2019 data)

Air Host

- https://www.airhost.net/
- Their smallest airport is Roanoke-Blacksburg Regional Airport: 343,000 enplanements (2019 data)

MSE Branded Foods

- http://www.msebranded.com/
- Their smallest airport is Flint Bishop Airport: 302,000 enplanements (2019 data)

Faber, Coe and Gregg

- https://faber-intl.com/
- Their smallest airport is Bismark Municipal Airport: 309,000 enplanements (2019 data)

APPENDIX D

Preliminary ROM Cost Estimated – Jacobs Engineering Group

Jacobs

BANGOR TERMINAL MASTERPLAN

Bangor International Airport Authority

Class 5 Concept Capital Cost Estimate

10 MARCH 2021

This memorandum serves to provide a Class 5 capital cost estimate for Bangor Terminal Masterplan for Bangor International Airport Authority. The purpose of this cost estimate is to provide an opinion of probable costs for seven cost development areas required for the design and construction of the infrastructure required to support the Addition/Renovation of Bangor Terminal in City of Bangor, Manie.

The attached estimate in Appendix A is a historical cost-based estimate, meaning, it was prepared using historical bid data from comparable projects. Historical data will generally include overhead and profit but will have applied factors to escalate costs to current 2021 dollars; in some cases, a Location Factor index is applied. The estimate is classified as a Class 5 estimate as defined by the Association for the Advancement of Cost Engineering International (AACE). The estimating accuracy for a Class 5 estimate is -30% to +50% as described on the chart attached in Appendix B.

TABLE 1.1

BGR Terminal Masterplan for Bangor, Maine

Class 5 Concept Capital Cost Estimate Summary

Low Range	COST BREAKDOWN WITH ESTIMATE RANGE	High Range
-30%	**D1 Gate 4 Building Infill**	+50%
$3,125,189	$4,464,556	$6,696,834
-30%	**D2 Existing Area Renovation**	+50%
$9,214,734	$13,163,906	$19,745,859
-30%	**D3 Existing Area Renovation**	+50%
$5,757,290	$8,224,700	$12,337,049
-30%	**D4 Gate 6 Building Infill**	+50%
$4,684,285	$6,691,835	$10,037,753
-30%	**I1 Roof deck Overbuild and Outdoor Deck**	+50%
$7,055,399	$10,079,141	$15,118,711
-30%	**I2 FIS Connection & Outdoor Deck**	+50%
$2,061,142	$2,944,489	$4,416,733
-30%	**I3 Existing Area Renovation**	+50%
$10,363,054	$14,804,363	$22,206,545
	TOTAL PROJECT CONSTRUCTION COST	
$42,261,092	**$60,372,989**	**$90,559,484**

General Scope:

- Cost Breakdown D1 Gate 4 Building Infill (2,645 SF)
    - Demolition as necessary
    - Concrete/Formwork/Reinforcement work for Building Foundations, Grade Beams

and Slab on Grade
- Structural Floor @ Level 2
- Structural Floor @ Roof
- Split Face Masonry at Exterior Envelope
- Metal Panels @ Exterior Envelope
- Exterior Envelope with Sunshade
- Reglazing of Existing Exterior Envelope as necessary
- New Roofing for Infill area
- Interior and Exterior Doors
- Interior Drywall Partitions/Furring and Glass Partitions
- Acoustical/Gyp Board and Wood Clad Ceiling Systems
- Allowance for Carpet Tile and Ceramic Tile Flooring
- Allowances for Interior/Exterior Signage
- Allowance for E-Gates
- Allowance for Base Cabinets/Wall Cabinets and Counter Tops
- Allowance for Hold Room Accessories
- Allowance for Fire Sprinkler System
- Allowance for HVAC and Integrated Automation Work
- Allowance for Electrical, Communications and Electronic Safety/Security work
- Site preparation and Demolition
- Earth Excavation/Backfill and Haul-off of material for Building Foundation
- Allowance for Utilities Connection

- Cost Breakdown D2 – Exiting Area Renovation (31,430 SF)
  - Allowance for Interior and Exterior Demolition of Existing Space
  - Allowance for Patching Existing Concrete Floor
  - Allowance for Interior/Exterior Glass and HM Doors, Frames and Hardware
  - Exterior Envelope with Sunshade
  - Reglazing of Existing Exterior Envelope as necessary
  - Interior Drywall Partitions/Furring and Glass Partitions
  - Acoustical/Gyp Board, Stretched Fabric Ceiling and Wood Clad Ceiling Systems
  - Allowance for Carpet Tile and Ceramic Tile Flooring
  - Allowance for Interior/Exterior Signage
  - Allowance for E-Gates
  - Allowance for Base Cabinets/Wall Cabinets and Counter Tops
  - Allowance for Hold Room Accessories
  - Allowance for Fire Sprinkler System
  - Allowance for HVAC and Integrated Automation Work
  - Allowance for Electrical, Communications and Electronic Safety/Security work

- Cost Breakdown D3 – Existing Area Renovation (15,770 SF)
  - Allowance for Patching Existing Concrete Floor
  - Allowance for Interior/Exterior Glass and HM Doors, Frames and Hardware
  - Exterior Envelope with Sunshade
  - Reglazing of Existing Exterior Envelope as necessary
  - Interior Drywall Partitions/Furring and Glass Partitions
  - Acoustical/Gyp Board, Stretched Fabric Ceiling and Wood Clad Ceiling Systems
  - Allowance for Carpet Tile and Ceramic Tile Flooring

  - Allowance for Interior/Exterior Signage
  - Allowance for Vase Cabinets/Wall Cabinets and Counter Tops
  - Allowance for Passenger Security Screening Area Accessories
  - Allowance for Fire Sprinkler System
  - Allowance for HVAC and Integrated Automation Work
  - Allowance for Electrical, Communications and Electronic Safety/Security work

- Cost Breakdown D4 – Gate 6 Building Infill (4,953 SF)
  - Demolition as necessary
  - Concrete/Formwork/Reinforcement work for Building Foundations, Grade Beams and Slab on Grade
  - Structural Floor @ Level 2
  - Structural Floor @ Roof
  - Split Face Masonry at Exterior Envelope
  - Metal Panels @ Exterior Envelope
  - Exterior Envelope with Sunshade
  - Reglazing of Existing Exterior Envelope as necessary
  - New Roofing for Infill area
  - Interior and Exterior Doors
  - Interior Drywall Partitions/Furring and Glass Partitions
  - Acoustical/Gyp Board and Wood Clad Ceiling Systems
  - Allowance for Carpet Tile and Ceramic Tile Flooring
  - Allowances for Interior/Exterior Signage
  - Allowance for E-Gates
  - Allowance for Base Cabinets/Wall Cabinets and Counter Tops
  - Allowance for Hold Room Accessories
  - Allowance for Fire Sprinkler System
  - Allowance for HVAC and Integrated Automation Work
  - Allowance for Electrical, Communications and Electronic Safety/Security work
  - Site preparation and Demolition
  - Earth Excavation/Backfill and Haul-off of material for Building Foundation
  - Allowance for Utilities Connection

- Cost Breakdown I1 – Roof deck Overbuild and Outdoor Deck (10,459 SF)
  - Concrete/Formwork/Reinforcement work for Building Foundations, Grade Beams and Slab on Grade
  - Split Face Masonry at Exterior Envelope
  - Structural Floor @ Level 2 and Roof
  - Interior/Exterior Doors and Windows
  - Exterior Envelope and Sunshade
  - Interior Drywall Partitions/Furring and Glass Partitions
  - Allowance for Carpet Tile and Ceramic Tile Flooring
  - Allowance for Acoustical/Gyp Board and Wood Clad Ceiling Systems
  - Allowances for Interior/Exterior Signage
  - Allowance for Base Cabinets/Wall Cabinets and Counter Tops
  - Allowance for Lounge Room Accessories
  - Allowance for Fire Sprinkler System
  - Allowance for Plumbing work

- Allowance for HVAC and Integrated Automation Work
- Allowance for Electrical, Communications and Electronic Safety/Security work
- Site preparation and Demolition
- Earth Excavation/Backfill and Haul-off of material for Building Foundation

- Cost Breakdown I2 – FIS Connection and Outdoor Deck (2,516 SF)
  - Demolition as necessary
  - Structural Floor @ Second Level and Roof
  - Exterior Envelope with Sunshade
  - Tempered Glass Handrails @ Open Deck
  - New Roofing for Infill area
  - Interior and Exterior Doors
  - Interior Drywall Partitions/Furring and Glass Partitions
  - Acoustical/Gyp Board and Wood Clad Ceiling Systems
  - Allowance for Carpet Tile and Ceramic Tile Flooring
  - Allowances for Interior/Exterior Signage
  - Allowance for Base Cabinets/Wall Cabinets and Counter Tops
  - Allowance for Lounge Room Accessories
  - Allowance for Two Stop Hole less Passenger Elevator
  - Allowance for Fire Sprinkler System
  - Allowance for HVAC and Integrated Automation Work
  - Allowance for Electrical, Communications and Electronic Safety/Security work

- Cost Breakdown I3 – Existing Area Renovation (26,290 SF)
  - Concrete/Formwork/Reinforcement work for Building Foundations, Grade Beams and Slab on Grade
  - Split Face Masonry at Exterior Envelope
  - Structural Floor @ Roof
  - New Fire Stair 02
  - New Roofing system
  - Interior/Exterior Doors and Windows
  - Exterior Envelope and Sunshade
  - Interior Drywall Partitions/Furring and Glass Partitions
  - Allowance for Carpet Tile and Ceramic Tile Flooring
  - Allowance for Acoustical/Gyp Board and Wood Clad Ceiling Systems
  - Allowances for Interior/Exterior Signage
  - Allowance for E-Gates
  - Allowance for Base Cabinets/Wall Cabinets and Counter Tops
  - Allowance for Hold Room Accessories
  - Allowance for Fire Sprinkler System
  - Allowance for Plumbing work
  - Allowance for HVAC and Integrated Automation Work
  - Allowance for Electrical, Communications and Electronic Safety/Security work
  - Site preparation and Demolition
  - Earth Excavation/Backfill and Haul-off of material for Building Foundation

Key Assumptions

The estimate assumes that the work will be done on a competitive bid basis and the contractor will have a reasonable amount of time to complete the work working 5-eight hour days per week, unless otherwise noted. Other key assumptions include:

- Contractor will have access and control of construction site during construction.
- Owner will coordinate with the contractor and provide adequate notification when needing to perform operations within the construction area.
- Contractor will accommodate owner access in the construction area in event of emergency
- The estimate is based on quantities developed by the design team.
- Historical unit prices were used from recent bid tabs from similar projects in the area.
- Reasonable Construction Schedule
- Site access for the contractor and contractor staging areas are adequate for the contractor's needs.
- The estimate is based on the narrative summary provided by our engineers.
- No detailed drawings available.
- Design Contingency of 20% is used.
- Delivery method is assumed to be design-bid-build procurement.
- 14 Gunnebo E=Gates compatible for biometric operations using SITA proprietary software were used in the estimates and cost assumptions are in 2021 dollars with indicative costs for integration and 1-year maintenance agreement. No additional costs for servicing and maintenance have been included beyond the initial year of service.

Key Exclusions

- Non-construction or soft costs for design, services during construction, land, legal and owner administration costs, they are added as below the line in the summary page of the cost estimate.
- All furniture, Fixture and Equipment (FF&E) excluded. This includes airport public seating as well as digital displays for Flight and Gate Information.
- Phasing Allowance
- Hazardous material abatement
- Premium for nonstandard Contracting method
- Changes to the project location, routing, or schedule due to obstructions
- Additional work required due to unseen or unknown conditions found during performance of other work
- Schedule delays due to inclement weather or other natural causes
- Schedule delays due to other site operations
- Access restriction

- Escalation to midpoint of construction
- Sales Tax
- Construction Contingency (Change orders during construction)

Allowances

The current cost estimate includes the following allowances within the cost estimate:

- Contractor General Conditions @ 10%
- Contractor Mobilization @ 6%
- Traffic Control @ 3%
- Seismic Structural Strengthening @ 10% for Renovated Areas only
- Erosion and Dust Control @ 1%
- Insurance and Bond @ 2.5%
- Permits @ 1%
- General Contractor's Overhead, Profit and Fees @ 15%

Methodology: This is a historical bid-based estimate that relies on historical bid data. This is the preferred method to develop conceptual costs for a Class 5 estimate. Unit costs include general contractor overhead and profit. Factors that may be applied to historical unit prices include escalation to current dollars, and a regional index factor that will correlate data from one region to another.

This cost estimate is based on quantities provided in the above referenced summary memo, and electronic quantity takeoffs that have been generated from the schematic design concepts.

Cost Resources

The following list is a summary of the various cost resources used in the development of this cost estimate:

- Estimator Judgement

- Local area recent bid tabs from City of Bangor

- Jacobs's Historical Data

- R.S. Means

- Cost Data Online

Estimate Validity

This cost estimate is prepared in March 2021. As with all estimates it represents a snapshot in time of what is known about the project and expected to occur. The commodities and energy markets are extremely active now. Changes in either will have dramatic affects to this estimate. Therefore, this estimate should be viewed in that light and if more than 90 days have passed, or there have been significant changes in the commodity markets, this estimate should be updated and reevaluated.

Estimate Disclaimer

The opinions of cost (estimates) shown, and any resulting conclusions on project financial or economic feasibility or funding requirements, have been prepared for guidance in project evaluation and implementation from the information available at the time the opinion was prepared. The final costs of the project and resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personnel and engineering, and other variable factors. The recent increases or decreases in material pricing may have a significant impact which is not predictable and careful review or consideration must be used in evaluation of material prices. As a result, the final project costs will vary from the opinions of cost presented herein. Because of these factors, project feasibility, benefit/cost ratios, risks, and funding needs must be carefully reviewed prior to making specific financial decisions or establishing project budgets to help ensure proper project evaluation and adequate funding.

Appendix A: Cost Estimate Detail and Summary Reports

Class 5 Cost Estimate by CSI Division

DATE: 10-Mar-21

BGR TERMINAL MASTERPLAN COST BUDGET

GSF	2,645	2,645	31,430	15,770	4,953	4,953	10,459	2,516	26,290	101,661
Construction Elements	**D1A - GATE 4 BUILDING INFILL**	**D1B - GATE 4 INFILL SHADOW SPACE**	**D2 - EXISTING AREA RENOVATION**	**D3 - EXISTING AREA RENOVATION**	**D4A - GATE 6 BUILDING INFILL**	**D4B - GATE 6 UTILITIES AREA**	**I1 - ROOFDECK OVERBUILD & OUTDOOR DECK**	**I2 - FIS CONNECTION & OUTDOOR DECK**	**I3 - EXISTING AREA RENOVATION**	**GRAND TOTAL**
Division 01 - General Requirements	$408,092	$207,510	$2,393,697	$1,495,562	$563,033	$359,681	$1,832,770	$406,005	$2,691,995	$10,358,345
Division 02 - Existing Conditions	$361,560	$7,935	$615,090	$331,050	$27,000	$22,359	$52,295	$12,580	$545,550	$1,975,419
Division 03 - Concrete	$47,610	$104,064	$188,580	$94,620	$89,154	$169,156	$188,262	$22,644	$582,440	$1,486,530
Division 04 - Masonry	$0	$61,560	$0	$0	$23,760	$88,560	$59,400	$56,250	$50,625	$340,155
Division 05 - Metals	$223,833	$200,028	$0	$0	$479,148	$374,571	$1,712,008	$392,740	$96,175	$3,478,502
Division 06 - Wood, Plastics, and Composites	$15,870	$7,935	$188,580	$94,620	$29,718	$14,859	$62,754	$15,096	$157,740	$587,172
Division 07 - Thermal and Moisture Protection	$76,705	$59,828	$31,430	$15,770	$143,637	$90,660	$303,311	$30,864	$34,490	$786,695
Division 08 - Openings	$191,700	$19,800	$468,300	$374,250	$228,600	$19,800	$389,800	$284,000	$736,200	$2,712,450
Division 09 - Finishes	$58,512	$22,710	$731,745	$863,545	$206,262	$41,526	$238,105	$69,491	$771,223	$3,003,117
Division 10 - Specialties	$21,160	$5,290	$125,720	$63,080	$39,624	$19,812	$83,672	$20,128	$210,320	$588,806
Division 11 - Equipment	$180,000	$0	$90,000	$0	$90,000	$0	$0	$0	$270,000	$630,000
Division 12 - Furnishings	$24,000	$0	$180,000	$120,000	$36,000	$0	$72,000	$14,400	$96,000	$542,400
Division 13 - Special Construction	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Division 14 - Conveying Systems	$0	$0	$0	$0	$0	$0	$0	$300,000	$0	$300,000
Division 21 - Fire Suppression	$19,838	$19,838	$141,435	$70,965	$37,148	$37,148	$78,443	$18,870	$197,175	$620,858
Division 22 - Plumbing	$0	$0	$0	$236,550	$0	$0	$156,885	$0	$315,480	$708,915
Division 23 - Heating, Ventilating, and Air Conditioning	$158,700	$79,350	$1,414,350	$709,650	$297,180	$148,590	$627,540	$150,960	$1,183,050	$4,769,370
Division 25 - Integrated Automation	$39,675	$19,838	$235,725	$118,275	$74,295	$0	$156,885	$37,740	$0	$682,433
Division 26 - Electrical	$238,050	$119,025	$2,262,960	$1,135,440	$445,770	$222,885	$941,310	$226,440	$1,577,400	$7,169,280
Division 27 - Communications	$39,675	$19,838	$235,725	$118,275	$74,295	$37,148	$156,885	$37,740	$157,740	$877,320
Division 28 - Electronic Safety and Security	$39,675	$19,838	$235,725	$118,275	$74,295	$37,148	$156,885	$37,740	$157,740	$877,320
Division 31 - Earthwork	$0	$21,979	$0	$0	$0	$35,237	$34,517	$0	$14,124	$105,857
Division 32 - Exterior Improvements	$0	$88,167	$0	$0	$0	$165,100	$0	$0	$876,333	$1,129,600
Division 33 - Utilities	$0	$6,000	$0	$0	$0	$6,000	$0	$0	$6,000	$18,000
Division 34 - Transportation	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Division 35 - Waterways and Marine	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Division 41 - Material Processing and Handling Equipment's	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Division 44 - Pollution Control Equipment's	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
(1) Total Amount for Construction - {Total of all Divisions}	$2,144,654	$1,090,531	$9,539,062	$5,959,927	$2,958,918	$1,890,238	$7,303,725	$2,133,688	$10,727,799	$43,748,543
(2) General Contractor's Mark Ups (Overhead, Profit and Fees)	$321,698	$163,580	$1,430,859	$893,989	$443,838	$283,536	$1,095,559	$320,053	$1,609,170	$6,562,281
(3) Contingencies and Owner Soft Costs	$493,270	$250,822	$2,193,984	$1,370,783	$680,551	$434,755	$1,679,857	$490,748	$2,467,394	$10,062,165
Grand Total for (1) + (2) +(3)	**$2,959,623**	**$1,504,933**	**$13,163,906**	**$8,224,700**	**$4,083,307**	**$2,608,528**	**$10,079,141**	**$2,944,489**	**$14,804,363**	**$60,372,989**
SAY $/SF	$1,119	$569	$419	$522	$824	$527	$964	$1,170	$563	$594

CLASS 5 COST ESTIMATE RANGE	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
LOW RANGE @ -30%	$2,071,736	$1,053,453	$9,214,734	$5,757,290	$2,858,315	$1,825,970	$7,055,399	$2,061,142	$10,363,054	$42,261,092
OPINION OF PROBABLE COST	$2,959,623	$1,504,933	$13,163,906	$8,224,700	$4,083,307	$2,608,528	$10,079,141	$2,944,489	$14,804,363	$60,372,989
HIGH RANGE @ +50%	$4,439,434	$2,257,399	$19,745,859	$12,337,049	$6,124,961	$3,912,792	$15,118,711	$4,416,733	$22,206,545	$90,559,484

NOTE: ALL NUMBERS ARE IN MARCH 2021 DOLLARS

GSF 2,645

D1A - GATE 4 BUILDING INFILL

Opinion of Probable Construction Cost   **DATE: 10-Mar-21**

Order of Magnitude

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
1	**DIVISION 1 - GENERAL REQUIREMENTS**					
2	Mobilization		**6.00%**	$1,736,562.13	$104,194	
3	Traffic Control		**3.00%**	$1,736,562.13	$52,097	
4	Erosion and Dust Control		**1.00%**	$1,736,562.13	$17,366	
5	General Conditions		**10.00%**	$1,736,562.13	$173,656	
6	Insurance & Bonds		**2.50%**	$1,736,562.13	$43,414	
7	Permits		**1.00%**	$1,736,562.13	$17,366	
8						
9	**GENERAL REQUIREMENTS TOTAL**					**$408,092**
10						
11	**DIVISION 2 - EXISTING CONDITIONS**					
12	Allowance for Relocating PBB	EA	1	$300,000.00	$300,000	
13	Removal of Existing Exterior Wall for New Storefront System	SF	1,368	$45.00	$61,560	
14						
15	**EXISTING CONDITIONS TOTAL**					**$361,560**
16						
17	**DIVISION 3 - CONCRETE**					
18	Concrete Topping Slab to Second Floor Level 3" Thick	GSF	2,645	$9.00	$23,805	
19	Concrete Topping Slab to Roof Level 3" Thick	GSF	2,645	$9.00	$23,805	
20						
21	**CONCRETE TOTAL**					**$47,610**
22						
23	**DIVISION 4 - MASONRY**					
24	Split Face CMU Exterior Wall 12' High	SF	0	$45.00	$0	
25						
26	**MASONRY TOTAL**					**$0**
27						
28	**DIVISION 5 - METALS**					
29	Allowance for steel framing including Columns and Beams for Roof Floor @ 25lbs/SF	TONS	33	$5,500.00	$181,844	
30	Metal Deck @ Second Floor Level	GSF	2,645	$4.50	$11,903	
31	Metal Deck @ Roof Level	GSF	2,645	$4.50	$11,903	
32	Allowance for Misc Steel	TONS	3	$5,500.00	$18,184	
33						
34	**METALS TOTAL**					**$223,833**
35						
36	**DIVISION 6 - WOOD, PLASTICS & COMPOSITES**					
37	Wood Blocking as necessary in East Loading Dock Area	GSF	2,645	$6.00	$15,870	
38						
39	**WOOD, PLASTICS & COMPOSITES TOTAL**					**$15,870**
40						
41	**DIVISION 7 - THERMAL & MOISTURE PROTECTION**					
42	Allowance for Joint Sealant and Caulking	GSF	2,645	$1.00	$2,645	
43	New Roofing System EPDM	GSF	2,645	$25.00	$66,125	
44	Spray On Fire Proofing to Deck	GSF	2,645	$3.00	$7,935	
45						
46	**THERMAL & MOISTURE PROTECTION TOTAL**					**$76,705**
47						
48	**DIVISION 8 - DOORS & WINDOWS**					
49	Exterior 3' x 7' HM Door with HM Frames and necessary Hardware	EA	1	$3,600.00	$3,600	
50	Exterior 6' x 7' Glass Door with Aluminum Frames and necessary Hardware	EA	1	$7,200.00	$7,200	
51	Interior Aluminum and Glass Partitions	SF	300	$90.00	$27,000	
52	Exterior Window Wall System	SF	912	$150.00	$136,800	
53	Allowance for Sun Shade	LF	114	$150.00	$17,100	
54						
55	**OPENINGS TOTAL**					**$191,700**

GSF 2,645

D1A - GATE 4 BUILDING INFILL

Opinion of Probable Construction Cost — DATE: 10-Mar-21

Order of Magnitude

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
56						
57	**DIVISION 9 - FINISHES**					
58	Furring to Exterior Walls	SF	254	$6.00	$1,524	
59	Soffits	SF	600	$7.50	$4,500	
60	New 2' X 4' Acoustical Ceiling System consisting of suspension system and 5/8" fiberglass ceiling panels	SF	2,645	$5.00	$13,225	
61	New Gyp Board Ceiling	SF	0	$15.00	$0	
62	Wood Clad Ceiling @ Boarding Area	SF	350	$45.00	$15,750	
63	Carpet Tile	SF	2,295	$4.50	$10,328	
64	Ceramic Tile Floor	SF	350	$15.00	$5,250	
65	Painting HM Doors, Frames, Drywall Partitions	GSF	2,645	$3.00	$7,935	
66						
67	**FINISHES TOTAL**					**$58,512**
68						
69	**DIVISION 10 - SPECIALTIES**					
70	Interior Signage	GSF	2,645	$2.00	$5,290	
71	Exterior Signage	GSF	2,645	$5.00	$13,225	
72	Fire Extinguisher Cabinet with Fire Extinguisher	GSF	2,645	$1.00	$2,645	
73						
74	**SPECIALTIES TOTAL**					**$21,160**
75						
76	**DIVISION 11 - EQUIPMENT**					
77	Allowance for E-Gates	EA	4	$45,000.00	$180,000	
78						
79	**EQUIPMENT TOTAL**					**$180,000**
80						
81	**DIVISION 12 - FURNISHINGS**					
82	**Allowance for**					
83	Base Cabinets	LF	20	$600.00	$12,000	
84	Wall Cabinets	LF	20	$450.00	$9,000	
85	Solid Surface Countertops 2' wide	LF	20	$150.00	$3,000	
86						
87	**FURNISHINGS TOTAL**					**$24,000**
88						
89	**DIVISION 13 - SPECIAL CONSTRUCTION**					
90	No Work					
91						
92	**SPECIAL CONSTRUCTION TOTAL**					**$0**
93						
94	**DIVISION 14 - CONVEYING EQUIPMENT**					
95	No Work					
96						
97	**CONVEYING EQUIPMENT TOTAL**					**$0**
98						
99	**DIVISION 21 - FIRE SUPPRESSION**					
100	Fire Sprinkler System connected to existing system with new sprinkler Heads & adjusting existing branch piping	GSF	2,645	$7.50	$19,838	
101						
102	**FIRE SUPPRESSION TOTAL**					**$19,838**
103						
104	**DIVISION 22 - PLUMBING**					
105	No work				$0	
106						
107	**PLUMBING TOTAL**					**$0**
108						
109	**DIVISION 23 - HEATING VENTILATION AIR CONDITIONING**					
110	Allowance for HVAC work including Temperature Control, Testing and Balancing	GSF	2,645	$60.00	$158,700	
111						
112	**HEATING VENTILATION AIR CONDITIONING TOTAL**					**$158,700**

GSF 2,645

D1A - GATE 4 BUILDING INFILL

Opinion of Probable Construction Cost

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Order of Magnitude

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
113						
114	**DIVISION 25 - INTEGRATED AUTOMATION**					
115	Allowance for Integrated Automation	GSF	2,645	$15.00	$39,675	
116						
117	**INTEGRATED AUTOMATION TOTAL**					**$39,675**
118						
119	**DIVISION 26 - ELECTRICAL**					
120	Allowance for all necessary Electrical Work	GSF	2,645	$90.00	$238,050	
121						
122						
123	**ELECTRICAL TOTAL**					**$238,050**
124						
125	**DIVISION 27 - COMMUNICATIONS**					
126	Allowance for all necessary Communication Systems	GSF	2,645	$15.00	$39,675	
127						
128	**COMMUNICATIONS TOTAL**					**$39,675**
129						
130	**DIVISION 28 - ELECTRONIC SAFETY & SECURITY**					
131	Allowance for Fire Alarm System	GSF	2,645	$15.00	$39,675	
132						
133	**ELECTRONIC SAFETY & SECURITY TOTAL**					**$39,675**
134						
135	**DIVISION 31 - EARTHWORK**					
136	No Work				$0	
137						
138	**EARTHWORK TOTAL**					**$0**
139						
140	**DIVISION 32 - EXTERIOR IMPROVEMENTS**					
141	No Work				$0	
142						
143	**EXTERIOR IMPROVEMENTS TOTAL**					**$0**
144						
145	**DIVISION 33 - UTILITIES**					
146	No Work				$0	
147						
148	**UTILITIES TOTAL**					**$0**
149						
150	**DIVISION 34 - TRANSPORTATION**					
151	No Work					
152						
153	**TRANSPORTATION TOTAL**					**$0**
154						
155	**DIVISION 35 - WATERWAY & MARINE**					
156	No Work					
157						
158	**WATERWAY & MARINE TOTAL**					**$0**
159						
160	**DIVISION 41 - MATERIAL PROCESSING & HANDLING EQUIPMENT**					
161	No Work					
162						
163	**MATL PROCESS & HANDLING EQUIP TOTAL**					**$0**
164						
165	**DIVISION 44 - POLLUTION CONTROL EQUIPMENT**					
166	No Work					
167						
168	**POLLUTION CONTROL EQUIPMENT TOTAL**					**$0**
169						
170	**SUBTOTAL OF DIRECT COST**					**$2,144,654**

GSF 2,645

D1A - GATE 4 BUILDING INFILL

Opinion of Probable Construction Cost

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DATE: 10-Mar-21

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
171						
172	**GENERAL CONTRACTOR'S MARK UP**					
173	Overhead, Profit and Fees		**15.00%**	$2,144,654.22	$321,698	
174						
175	**SUB TOTAL OF CONSTRUCTION COST**					**$2,466,352**
176						
177	**CONTINGENCIES**					
178	DESIGN AND ESTIMATING CONTINGENCIES		**20.00%**	$2,466,352.36	$493,270	
179	ESCALATIONS		**0**			
180	OWNERS SOFT COSTS		**0.00%**	$2,466,352.36	$0	
181						
182						
183	**CONTINGENCIES TOTAL**					**$493,270**
184						
185	**GRAND TOTAL OF CONSTRUCTION COSTS**					**$2,959,623**
					$/SF	**$1,119**

CLASS 5 COST ESTIMATE RANGE	AMOUNT	$/SF
LOW RANGE @ -30%	**$2,071,736**	**$783**
OPINION OF PROBABLE COST	**$2,959,623**	**$1,119**
HIGH RANGE @ +50%	**$4,439,434**	**$1,678**

GSF 2,645

D1B - GATE 4 INFILL SHADOW SPACE

Opinion of Probable Construction Cost **DATE: 10-Mar-21**

Order of Magnitude

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
1	**DIVISION 1 - GENERAL REQUIREMENTS**					
2	Mobilization		**6.00%**	$883,021.13	$52,981	
3	Traffic Control		**3.00%**	$883,021.13	$26,491	
4	Erosion and Dust Control		**1.00%**	$883,021.13	$8,830	
5	General Conditions		**10.00%**	$883,021.13	$88,302	
6	Insurance & Bonds		**2.50%**	$883,021.13	$22,076	
7	Permits		**1.00%**	$883,021.13	$8,830	
8						
9	**GENERAL REQUIREMENTS TOTAL**					**$207,510**
10						
11	**DIVISION 2 - EXISTING CONDITIONS**					
12	Allowance for Clearing and Grubbing	SF	2,645	$3.00	$7,935	
13						
14	**EXISTING CONDITIONS TOTAL**					**$7,935**
15						
16	**DIVISION 3 - CONCRETE**					
17	Strip Footing for Exterior Walls including Concrete, Formwork and Reinforcement, 114' x 4' x 2'	CY	34	$750.00	$25,333	
18	Foundation Walls including Concrete, Formwork and Reinforcement 114' x 3' x 1'	CY	13	$750.00	$9,500	
19	Spread Footing for Columns including Concrete, Formwork and Reinforcement 6' x 6' x 2' x 5	CY	13	$750.00	$10,000	
20	Grade Beams for Exterior Walls including Concrete, Formwork and Reinforcement 2' x 2' x 176'	CY	26	$750.00	$19,556	
21	Slab on grade including base course, vapor barrier, concrete, formwork, reinforcement, curing	SF	2,645	$15.00	$39,675	
22						
23	**CONCRETE TOTAL**					**$104,064**
24						
25	**DIVISION 4 - MASONRY**					
26	Split Face CMU Exterior Wall 12' High	SF	1,368	$45.00	$61,560	
27						
28	**MASONRY TOTAL**					**$61,560**
29						
30	**DIVISION 5 - METALS**					
31	Allowance for steel framing including Columns and Beams for Second Floor @ 25lbs/SF	TONS	33	$5,500.00	$181,844	
32	Allowance for Misc Steel	TONS	3	$5,500.00	$18,184	
33						
34	**METALS TOTAL**					**$200,028**
35						
36	**DIVISION 6 - WOOD, PLASTICS & COMPOSITES**					
37	Wood Blocking as necessary	GSF	2,645	$3.00	$7,935	
38						
39	**WOOD, PLASTICS & COMPOSITES TOTAL**					**$7,935**
40						
41	**DIVISION 7 - THERMAL & MOISTURE PROTECTION**					
42	Allowance for Joint Sealant and Caulking	GSF	2,645	$1.00	$2,645	
43	Metal Panels @ Exterior Face of CMU Walls	SF	1,368	$36.00	$49,248	
44	Spray On Fire Proofing to Deck	GSF	2,645	$3.00	$7,935	
45						
46	**THERMAL & MOISTURE PROTECTION TOTAL**					**$59,828**
47						
48	**DIVISION 8 - DOORS & WINDOWS**					
49	Exterior 3' x 7' HM Door with HM Frames and necessary Hardware	EA	1	$3,600.00	$3,600	
50	Exterior 6' x 7' Glass Door with Aluminum Frames and necessary Hardware	EA	1	$7,200.00	$7,200	
51	New Windows 6' x 6' High	EA	3	$3,000.00	$9,000	
52						
53	**OPENINGS TOTAL**					**$19,800**
54						
55	**DIVISION 9 - FINISHES**					
56	Furring to Exterior Walls	SF	1,140	$6.00	$6,840	

GSF 2,645

D1B - GATE 4 INFILL SHADOW SPACE

Opinion of Probable Construction Cost

Order of Magnitude

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
57	Concrete Sealer to Floor	GSF	2,645	$3.00	$7,935	
58	Painting HM Doors, Frames, Drywall Partitions	GSF	2,645	$3.00	$7,935	
59						
60	**FINISHES TOTAL**					**$22,710**
61						
62	**DIVISION 10 - SPECIALTIES**					
63	Exterior Signage	GSF	2,645	$1.00	$2,645	
64	Fire Extinguisher Cabinet with Fire Extinguisher	GSF	2,645	$1.00	$2,645	
65						
66	**SPECIALTIES TOTAL**					**$5,290**
67						
68	**DIVISION 11 - EQUIPMENT**					
69	No work					
70	**EQUIPMENT TOTAL**					**$0**
71						
72	**DIVISION 12 - FURNISHINGS**					
73	No Work					
74						
75	**FURNISHINGS TOTAL**					**$0**
76						
77	**DIVISION 13 - SPECIAL CONSTRUCTION**					
78	No Work					
79						
80	**SPECIAL CONSTRUCTION TOTAL**					**$0**
81						
82	**DIVISION 14 - CONVEYING EQUIPMENT**					
83	No Work					
84						
85	**CONVEYING EQUIPMENT TOTAL**					**$0**
86						
87	**DIVISION 21 - FIRE SUPPRESSION**					
88	Fire Sprinkler System connected to existing system with new sprinkler Heads & adjusting existing branch piping	GSF	2,645	$7.50	$19,838	
89						
90	**FIRE SUPPRESSION TOTAL**					**$19,838**
91						
92	**DIVISION 22 - PLUMBING**					
93	No work				$0	
94						
95	**PLUMBING TOTAL**					**$0**
96						
97	**DIVISION 23 - HEATING VENTILATION AIR CONDITIONING**					
98	Allowance for HVAC work including Temperature Control, Testing and Balancing	GSF	2,645	$30.00	$79,350	
99						
100	**HEATING VENTILATION AIR CONDITIONING TOTAL**					**$79,350**
101						
102	**DIVISION 25 - INTEGRATED AUTOMATION**					
103	Allowance for Integrated Automation	GSF	2,645	$7.50	$19,838	
104						
105	**INTEGRATED AUTOMATION TOTAL**					**$19,838**
106						
107	**DIVISION 26 - ELECTRICAL**					
108	Allowance for all necessary Electrical Work	GSF	2,645	$45.00	$119,025	
109						
110						
111	**ELECTRICAL TOTAL**					**$119,025**
112						

GSF 2,645

D1B - GATE 4 INFILL SHADOW SPACE

Opinion of Probable Construction Cost — DATE: 10-Mar-21

Order of Magnitude

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
113	**DIVISION 27 - COMMUNICATIONS**					
114	Allowance for all necessary Communication Systems	GSF	2,645	$7.50	$19,838	
115						
116	**COMMUNICATIONS TOTAL**					**$19,838**
117						
118	**DIVISION 28 - ELECTRONIC SAFETY & SECURITY**					
119	Allowance for Fire Alarm System	GSF	2,645	$7.50	$19,838	
120						
121	**ELECTRONIC SAFETY & SECURITY TOTAL**					**$19,838**
122						
123	**DIVISION 31 - EARTHWORK**					
124	Excavation for Exterior Wall strip Footings and Spread Footings	CY	304	$30.00	$9,111	
125	Backfill	CY	218	$36.00	$7,837	
126	Haul off site	CY	112	$45.00	$5,031	
127						
128	**EARTHWORK TOTAL**					**$21,979**
129						
130	**DIVISION 32 - EXTERIOR IMPROVEMENTS**					
131	Allowance for Apron Work	SY	294	$300.00	$88,167	
132						
133	**EXTERIOR IMPROVEMENTS TOTAL**					**$88,167**
134						
135	**DIVISION 33 - UTILITIES**					
136	Allowance for Utilities Connection	LSUM	1	$6,000.00	$6,000	
137						
138	**UTILITIES TOTAL**					**$6,000**
139						
140	**DIVISION 34 - TRANSPORTATION**					
141	No Work					
142						
143	**TRANSPORTATION TOTAL**					**$0**
144						
145	**DIVISION 35 - WATERWAY & MARINE**					
146	No Work					
147						
148	**WATERWAY & MARINE TOTAL**					**$0**
149						
150	**DIVISION 41 - MATERIAL PROCESSING & HANDLING EQUIPMENT**					
151	No Work					
152						
153	**MATL PROCESS & HANDLING EQUIP TOTAL**					**$0**
154						
155	**DIVISION 44 - POLLUTION CONTROL EQUIPMENT**					
156	No Work					
157						
158	**POLLUTION CONTROL EQUIPMENT TOTAL**					**$0**
159						
160	**SUBTOTAL OF DIRECT COST**					**$1,090,531**
161						

GSF 2,645

D1B - GATE 4 INFILL SHADOW SPACE

Opinion of Probable Construction Cost

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
162	**GENERAL CONTRACTOR'S MARK UP**					
163	Overhead, Profit and Fees		**15.00%**	$1,090,531.09	$163,580	
164						
165	**SUB TOTAL OF CONSTRUCTION COST**					**$1,254,111**
166						
167	**CONTINGENCIES**					
168	DESIGN AND ESTIMATING CONTINGENCIES		**20.00%**	$1,254,110.75	$250,822	
169	ESCALATIONS		**0**			
170	OWNERS SOFT COSTS		**0.00%**	$1,254,110.75	$0	
171						
172						
173	**CONTINGENCIES TOTAL**					**$250,822**
174						
175						**$1,504,933**
					$/SF	**$569**

CLASS 5 COST ESTIMATE RANGE	AMOUNT	$/SF
LOW RANGE @ -30%	**$1,053,453**	**$398**
OPINION OF PROBABLE COST	**$1,504,933**	**$569**
HIGH RANGE @ +50%	**$2,257,399**	**$853**

GSF 31,430

D2 - EXISTING AREA RENOVATION

Opinion of Probable Construction Cost

Order of Magnitude

DATE: 10-Mar-21

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
1	**DIVISION 1 - GENERAL REQUIREMENTS**					
2	Mobilization		**6.00%**	$7,145,365.00	$428,722	
3	Traffic Control		**3.00%**	$7,145,365.00	$214,361	
4	Allowance for Seismic Structural Strenthening		**10.00%**	$7,145,365.00	$714,537	
5	Erosion and Dust Control		**1.00%**	$7,145,365.00	$71,454	
6	General Conditions		**10.00%**	$7,145,365.00	$714,537	
7	Insurance & Bonds		**2.50%**	$7,145,365.00	$178,634	
8	Permits		**1.00%**	$7,145,365.00	$71,454	
9						
10	**GENERAL REQUIREMENTS TOTAL**					**$2,393,697**
11						
12	**DIVISION 2 - EXISTING CONDITIONS**					
13	Demo of Existing Interior Walls, Flooring and Ceiling	SF	31,430	$15.00	$471,450	
14	Demo of Exterior Walls	SF	3,192	$45.00	$143,640	
15						
16	**EXISTING CONDITIONS TOTAL**					**$615,090**
17						
18	**DIVISION 3 - CONCRETE**					
19	Allowance for Patching Concrete Floor	SF	31,430	$6.00	$188,580	
20						
21	**CONCRETE TOTAL**					**$188,580**
22						
23	**DIVISION 4 - MASONRY**					
24	No work	SF	0	$45.00	$0	
25						
26	**MASONRY TOTAL**					**$0**
27						
28	**DIVISION 5 - METALS**					
29	No work	EA	0	$1,200.00	$0	
30	**METALS TOTAL**					**$0**
31						
32	**DIVISION 6 - WOOD, PLASTICS & COMPOSITES**					
33	Wood Blocking as necessary in East Loading Dock Area	GSF	31,430	$6.00	$188,580	
34						
35	**WOOD, PLASTICS & COMPOSITES TOTAL**					**$188,580**
36						
37	**DIVISION 7 - THERMAL & MOISTURE PROTECTION**					
38	Allowance for Joint Sealant and Caulking	GSF	31,430	$1.00	$31,430	
39						
40	**THERMAL & MOISTURE PROTECTION TOTAL**					**$31,430**
41						
42	**DIVISION 8 - DOORS & WINDOWS**					
43	Interior Aluminum and Glass Partitions	SF	800	$90.00	$72,000	
44	Interior 6' x 7' Glass Door with Aluminum Frames and necessary Hardware	EA	3	$6,000.00	$18,000	
45	Interior 3' x 7' HM Door with HM Frames and necessary Hardware	EA	6	$2,400.00	$14,400	
46	6' x 7' HM Door with HM Frames and necessary Hardware	EA	1	$4,800.00	$4,800	
47	Exterior Window Wall System	SF	2,128	$150.00	$319,200	
48	Allowance for Sun Shade	LF	266	$150.00	$39,900	
49						
50	**OPENINGS TOTAL**					**$468,300**
51						

GSF 31,430

D2 - EXISTING AREA RENOVATION

Opinion of Probable Construction Cost

Order of Magnitude

DATE: 10-Mar-21

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
52	**DIVISION 9 - FINISHES**					
53	Interior Partitions consisting of 3-5/8" metal stud, and 1 layer of 5/8" gyp board both sides 6" above ceiling	SF	1,600	$7.50	$12,000	
54	Soffits	SF	600	$7.50	$4,500	
55	New 2' X 4' Acoustical Ceiling System consisting of suspension system and 5/8" fiberglass ceiling panels	SF	25,050	$5.00	$125,250	
56	New Gyp Board Ceiling	SF	3,600	$15.00	$54,000	
57	Wood Clad Ceiling @ Boarding Area	SF	2,800	$45.00	$126,000	
58	Stretched Fabric Ceiling	SF	350	$150.00	$52,500	
59	Epoxy Flooring	SF	1,000	$24.00	$24,000	
60	Carpet Tile	SF	22,650	$4.50	$101,925	
61	Ceramic Tile Floor	SF	7,800	$12.00	$93,600	
62	Ceramic Tile Wall	SF	2,400	$15.00	$36,000	
63	FRP Wall Panels	SF	640	$12.00	$7,680	
64	Painting HM Doors, Frames, Drywall Partitions	GSF	31,430	$3.00	$94,290	
65						
66	**FINISHES TOTAL**					**$731,745**
67						
68	**DIVISION 10 - SPECIALTIES**					
69	Interior Signage	GSF	31,430	$2.00	$62,860	
70	Exterior Signage	GSF	31,430	$1.00	$31,430	
71	Fire Extinguisher Cabinet with Fire Extinguisher	GSF	31,430	$1.00	$31,430	
72						
73	**SPECIALTIES TOTAL**					**$125,720**
74						
75	**DIVISION 11 - EQUIPMENT**					
76	Allowance for E-Gates	EA	2	$45,000.00	$90,000	
77						
78	**EQUIPMENT TOTAL**					**$90,000**
79						
80	**DIVISION 12 - FURNISHINGS**					
81	**Allowance for**					
82	Base Cabinets	LF	150	$600.00	$90,000	
83	Wall Cabinets	LF	150	$450.00	$67,500	
84	Solid Surface Countertops 2' wide	LF	150	$150.00	$22,500	
85						
86	**FURNISHINGS TOTAL**					**$180,000**
87						
88	**DIVISION 13 - SPECIAL CONSTRUCTION**					
89	No Work					
90						
91	**SPECIAL CONSTRUCTION TOTAL**					**$0**
92						
93	**DIVISION 14 - CONVEYING EQUIPMENT**					
94	No Work					
95						
96	**CONVEYING EQUIPMENT TOTAL**					**$0**
97						
98	**DIVISION 21 - FIRE SUPPRESSION**					
99	Fire Sprinkler System connected to existing system with new sprinkler Heads & adjusting existing branch piping	GSF	31,430	$4.50	$141,435	
100						
101	**FIRE SUPPRESSION TOTAL**					**$141,435**
102						
103	**DIVISION 22 - PLUMBING**					
104	No Work					
105						
106	**PLUMBING TOTAL**					**$0**

GSF 31,430

D2 - EXISTING AREA RENOVATION

Opinion of Probable Construction Cost

DATE: 10-Mar-21

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
107						
108	**DIVISION 23 - HEATING VENTILATION AIR CONDITIONING**					
109	Allowance for HVAC work including Temperature Control, Testing and Balancing	GSF	31,430	$45.00	$1,414,350	
110						
111	**HEATING VENTILATION AIR CONDITIONING TOTAL**					**$1,414,350**
112						
113	**DIVISION 25 - INTEGRATED AUTOMATION**					
114	Allowance for all Integrated Automation Work	GSF	31,430	$7.50	$235,725	
115						
116	**INTEGRATED AUTOMATION TOTAL**					**$235,725**
117						
118	**DIVISION 26 - ELECTRICAL**					
119	Allowance for all necessary Electrical Work	GSF	31,430	$72.00	$2,262,960	
120						
121						
122	**ELECTRICAL TOTAL**					**$2,262,960**
123						
124	**DIVISION 27 - COMMUNICATIONS**					
125	Allowance for all necessary Communication Systems	GSF	31,430	$7.50	$235,725	
126						
127	**COMMUNICATIONS TOTAL**					**$235,725**
128						
129	**DIVISION 28 - ELECTRONIC SAFETY & SECURITY**					
130	Allowance for Fire Alarm System	GSF	31,430	$7.50	$235,725	
131						
132	**ELECTRONIC SAFETY & SECURITY TOTAL**					**$235,725**
133						
134	**DIVISION 31 - EARTHWORK**					
135	No Work	CY	0	$0.00	$0	
136						
137	**EARTHWORK TOTAL**					**$0**
138						
139	**DIVISION 32 - EXTERIOR IMPROVEMENTS**					
140	No Work	CY	0	$0.00	$0	
141						
142	**EXTERIOR IMPROVEMENTS TOTAL**					**$0**
143						
144	**DIVISION 33 - UTILITIES**					
145	No Work	LSUM	1	$0.00	$0	
146						
147	**UTILITIES TOTAL**					**$0**
148						
149	**DIVISION 34 - TRANSPORTATION**					
150	No Work					
151						
152	**TRANSPORTATION TOTAL**					**$0**
153						
154	**DIVISION 35 - WATERWAY & MARINE**					
155	No Work					
156						
157	**WATERWAY & MARINE TOTAL**					**$0**
158						
159	**DIVISION 41 - MATERIAL PROCESSING & HANDLING EQUIPMENT**					
160	No Work					
161						
162	**MATL PROCESS & HANDLING EQUIP TOTAL**					**$0**
163						
164	**DIVISION 44 - POLLUTION CONTROL EQUIPMENT**					
165	No Work					
166						
167	**POLLUTION CONTROL EQUIPMENT TOTAL**					**$0**
168						
169	**SUBTOTAL OF DIRECT COST**					**$9,539,062**

GSF 31,430

D2 - EXISTING AREA RENOVATION

Opinion of Probable Construction Cost

Order of Magnitude

DATE: 10-Mar-21

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
170						
171	**GENERAL CONTRACTOR'S MARK UP**					
172	Overhead, Profit and Fees		**15.00%**	$9,539,062.28	$1,430,859	
173						
174	**SUB TOTAL OF CONSTRUCTION COST**					**$10,969,922**
175						
176	**CONTINGENCIES**					
177	DESIGN AND ESTIMATING CONTINGENCIES		**20.00%**	$10,969,921.62	$2,193,984	
178	ESCALATIONS		**0**			
179	OWNERS SOFT COSTS		**0.00%**	$10,969,921.62	$0	
180						
181						
182	**CONTINGENCIES TOTAL**					**$2,193,984**
183						
184					**GRAND TOTAL OF CONSTRUCTION COSTS**	**$13,163,906**
					$/SF	**$419**

CLASS 5 COST ESTIMATE RANGE	**AMOUNT**	**$/SF**
LOW RANGE @ -30%	**$9,214,734**	**$293**
OPINION OF PROBABLE COST	**$13,163,906**	**$419**
HIGH RANGE @ +50%	**$19,745,859**	**$628**

GSF 15,770

D3 - EXISTING AREA RENOVATION

Opinion of Probable Construction Cost

Order of Magnitude

DATE: 10-Mar-21

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
1	**DIVISION 1 - GENERAL REQUIREMENTS**					
2	Mobilization		**6.00%**	$4,464,365.00	$267,862	
3	Traffic Control		**3.00%**	$4,464,365.00	$133,931	
4	Allowance for Seismic Structural Strenthening		**10.00%**	$4,464,365.00	$446,437	
5	Erosion and Dust Control		**1.00%**	$4,464,365.00	$44,644	
6	General Conditions		**10.00%**	$4,464,365.00	$446,437	
7	Insurance & Bonds		**2.50%**	$4,464,365.00	$111,609	
8	Permits		**1.00%**	$4,464,365.00	$44,644	
9						
10	**GENERAL REQUIREMENTS TOTAL**					**$1,495,562**
11						
12	**DIVISION 2 - EXISTING CONDITIONS**					
13	Demo of Existing Walls, Flooring and Ceiling	SF	15,770	$15.00	$236,550	
14	Removal of Existing Exterior Wall for New Storefront System	SF	2,100	$45.00	$94,500	
15						
16	**EXISTING CONDITIONS TOTAL**					**$331,050**
17						
18	**DIVISION 3 - CONCRETE**					
19	Allowance for Patching Concrete Floor	SF	15,770	$6.00	$94,620	
20						
21	**CONCRETE TOTAL**					**$94,620**
22						
23	**DIVISION 4 - MASONRY**					
24	No work	SF	0	$45.00	$0	
25						
26	**MASONRY TOTAL**					**$0**
27						
28	**DIVISION 5 - METALS**					
29	No work	EA	0	$1,200.00	$0	
30	**METALS TOTAL**					**$0**
31						
32	**DIVISION 6 - WOOD, PLASTICS & COMPOSITES**					
33	Wood Blocking as necessary in East Loading Dock Area	GSF	15,770	$6.00	$94,620	
34						
35	**WOOD, PLASTICS & COMPOSITES TOTAL**					**$94,620**
36						
37	**DIVISION 7 - THERMAL & MOISTURE PROTECTION**					
38	Allowance for Joint Sealant and Caulking	GSF	15,770	$1.00	$15,770	
39						
40	**THERMAL & MOISTURE PROTECTION TOTAL**					**$15,770**
41						
42	**DIVISION 8 - DOORS & WINDOWS**					
43	Interior Aluminum and Glass Partitions	SF	800	$90.00	$72,000	
44	Interior 6' x 7' Glass Door with Aluminum Frames and necessary Hardware	EA	5	$6,000.00	$30,000	
45	Interior 3' x 7' HM Door with HM Frames and necessary Hardware	EA	5	$2,400.00	$12,000	
46	6' x 7' HM Door with HM Frames and necessary Hardware	EA	5	$4,800.00	$24,000	
47	Exterior Window Wall System	SF	1,400	$150.00	$210,000	
48	Allowance for Sun Shade	LF	175	$150.00	$26,250	
49						
50	**OPENINGS TOTAL**					**$374,250**
51						

GSF 15,770

D3 - EXISTING AREA RENOVATION

Opinion of Probable Construction Cost — **DATE: 10-Mar-21**

Order of Magnitude

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
52	**DIVISION 9 - FINISHES**					
53	Interior Partitions consisting of 3-5/8" metal stud, and 1 layer of 5/8" gyp board both sides 6" above ceiling	SF	1,600	$7.50	$12,000	
54	Soffits	SF	600	$7.50	$4,500	
55	New 2' X 4' Acoustical Ceiling System consisting of suspension system and 5/8" fiberglass ceiling panels	SF	15,770	$5.00	$78,850	
56	New Gyp Board Ceiling	SF	0	$15.00	$0	
57	Wood Clad Ceiling @ Boarding Area	SF	12,000	$45.00	$540,000	
58	Stretched Fabric Ceiling	SF	0	$150.00	$0	
59	Epoxy Flooring	SF	2,000	$24.00	$48,000	
60	Carpet Tile	SF	7,770	$4.50	$34,965	
61	Ceramic Tile Floor	SF	6,000	$12.00	$72,000	
62	Ceramic Tile Wall	SF	960	$15.00	$14,400	
63	FRP Wall Panels	SF	960	$12.00	$11,520	
64	Painting HM Doors, Frames, Drywall Partitions	GSF	15,770	$3.00	$47,310	
65						
66	**FINISHES TOTAL**					**$863,545**
67						
68	**DIVISION 10 - SPECIALTIES**					
69	Interior Signage	GSF	15,770	$2.00	$31,540	
70	Exterior Signage	GSF	15,770	$1.00	$15,770	
71	Fire Extinguisher Cabinet with Fire Extinguisher	GSF	15,770	$1.00	$15,770	
72						
73	**SPECIALTIES TOTAL**					**$63,080**
74						
75	**DIVISION 11 - EQUIPMENT**					
76	No work					
77	**EQUIPMENT TOTAL**					**$0**
78						
79	**DIVISION 12 - FURNISHINGS**					
80	**Allowance for**					
81	Base Cabinets	LF	100	$600.00	$60,000	
82	Wall Cabinets	LF	100	$450.00	$45,000	
83	Solid Surface Countertops 2' wide	LF	100	$150.00	$15,000	
84						
85	**FURNISHINGS TOTAL**					**$120,000**
86						
87	**DIVISION 13 - SPECIAL CONSTRUCTION**					
88	No Work					
89						
90	**SPECIAL CONSTRUCTION TOTAL**					**$0**
91						
92	**DIVISION 14 - CONVEYING EQUIPMENT**					
93	No Work					
94						
95	**CONVEYING EQUIPMENT TOTAL**					**$0**
96						
97	**DIVISION 21 - FIRE SUPPRESSION**					
98	Fire Sprinkler System connected to existing system with new sprinkler Heads & adjusting existing branch piping	GSF	15,770	$4.50	$70,965	
99						
100	**FIRE SUPPRESSION TOTAL**					**$70,965**
101						
102	**DIVISION 22 - PLUMBING**					
103	Allowance for Plumbing Work for Concessions Areas	GSF	15,770	$15.00	$236,550	
104						
105	**PLUMBING TOTAL**					**$236,550**
106						
107	**DIVISION 23 - HEATING VENTILATION AIR CONDITIONING**					
108	Allowance for HVAC work including Temperature Control, Testing and Balancing	GSF	15,770	$45.00	$709,650	
109						
110	**HEATING VENTILATION AIR CONDITIONING TOTAL**					**$709,650**
111						

GSF 15,770

D3 - EXISTING AREA RENOVATION

Opinion of Probable Construction Cost

Order of Magnitude

DATE: 10-Mar-21

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
112	**DIVISION 25 - INTEGRATED AUTOMATION**					
113	Allowance for all Integrated Automation Work	GSF	15,770	$7.50	$118,275	
114						
115	**INTEGRATED AUTOMATION TOTAL**					**$118,275**
116						
117	**DIVISION 26 - ELECTRICAL**					
118	Allowance for all necessary Electrical Work	GSF	15,770	$72.00	$1,135,440	
119						
120						
121	**ELECTRICAL TOTAL**					**$1,135,440**
122						
123	**DIVISION 27 - COMMUNICATIONS**					
124	Allowance for all necessary Communication Systems	GSF	15,770	$7.50	$118,275	
125						
126	**COMMUNICATIONS TOTAL**					**$118,275**
127						
128	**DIVISION 28 - ELECTRONIC SAFETY & SECURITY**					
129	Allowance for Fire Alarm System	GSF	15,770	$7.50	$118,275	
130						
131	**ELECTRONIC SAFETY & SECURITY TOTAL**					**$118,275**
132						
133	**DIVISION 31 - EARTHWORK**					
134	No Work	CY	0	$0.00	$0	
135						
136	**EARTHWORK TOTAL**					**$0**
137						
138	**DIVISION 32 - EXTERIOR IMPROVEMENTS**					
139	No Work	CY	0	$0.00	$0	
140						
141	**EXTERIOR IMPROVEMENTS TOTAL**					**$0**
142						
143	**DIVISION 33 - UTILITIES**					
144	No Work	LSUM	1	$0.00	$0	
145						
146	**UTILITIES TOTAL**					**$0**
147						
148	**DIVISION 34 - TRANSPORTATION**					
149	No Work					
150						
151	**TRANSPORTATION TOTAL**					**$0**
152						
153	**DIVISION 35 - WATERWAY & MARINE**					
154	No Work					
155						
156	**WATERWAY & MARINE TOTAL**					**$0**
157						
158	**DIVISION 41 - MATERIAL PROCESSING & HANDLING EQUIPMENT**					
159	No Work					
160						
161	**MATL PROCESS & HANDLING EQUIP TOTAL**					**$0**
162						
163	**DIVISION 44 - POLLUTION CONTROL EQUIPMENT**					
164	No Work					
165						
166	**POLLUTION CONTROL EQUIPMENT TOTAL**					**$0**
167						
168	**SUBTOTAL OF DIRECT COST**					**$5,959,927**

GSF 15,770

D3 - EXISTING AREA RENOVATION

Opinion of Probable Construction Cost

Order of Magnitude

DATE: 10-Mar-21

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
169						
170	**GENERAL CONTRACTOR'S MARK UP**					
171	Overhead, Profit and Fees		**15.00%**	$5,959,927.28	$893,989	
172						
173	**SUB TOTAL OF CONSTRUCTION COST**					**$6,853,916**
174						
175	**CONTINGENCIES**					
176	DESIGN AND ESTIMATING CONTINGENCIES		**20.00%**	$6,853,916.37	$1,370,783	
177	ESCALATIONS		**0**			
178	OWNERS SOFT COSTS		**0.00%**	$6,853,916.37	$0	
179						
180						
181	**CONTINGENCIES TOTAL**					**$1,370,783**
182						
183	**GRAND TOTAL OF CONSTRUCTION COSTS**					**$8,224,700**
					$/SF	**$522**

CLASS 5 COST ESTIMATE RANGE	AMOUNT	$/SF
LOW RANGE @ -30%	**$5,757,290**	**$365**
OPINION OF PROBABLE COST	**$8,224,700**	**$522**
HIGH RANGE @ +50%	**$12,337,049**	**$782**

GSF 4,953

D4A - GATE 6 BUILDING INFILL

Opinion of Probable Construction Cost **DATE: 10-Mar-21**

Order of Magnitude

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
1	**DIVISION 1 - GENERAL REQUIREMENTS**					
2	Mobilization		**6.00%**	$2,395,885.13	$143,753	
3	Traffic Control		**3.00%**	$2,395,885.13	$71,877	
4	Erosion and Dust Control		**1.00%**	$2,395,885.13	$23,959	
5	General Conditions		**10.00%**	$2,395,885.13	$239,589	
6	Insurance & Bonds		**2.50%**	$2,395,885.13	$59,897	
7	Permits		**1.00%**	$2,395,885.13	$23,959	
8						
9	**GENERAL REQUIREMENTS TOTAL**					**$563,033**
10						
11	**DIVISION 2 - EXISTING CONDITIONS**					
12	Removal of Existing Exterior Wall for New Storefront System	SF	600	$45.00	$27,000	
13	**EXISTING CONDITIONS TOTAL**					**$27,000**
14						
15	**DIVISION 3 - CONCRETE**					
16	Concrete Topping Slab to Second Floor Level 3" Thick	GSF	4,953	$9.00	$44,577	
17	Concrete Topping Slab to Roof Level 3" Thick	GSF	4,953	$9.00	$44,577	
18						
19	**CONCRETE TOTAL**					**$89,154**
20						
21	**DIVISION 4 - MASONRY**					
22	Split Face CMU Exterior Wall 12' High	SF	528	$45.00	$23,760	
23						
24	**MASONRY TOTAL**					**$23,760**
25						
26	**DIVISION 5 - METALS**					
27	Allowance for steel framing including Columns and Beams for Roof Floor @ 25lbs/SF	TONS	62	$5,500.00	$340,519	
28	Metal Deck @ Second Floor Level	GSF	4,953	$4.50	$22,289	
29	Metal Deck @ Roof Level	GSF	4,953	$4.50	$22,289	
30	Allowance for Misc Steel	TONS	6	$5,500.00	$34,052	
31	Allowance for New Fire Stair 01	Flight	2	$30,000.00	$60,000	
32						
33						
34	**METALS TOTAL**					**$479,148**
35						
36	**DIVISION 6 - WOOD, PLASTICS & COMPOSITES**					
37	Wood Blocking as necessary in East Loading Dock Area	GSF	4,953	$6.00	$29,718	
38						
39	**WOOD, PLASTICS & COMPOSITES TOTAL**					**$29,718**
40						
41	**DIVISION 7 - THERMAL & MOISTURE PROTECTION**					
42	Allowance for Joint Sealant and Caulking	GSF	4,953	$1.00	$4,953	
43	New Roofing System EPDM	SF	4,953	$25.00	$123,825	
44	Spray On Fire Proofing to Deck	GSF	4,953	$3.00	$14,859	
45						
46	**THERMAL & MOISTURE PROTECTION TOTAL**					**$143,637**
47						
48	**DIVISION 8 - DOORS & WINDOWS**					
49	Exterior 3' x 7' HM Door with HM Frames and necessary Hardware	EA	1	$3,600.00	$3,600	
50	Interior 3' x 7' Glass Door with Aluminum Frames and necessary Hardware	EA	3	$3,000.00	$9,000	
51	Interior 6' x 7' Glass Door with Aluminum Frames and necessary Hardware	EA	3	$6,000.00	$18,000	
52	Interior Aluminum and Glass Partitions	SF	400	$90.00	$36,000	
53	Exterior Window Wall System	SF	960	$150.00	$144,000	
54	Allowance for Sun Shade	LF	120	$150.00	$18,000	
55						
56	**OPENINGS TOTAL**					**$228,600**

GSF 4,953

D4A - GATE 6 BUILDING INFILL

Opinion of Probable Construction Cost — DATE: 10-Mar-21

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
57						
58	**DIVISION 9 - FINISHES**					
59	Furring to Exterior Walls	SF	768	$6.00	$4,608	
60	Soffits	SF	480	$7.50	$3,600	
61	New 2' X 4' Acoustical Ceiling System consisting of suspension system and 5/8" fiberglass ceiling panels	SF	4,953	$5.00	$24,765	
62	New Gyp Board Ceiling	SF	0	$15.00	$0	
63	Wood Clad Ceiling @ Boarding Area	SF	2,453	$45.00	$110,385	
64	Carpet Tile	SF	2,500	$4.50	$11,250	
65	Ceramic Tile Floor	SF	2,453	$15.00	$36,795	
66	Painting HM Doors, Frames, Drywall Partitions	GSF	4,953	$3.00	$14,859	
67						
68	**FINISHES TOTAL**					**$206,262**
69						
70	**DIVISION 10 - SPECIALTIES**					
71	Interior Signage	GSF	4,953	$2.00	$9,906	
72	Exterior Signage	GSF	4,953	$5.00	$24,765	
73	Fire Extinguisher Cabinet with Fire Extinguisher	GSF	4,953	$1.00	$4,953	
74						
75	**SPECIALTIES TOTAL**					**$39,624**
76						
77	**DIVISION 11 - EQUIPMENT**					
78	Allowance for E-Gates	EA	2	$45,000.00	$90,000	
79						
80	**EQUIPMENT TOTAL**					**$90,000**
81						
82	**DIVISION 12 - FURNISHINGS**					
83	**Allowance for**					
84	Base Cabinets	LF	30	$600.00	$18,000	
85	Wall Cabinets	LF	30	$450.00	$13,500	
86	Solid Surface Countertops 2' wide	LF	30	$150.00	$4,500	
87						
88	**FURNISHINGS TOTAL**					**$36,000**
89						
90	**DIVISION 13 - SPECIAL CONSTRUCTION**					
91	No Work					
92						
93	**SPECIAL CONSTRUCTION TOTAL**					**$0**
94						
95	**DIVISION 14 - CONVEYING EQUIPMENT**					
96	No Work					
97						
98	**CONVEYING EQUIPMENT TOTAL**					**$0**
99						
100	**DIVISION 21 - FIRE SUPPRESSION**					
101	Fire Sprinkler System connected to existing system with new sprinkler Heads & adjusting existing branch piping	GSF	4,953	$7.50	$37,148	
102						
103	**FIRE SUPPRESSION TOTAL**					**$37,148**
104						
105	**DIVISION 22 - PLUMBING**					
106	Allowance for Two Washrooms	EA	2	$0.00	$0	
107						
108	**PLUMBING TOTAL**					**$0**
109						
110	**DIVISION 23 - HEATING VENTILATION AIR CONDITIONING**					
111	Allowance for HVAC work including Temperature Control, Testing and Balancing	GSF	4,953	$60.00	$297,180	
112						
113	**HEATING VENTILATION AIR CONDITIONING TOTAL**					**$297,180**
114						

GSF 4,953

D4A - GATE 6 BUILDING INFILL

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
115	**DIVISION 25 - INTEGRATED AUTOMATION**					
116	Allowance for Integrated Automation	GSF	4,953	$15.00	$74,295	
117						
118	**INTEGRATED AUTOMATION TOTAL**					**$74,295**
119						
120	**DIVISION 26 - ELECTRICAL**					
121	Allowance for all necessary Electrical Work	GSF	4,953	$90.00	$445,770	
122						
123						
124	**ELECTRICAL TOTAL**					**$445,770**
125						
126	**DIVISION 27 - COMMUNICATIONS**					
127	Allowance for all necessary Communication Systems	GSF	4,953	$15.00	$74,295	
128						
129	**COMMUNICATIONS TOTAL**					**$74,295**
130						
131	**DIVISION 28 - ELECTRONIC SAFETY & SECURITY**					
132	Allowance for Fire Alarm System	GSF	4,953	$15.00	$74,295	
133						
134	**ELECTRONIC SAFETY & SECURITY TOTAL**					**$74,295**
135						
136	**DIVISION 31 - EARTHWORK**					
137	No Work				$0	
138						
139	**EARTHWORK TOTAL**					**$0**
140						
141	**DIVISION 32 - EXTERIOR IMPROVEMENTS**					
142	No Work				$0	
143						
144	**EXTERIOR IMPROVEMENTS TOTAL**					**$0**
145						
146	**DIVISION 33 - UTILITIES**					
147	No Work				$0	
148						
149	**UTILITIES TOTAL**					**$0**
150						
151	**DIVISION 34 - TRANSPORTATION**					
152	No Work					
153						
154	**TRANSPORTATION TOTAL**					**$0**
155						
156	**DIVISION 35 - WATERWAY & MARINE**					
157	No Work					
158						
159	**WATERWAY & MARINE TOTAL**					**$0**
160						
161	**DIVISION 41 - MATERIAL PROCESSING & HANDLING EQUIPMENT**					
162	No Work					
163						
164	**MATL PROCESS & HANDLING EQUIP TOTAL**					**$0**
165						
166	**DIVISION 44 - POLLUTION CONTROL EQUIPMENT**					
167	No Work					
168						
169	**POLLUTION CONTROL EQUIPMENT TOTAL**					**$0**
170						
171	**SUBTOTAL OF DIRECT COST**					**$2,958,918**
172						

GSF 4,953

D4A - GATE 6 BUILDING INFILL

Opinion of Probable Construction Cost

DATE: 10-Mar-21

Order of Magnitude

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
173	GENERAL CONTRACTOR'S MARK UP					
174	Overhead, Profit and Fees		15.00%	$2,958,918.13	$443,838	
175						
176	SUB TOTAL OF CONSTRUCTION COST					$3,402,756
177						
178	CONTINGENCIES					
179	DESIGN AND ESTIMATING CONTINGENCIES		20.00%	$3,402,755.85	$680,551	
180	ESCALATIONS		0			
181	OWNERS SOFT COSTS		0.00%	$3,402,755.85	$0	
182						
183						
184	CONTINGENCIES TOTAL					$680,551
185						
186	GRAND TOTAL OF CONSTRUCTION COSTS					$4,083,307
					$/SF	$824

CLASS 5 COST ESTIMATE RANGE	AMOUNT	$/SF
LOW RANGE @ -30%	$2,858,315	$577
OPINION OF PROBABLE COST	$4,083,307	$824
HIGH RANGE @ +50%	$6,124,961	$1,237

GSF 4,953

D4B - GATE 6 UTILITIES AREA

Opinion of Probable Construction Cost — **DATE: 10-Mar-21**

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
1	**DIVISION 1 - GENERAL REQUIREMENTS**					
2	Mobilization		**6.00%**	$1,530,556.90	$91,833	
3	Traffic Control		**3.00%**	$1,530,556.90	$45,917	
4	Erosion and Dust Control		**1.00%**	$1,530,556.90	$15,306	
5	General Conditions		**10.00%**	$1,530,556.90	$153,056	
6	Insurance & Bonds		**2.50%**	$1,530,556.90	$38,264	
7	Permits		**1.00%**	$1,530,556.90	$15,306	
8						
9	**GENERAL REQUIREMENTS TOTAL**					**$359,681**
10						
11	**DIVISION 2 - EXISTING CONDITIONS**					
12	Allowance for Clearing and Grubbing	SF	4,953	$3.00	$14,859	
13	Relocate Existing High Mast Lighting in its Entirety	EA	1	$7,500.00	$7,500	
14						
15	**EXISTING CONDITIONS TOTAL**					**$22,359**
16						
17	**DIVISION 3 - CONCRETE**					
18	Strip Footing for Exterior Walls including Concrete, Formwork and Reinforcement, 165' x 4' x 2'	CY	49	$750.00	$36,667	
19	Foundation Walls including Concrete, Formwork and Reinforcement 165' x 3' x 1'	CY	18	$750.00	$13,750	
20	Spread Footing for Columns including Concrete, Formwork and Reinforcement 6' x 6' x 2' x 10	CY	27	$750.00	$20,000	
21	Grade Beams for Exterior Walls including Concrete, Formwork and Reinforcement 2' x 2' x 220'	CY	33	$750.00	$24,444	
22	Slab on grade including base course, vapor barrier, concrete, formwork, reinforcement, curing	SF	4,953	$15.00	$74,295	
23						
24	**CONCRETE TOTAL**					**$169,156**
25						
26	**DIVISION 4 - MASONRY**					
27	Split Face CMU Exterior Wall 12' High	SF	1,968	$45.00	$88,560	
28						
29	**MASONRY TOTAL**					**$88,560**
30						
31	**DIVISION 5 - METALS**					
32	Allowance for steel framing including Columns and Beams for Second Floor @ 25lbs/SF	TONS	62	$5,500.00	$340,519	
33	Allowance for Misc Steel	TONS	6	$5,500.00	$34,052	
34	**METALS TOTAL**					**$374,571**
35						
36	**DIVISION 6 - WOOD, PLASTICS & COMPOSITES**					
37	Wood Blocking as necessary in East Loading Dock Area	GSF	4,953	$3.00	$14,859	
38						
39	**WOOD, PLASTICS & COMPOSITES TOTAL**					**$14,859**
40						
41	**DIVISION 7 - THERMAL & MOISTURE PROTECTION**					
42	Allowance for Joint Sealant and Caulking	GSF	4,953	$1.00	$4,953	
43	Metal Panels @ Exterior Face of CMU Walls	SF	1,968	$36.00	$70,848	
44	Spray On Fire Proofing to Deck	GSF	4,953	$3.00	$14,859	
45						
46	**THERMAL & MOISTURE PROTECTION TOTAL**					**$90,660**
47						
48	**DIVISION 8 - DOORS & WINDOWS**					
49	Exterior 3' x 7' HM Door with HM Frames and necessary Hardware	EA	1	$3,600.00	$3,600	
50	Exterior 6' x 7' Glass Door with Aluminum Frames and necessary Hardware	EA	1	$7,200.00	$7,200	
51	New Windows 6' x 6' High	EA	3	$3,000.00	$9,000	
52						
53	**OPENINGS TOTAL**					**$19,800**

GSF 4,953

D4B - GATE 6 UTILITIES AREA

Opinion of Probable Construction Cost

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
54						
55	**DIVISION 9 - FINISHES**					
56	Furring to Exterior Walls	SF	1,968	$6.00	$11,808	
57	Concrete Sealer to Floor	GSF	4,953	$3.00	$14,859	
58	Painting HM Doors, Frames, Drywall Partitions	GSF	4,953	$3.00	$14,859	
59						
60	**FINISHES TOTAL**					**$41,526**
61						
62	**DIVISION 10 - SPECIALTIES**					
63	Interior Signage	GSF	4,953	$2.00	$9,906	
64	Exterior Signage	GSF	4,953	$1.00	$4,953	
65	Fire Extinguisher Cabinet with Fire Extinguisher	GSF	4,953	$1.00	$4,953	
66						
67	**SPECIALTIES TOTAL**					**$19,812**
68						
69	**DIVISION 11 - EQUIPMENT**					
70	No work					
71	**EQUIPMENT TOTAL**					**$0**
72						
73	**DIVISION 12 - FURNISHINGS**					
74	**Allowance for**					
75	No work					
76						
77	**FURNISHINGS TOTAL**					**$0**
78						
79	**DIVISION 13 - SPECIAL CONSTRUCTION**					
80	No work					
81						
82	**SPECIAL CONSTRUCTION TOTAL**					**$0**
83						
84	**DIVISION 14 - CONVEYING EQUIPMENT**					
85	No Work					
86						
87	**CONVEYING EQUIPMENT TOTAL**					**$0**
88						
89	**DIVISION 21 - FIRE SUPPRESSION**					
90	Fire Sprinkler System connected to existing system with new sprinkler Heads & adjusting existing branch piping	GSF	4,953	$7.50	$37,148	
91						
92	**FIRE SUPPRESSION TOTAL**					**$37,148**
93						
94	**DIVISION 22 - PLUMBING**					
95	Allowance for Two Washrooms	EA	0	$12,000.00	$0	
96						
97	**PLUMBING TOTAL**					**$0**
98						
99	**DIVISION 23 - HEATING VENTILATION AIR CONDITIONING**					
100	Allowance for HVAC work including Temperature Control, Testing and Balancing	GSF	4,953	$30.00	$148,590	
101						
102	**HEATING VENTILATION AIR CONDITIONING TOTAL**					**$148,590**
103						
104	**DIVISION 25 - INTEGRATED AUTOMATION**					
105	NO WORK	GSF	0	$7.50	$0	
106						
107	**INTEGRATED AUTOMATION TOTAL**					**$0**
108						

GSF 4,953

D4B - GATE 6 UTILITIES AREA

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
109	**DIVISION 26 - ELECTRICAL**					
110	Allowance for all necessary Electrical Work	GSF	4,953	$45.00	$222,885	
111						
112						
113	**ELECTRICAL TOTAL**					**$222,885**
114						
115	**DIVISION 27 - COMMUNICATIONS**					
116	Allowance for all necessary Communication Systems	GSF	4,953	$7.50	$37,148	
117						
118	**COMMUNICATIONS TOTAL**					**$37,148**
119						
120	**DIVISION 28 - ELECTRONIC SAFETY & SECURITY**					
121	Allowance for Fire Alarm System	GSF	4,953	$7.50	$37,148	
122						
123	**ELECTRONIC SAFETY & SECURITY TOTAL**					**$37,148**
124						
125	**DIVISION 31 - EARTHWORK**					
126	Excavation for Exterior Wall strip Footings and Spread Footings	CY	489	$30.00	$14,667	
127	Backfill	CY	359	$36.00	$12,920	
128	Haul off site	CY	170	$45.00	$7,650	
129						
130	**EARTHWORK TOTAL**					**$35,237**
131						
132	**DIVISION 32 - EXTERIOR IMPROVEMENTS**					
133	Allowance for Apron Work	SY	550	$300.00	$165,100	
134						
135	**EXTERIOR IMPROVEMENTS TOTAL**					**$165,100**
136						
137	**DIVISION 33 - UTILITIES**					
138	Allowance for Utilities Connection	LSUM	1	$6,000.00	$6,000	
139						
140	**UTILITIES TOTAL**					**$6,000**
141						
142	**DIVISION 34 - TRANSPORTATION**					
143	No Work					
144						
145	**TRANSPORTATION TOTAL**					**$0**
146						
147	**DIVISION 35 - WATERWAY & MARINE**					
148	No Work					
149						
150	**WATERWAY & MARINE TOTAL**					**$0**
151						
152	**DIVISION 41 - MATERIAL PROCESSING & HANDLING EQUIPMENT**					
153	No Work					
154						
155	**MATL PROCESS & HANDLING EQUIP TOTAL**					**$0**
156						
157	**DIVISION 44 - POLLUTION CONTROL EQUIPMENT**					
158	No Work					
159						
160	**POLLUTION CONTROL EQUIPMENT TOTAL**					**$0**
161						
162	**SUBTOTAL OF DIRECT COST**					**$1,890,238**
163						

GSF 4,953

D4B - GATE 6 UTILITIES AREA

Opinion of Probable Construction Cost

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
164	**GENERAL CONTRACTOR'S MARK UP**					
165	Overhead, Profit and Fees		**15.00%**	$1,890,237.77	$283,536	
166						
167	**SUB TOTAL OF CONSTRUCTION COST**					**$2,173,773**
168						
169	**CONTINGENCIES**					
170	DESIGN AND ESTIMATING CONTINGENCIES		**20.00%**	$2,173,773.44	$434,755	
171	ESCALATIONS		**0**			
172	OWNERS SOFT COSTS		**0.00%**	$2,173,773.44	$0	
173						
174						
175	**CONTINGENCIES TOTAL**					**$434,755**
176						
177					**GRAND TOTAL OF CONSTRUCTION COSTS**	**$2,608,528**
					$/SF	**$527**

CLASS 5 COST ESTIMATE RANGE	AMOUNT	$/SF
LOW RANGE @ -30%	**$1,825,970**	**$369**
OPINION OF PROBABLE COST	**$2,608,528**	**$527**
HIGH RANGE @ +50%	**$3,912,792**	**$790**

GSF 10,459

I1 - ROOFDECK OVERBUILD & OUTDOOR DECK

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
1	**DIVISION 1 - GENERAL REQUIREMENTS**					
2	Mobilization		**6.00%**	$5,470,955.23	$328,257	
3	Traffic Control		**3.00%**	$5,470,955.23	$164,129	
4	Allowance for Seismic Structural Strenthening		**10.00%**	$5,470,955.23	$547,096	
5	Erosion and Dust Control		**1.00%**	$5,470,955.23	$54,710	
6	General Conditions		**10.00%**	$5,470,955.23	$547,096	
7	Insurance & Bonds		**2.50%**	$5,470,955.23	$136,774	
8	Permits		**1.00%**	$5,470,955.23	$54,710	
9						
10	**GENERAL REQUIREMENTS TOTAL**					**$1,832,770**
11						
12	**DIVISION 2 - EXISTING CONDITIONS**					
13	Allowance for Demo of Existing Obstructions	GSF	10,459	$5.00	$52,295	
14						
15	**EXISTING CONDITIONS TOTAL**					**$52,295**
16						
17	**DIVISION 3 - CONCRETE**					
18	Spread Footing for Columns including Concrete, Formwork and Reinforcement 6' x 6' x 2' x 12	CY	32	$750.00	$24,000	
19	Grade Beams for Exterior Walls including Concrete, Formwork and Reinforcement 2' x 2' x 176'	CY	68	$750.00	$50,667	
20	Slab on grade including base course, vapor barrier, concrete, formwork, reinforcement, curing	SF	1,200	$15.00	$18,000	
21	Concrete Topping Slab to Second Floor Level 3" Thick	GSF	10,459	$9.00	$94,131	
22	Concrete Topping Slab to Roof Level 3" Thick	GSF	10,459	$9.00	$94,131	
23						
24	**CONCRETE TOTAL**					**$188,262**
25						
26	**DIVISION 4 - MASONRY**					
27	Split Face CMU Exterior Wall 12' High	SF	1,320	$45.00	$59,400	
28						
29	**MASONRY TOTAL**					**$59,400**
30						
31	**DIVISION 5 - METALS**					
32	Allowance for steel framing including Columns and Beams for Second Floor @ 25lbs/SF	TONS	131	$5,500.00	$719,056	
33	Allowance for steel framing including Columns and Beams for Roof Level @ 25lbs/SF	TONS	131	$5,500.00	$719,056	
34	Metal Deck @ Second Floor Level	GSF	10,459	$4.50	$47,066	
35	Metal Deck @ Roof Level	GSF	10,459	$4.50	$47,066	
36	Allowance for Misc Steel	TONS	33	$5,500.00	$179,764	
37						
38	**METALS TOTAL**					**$1,712,008**
39						
40	**DIVISION 6 - WOOD, PLASTICS & COMPOSITES**					
41	Wood Blocking as necessary in East Loading Dock Area	GSF	10,459	$6.00	$62,754	
42						
43	**WOOD, PLASTICS & COMPOSITES TOTAL**					**$62,754**
44						
45	**DIVISION 7 - THERMAL & MOISTURE PROTECTION**					
46	Allowance for Joint Sealant and Caulking	GSF	10,459	$1.00	$10,459	
47	New Roofing System EPDM	SF	10,459	$25.00	$261,475	
48	Spray On Fire Proofing to Deck	GSF	10,459	$3.00	$31,377	
49						
50	**THERMAL & MOISTURE PROTECTION TOTAL**					**$303,311**
51						
52	**DIVISION 8 - DOORS & WINDOWS**					
53	Exterior 3' x 7' HM Door with HM Frames and necessary Hardware	EA	1	$3,600.00	$3,600	
54	Exterior 6' x 7' Glass Door with Aluminum Frames and necessary Hardware	EA	3	$7,200.00	$21,600	
55	Interior Aluminum and Glass Partitions	SF	880	$90.00	$79,200	

GSF 10,459

I1 - ROOFDECK OVERBUILD & OUTDOOR DECK

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Order of Magnitude

Jacobs

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
56	3' x 7' HM Door with HM Frames and necessary Hardware	EA	8	$2,400.00	$19,200	
57	6' x 7' HM Door with HM Frames and necessary Hardware	EA	4	$4,800.00	$19,200	
58	Exterior Window Wall System	SF	960	$150.00	$144,000	
59	Allowance for Sun Shade	LF	120	$150.00	$18,000	
60	Tempered Glass Guardrails	LF	170	$500.00	$85,000	
61						
62	**OPENINGS TOTAL**					**$389,800**
63						
64	**DIVISION 9 - FINISHES**					
65	Furring to Exterior Walls	SF	1,120	$6.00	$6,720	
66	Interior Partitions consisting of 3-5/8" metal stud, and 1 layer of 5/8" gyp board both sides 6" above ceiling	SF	4,000	$7.50	$30,000	
67	Soffits	SF	600	$7.50	$4,500	
68	New 2' X 4' Acoustical Ceiling System consisting of suspension system and 5/8" fiberglass ceiling panels	SF	9,259	$5.00	$46,295	
69	New Gyp Board Ceiling	SF	1,200	$15.00	$18,000	
70	Carpet Tile	SF	425	$4.50	$1,913	
71	Ceramic Tile Floor	SF	7,775	$12.00	$93,300	
72	Ceramic Tile Wall	SF	400	$15.00	$6,000	
73	Painting HM Doors, Frames, Drywall Partitions	GSF	10,459	$3.00	$31,377	
74						
75	**FINISHES TOTAL**					**$238,105**
76						
77	**DIVISION 10 - SPECIALTIES**					
78	Interior Signage	GSF	10,459	$2.00	$20,918	
79	Exterior Signage	GSF	10,459	$5.00	$52,295	
80	Fire Extinguisher Cabinet with Fire Extinguisher	GSF	10,459	$1.00	$10,459	
81						
82	**SPECIALTIES TOTAL**					**$83,672**
83						
84	**DIVISION 11 - EQUIPMENT**					
85	No work					
86	**EQUIPMENT TOTAL**					**$0**
87						
88	**DIVISION 12 - FURNISHINGS**					
89	**Allowance for**					
90	Base Cabinets	LF	60	$600.00	$36,000	
91	Wall Cabinets	LF	60	$450.00	$27,000	
92	Solid Surface Countertops 2' wide	LF	60	$150.00	$9,000	
93						
94	**FURNISHINGS TOTAL**					**$72,000**
95						
96	**DIVISION 13 - SPECIAL CONSTRUCTION**					
97	No Work					
98						
99	**SPECIAL CONSTRUCTION TOTAL**					**$0**
100						
101	**DIVISION 14 - CONVEYING EQUIPMENT**					
102	No Work					
103						
104	**CONVEYING EQUIPMENT TOTAL**					**$0**
105						
106	**DIVISION 21 - FIRE SUPPRESSION**					
107	Fire Sprinkler System connected to existing system with new sprinkler Heads & adjusting existing branch piping	GSF	10,459	$7.50	$78,443	
108						
109	**FIRE SUPPRESSION TOTAL**					**$78,443**
110						
111	**DIVISION 22 - PLUMBING**					
112	Allowance for Plumbing work	GSF	10,459	$15.00	$156,885	
113						
114	**PLUMBING TOTAL**					**$156,885**

GSF 10,459

I1 - ROOFDECK OVERBUILD & OUTDOOR DECK

Opinion of Probable Construction Cost

Order of Magnitude

DATE: 10-Mar-21

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
115						
116	**DIVISION 23 - HEATING VENTILATION AIR CONDITIONING**					
117	Allowance for HVAC work including Temperature Control, Testing and Balancing	GSF	10,459	$60.00	$627,540	
118						
119	**HEATING VENTILATION AIR CONDITIONING TOTAL**					**$627,540**
120						
121	**DIVISION 25 - INTEGRATED AUTOMATION**					
122	NO WORK	GSF	10,459	$15.00	$156,885	
123						
124	**INTEGRATED AUTOMATION TOTAL**					**$156,885**
125						
126	**DIVISION 26 - ELECTRICAL**					
127	Allowance for all necessary Electrical Work	GSF	10,459	$90.00	$941,310	
128						
129						
130	**ELECTRICAL TOTAL**					**$941,310**
131						
132	**DIVISION 27 - COMMUNICATIONS**					
133	Allowance for all necessary Communication Systems	GSF	10,459	$15.00	$156,885	
134						
135	**COMMUNICATIONS TOTAL**					**$156,885**
136						
137	**DIVISION 28 - ELECTRONIC SAFETY & SECURITY**					
138	Allowance for Fire Alarm System	GSF	10,459	$15.00	$156,885	
139						
140	**ELECTRONIC SAFETY & SECURITY TOTAL**					**$156,885**
141						
142	**DIVISION 31 - EARTHWORK**					
143	Excavation for Exterior Wall strip Footings and Spread Footings	CY	489	$30.00	$14,667	
144	Backfill	CY	389	$36.00	$14,000	
145	Haul off site	CY	130	$45.00	$5,850	
146						
147	**EARTHWORK TOTAL**					**$34,517**
148						
149	**DIVISION 32 - EXTERIOR IMPROVEMENTS**					
150	No Work					
151						
152	**EXTERIOR IMPROVEMENTS TOTAL**					**$0**
153						
154	**DIVISION 33 - UTILITIES**					
155	No Work					
156						
157	**UTILITIES TOTAL**					**$0**
158						
159	**DIVISION 34 - TRANSPORTATION**					
160	No Work					
161						
162	**TRANSPORTATION TOTAL**					**$0**
163						
164	**DIVISION 35 - WATERWAY & MARINE**					
165	No Work					
166						
167	**WATERWAY & MARINE TOTAL**					**$0**
168						
169	**DIVISION 41 - MATERIAL PROCESSING & HANDLING EQUIPMENT**					
170	No Work					
171						
172	**MATL PROCESS & HANDLING EQUIP TOTAL**					**$0**
173						

GSF 10,459

I1 - ROOFDECK OVERBUILD & OUTDOOR DECK

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
174	**DIVISION 44 - POLLUTION CONTROL EQUIPMENT**					
175	No Work					
176						
177	**POLLUTION CONTROL EQUIPMENT TOTAL**					**$0**
178						
179	**SUBTOTAL OF DIRECT COST**					**$7,303,725**
180						
181	**GENERAL CONTRACTOR'S MARK UP**					
182	Overhead, Profit and Fees		**15.00%**	$7,303,725.23	$1,095,559	
183						
184	**SUB TOTAL OF CONSTRUCTION COST**					**$8,399,284**
185						
186	**CONTINGENCIES**					
187	DESIGN AND ESTIMATING CONTINGENCIES		**20.00%**	$8,399,284.02	$1,679,857	
188	ESCALATIONS		**0**			
189	OWNERS SOFT COSTS		**0.00%**	$8,399,284.02	$0	
190						
191						
192	**CONTINGENCIES TOTAL**					**$1,679,857**
193						
194	**GRAND TOTAL OF CONSTRUCTION COSTS**					**$10,079,141**
					$/SF	**$964**

CLASS 5 COST ESTIMATE RANGE	**AMOUNT**	**$/SF**
LOW RANGE @ -30%	**$7,055,399**	**$675**
OPINION OF PROBABLE COST	**$10,079,141**	**$964**
HIGH RANGE @ +50%	**$15,118,711**	**$1,446**

GSF 2,516

I2 - FIS CONNECTION & OUTDOOR DECK

Opinion of Probable Construction Cost **DATE: 10-Mar-21**

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
1	**DIVISION 1 - GENERAL REQUIREMENTS**					
2	Mobilization		**6.00%**	$1,727,682.25	$103,661	
3	Traffic Control		**3.00%**	$1,727,682.25	$51,830	
4	Erosion and Dust Control		**1.00%**	$1,727,682.25	$17,277	
5	General Conditions		**10.00%**	$1,727,682.25	$172,768	
6	Insurance & Bonds		**2.50%**	$1,727,682.25	$43,192	
7	Permits		**1.00%**	$1,727,682.25	$17,277	
8						
9	**GENERAL REQUIREMENTS TOTAL**					**$406,005**
10						
11	**DIVISION 2 - EXISTING CONDITIONS**					
12	Allowance for Demo of Existing Obstructions	GSF	2,516	$5.00	$12,580	
13						
14	**EXISTING CONDITIONS TOTAL**					**$12,580**
15						
16	**DIVISION 3 - CONCRETE**					
17	Concrete Topping Slab to Second Floor Level 3" Thick	SF	1,694	$9.00	$15,246	
18	Concrete Topping Slab to Second Floor Level 3" Thick	SF	822	$9.00	$7,398	
19						
20	**CONCRETE TOTAL**					**$22,644**
21						
22	**DIVISION 4 - MASONRY**					
23	Split Face CMU Exterior Wall	SF	1,250	$45.00	$56,250	
24						
25	**MASONRY TOTAL**					**$56,250**
26						
27	**DIVISION 5 - METALS**					
28	Allowance for steel framing including Columns and Beams for Second Floor @ 25lbs/SF	TONS	31	$5,500.00	$172,975	
29	Allowance for steel framing including Columns and Beams for Roof Level @ 25lbs/SF	TONS	10	$5,500.00	$57,200	
30	Metal Deck @ Second Floor Level	GSF	2,516	$4.50	$11,322	
31	Metal Deck @ Roof Level	GSF	822	$4.50	$3,699	
32	Allowance for Misc Steel	TONS	10	$5,500.00	$57,544	
33	Allowance for New FIS Communication Stairs	Flight	2	$45,000.00	$90,000	
34	**METALS TOTAL**					**$392,740**
35						
36	**DIVISION 6 - WOOD, PLASTICS & COMPOSITES**					
37	Wood Blocking as necessary in East Loading Dock Area	GSF	2,516	$6.00	$15,096	
38						
39	**WOOD, PLASTICS & COMPOSITES TOTAL**					**$15,096**
40						
41	**DIVISION 7 - THERMAL & MOISTURE PROTECTION**					
42	Allowance for Joint Sealant and Caulking	GSF	2,516	$1.00	$2,516	
43	New Roofing System EPDM	SF	832	$25.00	$20,800	
44	Spray On Fire Proofing to Deck	GSF	2,516	$3.00	$7,548	
45						
46	**THERMAL & MOISTURE PROTECTION TOTAL**					**$30,864**
47						
48	**DIVISION 8 - DOORS & WINDOWS**					
49	Exterior 3' x 7' HM Door with HM Frames and necessary Hardware	EA	1	$3,600.00	$3,600	
50	Exterior 6' x 7' Glass Door with Aluminum Frames and necessary Hardware	EA	1	$7,200.00	$7,200	
51	Exterior Window Wall System	SF	1,056	$150.00	$158,400	
52	Allowance for Sun Shade	LF	132	$150.00	$19,800	
53	Tempered Glass Guardrails	LF	190	$500.00	$95,000	
54						
55	**OPENINGS TOTAL**					**$284,000**

GSF 2,516

I2 - FIS CONNECTION & OUTDOOR DECK

Opinion of Probable Construction Cost — **DATE: 10-Mar-21**

Order of Magnitude

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
56						
57	**DIVISION 9 - FINISHES**					
58	Furring to Exterior Walls	SF	1,250	$6.00	$7,500	
59	Interior Partitions consisting of 3-5/8" metal stud, and 1 layer of 5/8" gyp board both sides 6" above ceiling	SF	1,000	$7.50	$7,500	
60	Soffits	SF	600	$7.50	$4,500	
61	New 2' X 4' Acoustical Ceiling System consisting of suspension system and 5/8" fiberglass ceiling panels	SF	816	$5.00	$4,080	
62	New Gyp Board Ceiling	SF	950	$15.00	$14,250	
63	Carpet Tile	SF	825	$4.50	$3,713	
64	Ceramic Tile Floor	SF	1,700	$12.00	$20,400	
65	Painting HM Doors, Frames, Drywall Partitions	GSF	2,516	$3.00	$7,548	
66						
67	**FINISHES TOTAL**					**$69,491**
68						
69	**DIVISION 10 - SPECIALTIES**					
70	Interior Signage	GSF	2,516	$2.00	$5,032	
71	Exterior Signage	GSF	2,516	$5.00	$12,580	
72	Fire Extinguisher Cabinet with Fire Extinguisher	GSF	2,516	$1.00	$2,516	
73						
74	**SPECIALTIES TOTAL**					**$20,128**
75						
76	**DIVISION 11 - EQUIPMENT**					
77	No work					
78	**EQUIPMENT TOTAL**					**$0**
79						
80	**DIVISION 12 - FURNISHINGS**					
81	**Allowance for**					
82	Base Cabinets	LF	12	$600.00	$7,200	
83	Wall Cabinets	LF	12	$450.00	$5,400	
84	Solid Surface Countertops 2' wide	LF	12	$150.00	$1,800	
85						
86	**FURNISHINGS TOTAL**					**$14,400**
87						
88	**DIVISION 13 - SPECIAL CONSTRUCTION**					
89	NO WORK					
90						
91	**SPECIAL CONSTRUCTION TOTAL**					**$0**
92						
93	**DIVISION 14 - CONVEYING EQUIPMENT**					
94	New Two Stop Hole less passenger Elevator	EA	1	$300,000.00	$300,000	
95						
96	**CONVEYING EQUIPMENT TOTAL**					**$300,000**
97						
98	**DIVISION 21 - FIRE SUPPRESSION**					
99	Fire Sprinkler System connected to existing system with new sprinkler Heads & adjusting existing branch piping	GSF	2,516	$7.50	$18,870	
100						
101	**FIRE SUPPRESSION TOTAL**					**$18,870**
102						
103	**DIVISION 22 - PLUMBING**					
104	NO WORK	GSF	0	$12.00	$0	
105						
106	**PLUMBING TOTAL**					**$0**
107						
108	**DIVISION 23 - HEATING VENTILATION AIR CONDITIONING**					
109	Allowance for HVAC work including Temperature Control, Testing and Balancing	GSF	2,516	$60.00	$150,960	
110						
111	**HEATING VENTILATION AIR CONDITIONING TOTAL**					**$150,960**
112						
113	**DIVISION 25 - INTEGRATED AUTOMATION**					
114	NO WORK	GSF	2,516	$15.00	$37,740	
115						
116	**INTEGRATED AUTOMATION TOTAL**					**$37,740**

GSF 2,516

I2 - FIS CONNECTION & OUTDOOR DECK

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
117						
118	**DIVISION 26 - ELECTRICAL**					
119	Allowance for all necessary Electrical Work	GSF	2,516	$90.00	$226,440	
120						
121						
122	**ELECTRICAL TOTAL**					**$226,440**
123						
124	**DIVISION 27 - COMMUNICATIONS**					
125	Allowance for all necessary Communication Systems	GSF	2,516	$15.00	$37,740	
126						
127	**COMMUNICATIONS TOTAL**					**$37,740**
128						
129	**DIVISION 28 - ELECTRONIC SAFETY & SECURITY**					
130	Allowance for Fire Alarm System	GSF	2,516	$15.00	$37,740	
131						
132	**ELECTRONIC SAFETY & SECURITY TOTAL**					**$37,740**
133						
134	**DIVISION 31 - EARTHWORK**					
135	No Work					
136						
137	**EARTHWORK TOTAL**					**$0**
138						
139	**DIVISION 32 - EXTERIOR IMPROVEMENTS**					
140	No Work					
141						
142	**EXTERIOR IMPROVEMENTS TOTAL**					**$0**
143						
144	**DIVISION 33 - UTILITIES**					
145	No Work					
146						
147	**UTILITIES TOTAL**					**$0**
148						
149	**DIVISION 34 - TRANSPORTATION**					
150	No Work					
151						
152	**TRANSPORTATION TOTAL**					**$0**
153						
154	**DIVISION 35 - WATERWAY & MARINE**					
155	No Work					
156						
157	**WATERWAY & MARINE TOTAL**					**$0**
158						
159	**DIVISION 41 - MATERIAL PROCESSING & HANDLING EQUIPMENT**					
160	No Work					
161						
162	**MATL PROCESS & HANDLING EQUIP TOTAL**					**$0**
163						
164	**DIVISION 44 - POLLUTION CONTROL EQUIPMENT**					
165	No Work					
166						
167	**POLLUTION CONTROL EQUIPMENT TOTAL**					**$0**
168						
169	**SUBTOTAL OF DIRECT COST**					**$2,133,688**
170						

GSF 2,516

I2 - FIS CONNECTION & OUTDOOR DECK

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
171	**GENERAL CONTRACTOR'S MARK UP**					
172	Overhead, Profit and Fees		**15.00%**	$2,133,687.58	$320,053	
173						
174	**SUB TOTAL OF CONSTRUCTION COST**					**$2,453,741**
175						
176	**CONTINGENCIES**					
177	DESIGN AND ESTIMATING CONTINGENCIES		**20.00%**	$2,453,740.72	$490,748	
178	ESCALATIONS		**0**			
179	OWNERS SOFT COSTS		**0.00%**	$2,453,740.72	$0	
180						
181						
182	**CONTINGENCIES TOTAL**					**$490,748**
183						
184	**GRAND TOTAL OF CONSTRUCTION COSTS**					**$2,944,489**
					$/SF	**$1,170**

CLASS 5 COST ESTIMATE RANGE	**AMOUNT**	**$/SF**
LOW RANGE @ -30%	**$2,061,142**	**$819**
OPINION OF PROBABLE COST	**$2,944,489**	**$1,170**
HIGH RANGE @ +50%	**$4,416,733**	**$1,755**

GSF 26,290

I3 - EXISTING AREA RENOVATION

Opinion of Probable Construction Cost **DATE: 10-Mar-21**

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Jacobs

LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
1	**DIVISION 1 - GENERAL REQUIREMENTS**					
2	Mobilization		**6.00%**	$8,035,804.72	$482,148	
3	Traffic Control		**3.00%**	$8,035,804.72	$241,074	
4	Allowance for Seismic Structural Strenthening		**10.00%**	$8,035,804.72	$803,580	
5	Erosion and Dust Control		**1.00%**	$8,035,804.72	$80,358	
6	General Conditions		**10.00%**	$8,035,804.72	$803,580	
7	Insurance & Bonds		**2.50%**	$8,035,804.72	$200,895	
8	Permits		**1.00%**	$8,035,804.72	$80,358	
9						
10	**GENERAL REQUIREMENTS TOTAL**					**$2,691,995**
11						
12	**DIVISION 2 - EXISTING CONDITIONS**					
13	Demo of Existing Walls, Flooring and Ceiling	GSF	26,290	$15.00	$394,350	
14	Demo of Exterior Walls	SF	3,360	$45.00	$151,200	
15						
16	**EXISTING CONDITIONS TOTAL**					**$545,550**
17						
18	**DIVISION 3 - CONCRETE**					
19	Allowance for Patching Concrete Floor	GSF	26,290	$6.00	$157,740	
20	Strip Footing for Exterior Walls including Concrete, Formwork and Reinforcement, 45' x 4' x 2'	CY	13	$750.00	$10,000	
21	Foundation Walls including Concrete, Formwork and Reinforcement 45' x 3' x 1'	CY	5	$750.00	$3,750	
22	Spread Footing for Columns including Concrete, Formwork and Reinforcement 6' x 6' x 2' x 4	CY	11	$750.00	$8,000	
23	Grade Beams for Exterior Walls including Concrete, Formwork and Reinforcement 2' x 2' x 45'	CY	7	$750.00	$5,000	
24	Slab on grade including base course, vapor barrier, concrete, formwork, reinforcement, curing	SF	26,290	$15.00	$394,350	
	Concrete Topping Slab to Second Floor Level 3" Thick	SF	400	$9.00	$3,600	
25						
26	**CONCRETE TOTAL**					**$582,440**
27						
28	**DIVISION 4 - MASONRY**					
29	Split Face CMU Exterior Wall	SF	1,125	$45.00	$50,625	
30						
31	**MASONRY TOTAL**					**$50,625**
32						
33	**DIVISION 5 - METALS**					
34	Allowance for steel framing including Columns and Beams for Roof Level @ 25lbs/SF	TONS	5	$5,500.00	$27,500	
35	Metal Deck @ Roof Level	SF	400	$4.50	$1,800	
36	Allowance for Misc Steel	TONS	1	$5,500.00	$6,875	
37	Allowance for New Fire Stair 02	Flight	2	$30,000.00	$60,000	
38						
39	**METALS TOTAL**					**$96,175**
40						
41	**DIVISION 6 - WOOD, PLASTICS & COMPOSITES**					
42	Wood Blocking as necessary in East Loading Dock Area	GSF	26,290	$6.00	$157,740	
43						
44	**WOOD, PLASTICS & COMPOSITES TOTAL**					**$157,740**
45						
46	**DIVISION 7 - THERMAL & MOISTURE PROTECTION**					
47	Allowance for Joint Sealant and Caulking	GSF	26,290	$1.00	$26,290	
48	New Roofing System EPDM	SF	250	$25.00	$6,250	
49	Spray On Fire Proofing to Deck	SF	650	$3.00	$1,950	
50						
51	**THERMAL & MOISTURE PROTECTION TOTAL**					**$34,490**
52						

GSF 26,290

I3 - EXISTING AREA RENOVATION

Opinion of Probable Construction Cost

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
53	**DIVISION 8 - DOORS & WINDOWS**					
54	Exterior 3' x 7' HM Door with HM Frames and necessary Hardware	EA	1	$3,600.00	$3,600	
55	Exterior 6' x 7' Glass Door with Aluminum Frames and necessary Hardware	EA	1	$7,200.00	$7,200	
56	Interior Aluminum and Glass Partitions	SF	1,760	$90.00	$158,400	
57	Exterior Window Wall System	SF	3,360	$150.00	$504,000	
58	Allowance for Sun Shade	LF	420	$150.00	$63,000	
59						
60	**OPENINGS TOTAL**					**$736,200**
61						
62	**DIVISION 9 - FINISHES**					
63	Furring to Exterior Walls	SF	1,080	$6.00	$6,480	
64	Interior Partitions consisting of 3-5/8" metal stud, and 1 layer of 5/8" gyp board both sides 6" above ceiling	SF	2,000	$7.50	$15,000	
65	Soffits	SF	600	$7.50	$4,500	
66	New 2' X 4' Acoustical Ceiling System consisting of suspension system and 5/8" fiberglass ceiling panels	SF	26,290	$5.00	$131,450	
67	Wood Clad Ceiling @ Boarding Area	SF	5,970	$45.00	$268,650	
68	Carpet Tile	SF	13,545	$4.50	$60,953	
69	Ceramic Tile Floor	SF	16,610	$12.00	$199,320	
70	Ceramic Tile Wall	SF	400	$15.00	$6,000	
71	Painting HM Doors, Frames, Drywall Partitions	GSF	26,290	$3.00	$78,870	
72						
73	**FINISHES TOTAL**					**$771,223**
74						
75	**DIVISION 10 - SPECIALTIES**					
76	Interior Signage	GSF	26,290	$2.00	$52,580	
77	Exterior Signage	GSF	26,290	$5.00	$131,450	
78	Fire Extinguisher Cabinet with Fire Extinguisher	GSF	26,290	$1.00	$26,290	
79						
80	**SPECIALTIES TOTAL**					**$210,320**
81						
82	**DIVISION 11 - EQUIPMENT**					
83	Allowance for E-Gates	EA	6	$45,000.00	$270,000	
84						
85	**EQUIPMENT TOTAL**					**$270,000**
86						
87	**DIVISION 12 - FURNISHINGS**					
88	**Allowance for**					
89	Base Cabinets	LF	80	$600.00	$48,000	
90	Wall Cabinets	LF	80	$450.00	$36,000	
91	Solid Surface Countertops 2' wide	LF	80	$150.00	$12,000	
92						
93	**FURNISHINGS TOTAL**					**$96,000**
94						
95	**DIVISION 13 - SPECIAL CONSTRUCTION**					
96	No Work					
97						
98	**SPECIAL CONSTRUCTION TOTAL**					**$0**
99						
100	**DIVISION 14 - CONVEYING EQUIPMENT**					
101	No Work					
102						
103	**CONVEYING EQUIPMENT TOTAL**					**$0**
104						
105	**DIVISION 21 - FIRE SUPPRESSION**					
106	Fire Sprinkler System connected to existing system with new sprinkler Heads & adjusting existing branch piping	GSF	26,290	$7.50	$197,175	
107						
108	**FIRE SUPPRESSION TOTAL**					**$197,175**
109						
110	**DIVISION 22 - PLUMBING**					
111	Allowance for Plumbing Work	GSF	26,290	$12.00	$315,480	
112						
113	**PLUMBING TOTAL**					**$315,480**

GSF 26,290

I3 - EXISTING AREA RENOVATION

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LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
114						
115	**DIVISION 23 - HEATING VENTILATION AIR CONDITIONING**					
116	Allowance for HVAC work including Temperature Control, Testing and Balancing	GSF	26,290	$45.00	$1,183,050	
117						
118	**HEATING VENTILATION AIR CONDITIONING TOTAL**					**$1,183,050**
119						
120	**DIVISION 25 - INTEGRATED AUTOMATION**					
121	NO WORK	GSF	0	$12.00	$0	
122						
123	**INTEGRATED AUTOMATION TOTAL**					**$0**
124						
125	**DIVISION 26 - ELECTRICAL**					
126	Allowance for all necessary Electrical Work	GSF	26,290	$60.00	$1,577,400	
127						
128						
129	**ELECTRICAL TOTAL**					**$1,577,400**
130						
131	**DIVISION 27 - COMMUNICATIONS**					
132	Allowance for all necessary Communication Systems	GSF	26,290	$6.00	$157,740	
133						
134	**COMMUNICATIONS TOTAL**					**$157,740**
135						
136	**DIVISION 28 - ELECTRONIC SAFETY & SECURITY**					
137	Allowance for Fire Alarm System	GSF	26,290	$6.00	$157,740	
138						
139	**ELECTRONIC SAFETY & SECURITY TOTAL**					**$157,740**
140						
141	**DIVISION 31 - EARTHWORK**					
142	Excavation for Exterior Wall strip Footings and Spread Footings	CY	157	$30.00	$4,722	
143	Backfill	CY	121	$36.00	$4,371	
144	Haul off site	CY	112	$45.00	$5,031	
145	**EARTHWORK TOTAL**					**$14,124**
146						
147	**DIVISION 32 - EXTERIOR IMPROVEMENTS**					
148	Allowance for Apron Work	SY	2,921	$300.00	$876,333	
149						
150	**EXTERIOR IMPROVEMENTS TOTAL**					**$876,333**
151						
152	**DIVISION 33 - UTILITIES**					
153	Allowance for Utilities Connection	LSUM	1	$6,000.00	$6,000	
154						
155	**UTILITIES TOTAL**					**$6,000**
156						
157	**DIVISION 34 - TRANSPORTATION**					
158	No Work					
159						
160	**TRANSPORTATION TOTAL**					**$0**
161						
162	**DIVISION 35 - WATERWAY & MARINE**					
163	No Work					
164						
165	**WATERWAY & MARINE TOTAL**					**$0**
166						
167	**DIVISION 41 - MATERIAL PROCESSING & HANDLING EQUIPMENT**					
168	No Work					
169						
170	**MATL PROCESS & HANDLING EQUIP TOTAL**					**$0**
171						
172	**DIVISION 44 - POLLUTION CONTROL EQUIPMENT**					
173	No Work					
174						
175	**POLLUTION CONTROL EQUIPMENT TOTAL**					**$0**
176						
177	**SUBTOTAL OF DIRECT COST**					**$10,727,799**

GSF 26,290

I3 - EXISTING AREA RENOVATION

Opinion of Probable Construction Cost

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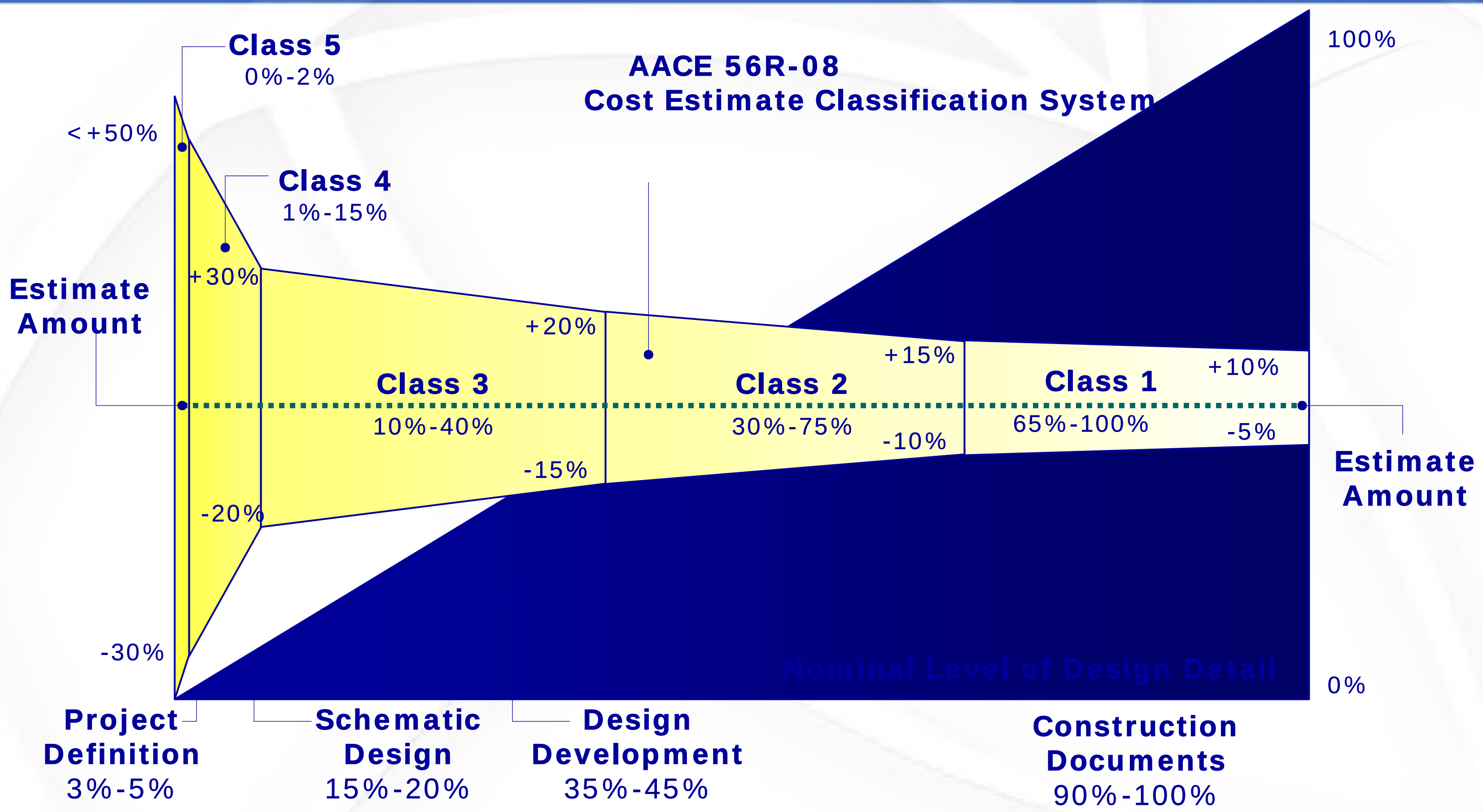
LINE ITEM #	DESCRIPTION	UNIT	QTY	RATE	AMT	DIV TOTAL
178						
179	**GENERAL CONTRACTOR'S MARK UP**					
180	Overhead, Profit and Fees		**15.00%**	$10,727,799.30	$1,609,170	
181						
182	**SUB TOTAL OF CONSTRUCTION COST**					**$12,336,969**
183						
184	**CONTINGENCIES**					
185	DESIGN AND ESTIMATING CONTINGENCIES		**20.00%**	$12,336,969.20	$2,467,394	
186	ESCALATIONS		**0**			
187	OWNERS SOFT COSTS		**0.00%**	$12,336,969.20	$0	
188						
189						
190	**CONTINGENCIES TOTAL**					**$2,467,394**
191						
192						**$14,804,363**
					$/SF	**$563**

CLASS 5 COST ESTIMATE RANGE	**AMOUNT**	**$/SF**
LOW RANGE @ -30%	**$10,363,054**	**$394**
OPINION OF PROBABLE COST	**$14,804,363**	**$563**
HIGH RANGE @ +50%	**$22,206,545**	**$845**

Appendix B: AACE Estimate Accuracy Chart

AACE – Classification System



Construction Cost Estimate Accuracy Ranges

Appendix E Energy Audit

Bangor International Airport Energy Audit

Report

Final

April 2, 2021

Contents

Appendix(es)

Table(s)

Figure(s)

Acronyms and Abbreviations

°F	degree(s) Fahrenheit
AHU	air-handling unit
BGR	Bangor International Airport
Btu	British thermal unit(s)
CHW	chilled water
DDC	direct digital control
DX	direct expansion
ECM	Energy Conservation Measure
EUI	energy use intensity
FAA	Federal Aviation Administration
gpm	gallon(s) per minute
gpf	gallon(s) per flush
HHW	heating hot water
HID	high intensity discharge
HVAC	heating, ventilation, and air conditioning
IR	infrared
kBtu	1,000 British thermal unit(s)
kGal	kilogallon(s) (1,000 gallons)
kGal/yr	kilogallon(s) per year
kW	kilowatt(s)
kWh	kilowatt-hour(s)
LC/NC	low-cost/no-cost
LCC	life cycle cost
LED	light-emitting diode
LEED	Leadership in Energy and Environmental Design
MMBtu	million British thermal unit(s)
MW	megawatt(s)
MWh	megawatt hour(s)
N/A	not applicable
O&M	operation and maintenance
pax	passengers
PV	photovoltaic
SF	square foot (feet)
W	Watt(s)
yr	year

1. Overview

Jacobs is developing an Airport Master Plan (AMP) for Bangor International Airport (FAA identifier = BGR). This Energy Audit Report is an attachment to the AMP and summarizes the energy audit of the Airport and supporting facilities included in the project scope (**Table 1-1**). The first objective of the audit is to review and assess existing conditions and develop baseline energy and water profiles. The second objective is to identify, analyze, and prioritize energy- and water-efficiency opportunities, or Energy Conservation Measures (ECMs), and to develop an implementation plan to help the BGR team meet their energy reduction and resiliency goals.

This Energy Audit Report provides a summary of the findings of the audit, analysis of historical energy and water consumption data, modeled facility energy and potable water consumption baselines, as well as recommended energy- and water efficiency opportunities.

Table 1-1. Energy Audit Building List
Bangor International Airport Energy Audit

Building Number	Building Name/Description	Primary Function	Building Area (SF)
2	Airport-Domestic Terminal (DAB)	Passenger Terminal	185,608
3	Airport-International Terminal (IAB)	Passenger Terminal	
96	Federal Aviation Administration (FAA)	Office Building	12,675
100	Airfield Maintenance Building	Maintenance	37,335
121	Bangor Aviation Services	Office Building	11,784
123	Corporate Hangar	Hangar	11,100
124	T Hangar	Hangar	12,480
252	Hangar 8 & 9 - FedEx Corporation / University of Maine	Hangar	26,181
253	Ground Support Equipment (GSE) Shop / Alamo & National Rental Car	Maintenance	13,357
271	Bangor Innovation Center	Office Building	29,043
e456	De-Icing Facility	Maintenance	7,200
600	Airport Storage/Life Flight of Maine/ C & L Aviation Group	Warehouse	49,468
N/A	Fuel Farm Main Office	Office Building	1,200

1.1 Background

Airports are often one of the highest consumers for regional utility providers, and related costs can make up a significant percentage of an airport's operating budget, with lighting and climate control as the most significant source of demand. BGR currently spends almost $1 million per year on energy, water, and wastewater, which is a significant expense in a price-sensitive environment.

The last energy audit for BGR was prepared in 2008. Since that time, BGR has implemented a number of energy projects and has renovated some of the facilities. Implemented projects include use of natural gas, replacing incandescent light bulbs with LED lights, waste recycling, enhanced building insulation in select facilities, and low flow water fixtures.

Despite these upgrades, additional energy-conservation opportunities remain. A number of changes have occurred at the Airport, and throughout the aviation industry, since the previous energy audit. For example, BGR has seen increased activity and growth in several facets impacting energy and water consumption as well as visibility to the public as a good steward of the environment. The Airport's recent growth and current expansion efforts create new challenges for BGR. In addition to increased load demands for utilities, aging infrastructure, such as electrical hardware, poses significant operational risks, which are exacerbated by these new load demands.

In order to address these challenges and support the Airport's sustainability vision in an economically viable way, it is important to identify improvements that can be paid for by utilizing energy and operational savings. The measures identified as part of the energy audit will focus on energy efficient facility improvements, improved building comfort, and energy cost reductions, as well as increased energy resiliency.

1.2 Onsite Energy Audit

Jacobs conducted an on-site energy audit at the Airport from 10 to 12 November 2020. Jacobs specialists met with key personnel and observed the operations and equipment at the facilities listed above. In addition, existing drawings, and equipment specific data as well as utility data was obtained from BGR.

The audit included an assessment of all significant energy and water-using systems including lighting; heating, ventilation, and air conditioning (HVAC); water heating; pumps; motors; building envelope; water fixtures; and environmental controls. In addition, during the audit personnel responsible for operating and maintaining the equipment in the facility were interviewed, and data was requested to support development of the energy and water management profiles.

The audit team surveyed each building and facility for a general overview of the building and systems and to collect the data required to identify and develop potential ECMs. Each level of the buildings and facilities was included in the audit, and all major energy and water consuming systems (lighting systems, HVAC systems and controls, water fixtures). Building construction types and conditions were documented. In addition, interviews were conducted with BGR staff to discuss data needs, utility management, metering, status of previously implemented measures, measures under consideration, operation, and maintenance (O&M) procedures, and other relevant aspects of energy- and water consuming systems.

- **Lighting.** Lamp types and wattages, and lighting control types for both interior and exterior lighting systems were documented. Additional detailed information was provided by BGR. For inaccessible areas, assumptions were made based on lighting systems in adjacent or similar spaces within the respective buildings. Lighting runtime hours were approximated based on observations and interviews with Airport staff.

- **Water Fixtures.** Water usage data collected included types, flow rates and approximate quantities for plumbing fixtures and other water consuming equipment and processes. In general, plumbing fixture flow rates were based on the marked flow rate on the valve, aerator, or showerhead, as applicable. Where markings were not visible, assumptions were made based on water fixtures in adjacent or similar spaces within the respective buildings.

- **HVAC and Control Systems.** HVAC systems data collected included identifying overall system type and equipment, collecting nameplate data, and noting the observed equipment condition. Where equipment was inaccessible, assumptions were made based on other observed system components, similar accessible equipment in the building, and as-built drawings, where available. Control system types were also recorded, including existing setpoints and scheduling, where applicable and accessible.

- **Building Construction.** Building construction observations included the general construction detail and condition of the roof, exterior walls, windows, and doors. Insulation values for walls and roofs were typically estimated using the construction material type and thickness of each surface. For example, an exterior wall thickness is measured at an exterior door opening where the wall can be measured from the interior to the exterior surface. Where available, as-built drawings were used to confirm observations. The condition of insulation and weather stripping was based on observation only; thermal imaging was not included in the scope of this project.

- **Operations and Maintenance Procedures**. In addition to building and facility data, during the audit O&M procedures were discussed with BGR staff to better understand current practices, challenges, and concerns with the O&M program.

1.3 Building Summaries

Appendix A contains profiles for each building or facility that highlights primary energy and water consuming systems and equipment, and present readily available data.

2. Energy Management Profile

Non-renewable energy is a finite and costly resource and is the primary source of greenhouse gas emissions and other air pollutant emissions. Therefore, understanding the Airport's energy utility infrastructure, as well as the metering and control of these systems, is critical to the energy management process.

This section provides an overview of the energy utility infrastructure; an analysis of energy consumption and cost, including an energy consumption baseline, and energy profiles for the audited buildings

2.1 Historical Energy Usage Summary

The Airport uses electricity, natural gas, and fuel oil as its primary sources of energy. Bangor, ME is in a heating dominant climate, therefore a significant portion of their energy consumption is attributed to building heating systems, which are predominantly natural gas or fuel oil fired equipment. HVAC equipment data for each audited building is provided in **Appendix A**.

2.1.1 Energy Consumption Baseline

Utility bills for the Airport were provided for August 2019 through August 2020. Based on the data provided, Bangor International Airport uses approximately 33,025 million British Thermal Units (MMBtu) of energy annually, including 4.6 million kWh of electricity. The total annual cost is approximately $780,000, with over $620,000 attributed to electric utility charges. **Table 2-1** provides a breakdown of annual usage by utility based on utility bills provided for August 2019 through August 2020.

To establish the Airports' energy consumption baseline, the total annual usage and cost for the Airport was divided by the number of passengers -approximately 525,600 passengers (average of data for 2019 and 2020). Based on this, the estimated energy consumption baseline for Bangor International Airport, is **60 kBtu per passenger** (pax), at a cost of USD $1.48/pax.

The baseline is slightly higher than the range of industry average and significantly higher than airports that have implemented sustainability programs. For example, Logan Airport in Boston, Massachusetts, has a mature sustainability program and has implemented several projects focused on energy and GHG emissions reduction over the last several years, including installation of solar PV. They reported an average of 8.5 kBtu/pax for 2018, compared to their baseline year in 2004 when the energy use was approximately 45 kBtu/pax. Additionally, the energy baseline for the reported period may be slightly skewed by reduced passenger traffic in 2020 due to the COVID-19 pandemic.

Table 2-1. Energy Baseline Consumption and Cost Summary

Bangor International Airport Energy Baseline

Utility	Provider	Annual Usage (unit) [a]	Annual Usage (MMBtu)	Annual Cost [a]
Electric	Emera Maine (Versant Power)	4.64 MWh	15,882	$618,465
Natural Gas	Bangor Natural Gas	158,200 Therms	16,506	$154,660
Fuel Oil	Maine Energy	3,362 Gallons	470	$3,560
Propane	Maine Energy	2,487 Gallons	226	$2,550
		Total	**31,561**	**$779,238**
		Baseline [b]	**60 kBtu/pax**	**$1.48/pax**

MWh = Megawatt Hour
MMBtu = Million British Thermal Units
kBtu = 1,000 British Thermal Units
Pax = passengers

Table Notes:

a. Total metered consumption and cost is the aggregate of all utility bill data for August 2019 to August 2020.
b. Approximately 525,600 passengers, based on 2020 passenger data.

2.1.2 Metered Energy Profile

Electric and natural gas utilities are billed monthly, fuel oil and propane are billed when the tanks are refilled, generally during the primary heating months. **Figure 2-1** shows the consumption profile based on the provided data, recorded by billing month. Heating and cooling degree days are also shown to illustrate the impact of weather on the overall energy consumption and fuel usage.

There is a significant increase in overall energy consumption in the heating months attributed to the consumption of fuel for heating systems. Electricity consumption remains relatively constant throughout the year, with no noticeable impact during the peak heating or cooling seasons. This is generally an indicator that the majority of electricity is consumed by lighting, fan systems and plug loads, such as computers and monitors, as well as process related equipment such as baggage belts and preconditioned air for aircraft. The spike in March as compared to February is likely due to the number of days in the billing cycles.

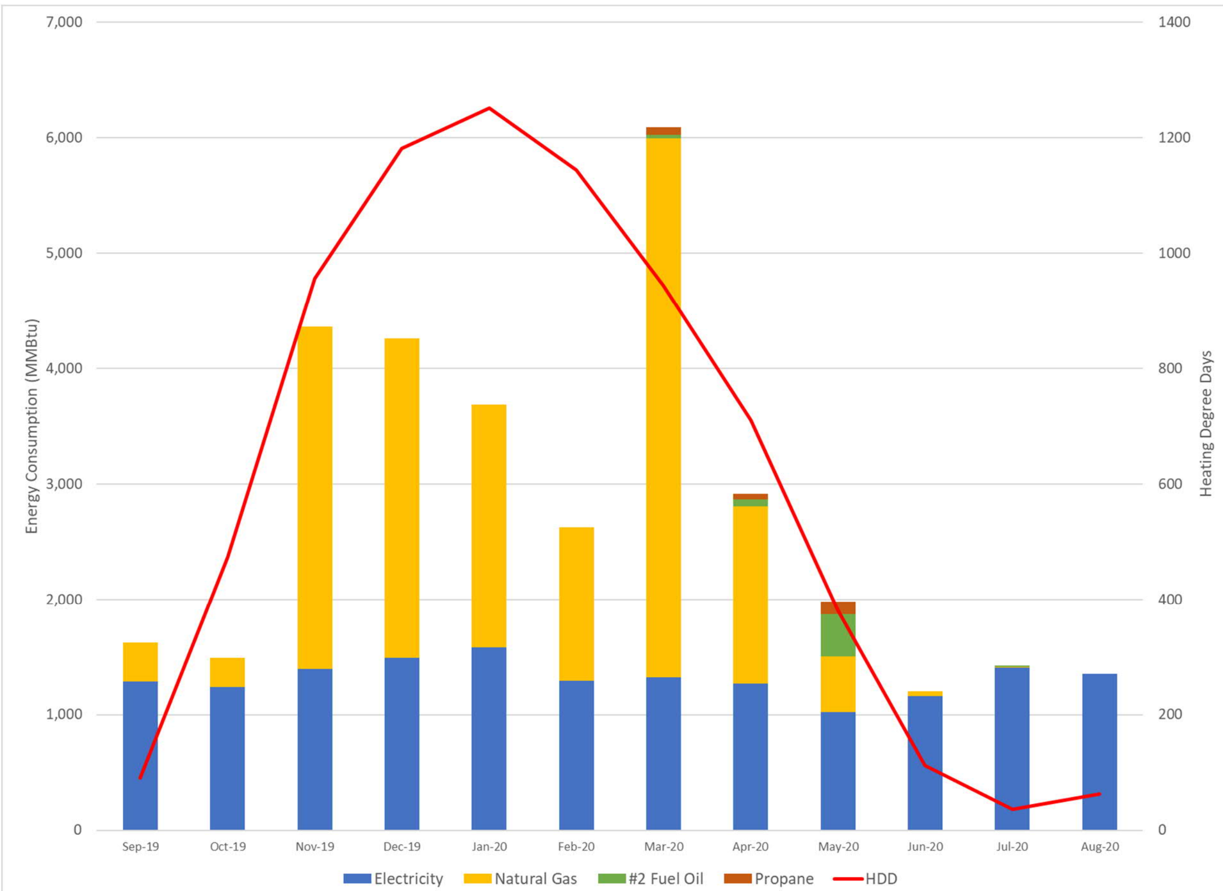


Figure 2-1. Metered Utility Consumption Profile
Bangor International Airport Energy Audit

2.2 Energy Utility Infrastructure

2.2.1 Electric Utility

Power is provided to the Airport by Emera Maine (Versant Power) via two main service feeds. The second feeder was installed within the last five years and primarily serves the main terminal building complex. There are currently thirty-seven metered accounts with Emera; some buildings have multiple meters primarily where there are multiple tenant spaces. **Table 2-2** summarizes the electric utility accounts and meters associated with the audited buildings.

Back-up power is provided by local generators. There are no other onsite power generation or renewable energy systems at the Airport.

Table 2-2. Electric Utility Account and Meter Summary for Audited Buildings
Bangor International Airport Energy Audit

Associated Building Number(s)	Description of Metered Loads	Account No.	Meter No.	Tenant
2, 3, 456, 457 [a]	DAB IAB (456 457)	10017429-9	007703229	
96	Building 96	10017428-7	007700896	FAA
100	Building 100	10017421-2	007705017	
121	Building 121	10017385-5	007705180	General Aviation
123	Building 123 Bay 1 [d]	10559600-9	007190855	
	Building 123 Bay 2 [d]	10017386-7	007190856	Maine Aero
	Building 123 Bay 3	10017388-1	007190858	T & T Capital
124 [b]	T Hanger, Unit 4 [d]	10576015-9	007193188	Vacant
	T Hanger, Unit 9	10604668-7	007194646	Vacant
	T Hanger, Unit 7	10576016-1	007194664	Vacant
	T Hanger, Unit 6	10804942-2	007194670	
	T Hanger, Unit 10	10576017-3	007194728	Vacant
252	Bldg 252 Hangars 8 & 9	10017428-3	007700697	
	Hangar 8 & 9 Fire Pump	10017405-9	007701018	Fire Pump Room
253	BIA Unit 11/GSE Pump Room	10017380-5	007194671	Fire Pump Room
	Bldg 253 RAC Unit	10017413-5	007702199	RAC
	GA Ramp Poles/Unit 253	10017409-7	007704493	GSE shop
271	40 Johnson, Bldg 271	10017424-8	007700698/ 007704830 [c]	Free Trade Zone
600	Bldg 600 Life Flight	10489012-6	007703538	Life Flight, C&L

Notes:

a. Meter includes DAB, IAB, Buildings 456 and 457. Building 457 was not included in the energy audit.
b. Building 124 has 10 individual hangar bays, however, only the bays listed have individual meters.
c. The building has two separate meters associated with a single billing account.
d. No utility bills or usage data was provided for the listed meter.

2.2.2 Fuel Utilities

Historically, the Airport used #2 Fuel Oil as its primary heating fuel source, with a few buildings utilizing propane as an alternate. Back-up generators also utilize fuel oil. In general, above ground local storage tanks are located at each facility sized to support the connected equipment. Maine Energy provides filling services for all of the storage tanks located throughout the Airport, as well as generator fuel tanks. Fuel oil and propane consumption are not metered.

Within the last decade, the Airport has worked with the local natural gas (NG) utility to bring service to several buildings on site. NG consumption is metered at the facility level. In some cases, NG has been brought to the building, but the heating equipment has not yet been retrofitted to accommodate the fuel change and is still utilizing fuel oil or propane resources.

Due to the competitive pricing of fuel oil versus natural gas in the area, some facilities have dual fuel capable equipment and therefore, both fuel oil and natural gas utilities are present. **Table 2-3** provides a summary of fuel oil, propane and natural gas utilities present at the audited buildings.

Table 2-3. Fuel Utility Account and Meter Summary for Audited Buildings
Bangor International Airport Energy Audit

Building No.	Building Description	Natural Gas		Fuel Oil Present (Yes/No)	Propane Present (Yes/No)
		Account No.	Meter No		
2	Airport-Domestic Terminal (DAB)	21080630	BG801510	Yes	No
3	Airport-International Terminal (IAB)	210805885	BG801501	Yes	No
96	FAA	N/A	N/A	Yes	No
100	Airfield Maintenance Building	210825799	BG1451854	Yes	No
121	Bangor Aviation Services	210830212	BG803017	Yes	No
123	Corporate Hangar	N/A	N/A	Yes	No
124	T Hangar [c]	N/A	N/A	No	No
252	Hangar 8 & 9	N/A	N/A	Yes	No
253	GSE Shop	N/A	N/A	Yes	No
271	Bangor Innovation Center	N/A	N/A	Yes	No
456	De-Icing Facility	N/A	N/A	Yes	No
600	Life Flight of Maine	210818606	BG1429161	Yes	Yes
N/A	Fuel Farm Main Office	N/A	N/A	No	No

2.3 Energy Unit Cost Summary

Utility costs are a key component in developing an energy baseline and evaluating the financial viability of ECMs. As part of an energy management plan, it is also important to understand the billing structures and review assigned rate tariffs regularly to ensure that the most appropriate and economical structure is applied. A properly selected rate tariff can result in cost savings without corresponding changes in metered energy consumption.

The following paragraphs provide information on current utility costs and rate tariffs.

2.3.1 Electric Rate Tariff

As described in Section 2.2.1, there are multiple electric utility meters at the Airport. Each electric meter has an assigned rate tariff, some of the rate tariffs include an electric demand charge (kW) component in addition to the electricity consumption (kWh) charges. Each account includes two separate rate tariffs, one for delivery and one for supply depending on the service agreement for each account. **Table 2-5** provides a summary of the electric utility rate structures for each of the rate tariffs currently assigned to the meters at the Airport, based on the most recent energy utility bills provided for August 2020.

Although there are multiple rate structures currently in place at the Airport, a simplified energy rate will be used to evaluate financial viability of potential ECMs. A blended rate of ***$0.1350/kWh*** will be used for the analysis, which includes all cost components, such as consumption, demand, base charges, and additional fees, based on the rate structures below and the historical usage and cost data.

Table 2-5. Current Electric Utility Rate Tariff Summary
Bangor International Airport Energy Audit

	Delivery			Supply		
Rate Tariff Designation:	**M-1**	**M-2**	**B-1/B-2**	**Small**	**Standard [a]**	**Medium**
Basic Monthly Charge	$39.65	$47.83	$15.53	N/A	N/A	N/A
Electric Consumption Rate ($/kWh) [b]	$0.00379	$0.00379	$0.0872	$0.068785	$0.0514 $0.0683	$0.05623
Demand Rate ($/kW) [c]	$21.58	$22.95	N/A	N/A	N/A	N/A
Quantity of Meters in Category for BGR [d]	2	7	30	8	15	3

kW = kilowatt(s)

kWh = kilowatt-hour(s)

Notes:

a. Standard supply rates are subject to change based on local energy supplier rates (www.maine.gov/meopa/energy), most recent rates reflected in the provided utility data are shown.
b. Electric consumption delivery charges include distribution, transmission, and conservation charges as applicable to the tariff.
c. Electric demand charges include distribution and transmission charges.
d. Rate tariff assignments are based on available utility bills, some accounts may not be reflected.

2.3.2 Fuel Utility Costs

Natural gas is metered and billed on a monthly basis. The main components of the NG billing structure include a base monthly charge (flat fee dependent on rate tariff), and energy and transport charges applied to the usage in therms. The utility bill information for the period of August 2019 through August 2020, indicate a fluctuating energy charge of natural gas between $0.240 and $0.664 per therm; the transport charge is a constant rate of $0.279 per therm. The energy charges are largely dependent on season, increasing in cost during peak heating months. However, a simplified rate will be used to evaluate financial viability of potential ECMs in subsequent deliverables. A blended rate of ***$0.988/Therm*** will be used for the analysis, which includes all cost components and is based on the weighted average of usage and cost data in the provided utility bills.

Fuel oil and propane are not directly metered, but instead are billed on an as needed basis when tanks are refilled. Each bill includes a single unit price per gallon. Similar to NG, the price fluctuates largely depending on season as well as market value. Simplified unit cost values of ***$1.050/gallon*** for fuel oil and ***$1.00/gallon*** for propane, was calculated for based on the weighted average of usage and cost data in the provided utility bills.

3. Water Management Profile

Understanding how the Airport utilizes water and wastewater utilities, forms the foundation of the energy and water consumption baseline. Therefore, as detailed in **Section 1**, the site visit included an assessment of all significant water-using systems (water fixtures, HVAC equipment, process water usage and water heating) in the audited buildings as well as interviews with personnel responsible for operating and maintaining the equipment. The data collected was then used to validate water consumption data and identify water conservation strategies.

This section provides an overview of the findings, including details on the potable water and wastewater infrastructure, and an analysis of potable water consumption, including the 2020 potable water consumption baseline.

3.1 Historical Water and Wastewater Usage Summary

Potable water is used primarily at plumbing fixtures in occupied buildings; other significant potable water use includes vehicle washing, deicing fluid dilution and water truck filling to service the aircraft. There are no irrigation systems at the airport and no other significant equipment usage, such as cooling towers, were observed. All potable water is discarded to the sewer and sent to the local wastewater treatment facility. Plumbing fixture data for each audited building is provided in **Appendix A**.

3.1.1 Potable Water and Wastewater Baseline

Water and wastewater utility bills for the Airport were provided for August 2019 through August 2020. Based on the data provided, the annual potable water consumption for the Airport is estimated to be 2,145 kilogallons per year (kGal/yr) and sewer is approximately 2,454 kGal/yr. The total annual cost of potable water consumption and related sewer charges is approximately $41,500. The airport is also billed for stormwater treatment on a square foot (sf) basis of approximately 18.4 million sf of impervious surfaces. **Table 3-1** provides a breakdown of annual usage by utility based on utility bills provided for August 2019 through August 2020.

To establish the Airports' potable water consumption baseline, the total annual usage was divided by the most current passenger data for the same time period—approximately 525,600 passengers. This equates to **8.5 gallons per passenger** (gal/pax). This is within the range of industry average. For example, Logan Airport in Boston, Massachusetts, reported an average of 7.01 gal/pax for 2018, while Dallas Fort Worth Airport in Texas reported approximately almost 15.0 gal/pax for 2019. Both airports have sustainability programs in place and have implemented water conservation measures similar to BGR, such as low flow fixtures in the terminal buildings.

Table 3-1. Water and Wastewater Baseline Consumption and Cost Summary
Bangor International Airport Energy Baseline

Utility	Provider	Annual Usage (kGal) [a]	Annual Cost
Water	Bangor Water District	2,145	$11,279
Wastewater	City of Bangor	2,454	$30,316
Stormwater	City of Bangor	N/A	$169,038[b]
		Total	**$210,633**

kGal = kilogallons

Notes:

a. Total metered consumption and cost is the aggregate of all utility bill data for August 2019 to August 2020.

b. The airport is billed for stormwater on approximately 18.4 million square feet of impervious surface.

3.1.2 Metered Consumption Profile

The airport is billed every quarter for water and wastewater, **Figure 3-1** shows the consumption profile based on the provided data, recorded by billing month. For the purposes of the energy audit, the sewer component of the wastewater billing has been isolated to better represent the facility level consumption trend.

Typically, potable water consumption and related sewer usage should be relatively similar. However, based on the provided data, it appears that the sewer usage is greater than the metered potable water usage. The discrepancy may be due to the fact that some of the water meters are indicating no usage for the same time period as there are sewer charges shown. Functionality of the meters and accuracy of the usage charges should be confirmed to ensure proper billing.

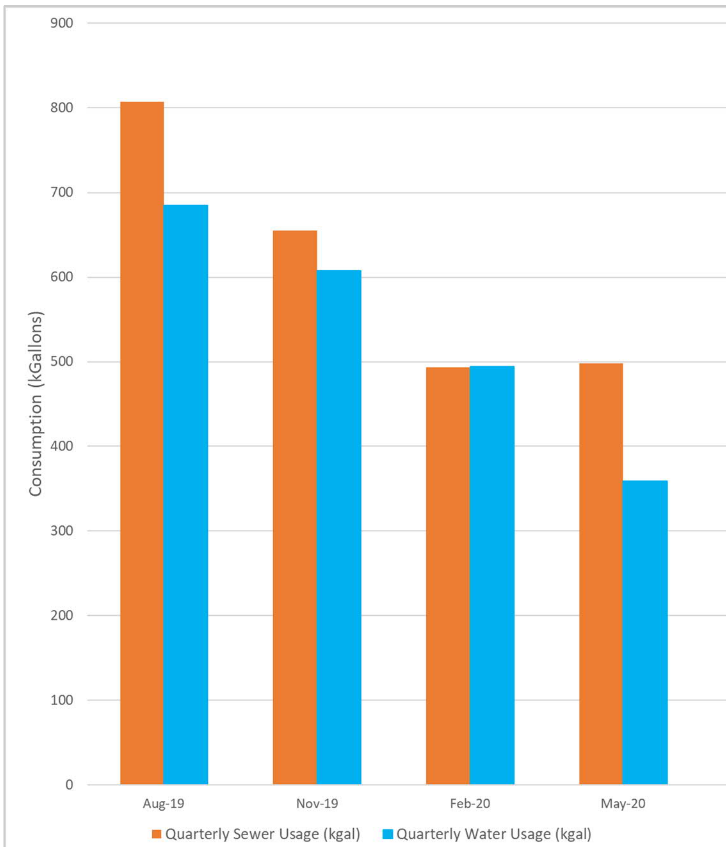


Figure 3-1. Metered Potable Water and Sewer Consumption Profile
Bangor International Airport Energy Audit

3.2 Water and Wastewater Infrastructure

All water used at the Airport is potable water supplied from the Bangor Water District. There are no groundwater wells or surface water sources that supply water to the Airport, and there is currently no greywater reuse system or rainwater capture and reuse system onsite. There are approximately fifteen metered accounts for potable water usage at the Airport.

Wastewater from the buildings as well as blue water from the aircraft is sent to the local wastewater treatment plant, there are no onsite wastewater treatment plants. The airport is also billed for stormwater based on a square foot basis. There are approximately fifty (50) billed accounts, 28 of which have a sewage charge component, the others are stormwater only.

Table 3-2 summarizes the water and wastewater billing accounts for the audited buildings.

Table 3-2. Water and Wastewater Account Summary
Bangor International Airport Energy Audit

Building No.	Building Description	Water	Wastewater			Notes
		Account No.	Account No.	Billing Component	Stormwater Area Billed (SF)	
2	Airport-Domestic Terminal	000008031301	8006201	SW Only	N/A	
3	Airport-International Terminal	000008031201	8006101	SW and ST	109,993.00	
96	FAA	000008011201	8008401	SW and ST	8,438.00	
100	Airfield Maintenance Building	000008010601	8000501	SW and ST	31,093.16	
121	Bangor Aviation Services	000008012001	8000801	SW and ST	7,011.69	
123	Corporate Hangar	000008013101	5163 (ST) 391, 392, 393 (SW)	SW and ST	11,554.87	Sewer charges by individual bay
124	T Hangar	N/A	N/A	--	--	No water or wastewater at building
252	Hangar 8 & 9	000008014201	5165	ST Only	27,012.82	
253	GSE Shop	000008014301	8001001	SW and ST	13,173.46	
271	Bangor Innovation Center	000008024801	8004301	SW and ST	80,531.73	
456	De-Icing Facility	000008031701	8031701	SW Only	N/A	No stormwater charges
600	Life Flight of Maine	000008010002	8000202	SW and ST	209,119.26	
N/A	Fuel Farm Main Office	000008027001	693	No	1,508.00	

SF = square feet
ST = Stormwater
SW = Sewer

3.3 Water and Sewer Unit Cost Summary

Utility costs are a key component in developing a baseline and evaluating the financial viability of ECMS focused on water conservation. Based on the provided utility data summarized above, unit costs of ***$5.60/kgal*** for water and ***$12.30/kgal*** for sewer will be used for the analysis. The rates are based on the historical usage and cost data, removing any outliers, such as instances where there are basic meter charges but no recorded usage.

4. Facility Energy and Water Profiles

Although a comprehensive utility summary for a site can help to recognize potential trends and opportunities, understanding how each individual building uses these utilities helps to form the foundation of the energy and water profile and further identify specific ECMs. Where utility meter data only provide usage information at the building level, detailed models provide a representative breakdown of energy consumption by primary category of use. Therefore, conceptual energy- and water-consumption profiles were developed to establish a baseline for each audited facility.

Domestic water-consumption baselines for the audited buildings were modeled using an Excel spreadsheet-based methodology to determine the number of fixture uses by occupancy count (in similar fashion to the U.S. Green Building Council's Leadership in Energy and Environmental Design [LEED] methodology [2013]). Available meter data were used to help calibrate the annual water usage estimates.

4.1 Energy Baselines and Profiles

4.1.1 Energy Modeling Methodology

Energy consumption profiles were developed using eQUEST (http://www.doe2.com/equest) to establish a baseline for each audited building. Baseline energy profiles were modeled using information collected during the field assessment, as-built drawings, and professional judgment. Available meter data were used to help calibrate the models for annual energy consumption. The modeling engine uses Typical Meteorological Year weather data to perform an hourly simulation of the building, the weather file for Bangor, Maine was used in the energy simulations. The models were calibrated to the available utility data.

Although the baseline energy models developed are calibrated to the available meter data, the modeled baseline energy use intensity (EUI), which is a normalized value of energy usage within a facility, were also compared to benchmark values for similar building types. Benchmarking is a foundational element of an energy management strategy because it provides owners with a tool for tracking and comparing energy consumption on an ongoing basis. For reference, comparison benchmark values are shown below. These values are based on *Energy Star Portfolio Manager, US Energy Use Intensity by Property Type* (Energy Star 2018) which provides median energy intensity for specific building types and functions using historic data for multiple buildings across all climate zones. When benchmarking, the focus is on the primary function, or main activity, in the facility.

4.1.2 Facility Energy Baselines

Table 4-1 provides the total modeled energy consumption (calibrated to available meter data) for each facility or type of facility audited and includes the total EUI, since that metric is common for benchmarking across facilities. The benchmark category and associated EUI for each building is also listed for comparison purposes.

As seen in **Table 4-1**, the modeled EUI differs from the benchmark category EUI. This is primarily because the models were based on observed conditions and calibrated to the available metered data to better represent the actual energy profile of each building. A few specific items to note are as follows:

- For the terminal buildings, where there are multiple primary functions, such as administrative, retail and food service, multiple use types were referenced to select the most appropriate benchmark value.

- Buildings 124 and 252 are unconditioned hangar spaces that are largely unoccupied, and lighting is turned off, therefore energy usage is much lower than the benchmark facility. Modeled usage was calibrated to meter data.

Table 4-1. Facility Baseline Energy Model Data
Bangor International Airport Energy Audit

Building No.	Building Description	Baseline Annual Energy Consumption (MBtu/yr)	Modeled EUI (MBtu/kSF)	Benchmark EUI (MBtu/kSF)	Benchmark Facility Type
2 / 3	Airport-Domestic and International Terminals	23,302	125.5	200.0	Airport Terminal, Retail Store, Food Service
96	FAA	895	70.6	52.9	Office
100	Airfield Maintenance Building	3,099	83.0	76.1	Maintenance Facilities
121	Bangor Aviation Services	835	70.9	52.9	Office
123	Corporate Hangar	908	81.8	84.2	Warehouse - Conditioned
124	T Hangar	36	2.9	20.2	Warehouse - Unconditioned
252	Hangar 8 & 9	127	4.8	20.2	Warehouse - Unconditioned
253	GSE Shop	984	73.6	76.1	Maintenance Facilities
271	Bangor Innovation Center	1,553f	53.5	40.1	Technology/Science
456	De-Icing Facility	377	52.3	40.1	Utility - Other
600	Life Flight of Maine	2,299	46.5	40.1	Public Services - Other
N/A	Fuel Farm Main Office	87	72.3	52.9	Office

4.1.3 Energy Consumption Profile

Based on the modeled data, the most significant consumer of energy at the Airport are the heating systems (over 60 percent), followed by lighting (22 percent) and other equipment (11 percent), such as computers and monitors throughout the terminal and other plug loads (i.e. vending machines, lamps, copiers) **(Figure 4-1).**

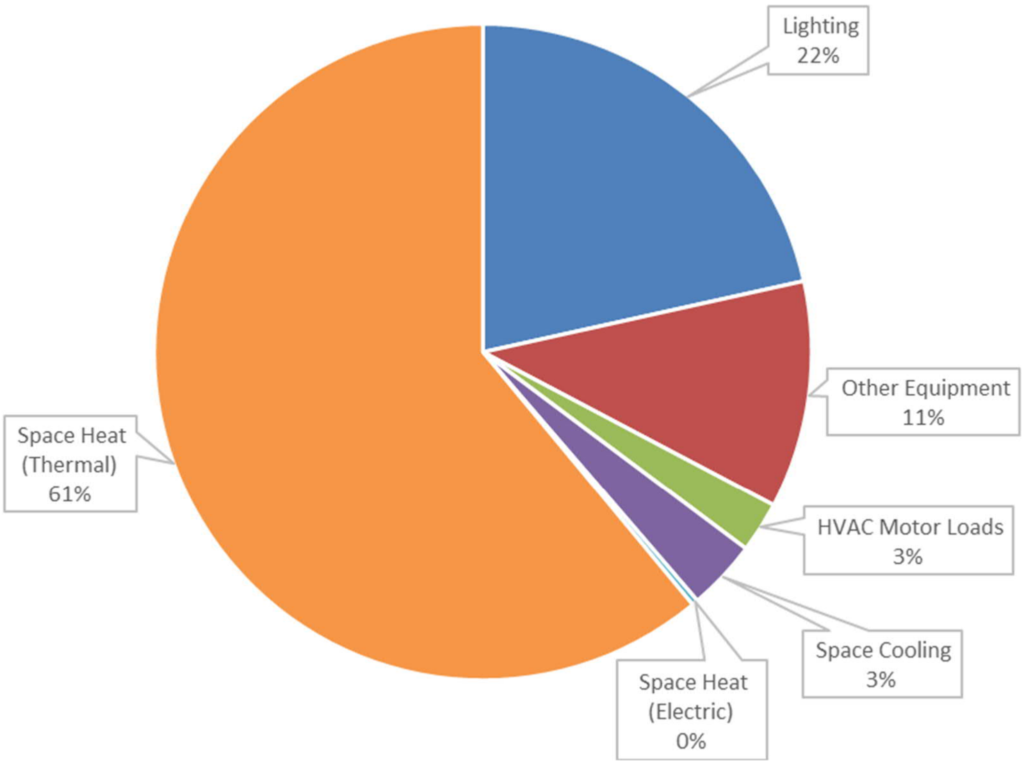


Figure 4-1. Energy Consumption Profile by End Use Category
Bangor International Airport Energy Audit

4.2 Modeled Potable Water Consumption for Audited Buildings

4.2.1 Potable Water Modeling Methodology

Domestic water-consumption baselines for the audited buildings were modeled using an Excel spreadsheet-based methodology (similar to the U.S. Green Building Council's Leadership in Energy and Environmental Design [LEED] methodology [2013]) to approximate baseline water usage at the fixture level. The calculations used to develop the water-consumption estimates for each typical fixture type are outlined in **Section 4.2.1**. Available water meter data are used to calibrate baseline usage.

These calculations were also used to estimate the energy consumption attributed to domestic hot water (DHW) production in each facility as well, which is incorporated into the energy consumption baseline described in **Section 4.1**.

4.2.2 Facility Potable Water Baselines

Table 4-2 provides the total modeled potable water consumption for the plumbing fixtures in each facility audited. Approximate occupancy counts used in the calculations are based on data collected during the site visit.

Table 4-2. Domestic Water Modeled Baselines
Bangor International Airport Energy Audit

Building No.	Building Description	Estimated Daily Occupancy (Number of People)	Modeled Potable Water Consumption (kGal/yr)	Metered Water Usage (kGal/yr)	DHW Energy Source
2	Airport Domestic Terminal [a]	1,255	1,048	930	Fuel Oil
3	Airport International Terminal [a]	185	232	254	Electric
96	FAA	10	21	17	Electric
100	Airfield Maintenance Building	18	85	87	Electric
121	Bangor Aviation Services	25	92	90	Electric
123	Corporate Hangar [b]	0	<1	0	Electric
124	T Hangar [c]	0	N/A	--	N/A
252	Hangar 8 & 9 [d]	0	N/A	0	N/A
253	GSE Shop	12	45 [f]	196	Electric
271	Bangor Innovation Center	30	78 [g]	245	Electric
456	De-Icing Facility [e]	0	N/A	100	N/A
600	Life Flight of Maine	50	130	133	Electric
N/A	Fuel Farm Main Office	4	12.3	10	Electric

kGal/yr = kilogallon(s) per year

Notes:

a. Average passengers per day, based on the most recent data for domestic and international PAX (BIA Accounting, 2020).
b. Not regularly occupied, plumbing fixtures are rarely used.
c. No potable water at building.
d. Not regularly occupied; potable water provided for fire suppression system only.
e. No plumbing fixtures in building; all water consumption is for process usage.
f. Model excludes process water usage for vehicle washing, which is reflected in the meter data for Building 253.
g. Model excludes process water usage likely used in the shop areas, which is reflected in the meter data for Building 271.

4.2.3 Potable Water Consumption Calculation Methodology

The following calculations were used to model the water-consumption estimates for each typical fixture.

Toilets and Urinals

Toilet and urinal water use calculations are based on industry-standards established in the LEED Reference Guide for Building Design and Construction (USGBC 2013). Toilet water use calculations assume that each female occupant uses a toilet three times per day, and that each male occupant uses a toilet once per day. The calculations generally assume an even distribution of male and female occupants. Urinal water use calculations assume no female usage and two urinal uses for males.

$$T\_Total = [(3\ x\ F\ x\ PF\ ) + (1\ x\ F\ x\ PM\ )]/1{,}000$$

Where:

T_Total = Total water use by toilets (kilogallons per day [kGal/day])

F = Flow of toilet or urinal (gpf)

PF = Female population in the building

PM = Male population in the building

Lavatory Sinks

Lavatory sink water use calculations follow a similar methodology regarding fixture flow and building population but are also dependent on the usage time of each sink per use. The assumption used for this value was 0.25 minute, based on LEED Guidance (USGBC 2013).

$$L\_Total = [3\ x\ F\ x\ (PF + PM)\ x\ t]/1{,}000$$

Where:

L_Total = Total water use by lavatory sinks (kGal/day)

F = Flow of lavatory (gym)

PF = Female population in the building

PM = Male population in the building

t = Time of use for each lavatory (minutes)

Lavatory DHW Energy Use

Lavatory energy use baselines are calculated based on the flow, usage time, and the temperature difference between the entering water and the temperature setpoint for the sink.

$$E_{Total} = F\ x\ \Delta T\ x\ t\ x\ 8.33 \frac{lb}{gallon}\ x\ 1\ \frac{Btu}{lb\ x\ °\mathrm{F}}$$

Where:

E_{Total} = Total energy use by lavatory sinks (British thermal units [Btu] per day)

F = Flow of lavatory (gpm)

ΔT = Temperature difference between entering water and fixture setpoint (in degrees Fahrenheit [°F])

t = Time of use for each lavatory (minutes)

Other Fixture Type Water and Energy Use

Energy and water use of other sinks, showerheads, and residential washing machines is calculated using the estimated usage time per day and the flow of the sink (gpm); it is independent of building population.

5. Energy Conservation Measure Evaluation Methodology

A set of evaluation criteria has been developed for energy and water conservation measures (ECMs) identified as part of the energy audit. ECMs were evaluated for economic viability as a primary metric, described in Section 5.1. Once a measure has been determined to be economically viable, it was further ranked by other non-economic benefits. Section 5.2 provides additional information on these benefits as they apply to the water and energy conservation initiatives.

It is not proposed to use this type of detailed screening or evaluation process for the other sustainability focus areas where the recommendations primarily include initiatives to conduct further studies to better define the baseline conditions, initiatives to establish programs, development of trials to determine the feasibility/effectiveness of initiatives, and initiatives that are environmental compliance and sustainability best practice for airports embarking on development of a sustainability plan.

5.1 Economic Viability Evaluation

Using information gathered during the energy audit, screening-level calculations were performed using multiple approaches to estimate savings for energy and water conservation opportunities. Savings calculations were completed using energy simulation models and spreadsheets including the use of eQUEST, U.S. Department of Energy-originated tools, and other sources, depending on the conservation initiative.

The ECMs were analyzed as stand-alone measures and interactive effects from implementing multiple ECMs have not been included. For example, the savings associated with a controls ECM could negate the savings of an HVAC equipment upgrade ECM.

5.1.1 Utility Costs

Utility costs are a key component in developing an energy baseline and evaluating the financial viability of ECMs. **Table 5-1** summarizes the utility unit costs that are used in the ECM savings calculations. Details on the basis of these costs and existing rate structures are in the previous sections.

Table 5-1. Energy Unit Costs

Bangor International Airport Energy Audit

Utility	Utility Unit Cost	Utility Unit Cost ($/MBtu)
Electricity	$0.1350/kWh	$39.566
Natural Gas	$0.988/therm	$9.876
Fuel Oil	$1.050/gallon	$7.500
Propane	$1.00/gallon	$10.526
Water	$5.60/kGal	N/A
Sewer	$12.30/kGal	N/A

kGal = kilogallon(s) (1,000 gallons)
kWh = kilowatt-hour(s)
MBtu = million British thermal unit(s)
N/A = not applicable

5.1.2 Implementation Costs

Detailed cost estimates were not be developed, however, screening-level cost ranges based on historic cost data for similar projects or technologies are used to aid in evaluating the economic viability of each measure.

RSMeans 2020, vendor data, Jacobs historical data, national contractor associations, and estimator judgment provide the basis for parametric cost estimating. The quantities used in the calculations are based on field observations or take-offs from as-built drawings, when available.

Project designs have not been initiated for any of the ECMs, so the level of uncertainty in the cost-estimating process is consistent with a pre-design conceptual estimate. Because of fluctuations in market conditions, bidding procedures, and timing of project execution, JACOBS cannot warrant that bids, ultimate construction cost, or projected payback for ECMs will not vary from these parametric estimates.

5.1.3 Simple Payback Criteria

The simple payback of an ECM is calculated by dividing the implementation cost of the ECM by the annual value of the energy/water savings generated by the ECM. The calculation provides the number of years required for the ECM to pay for itself in savings. This is a high-level form of economic analysis that allows rapid identification of the most economically viable ECM's. More detailed evaluation can be completed through the use of Life Cycle Cost Analysis that incorporates implementation costs, energy cost escalation rates, maintenance costs, salvage value and a discount factor. This type of analysis is typically completed at more advanced stages of project development, not at the master planning stage. Therefore, Life Cycle Cost Analysis will not be conducted for this project.

For a measure to be considered economically viable with a simple payback analysis, the payback period should be less than or equal to the service life of the associated technology or equipment. ECM's with the quickest payback are typically identified for early implementation. **Table 5-2** provides a recommended category ranking based on simple payback periods.

Table 5-2. Payback Criteria Ranking

Bangor International Airport Energy Audit

Simple Payback Range (Years)	Capital Improvement Planning – Recommended Phasing
0 to 5	Short Term or immediate action ("Quick Wins")
5 to 10	Medium Term
10 to 25	Long Term
25 to 50	Recommended for re-evaluation based on future economics and available technology as part of future planning. *Generally, simple payback exceeds economic life of the recommended technology, however, it is anticipated that future technology advances or improved economics may improve financially viability in the future.*
50 or Greater	Non-viable. *This is typically reserved for measures with payback ranges that far exceed the economic life of the technology being evaluated. Generally, any measure exceeding this payback period is not recommended for implementation, and potential improved future economics will not likely yield favorable results.*

5.1.4 Capital Cost Investment Criteria

In addition to the return on investment criteria, the measure will also be categorized and prioritized based on estimated capital cost of the measure. This is important to consider as well as payback periods, as there can be instances where an ECM has a short payback period, falling in the Short-Term phase criteria, but may be so costly to implement that a long-term planning process and the appropriation of funds might be required resulting in a lower ranking and therefore the ECM would be pushed to the Long-Term phase. **Table 5-3** provides recommended ranking tiers based on typical investment cost ranges expected for the identified measures.

Table 5-3. Capital Cost Investment Ranking Criteria

Bangor International Airport Energy Audit

Procurement Category	Capital Cost Range ($)	Description
Petty Cash	0 to $3,000	Low Cost/No Cost Measure *Applies to minor situations such as repairs or immediate needs. May be implemented as part of operation and maintenance (O&M) program. Likely will not require significant design effort.*
Minor Contracting	$1,000 - $50,000	Upgrade to Existing System *Upgrades to an individual system with little to no interaction with other systems, for example lighting replacements or water fixture upgrades; minor design effort and technical specifications required.*
Public Tender	$50,000 and greater	Capital Improvement *Projects impacting multiple spaces, buildings or systems; moderate design effort with less complex technical specifications required.*
Best Value Procurement	$250,001+	Major Renovation or System Replacement *Projects where significant design effort and complex technical specifications are required; typically includes multiple disciplines. Likely will require phasing, temporary systems or swing spaces. Evaluation of additional factors other than the cost, such as quality and expertise, is also required.*

It should be noted that these cost ranges may not fit all situations. For example, an airport-wide lighting retrofit would be considered an Upgrade to an Existing System, but the cost might exceed the threshold indicated in the table above due to the extent of upgrading all the lighting across the entire airport.

In general, avoided capital costs are not included as a savings to offset the cost of an ECM. Only the energy savings attributable to the new equipment or technology may be used to offset the cost of the ECM. Use of a capital cost avoidance would be counting savings that do not exist because the funds are not yet appropriated for replacement of that item. For example, only the energy utility savings attributable to a new boiler may be used to offset the cost of replacing a boiler at the end of its design life as part of a Utility Energy Service Contract, Energy Savings Performance Contract, or other energy project type.

5.2 Non-economic Benefit Evaluation Criteria

Once a measure has been determined to be economically viable, it is further evaluated based on non-economic benefits. Non-economic benefits are more subjective in nature than economic analysis, but they are important in the planning process in order to provide a comprehensive sustainability plan. Non-economic benefits that will be used to evaluate the energy and water conservation measures are summarized below. These are divided into three main categories.

- Operational efficiency
  - Does the ECM improve the reliability, durability, or resilience of the utilities and systems?
  - Does the ECM improve the ability to manage energy and water consumption and optimize performance?
  - Does the ECM enhance the maintenance program by reducing the maintenance burden?
  - Is the ECM maintainable over its service life? Is additional training or contracted support required?
- Natural resource conservation
  - Does the ECM reduce greenhouse gas (GHG) emissions?
  - Does the ECM result in a reduction in the use of natural resources?
- Social responsibility

- Does the ECM result in improved passenger and staff comfort?
- Does the ECM provide a socially acceptable solution that can be embraced by the community and promote a culture of sustainability?
- Does the ECM reduce demands on regional utility generation, transmission and distribution systems or water and wastewater treatment and conveyance?

Judgement must be applied in using this evaluation criteria, as a particular ECM could be prioritized for implementation for a wide variety of reasons even if it does not provide the lowest payback period. The scale of the overall impact of the measure can outweigh the economic payback. For example, an ECM might be the highest priority despite it not providing the best economic payback if that ECM provides a significant decrease in energy consumption and GHG emissions. It could also be favored due to enhancements to the maintenance program or the passenger experience and comfort. Other ECM's might be chosen due to their ability to demonstrate commitment to sustainability and to set an example for the community.

Many factors are to be considered in ECM evaluation, and the judgement of BGR personnel is important in making the best choices.

6. Energy and Water Conservation Measure Evaluation Results

Using the evaluation process and criteria described above, a recommended list of prioritized energy and water conservation measures (ECMs) was developed (**Table 6-1)**. The recommended ECMs offer the greatest opportunity for energy or water savings, result in SPB periods within the economic life of the associated technology or equipment and align with BGR's long-term sustainability goals. Descriptions for each recommended ECM are provided in **Section 7.0**. An electronic ECM Matrix is provided in **Appendix B** (electronically). It is intended to enable the Airport to sort and bundle ECMs as needed to align with other planned infrastructure upgrades at each facility.

The energy and water savings potential presented for each ECM is based on implementation as stand-alone measure; interactive effects from implementing multiple ECMs have not been included. For example, implementing energy efficiency lighting will reduce cooling load requirements in a building, and thus the adjusted baseline and savings associated with air conditioning related ECMs would be reduced.

In addition to the recommended ECMs, other initiatives were identified to support energy and water management that could not be evaluated on economic merit, as they generally include initiatives to conduct further studies or establish programs and initiatives to further support the airport's development of a sustainability plan. These recommendations are listed in **Section 8.0**.

Table 6-1. Energy and Water Conservation Measure Analysis Results Summary
Bangor International Airport Energy Audit

Energy and Water Conservation Measures	Estimated Annual Energy Savings (MBtu)	Estimated Annual Water Savings (kGal)	Simple Payback [a] (Years)	Estimated Capital Cost [b]	Buildings included in ECM
Short Term and Quick Wins					
Premium Efficiency Motor Replacements (Quick Win) [c]	8	N/A	<3.0	$2,000	2 (DAB)
Low-Flow Water Fixtures - Aerator Replacements (Quick Win)	28	104	<1.0	$2,500	Multiple Buildings
Retro-commissioning (RCx)	Note d	N/A	<3.0	$150,000 [e]	IAB/DAB & 96
Medium Term					
High Efficiency Natural Gas Condensing Boilers [f]	6,028	N/A	9.1	$575,000	Multiple Buildings
Infrared (IR) Heaters in High Bay Areas	1,067	N/A	8.8	$130,000	253, 600
LED Interior and Exterior Lighting Systems and Controls [g]	1,446	N/A	10.1	$580,000	Multiple Buildings
Long Term					
Low-Flow Water Fixtures - Full Fixture Replacements	N/A	91	15.5	$25,000	100, 271 & 600
High Efficiency Air Source Heat Pump Domestic Water Heaters	66	N/A	20.0	$52,000	IAB/DAB, 121 & 600
14MW Solar PV Array on SW Side of Runway	16,805 MWh [h]	N/A	28	$70.0M+	N/A
Dynamic Glass Windows [i]	1,674	N/A	50+	$1.5M+	IAB/DAB
Additional Considerations and Non-viable Measures					
Air Curtains at Overhead Doors and Frequently Used Entryways	74	N/A	125+	$25,000	IAB/DAB

Table 6-1. Energy and Water Conservation Measure Analysis Results Summary

Bangor International Airport Energy Audit

Energy and Water Conservation Measures	Estimated Annual Energy Savings (MBtu)	Estimated Annual Water Savings (kGal)	Simple Payback [a] (Years)	Estimated Capital Cost [b]	Buildings included in ECM
New Roof with Dark EPDM [j]	336	N/A	340+	$1.0M+	IAB/DAB
Rainwater Harvesting Systems for Vehicle Wash Water	N/A	52	600+	$185,000	253

N/A = Not applicable
MWh = Megawatt hour
kGal = kilogallon

Notes:

a. Simple payback (SPB) values are estimated using normalized cost values for each respective utility, based on utility information provided for 2019 and 2020.

b. Estimated capital cost shown for each ECM is inclusive of all buildings where the ECM technology was found to be viable. Estimated costs for individual buildings is provided in Appendix B, ECM Matrix.

c. Energy savings and costs shown represent replacement of four small motors for the baggage carousels in the DAB; motors were observed to be nearing end of life and should be replaced with premium efficiency motors. Additional savings can be realized by incorporating premium efficiency motor replacements into regular O&M practices.

d. Energy savings was not estimated for RCx because actual savings is highly dependent on the findings from the investigation phase of the process. However, RCx typically results in energy savings that pay for the investment within the first few years of completion. Cost range is based on typical RCx activities for the size and type of facilities recommended; it does not include cost for any major deficiencies that may be found during investigation.

e. While RCx can be beneficial to perform on existing systems and controls, implementing RCx activities along with upgrading existing DDC systems would result in an economy of scale to reduce costs and still obtain significant energy savings.

f. Estimated cost assumes the NG utility company will install service up to and including the meter at each facility, if not already present.

g. The ECM includes exterior wallpack lighting at entryway doors on several buildings; it does not include exterior parking or apron lighting, as the majority had already been upgraded to LED.

h. Estimated savings for Solar PV represents the estimated power production capacity of the array. Evaluation is based on a screening level analysis and are presented to support informed decision making by the Airport; a more detailed study or design, not included with this study, may yield slightly different results.

i. Estimated cost is based on smart window technology, such as SmartGlass, for approximately 10,000 SF of glazing at the terminal buildings; more typical replacements, such as low e glazing, may reduce costs but will also result in lower savings potential. Several windows were observed to be in fair to poor condition, showing indication of failed seals and leakage. Window replacements not only improve occupant comfort but can also result in additional energy savings by reducing infiltration.

j. In heating dominant climates, such as Bangor, ME, more savings can be realized from a dark roof rather than light roof, as the majority of energy consumption is related to space heating costs. A dark roof will increase solar gain through the roof, reducing the amount of mechanical heat required to maintain space temperatures.

7. Energy and Water Conservation Measure Descriptions

The following paragraphs provide a brief description of each ECM presented in Section 6.

7.1 Short Term Initiatives and Quick Wins

7.1.1 Premium Efficiency Motor Replacements (Quick Win)

The baggage carousels located in the domestic terminal building are powered by four 1-horsepower (hp) motors, two per belt. These motors were observed to be in fair to poor condition. Replacing these motors with premium efficiency motors will reduce the amount of energy consumed by the motors.

Although this ECM represents a relatively small savings potential, a similar approach should be taken as other equipment motors, such as pumps, fans and other baggage handling equipment, reach the end of their useful life. Establishing a policy to replace all high-efficiency and standard-efficiency motors with premium-efficiency motors instead of rewinding them can result in considerable savings; therefore, replacing the motors is recommended as the primary option for reducing motor energy consumption over time.

7.1.2 Low-Flow Water Fixtures - Aerator Replacements (Quick Win)

Many of the existing lavatory and other sink faucets at the airport support facilities are not currently low-flow or high-efficiency types; most fixtures have been upgraded in the main terminal buildings. Replacing these fixtures will reduce water consumption as well as energy consumption from domestic hot water (DHW) production. Typically, these upgrades can be done as retrofits to existing faucets and only take a few minutes per faucet to install, and can be done by in-house maintenance staff, making this a potential quick win for the Airport.

The following summarizes the low-flow and high-efficiency options for faucet aerators recommended for the Airport based on the cost-benefit analysis of available options:

- Lavatory Faucet Aerator Retrofits: Replace existing aerator with a new low flow option with a flow rate of 0.5 gallons per minute (gpm). Full fixture replacements are available and can include additional water saving features, such as IR motion sensors, however, they are significantly more expensive than an aerator retrofit.

- Other Sink Faucet Aerators: Like lavatory sinks, other faucets, such as on kitchen and breakroom sinks, can also be retrofitted with new low flow options. For these sinks it is recommended to use 1.5 gpm aerators, primarily because these sinks are often used for filling cups, coffee pots, etc. and not just washing hands.

Table 7-1. Low Flow Aerator Replacements

Building No.	Lavatory Low-flow Aerators	Other Sink Low-flow Aerators
96	9	1
100	3	1
121	16	2
253	4	2
271	2	1
600	5	1
FF	1	1
TOTAL	**40**	**9**

7.1.3 Retro-commission (RCx)

Retro-commissioning (RCx) is often one of the most cost-effective energy conservation measures available to a building owner. Unlike an energy audit, which focuses on identifying cost-effective ECMs for a wide range of technologies, RCx is an independent, systematic process that is completed for a building to improve and optimize the building's system operations, O&M practices, occupant comfort, and system sustainability. Industry wide, retro-commissioning is extremely cost effective.

Over time, equipment set points and calibration drift out of their appropriate range, and other equipment simply fails or is improperly configured. In retro-commissioning an engineer works with mechanics and maintenance personnel to identify and solve problems with mechanical equipment and building automation systems and controls. This process includes reviewing existing system documentation; conducting interviews; performing field investigations; and monitoring and analyzing building systems to gain an understanding of the current and intended operations. It is also common to provide testing and balancing of systems in retro-commissioning to provide re-tuning of existing systems.

The problems identified in retro-commissioning for repair and correction are typically called no cost/low cost measures, and they often result in significant savings. In addition to the energy savings, other benefits typically include the extension of the service life of equipment, reductions in deferred maintenance requirements, improvements to the maintenance program through the training of the staff, and improved occupant comfort.

A few high-level observations made during the energy audit site visit at BGR indicated that the main terminal buildings as well as Building 96 (FAA) would benefit greatly from RCx. For example, several spaces are currently unused or scheduled for future repurposing, wherein the HVAC systems may need to be adjusted or set to unoccupied setpoints while not in use. Based on the age of the systems, it is also recommended to review the control sequences and operations to ensure they are working as intended and include energy savings strategies such as:

- SAT Reset on VAV Systems: VAV air-handling units (AHUs) are typically controlled to maintain a constant supply air temperature, 55 degrees Fahrenheit (°F), regardless of the space temperature demands. Implement a supply air temperature reset schedule for VAV systems based on space temperatures to allow leaving air temperature range of 55 to 68°F.

- Space Temperature Setbacks: Adjust space temperature setpoints during unoccupied hours to reduce energy usage needed for heating or cooling.

- System and Fan Operation Scheduling: Turn off all system fans and pumps when the building is unoccupied. Allow equipment to cycle on only as needed to meet unoccupied space temperature setpoints. This will reduce excess fan and pump energy usage when systems are not needed.

- Ventilation (Outside Air) Control: Install new or use existing modulating dampers on the outside air (OA) intake and return air ducts and implement a control strategy to schedule the OA damper to a minimum, or closed, position when the buildings are unoccupied. Also include installation of new carbon dioxide (CO2) sensors in specified high-occupancy zones to allow the system to modulate OA based on actual occupancy during occupied hours. Operation of the existing exhaust systems should also be linked to the new OA controls to maintain proper building pressurization. This project will significantly reduce the amount of OA being introduced into the systems and result in reduced energy usage.

Other buildings could also benefit from implementing the strategies outlined above, however, less sophisticated control types, such as programmable thermostats, do not have the full range of control capacity as a Direct digital control (DDC) system. Therefore, they are not included in this recommendation. However, it is recommended that the airport consider potentially expanding DDC systems in other buildings to provide groundwork a for future Energy Management Control System (EMCS) for central monitoring and control capabilities (refer Section 8).

7.2 Medium Term Initiatives

7.2.1 High Efficiency Natural Gas Condensing Boilers

Conventional fuel-fired boilers are used for comfort heating in multiple buildings, the table below summarizes the existing equipment in each building included in the ECM. In these type of conventional boilers, fuel is burned and the hot gases produced are passed through a heat exchanger to heat water and the waste heat is exhausted to the outside from the flue. The efficiencies vary based on the specific setup and application but are typically 75 to 82%. Although these boilers are adequately maintained, some are aging and are likely losing efficiency due to scale buildup in the heat exchanger piping. In addition, the burner controls may no longer be set for optimal performance.

Replacing the existing boilers with energy efficient natural gas-fired condensing boilers can result in substantial energy savings. Condensing boilers capture the boiler waste heat to pre-heat the incoming water to the boiler. This results in improved operating efficiencies by reducing the difference in boiler temperature feed and exit lines. The waste-to-pre-heat capabilities of condensing boilers are most effective when it is operating at part load conditions and can result in efficiency ratings greater than 90%.

Existing piping, pumps, and heating hot water (HHW) loop controls will be reused. Existing steam boilers and associated heat exchanges will be replaced with condensing hot water boilers and be connected to the existing hot water loops. In some cases, multiple boilers may replace a single boiler and be configured so that they run simultaneously at part load, to maximize efficiency. It is assumed that natural gas service (including regulators and meters) is available at the buildings or will be installed by the natural gas utility company. New controls will be included with the new boiler installations, which will be configured to further maximize efficiency with strategies such as outside air temperature reset.

Table 7-2. Existing Boiler Equipment Summary
Bangor International Airport Energy Audit

Building No.	Existing Equipment	Year Installed	Existing NG Service at Building
2/3	(3) Dual fuel steam boilers and steam-to-hot water converters	Varies	Yes
96	(1) Fuel oil-fired hot water boiler	1989	No
100	(2) Dual fuel hot water boilers	1987, 2008	Yes
121	(1) Natural gas-fired hot water boiler	2004 (new burner in 2012)	Yes
123	(3) Fuel oil-fired hot water boilers	Not listed	No
253	(1) Fuel oil-fired steam boiler and steam-to-hot water converter	1998	No
271	(1) fuel oil-fired hot water boiler	2005	No
600	(1) fuel oil-fired hot water boiler	2016	Yes

Due to the variable unit cost of fuel oil based on season, the energy cost for operating the new natural gas fired equipment may be marginally greater than the existing equipment at times. However, this ECM provides a significant energy savings for the airport and is therefore recommended for implementation.

7.2.2 Infrared (IR) Heaters in High Bay Areas

It is recommended that IR heaters be installed to replace the forced-air heating equipment currently being used for comfort heating in high bay areas in Buildings 253 and 600. Forced-air type heaters, such as unit heaters, can be inefficient in high bay applications and may be greatly affected by infiltration and air movement, which reduces the efficiency of the units and hinders their ability to heat space effectively. IR heaters are more effective than forced-air heaters in these areas because the heat is radiant rather than convective and is less affected by air movement or distance; IR heaters heat the surfaces rather than the air space. Therefore, the amount of total heating needed is less than if the entire air space were to be heated. The perception of heat can be higher for personnel in areas heated by IR heaters, so thermostats can be set lower.

- In Building 253, replace several hot water unit heaters with natural gas IR heaters. Natural gas is currently not available at the building, however, this ECM could be combined with a new condensing boiler ECM, which would also reduce the required boiler capacity and potentially reduce overall implementation costs.

- In Building 600, replace the existing propane IR heaters and fuel oil fired air turnover units with natural gas IR heaters. Natural gas service has recently been installed at the building and can be expanded to replace propane and fuel oil fired equipment.

7.2.3 LED Interior and Exterior Lighting Systems and Controls Upgrades

Lighting systems are a basic component of all airport facilities and includes interior building lighting as well as exterior lighting. The majority of exterior area lighting, including parking lots, platforms, and aprons has been upgraded to LED technology, so this recommendation is focused on lighting associated with the audited buildings.

Based on observations and information gathered as part of the Energy Audit, it is estimated that the interior lighting, alone, constitutes over 20% of the total energy consumption of the main terminal buildings and other support facilities. Although some upgrades have been completed, there are still instances throughout the Airport, where older technology lamps and fixtures, such as T-8 fluorescent or high-intensity discharge (HID) lamps, are still being used.

In addition, most lighting systems are controlled by manual switches, which requires occupants to remember to turn lights off when the spaces are unoccupied. It was also observed that several large areas, such as the passenger waiting areas and the boarding pier, could benefit from using the natural daylight coming through the windows. Additionally, most of the building exterior lighting at entry doors is high-intensity discharge (HID) type, such as metal halide and high-pressure sodium (HPS) lighting.

Table 7-3. Lighting Upgrade Summary

Building No.	Interior LED Fixtures	Interior High Bay LED Fixtures	Occupancy Sensor Controls	Daylighting Controls	Exterior LED Wallpacks
2/3	●			●	
96	●		●		●
100	●		●		●
121	●		●		
123	●		●		●
124	●				
252		●			●
253		●			●
271	●				●
456		●			●
600	●		●		●

Based on the cost-benefit analysis results, BGR should implement an Airport-wide energy efficient lighting system upgrade project to include the following elements: LED fixture replacements, including interior fixtures and exterior wallpacks, occupancy controls, and daylighting controls, which include new photosensors and dimmable ballasts with the new LED fixtures to control artificial lighting during periods where natural sunlight from exterior glazing is adequate. Table 7-3 summarizes the upgrade types recommended for each of the audited buildings.

7.3 Long Term Initiatives

7.3.1 Low-Flow Water Fixtures – Full Fixture Replacements

Many of the existing toilets and urinals at the airport and support facilities have been upgraded to low flow alternatives. However, some older fixtures were observed in the support facilities during the energy audit. Replacing these fixtures with new low-flow or high-efficiency replacements will provide the same service while reducing water consumption. The following summarizes the recommended upgrades for the Airport based on the cost-benefit analysis of available options:

Table 7-4. Low Flow Fixture Replacements

Building No.	Low-flow Toilets	Low-flow Urinals
100	3	1
271	3	1
600	3	2
TOTAL	**9**	**4**

- Toilets: Complete fixture and flush valve replacement with new flowrate of 1.28 gallons per flush (gpf). There are also dual-flush alternatives available (1.1 gpf/1.6 gpf), but these are typically a higher cost than the single flush valve option and can extend simple payback periods for a retrofit project.

- Urinals: Complete fixture and flush valve replacement with new flowrate of 0.125 gpf. Waterless urinals are an available option but are not recommended due to increased maintenance requirements, especially in high use areas.

Typically, these types of upgrades require a full fixture replacement to ensure proper drainage with the new lower flow volume, therefore implementing these upgrades with other projects, such as restroom renovations, can be more cost-beneficial and reduce down-time of facilities.

7.3.2 High Efficiency Air Source Heat Pump Domestic Water Heaters

Domestic hot water production for the Airport is generally provided by electric tank type water heaters. Replacing conventional water heaters with air source heat pump (ASHP) technology decreases energy consumption by increasing DHW production efficiency. ASHP water heaters can typically produce DHW at one-half to one-third the input energy required of standard electric resistance water heaters.

Based on the estimated baseline consumption and economic analysis, this measure is recommended for the main terminal buildings (IAB/DAB), Building 121 and Building 600.

7.3.3 Install Large Scale Solar PV Array with Battery Storage

The Airport has been in discussions with the City regarding a utility scale solar PV installation at the airport. Based on other land use recommendations, the city owned land northwest of the airport was used as the evaluation area (**Figure 7-1**). The solar PV array would consist of several modules used to offset centrally supplied electricity. Based on a screening level analysis, it is estimated that a 14.7 MW array would fit in the designated area and have annual power generation potential of approximately 16,800 MWh. An array of this size will require approximately 25 acres.

Adding a battery storage system will further increase energy resiliency for the site and allow generated power to be used throughout the day to better match operational profiles.

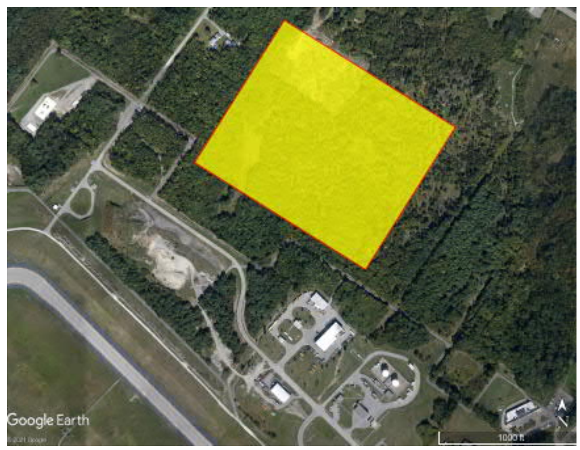


Figure 7-1. Potential Location for Solar PV
Bangor International Airport Energy Audit

The figure below shows the monthly production profile of the array.

Figure 7-2. Solar PV Monthly Production Profile
Bangor International Airport Energy Audit

7.3.4 Dynamic Glass Windows

Windows are a great way to introduce natural lighting into a space. However, they can also allow significant solar gain impacting the cooling load requirements for a building, which can be made worse by older single pane windows or even double pane windows with broken thermal seals. In addition, weather sealant around windows degrades over time, causing excess infiltration further increasing the cooling load requirements of the space and reducing overall occupant comfort. There are several options that can be implemented to mitigate these impacts from full window replacements to repairing existing windows and weather sealant.

A cost-benefit analysis was performed for installing new windows with dynamic, or intelligent, glass technology at the main terminal buildings. This technology employs a switchable Polymer Dispersed Liquid Crystal (PDLC) which is a medium with variable opacity that can be adjusted through the application of an electric field. Application of this technology can reduce both HVAC and lighting costs, by optimizing shading throughout the day. Cooling peak load and energy consumption are significantly reduced, allowing downsizing of HVAC systems and cost savings in annual operating costs.

Although there are many benefits, this technology is more expensive than more traditional window replacement options, which extends the payback period over 50 years as a stand-alone measure. There are less costly alternatives, such as applying window films. However, based on the observed condition of the existing windows, it is likely that significant repair or replacements will be needed. Therefore, this recommendation focuses on complete window replacements. Based on analysis, it is recommended that the Airport evaluate incorporating a dynamic glazing technology with any new window repair or replacement project, where the increase in cost would be significantly offset by the energy savings.

7.4 Non-viable Initiatives

7.4.1 Air Curtains at Overhead Doors and Frequently Used Entryways

In the baggage handling areas in the IAB/DAB, large overhead doors are opened frequently throughout the day, allowing significant infiltration into the building. Additional infiltration requires the building heating systems to run more often and use excessive energy to maintain space temperature. This ECM evaluated installation of mechanical air curtains over the doors to reduce infiltration into the building. The curtains would be interlocked with the doors so that they only operate when the doors are open to reduce fan energy.

Based on the cost-benefit analysis, this ECM has an extended payback period and is not recommended for implementation as a stand-alone measure.

7.4.2 Install New Roof with Dark EPDM

Over half of the energy currently consumed at the Airport is used for providing space comfort heating, therefore, BGR should consider implementing a dark roof system at the main terminal buildings to reduce energy consumption related to the heating systems. In a heating dominant climate, such as Bangor, ME, more energy savings can be realized from a dark roof rather than light roof, or cool roof, as the majority of energy consumption is related to space heating costs. A dark roof will increase solar gain through the roof, reducing the amount of mechanical heat required to maintain space temperatures. A dark roof has additional benefits in colder climates as well, including faster ice and snow melt and reduced glare.

Replacing a roofing system for the sake of energy conservation is not economically viable. However, when repairing or replacing existing roofs, it is recommended that the Airport specify dark colored roofing materials, such as EPDM. In new construction, dark roofs can also provide for a reduction in the capacity of the heating equipment, which reduces both capital costs and operating costs.

7.4.3 Install Rainwater Harvesting Systems for Vehicle Wash Water

As municipal water resources are challenged to provide for population growth and economic development, new water supply strategies will be necessary to meet this demand. One of the primary benefits of rainwater harvesting is that it is a sustainable water management practice that can be implemented on many different levels to suit the need, from a simple rain barrel to a comprehensive rainwater harvesting system that integrates with an industrial process use, irrigation system or building plumbing systems. Rainwater harvesting can also help reduce stormwater runoff from a property, which represents a significant cost for the Airport. Collecting and using rainwater to replace municipal water use also reduces utility costs, as rainwater is essentially a free and readily available resource.

Rainwater is one of the cleanest water sources available; hardness and sodium content is essentially zero and it is only slightly acidic in nature due to dissolved CO2 and nitrates. However, once it is captured and stored it can become contaminated by various elements such as metals, organics, and even bacteria. Although treatment systems can be added, it can be significantly costlier to implement if the intent is to use the harvested water for potable, rather than non-potable uses. Therefore, it is recommended that rainwater harvesting be considered for non-potable use in order to keep investment and maintenance costs down.

The key component to reaping the full benefit of a rainwater harvesting system is to have a strategy to use all the collected rainwater in a timely and efficient manner. If the harvested rainwater is not used efficiently, then the storage tank will essentially stay full, and new rainwater from each rainstorm will overflow the storage volume and provide no additional water conservation benefit.

For BGR, rainwater harvesting is recommended for vehicle washing at Building 253. Based on the baseline water consumption data (Section 4.2), it is estimated that approximately 30% (50 kGal/year) of the total water usage for washing could be offset by using the roof of the building as the capture area and installing a rainwater capture system with 5,000-gallon storage tank.

8. Additional Energy and Water Conservation Initiatives

In addition to the recommended ECMs, additional initiatives were identified to support energy and water management that could not be evaluated on economic merit. This is because the recommendations primarily include initiatives to conduct further studies to better define the baseline conditions, initiatives to establish programs, development of trials to determine the feasibility/effectiveness of initiatives, and initiatives that are environmental compliance and sustainability best practice for airports embarking on development of a sustainability plan. These initiatives are further categorized as follows:

- **Policy, Operations, and Management Initiatives** – Initiatives to establish policies and programs for managing, meeting and maintaining energy and water conservation goals
- **Future Feasibility Study Recommendations** – Initiatives that require further investigation, data and project definition before implementation

Descriptions of these initiatives are provided in the following paragraphs.

8.1 Policy, Operations, and Management Initiatives

8.1.1 Implement an Energy Management Program

The energy conservation measures outlined above are a summary of projects that are recommended for implementation. The ECM's have the ability to reduce energy consumption and generate savings, but unless an actual Energy Management Program is established, the long term results will likely be marginal. It has been recognized for nearly 50 years that professional energy management is very important to the long-term success of a wide variety of organizations, and the establishment of an actual Energy Management Program is an important step. It is recommended that BGR develop a program to guide the airport to high levels of achievement in sustainability.

An Energy Management Program can have many benefits beyond basic cost savings. Of course, a key sustainability attribute includes emissions reductions and improvements to air quality. Other benefits include opportunities to improve the comfort of airport passengers as well as airport staff, and of utmost importance to the business of running an airport, energy security can be enhanced through a strong program. In addition, a strong program can prepare an organization for highly volatile commodity pricing.

An Energy Management Program should include staffing, training, funding, policy, and goals. A designated Energy Manager should be appointed, and training should be provided for the Energy Manager. The Association of Energy Engineers provides a wide variety of energy management training courses and credentialing opportunities, and they are a leader in providing high quality education in this field. Recommended training includes, Energy Management, Energy Auditing, Measurement & Verification, Water Efficiency, and Renewable Energy. Training for the maintenance and engineering staff of the airport would be dependent upon the type of projects implemented. For example, training on submetering systems, building automation systems, renewable energy equipment or other controls could be recommended.

The Energy Management Program should develop policy that include goals and objectives with deadlines and the assignment of responsibility. Required reports should be identified and explained in the policy. Initiatives can include a wide variety of tasks such as:

- Stakeholder Engagement Coordination – Conduct events such as energy fairs to raise awareness of the Energy Management Program and its initiatives and engage stakeholders as well as passengers.
- Utility Rate and Tariff Analysis and Energy Procurement Strategies – Perform routine checks on available rate tariffs and applicability to each meter type, which can result in cost savings such as reduced demand charges.

- Energy Security Analysis – Identify areas of increased vulnerabilities impacting reliability and resiliency of energy resources.
- Demand Side Management Initiatives – Evaluate load profiles and identify opportunities for possible load shifting.
- Periodic Energy Audits – Conduct routine audits, typically every three to four years on a regular cycle, to observe any previous measures that have been implemented, evaluate new technologies and opportunities, as well as evaluate progress towards goals. Can be done by inhouse staff or outside resources.
- Project Development and Implementation – Implement ECMs identified from energy audits, projects and strategies to address demand side management and mitigate energy security vulnerabilities.
- Progress Reporting – The most critical element to evaluating the success of the Energy Management Program is through measure progress towards goals, reporting on consumption, costs, and initiatives. This can be done at several levels, from tracking project implementation to monitoring and measuring energy consumption through meter data or an Energy Management Control System (EMCS) and comparing it to implementation plans and goals.

For an energy management program to be successful, the unequivocal support from executive management is required. Management must clearly state its support for the program, should expect to be periodically updated on program requirements and results, and should hold staff throughout the airport responsible for results.

8.1.2 Incorporate Energy Strategies in Sustainable Design Guidelines

Buildings are responsible for 40% of GHG emissions globally. Implementing a Sustainable Design Guideline and Policy could significantly reduce the GHG emissions from buildings at the airport during both construction and operations, as well as reduce overall operational costs. To support the Energy Management Program goals, the airport should consider implementing a policy requiring specific minimum requirements for energy and water performance in new facility construction or major renovation projects. Not only do guidelines help support energy and water goals, they also help to standardize equipment and operations, which reduces overall maintenance costs. Examples of specific criteria may include the following, where cost effective:

- Provide direct digital control (DDC) systems, compatible with the central EMCS (see Section 8.1.3). Where DDC is not cost effective, provide at a minimum, programmable thermostats and apply required control strategies where possible.
- Implement control strategies such as setpoint and equipment runtime schedules, hot water reset schedules, etc.
- Provide high efficiency (minimum 90%) boilers, such as condensing boilers. Standardizing on a type of boiler will also reduce maintenance costs.
- Minimum insulation requirements (R values) for building envelope components such as roofs and walls.
- Minimum water fixture flow rates and types, include other desired features such as IR sensors, dual flush options, etc.

Additionally, the airport could employ the use of a rating system such the LEED®, wherein the policy would require green building certification at a certain level such LEED Gold or Platinum. Simply requiring the use of a rating system is not considered to be adequate, it is important to select the appropriate level to achieve the desired project goals. Lower levels of certification have costs for implementation while having little impact on actual emissions or energy and water performance. Higher levels of certification are worthwhile, and when implemented will have a significant impact. It has been shown on multiple projects in the US that very high level of performance including LEED Platinum and Zero Energy can be achieved cost competitively. To put it very simply, big savings costs less than little savings.

When seeking high levels of performance, the most impact comes from requiring the project team to use an Integrated Design strategy. With Integrated Design, all stakeholders are brought together very early in the project at a sustainability charrette. Goals for the project are established, and the commitment of all stakeholders to achieving the goals through collaboration is obtained. If possible, the construction contractor should be included in the charrette. The most important stakeholder is the owner, in this case, the Airport staff. An unequivocal commitment from the owner to the goals must be made clear to other the stakeholders.

Such a policy could have many benefits beyond just the reduction in emissions. For example, it is common for green building policies and rating criteria to include requirements for local sourcing of building products, and this contributes to the local economy. Green buildings produce less construction and demolition debris which reduces impacts on landfills. In addition, high performance green buildings consume significantly less energy and water than a typical building, and this results in long term cost savings for utilities. Green buildings also can provide superior indoor environmental quality which contributes benefits to both the airport and the passengers visiting the airport. It is common for employee attendance to be improved due to better health, and employee retention has even been documented to improve in green buildings.

8.1.3 Centrally Manage and Monitor Energy Consuming Systems

Centrally monitoring and managing energy consuming equipment and systems would allow the Airport staff to proactively manage conditioned spaces and support systems. Currently, energy consumption for the Airport is reported at the end of a billing cycle, as part of the respective utility bills. Implementing a central monitoring system, such as an Energy Management Control System (EMCS), would provide for real-time monitoring of the energy consumption and provide control capability to proactively manage energy more effectively.

An EMCS can vary in complexity, depending on the amount of control and monitoring capability required. A relatively common approach is to integrate ECMS capabilities as a part of a networked DDC system. In this application, the system can monitor and trend HVAC system operations and be set to notify maintenance personnel when key metrics such as temperature or relative humidity get out of their allowed range. This helps the maintenance team to proactively identify and correct problems prior to occupant calls being made. In addition to improving occupant comfort, alarms can notify staff when energy consumption and load profiles exceed thresholds. Load profiles can be monitored, and opportunities to improve the load factor, manage peak demand and reduce energy consumption can be more easily identified, ensuring that energy conservation goals are met.

Currently Honeywell DDC systems are installed at the IAB, DAB and Building 96. The system is networked but the Airport has little to no visibility of the control system and functionality. As a first step to implementing a central EMCS, evaluate upgrading and expanding the capability of the existing DDC system, and ensuring that Airport facilities personnel have the appropriate access and training to use the system to its full capabilities. It is recommended that the upgraded system also include the ability to input utility consumption data, such as meter data, and provide energy consumption and trending reports to allow for ongoing energy reporting.

8.2 Future Feasibility Study Recommendations

8.2.1 Exterior Area Lighting Upgrades

Although the majority of the exterior area lighting at the Airport, including parking lots, platforms, and aprons has been upgraded to LED technology, there are still opportunities for additional upgrades at other locations on the Airport Property. These areas, such as the Wayfair parking lot area, are primarily using high-intensity discharge (HID) lamps, which can be replaced with higher efficiency LED fixtures.

These facilities were not included in the energy audit; therefore a detailed calculation was not performed. However, a brief screening level analysis shows that upgrades to these systems can result in additional energy savings for BGR and are estimated to have a 15-year average simple payback, based on current economics. Another alternative for exterior lighting, especially in parking areas, is solar powered high-efficiency fixtures, eliminating the use of electricity as well as promoting the use of renewable energy. These are higher in cost than traditional upgrades but can still provide simple payback within an acceptable range.

When considering replacing exterior area lighting, a one for one replacement is often not sufficient to provide the minimum required lighting; there are additional analyses needed, such as light level, coverage, and glare, that are required for exterior lighting systems to ensure public safety requirements are met. But due to the energy savings potential of these upgrades, it is recommended that BGR consider exterior lighting upgrade evaluations for all airport areas and facilities as part of their energy management program.

8.2.2 Combined Heat and Power (CHP) Plant

As natural resources are depleted, it is ever more important to look for alternative energy solutions. While renewable energy options, such as solar, provide clean energy solutions, there are other ways to reduce carbon footprint by finding more efficient methods to provide the same functions already in place. One option is combined heat and power (CHP), also known as cogeneration, which concurrently generates electricity and useful thermal energy from the same fuel sources. CHP can be used to either replace or supplement conventional heat and/or power.

Over half of the energy consumed by the airport is used for heating. This presents a great opportunity to apply CHP technology. Initially, two scenarios were evaluated: 1) a single 65-kW micro-turbine at the main terminal buildings and 2) a 65-kW and a 30-kW microturbine acting as a central heat and power plant for the terminal and surrounding buildings. After preliminary screening it was determined the most effective course of action would be to implement CHP at the terminal buildings only. The lack of heat load from surrounding buildings and added cost for hot water distribution piping required to connect the buildings were the determining factors in this conclusion.

The 65 kW microturbine will produce 558,000 kWh of electricity and 3.28 MMBtu of thermal heat, annually, leading to a cost savings in excess of $75,000 per year. With an estimated installation cost of $450,000 to $600,000, the simple payback for the project is calculated between 5.5 and 8 years. Additional analysis is required to fully evaluate the feasibility of the technology application and associated the costs. However, based on the results of the screening level analysis, it is recommended that the Airport consider CHP as an alternative option to condensing boiler replacements, recommended above, as CHP provides the following benefits:

- Increased energy efficiency. CHP systems typically achieve total system efficiencies ranging from 60 to 80 percent for producing electricity and thermal energy as compared to typical methods of separate electricity generation and on-site heat generation, which have a combined efficiency of about 45 percent.
- Reduced air emissions. Since less fuel is consumed in CHP applications than separate heat and power systems to produce the same amount of energy, greenhouse gas emissions are reduced.
- Enhanced energy reliability and resilience. CHP systems can provide resilient power for critical facilities during grid outages or emergencies.

8.2.3 Waste-to-Energy Plant

Currently all international airside (deplaned) trash is sterilized on site by a steam boiler before being taken offsite to be disposed at a landfill. This process is an expense to the Airport, not only in boiler plant operation, which requires a specialized technician, but also in costs for hauling and disposal. The plant is operated approximately three 8-hour days per week, for a total of 1,250 hours per year. It is estimated that the Airport is currently spending approximately $70,000 per year in boiler plant operating costs, in addition to costs for hauling to the landfill.

For long term site sustainability and resiliency, a multi-functional infrastructure should be considered. In this case, rather than continuing current operations, a future waste-to-energy plant could be implemented to reduce the waste stream to the landfill while providing biogas for reuse.

Conceptually, all of the airside waste, such as food, cups, paper, etc., would be placed into an anerobic digester where the anaerobic bacteria cultures will digest the organic waste, mostly the food waste as that is most easily digested, and convert the waste into biogas (methane and carbon dioxide). The biomethane can then be piped to the existing steam boiler to offset propane consumption. Typically, there would be two or more digesters operating to allow for cycling of the process. As the digestion process completes and the biogas production drops below certain levels, the residual waste would be removed and dewatered, with the remaining solids then sterilized in the boiler and processed as they are now.

Figure 8-1. Anaerobic Biogas Generator

Curtesy: Earthlee; Modular Digester. https://www.earthlee.com/modular-digester

This concept is one that is being employed in other markets today, particularly in the food processing industry. Many manufactures also offer turnkey and modular solutions (**Figure 8-1**). However, further evaluation will need to be done to fully conceptualize the system for the airport and ensure current regulations are met. This technology not only reduces fuel consumption, but also landfill waste resulting in cost savings.

Another technology that was consider was a waste-to-energy plant, wherein an incinerator plant would be installed onsite that would produce electricity as a biproduct. The typical range of net electrical energy that can be produced is about 500 to 600 kWh of electricity per ton of waste incinerated. However, the airport produces less than a quarter ton per day on average, making the economy of scale for this option not financially viable. **Figure 8-2** shows the regulated waste total by month in 2019 for the airport. Typically, a steady waste stream of at least 2-5 tons per day is recommended in order to make this option feasible.

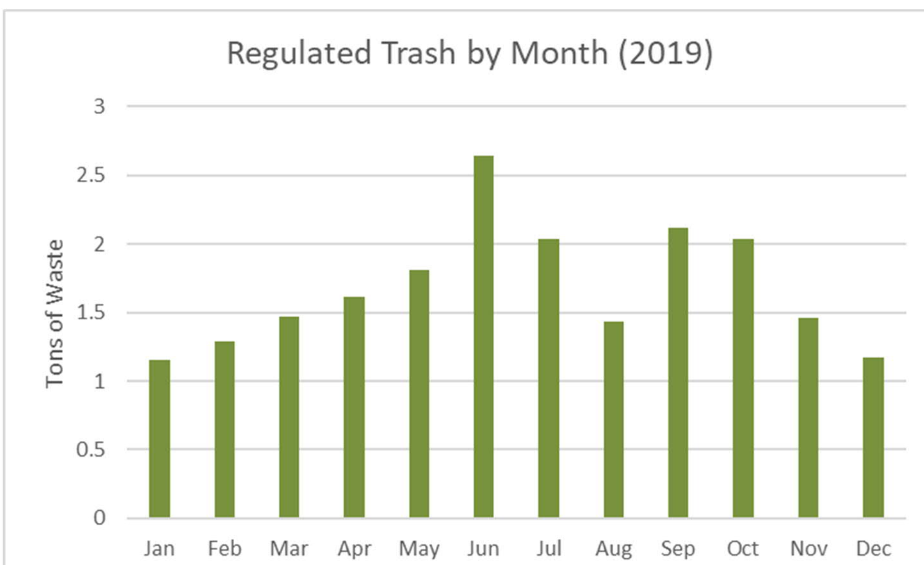


Figure 8-2. Regulated Trash Monthly Profile
Bangor International Airport Energy Audit

8.2.4 Install a Microgrid

The Airport is critical infrastructure and must be operational under any condition – including during a prolonged, widespread power outage. A microgrid can be constructed at the airport to enhance energy resilience. A microgrid is a combination of loads, distributed generation assets, energy storage assets, and a control system to monitor conditions and take appropriate actions. A microgrid can operate while connected to the broader electrical grid, or it can operate in Island Mode with the entire facility isolated from the grid.

Generation assets can include conventional diesel generators, gas turbines, micro turbines and other fossil fuel fired assets, and renewable energy systems such as solar PV. Solar PV systems can provide energy for a microgrid to allow reduced engine generator run times to conserve fuel and reduce emissions. Energy storage can include utility scale battery energy storage or thermal storage systems such as ice or chilled water.

The combination of assets in a microgrid for generation, storage and control can be used in a variety of ways depending upon the regional regulations and operation of the electrical grid. A microgrid could be used daily to respond to conditions internal to the airport or external to the airport. For example, distributed generation and energy storage assets could be used regularly to manage the facility load profile and shave the peak demand. This strategy can result in significant cost savings. Energy storage systems can also be used to manage the intermittency of a renewable energy power generating resource such as a solar PV array. The microgrid could also monitor the conditions of the grid, and the microgrid could provide the opportunity to participate in the ancillary services market. Demand response and frequency regulation are two to the more common ways to participate.

The combination of managing peak demand and participating in the ancillary services market in various ways can be called Value Stacking. The benefits of avoiding power outages using a resilient microgrid should also be considered. Value stacking in addition to the benefits of energy resilience and the avoidance of business disruptions provides a compelling case for the installation of a microgrid at the airport.

For further reading please refer to: ACRP 137: Microgrids and Their Application for Airports and Public Transport http://www.trb.org/Publications/Blurbs/177928.aspx

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Appendix A
Facility Descriptions

Domestic and International Arrival Buildings

General Description

The terminal complex consists of the Domestic and International Arrival Buildings (DAB and IAB, respectively) which are physically connected and have common utility systems.

The DAB is approximately 73,000 square feet and consists of passenger processing and related support space, and has three jet loading bridges as well as ground level ramp gates for regional aircraft. The DAB also has a number of concessions, holding rooms, public waiting area, airline ticket counters, rental car offices, office space, baggage claim, and security areas.

The IAB is approximately 55,000 square feet and has four jet loading bridges and associated hold rooms. The international terminal also has U.S. customs and immigration offices and screening facilities for international passengers. BGR Airport's dispatch office and the airport's administrative offices are located between the IAB and DAB.

The building construction consists primarily of CMU and precast concrete walls and a flat roof with white membrane covering. There are also a large number of windows throughout the building with clear glazing and no shading, many of the windows appeared to be in poor condition and showed signs of leaking.

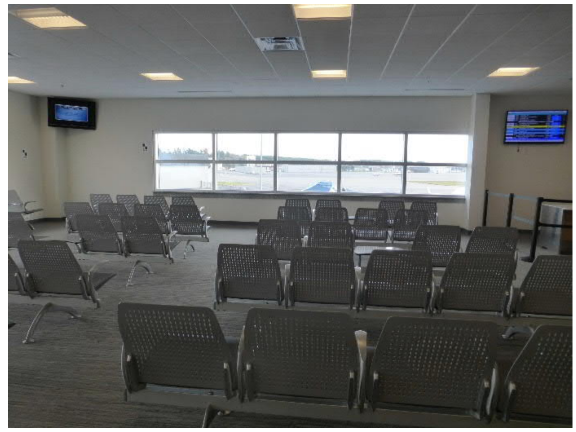


Figure 1. Domestic Terminal Interior Passenger Gate Area

Figure 2. Windows in the International Terminal Area

Lighting

The lighting consists of a variety of fixtures, primarily T8 fluorescent. Some areas in the lower level of the DAB have been upgraded to LED with occupancy sensors. Some other intermittent use areas, such as restrooms have been retrofit with occupancy sensor controls as well.

HVAC Systems

The terminals are conditioned via multiple packaged roof top units (RTUs) and air handling units (AHUs). Cooling is primarily direct expansion (DX), but there is a single air cooled chiller present as well. Heating is provided via hot water coils in the RTUs and AHUs, as well as unit heaters, and baseboard radiators.

The terminals share a hot water heating loop which is served by three steam boilers and steam to hot water heat exchanger. Two dual fuel boilers are located in the International terminal and one dual fuel boiler is located in the Domestic terminal; the boilers are brought online as needed to support the heating load in both terminals.

The terminals have a combination of electric, DDC and pneumatic controls. All of the rooftop units and air handling units have DDC controls. The baseboard radiation heat, one HW converter, reheat coils and chilled water coils have pneumatic controls.

The tables below list the major HVAC equipment observed during the energy audit..

Boiler Data							
Tag	Year Installed	Manufacturer / Model	Serial Number	Fuel/ Source	Steam/ HHW	Input (MBH)	Output (MBH) or Efficiency (%)
DAB	2009	Cleaver Brooks/ CBI 200-150LE	01335-2-1	NG/Fuel Oil	Steam	6277	Not listed
IAB	1974	Cleaver Brooks/ CB 600-100	L-59153	No. 2 Fuel Oil	Steam	4184	Not listed
IAB	1992	Cleaver Brooks/ CB 101-100	90996	NG/Fuel Oil	Steam	4184	Not listed

Chiller Data					
Tag	Year Installed	Manufacturer / Model	Serial No.	Chiller Type	Nominal Capacity (tons)
CH-1 (DAB)	2006	Trane/RTAA 1004 XR01 A3D0 GMNB	U06C06595	Air Cooled	100

Air-handling Units								
Tag	Year Installed	Manufacturer / Model	Serial No.	System Type	Cooling Method	Heating Method	OA Control Method	Fan hp
AHU-1	1992	Trane/MCCA030	K92J48792	VAV	DX	HHW	Motorized Damper	25
AHU-2	1992	Trane/MCCA025	K92J47615	CAV	DX	HHW	Motorized Damper	15
AHU-3	1992	Trane/MCAA040	----21642	VAV	DX	HHW	Motorized Damper	20
Coffee Shop	--	General Electric/WE09004A0 B	316256	CV	DX	HHW	Motorized Damper	1

Air-handling Units								
Tag	Year Installed	Manufacturer / Model	Serial No.	System Type	Cooling Method	Heating Method	OA Control Method	Fan hp
AHU-4	--	American Air Filter Co	--	VAV	DX	Glycol	Motorized Damper	not listed
HVAC-3	2006	Trane/MCCB010	K06E61758	VAV	CHW	Glycol	Motorized Damper	3
VAV-1	2006	Trane/VCCF120	R06E69672	VAV	CHW	HHW	Motorized Damper	not listed
MAU-1	2015	Trane/CSAA021UBL 00	K15C21648	MAU	N/A	Natural Gas	Damper in Unit	10
RTU-1	2008	Trane/Intellipak SLHFF254CC48	C08H08716	Packaged RTU	DX	HHW	Damper in Unit	15
RTU-1	2016	Trane/THC120F	163611461L	Packaged RTU	DX	HHW	Damper in Unit	3.6
RTU-2	--	Trane/ YHH180F4R	--	Packaged RTU	DX	Natural Gas	Damper in Unit	not listed
RTU-12	1992	Trane/TCD150B400B A	G261426820	Packaged RTU	DX	HHW	Damper in Unit	not listed
RTU-13	1992	Trane/--- 0120B400BA	G17142723D	Packaged RTU	DX	HHW	Damper in Unit	2
HV#7	--	Century	--	Packaged RTU	DX	HHW	Motorized Damper	15
RTU	--	Fedders	--	Packaged RTU	DX	HHW	Damper in Unit	not listed
RTU-1	1992	Trane/TC0240B	G261427510	Packaged RTU	DX	HHW	Damper in Unit	5
RTU-2	1992	Trane/Nameplate illegible	--	Packaged RTU	DX	HHW	Damper in Unit	--
RTU-9	1992	Trane/TC0210B	G271424690	Packaged RTU	DX	HHW	Damper in Unit	5
RTU-11	1992	Trane/TCD090C	G26142212D	Packaged RTU	DX	HHW	Damper in Unit	1

DX Condensing Units					
Tag	Year Installed	Manufacturer / Model	Serial No.	Nom. Cooling Capacity (MBH)	System Type
AC Coffee Shop		Johnson Controls/ YCJD60S44S4A	W1F6686943	60	Cooling Only
Red Baron	1994	Carrier/ 38TKB048310	0594E00405	48	Cooling Only

DX Condensing Units					
Tag	Year Installed	Manufacturer / Model	Serial No.	Nom. Cooling Capacity (MBH)	System Type
CU-1	1992	Trane/ RAUCC404	J92F82753	40 tons	Cooling Only
CU-2	1992	Trane/ RAUCC604	J92F82752	60 tons	Cooling Only
#10		Trane/ RAUA-5004-MC		50 tons	Cooling Only
#7		Trane/ RAUA-5004-MC	J78M-22480	50 tons	Cooling Only
CU		Trane/ RAUA-4004-MC	J79B-24098	40 tons	Cooling Only

Plumbing Fixtures and Domestic Hot Water

There are multiple restroom facilities in the terminal buildings as well a kitchenette in the office area and sinks in the cafes. The tables below summarize the water fixtures the Domestic and International Terminal Buildings, Respectively.

Domestic hot water is provided in the DAB by a 173 MBTU fuel oil fired water heater with 68 gallon storage capacity (Bock Model 71E) and the IAB by a 4.5 kW electric heat pump water heater with 80 gallon storage capacity (Bradford White Model RE2H80R10B).

	Fixture Category	Quantity	Flow Rate(s)	Notes
Domestic Terminal Building	Toilets	36	1.6 gpf	IR flush valves
	Urinals	11	1.0 gpf	IR flush valves
	Lavatories	24	0.5 gpm	IR sensors
International Terminal Building	Toilets	52	1.6 gpf	
	Urinals	14	1.0 gpf	
	Lavatories	42	0.5 gpm	

Building 96 Federal Aviation Administration (FAA)

General Description

Building 96, Federal Aviation Administration, is an administrative office building. A portion of the building is currently unoccupied and under renovation for possible future use. The building construction consists of CMU block walls with brick veneer and a flat membrane roof. The building has double pane windows with operable sections and interior shading to reduce solar gain.

Figure 1. Building 96 Front Elevation

Lighting

The lighting is comprised of 2-, 3- and 4-lamp 4 foot 32-watt T8 linear fluorescent fixtures. All lights are controlled by manual switches. A wallpack located on the exterior of the building is high pressure sodium.

HVAC Systems

The building is conditioned by five roof top units (RTUs) with direct expansion (DX) cooling and hot water heating coils. There are also perimeter hot water baseboard radiators throughout the building. Heating for the building is provided by a fuel oil boiler, circulated by a primary only constant flow pump to the hot water coils throughout the building.

The building has a combination of electric and pneumatic controls. The baseboard radiators are equipped with control valves controlled from individual zone thermostats.

Figure 2. Building 96 Boiler Room

The tables below list the significant HVAC equipment in the buidlng. The rooftop units were not observed during the site visit due to limited access.

Boiler Data							
Tag	Year Installed	Manufacturer / Model	Serial Number	Fuel/ Source	Steam/ HHW	Input (MBH)	Output (MBH) or Efficiency (%)
	1989	Cleaver Brooks/M4W-1500 Series 100	4G 018008-M4	No. 2 Fuel Oil	Hot Water	1500	1200

Split-system AHUs or Packaged Units (DX Equipment)						
Tag	Year Installed	Manufacturer / Model	Serial No.	System Type	Nom. Cooling Capacity (MBH)	Heating Method and Capacity (MBH or kW)
RTU	c. 1990	Trane/--	--	Packaged RTU	Unknown	Hot Water/unknown

RTU	c. 1990	Trane/--	--	Packaged RTU	Unknown	Hot Water/unknown
RTU	c. 1990	Trane/--	--	Packaged RTU	Unknown	Hot Water/unknown
RTU	c. 1990	Trane/--	--	Packaged RTU	Unknown	Hot Water/unknown
RTU	c. 1990	Trane/--	--	Packaged RTU	Unknown	Hot Water/unknown
RTU	c. 1990	Trane/--	--	Packaged RTU	Unknown	Hot Water/unknown

Plumbing Fixtures and Domestic Hot Water

There are men's and women's restroom facilities on each floor, the table below summarizes the water fixtures in the building. Domestic hot water is provided by a 4.5 kW electric water heater with 40 gallon storage capacity (State Industries Model ES640D0RS).

Fixture Category	Quantity	Flow Rate(s)	Notes
Toilets	7	1.6 gpf	Combination of flush valve and tank type fixtures
Urinals	4	1.0 gpf	
Lavatories	9	2.2 gpm	
Other Sinks	1	2.2 gpm	Kitchen sink
Showers	3	2.5 gpm	

Buidling 100 Airfield Maintenance Buidling

General Description

Building 100, the Airfield Maintenance building, is a one-story building with two bays, East and West, with administration space between including offices, restrooms, locker rooms and kitchen/break room. The bays are used as garages for the airport runway maintenance vehicles and ground equipment. The walls are cast concrete with insulated panels on the interior of the bays. The roof is flat steel frame and membrane. The building also has single pane operable windows with storm glass inserts in the office areas.

Figure 1. Building Front Elevation

Lighting

The lighting in the office areas is comprised mainly of 2 lamp 4 foot 32-watt T8 linear fluorescent fixtures. Lighting in the bays includes 4 lamp 4 foot T5 fixtures and some LED fixtures. All lights are controlled by manual switches. Wallpacks located on the exterior of the building are compact fluorescents.

HVAC Systems

Heating for the building is provided by two dual-fuel boilers, circulated by primary only constant flow pumps to the hot water coils throughout the building. Heating is delivered by unit heaters in the bays and baseboard radiant heaters and air handling unit (AHU) in the administration areas. There is also a transpired solar collector (Solar Wall) on the West bay that provides heating to the space. There is no mechanical cooling in the building.

Boiler system controls are electric analog type. Space temperature controls throughout the building are electric thermostats.

The tables below list the significant HVAC equipment in the buidlng.

Figure 2. West Elevation with Solar Wall

Boiler Data							
Tag	Year Installed	Manufacturer / Model	Serial Number	Fuel/ Source	Steam/ HHW	Input (MBH)	Output (MBH) or Efficiency (%)
	1987	HB Smith/Series 28-6, Burner: Carlin 801 CRD	N87-719	No. 2 Fuel Oil	Hot Water	1645	1139
	2008	Burnham/V1110, Burner: Powerflame	64077698	NG/Fuel Oil	Hot Water	Not Listed	1888

Air-handling Units								
Tag	Year Installed	Manufacturer / Model	Serial No.	System Type	Cooling Method	Heating Method	OA Control Method	Fan hp
--	--	Inaccessible over office area ceiling		CAV	None	HHW	Motorized Damper	--

Plumbing Fixtures and Domestic Hot Water

There is one men's and one women's restroom facility in the building as well a breakroom area. The table below summarizes the water fixtures in the building. Domestic hot water is provided by a 4.5 kW electric water heater with 80 gallon storage capacity (Bradford White Model LE280T3-3NCWW).

Fixture Category	Quantity	Flow Rate(s)	Notes
Toilets	3	3.5 gpf	
Urinals	1	1.0 gpf	
Lavatories	3	2.2 gpm	
Other Sinks	1	2.5 gpm	Breakroom sink
Showers	1	2.5 gpm	

Building 121 Bangor Aviation Services

General Description

Building 121 is a two-story building originally constructed in the 1950's and had several recent renovations which included an expansion of the second floor. The building houses the General Aviation Terminal, and consists of office areas, lounge spaces, conference and break rooms and locker rooms. The building is open 05:00 to 19:00 daily.

The building construction consists of brick walls and a flat membrane roof. The building also single pane operable windows with storm glass inserts which are programmed to be replaced.

Figure 1. Bangor Aviation Services Building

Lighting

The lighting is comprised mainly of 2 lamp 4 foot 32-watt T8 linear fluorescent fixtures. All lights are controlled by manual switches. Wallpacks located on the exterior of the building are compact fluorescents.

HVAC Systems

Heating for the building is provided by a natural gas fired boiler, circulated by primary only constant volume pumps to baseboard radiant heaters throughout the building. Cooling is provided by ceiling cassette type direct expansion (DX) split systems. Boiler system controls are electric analog type. Space temperature controls throughout the building are electric thermostats.

The tables below list the significant HVAC equipment in the buidlng.

Boiler Data							
Tag	**Year Installed**	**Manufacturer / Model**	**Serial Number**	**Fuel/ Source**	**Steam/ HHW**	**Input (MBH)**	**Output (MBH) or Efficiency (%)**
	2004 (2012 Burner)	HB Smith/Series 19A, Burner: Carlin 301 Gas	FA2004-788	Natural Gas	Hot Water	Not listed	Not listed

Figure 2 – Boiler and Pumps

Plumbing Fixtures and Domestic Hot Water

There are restroom facilities on both floors of the building, and have been recently upgraded. The table below summarizes the water fixtures in the building. Domestic hot water is provided by a 4.5 kW electric water heater with 40 gallon storage capacity (Bradford White Model RE340S6-1NCWW).

Fixture Category	Quantity	Flow Rate(s)	Notes
Toilets	16	1.6 gpf	Toilets in the new area are tank type, older restrooms have flush valve type
Urinals	4	1.0 gpf	
Lavatories	16	2.2 gpm	Lavatory faucets in the new locker rooms are 0.5 gpm
Other Sinks	2	2.5 gpm	Breakroom/kitchenette sinks
Showers	4	2.5 gpm	

Building 123 Corporate Hangar

General Description

Building 123, the Corporate Hangar, is a single-story building with three hangar bays. Each bay also has a small apartment space with restroom, kitchenette and bedroom. The facility is occupied intermittently by the tenants who hold individual leases to each bay.

The building construction consists of ridged steel frame with insulated metal siding panels and a low slope standing seam metal roof insulated with fiberglass batt. There are also three large cantilever style aircraft access doors with insulated panels, one per bay. Each bay also has single pane operable windows with storm glass inserts on the back elevation of the building.

Figure 1. Building 123 Front Elevation

Lighting

Each bay has a different style of high-bay lighting: Bay 1 has LED fixtures; Bay 2 has high efficiency T5 linear fluorescents and Bay 3 has metal halide fixtures. The residential spaces have 2 lamp 4 foot 32-watt T8 linear fluorescent fixtures. All lights are controlled by manual switches. Wallpacks located on the exterior of the building are high pressure sodium.

Figure 2. Building 123 Back Elevation

HVAC Systems

Each bay has a fuel oil fired boiler that provides heating hot water to an in-floor radiant heating system. The tables below summarizes the primary HVAC equipment in the building.

The table below lists the significant HVAC equipment in the buidlng.

Figure 3. Building 123 Fuel Oil Fired Boiler, Typical of Three

Boiler Data							
Tag	**Year Installed**	**Manufacturer / Model**	**Serial Number**	**Fuel/ Source**	**Steam/ HHW**	**Input (MBH)**	**Output (MBH) or Efficiency (%)**
Bay 1		Vega/G10 Series Model G, Burner: Beckett SMG	2460	No. 2 Fuel Oil	Hot Water	Not listed	Not listed
Bay 2		Vega/G10 Series Model G, Burner: Beckett AF11	3344	No. 2 Fuel Oil	Hot Water	Not listed	Not listed
Bay 3		Vega/G10 Series Model G, Burner: Beckett SMG	2462	No. 2 Fuel Oil	Hot Water	Not listed	Not listed

Plumbing Fixtures and Domestic Hot Water

There is one restroom facility and one kitchenette per bay, the facilities are used infrequently. Each bay has a dedicated electric tank type water heater for domestic hot water. The table below summarizes the water fixtures in the building.

Fixture Category	Quantity	Flow Rate(s)	Notes
Toilets	3 (one per bay)	1.6 gpf	
Urinals	0	N/A	
Lavatories	3 (one per bay)	2.2 gpm	
Other Sinks	3 (one per bay)	2.5 gpm	
Showers	3 (one per bay)	2.5 gpm	

Building 124 T Hangar

General Description

Figure 1. T Hangar Exterior Elevation

Building 124, T Hangar, is a single-story building with ten T-shaped hangar bays. The facility is used as unheated aircraft storage and is generally unoccupied. There are no facilities in the building.

The building construction consists of ridged steel frame with insulated metal siding panels and a low slope standing seam metal roof insulated with fiberglass batt. Each bay has a large insulated panel cantilever door.

Lighting

The interior lighting in the building consists of high bay metal halide fixtures with manual switch controls, one per bay. Wallpacks located on the exterior of the building are high pressure sodium.

HVAC Systems

There are no HVAC systems at the building.

Plumbing Fixtures and Domestic Hot Water

There are no restroom facilties or other plumbing fixtures in the building.

Building 252 Hangars #8 and #9

General Description

Building 252 is a single-story building with open hangar space, originally constructed in the 1950s. The facility is used as unheated aircraft storage and is generally unoccupied. There are no facilities in the building.

The construction consists of ridged steel frame with metal roofing and siding. The metal low sloped roof and walls are insulated with fiberglass batt original to the building. There are translucent panels at the top of the sliding hangar doors as well as on the front elevation (street side) of the building that provide some natural lighting for the space.

Figure 1. Building 252 Front Elevation

Figure 2. Building 252 Back Elevation

Lighting

The interior lighting consists of 4 lamp 4 foot 32-watt T8 linear fluorescent fixtures. All lights are controlled by manual switches.

HVAC Systems

There are no HVAC systems at the building. A single electric unit heater maintains the fire pump room above freezing.

Plumbing Fixtures and Domestic Hot Water

There are no restroom facilities or other plumbing fixtures in the building. Water is provided only for the fire suppression system.

Building 253 Ground Support Equipment (GSE) Shop / Alamo & National Rental Car

General Description

Building 253 is a single-story building originally constructed in the 1950's. The building houses two occupants which are physically separated: the Ground Support Equipment (GSE) Shop and Alamo & National Rental Car Maintenance. The building is occupied from 06:30 to 16:00, seven days a week.

Each space consists of high-bay maintenance space as well as support office and facilities. The building construction consists of CMU block walls with brick veneer and a flat membrane roof. The building has single pane operable windows with storm glass inserts in the office areas and high bays.

Figure 1. Building 253 GSE Shop

Lighting

The interior lighting in the high bays consists of 4 lamp 4 foot 32-watt T8 linear fluorescent fixtures, fixtures in the office areas are generally 2 lamp. All lights are controlled by manual switches. Wallpacks located on the exterior of the building are high pressure sodium.

Figure 2. Building 253 Alamo & National Rental Car Maintenance

HVAC Systems

The building space heating is provided by an oil-fired steam boiler. A steam-to-hot water converter is utilized to generate hot water. Boiler system controls are electric analog type.

Hot water is distributed by two (2) hot water circulating pumps, which provide hot water for baseboard radiators in the offices and unit heaters in the high bays. Office areas are cooled via terminal direct expansion (DX) cooling units, including mini-split and window type units.

The tables below list the significant HVAC equipment in the buidlng.

Boiler Data							
Tag	Year Installed	Manufacturer / Model	Serial Number	Fuel/ Source	Steam/ HHW	Input (MBH)	Output (MBH) or Efficiency (%)
	1998	Cleaver Brooks/M4S-1500 Series 100	4G 029710	No. 2 Fuel Oil	Steam	1500	1237

Plumbing Fixtures and Domestic Hot Water

There is one restroom facility in each tenant use space. The table below summarizes the water fixtures in the building. Domestic hot water is provided by a 4.5 kW electric water heater with 40 gallon storage capacity (State Industries Model PV 40 20RSO).

Fixture Category	Quantity	Flow Rate(s)	Notes
Toilets	1 (GSE) 1 (Rental Car)	1.6 gpf	
Urinals	3 (GSE) 0 (Rental Car)	1.0 gpf	
Lavatories	4 (GSE) 1 (Rental Car)	2.2 gpm	
Other Sinks	1 (GSE) 1 (Rental Car)	2.5 gpm	Breakroom sinks
Showers	0 (GSE) 1 (Rental Car)	Not labeled	
Other	--	--	Water used for vehicle washing in the rental car bays

Building 271 Bangor Innovation Center

General Description

Building 271 is a single-story building that houses several workshop spaces and office areas, utilized by multiple tenants. The building construction consists of CMU block walls and a flat membrane roof. The building has single pane operable windows with storm glass inserts.

Figure 1. Bangor Innovation Center Front Elevation

Lighting

The interior lighting consists of 2 lamp 4 foot 32-watt T8 linear fluorescent fixtures, one area was observed to have T12 fixtures. All lights are controlled by manual switches. Wallpacks located on the exterior of the building are high pressure sodium.

HVAC Systems

The building space heating is provided by an oil-fired boiler. Hot water is distributed by constant flow circulating pumps, which provide hot water for baseboard radiators, unit heaters and heating coils in three constant volume air handling units (AHUs).

Figure 2. Building 271 Boiler

Boiler system controls are electric analog type. Space temperature controls are via non-programmable thermostats and the AHUs are controlled via local DDC.

The tables below list the significant HVAC equipment in the buidlng.

Boiler Data							
Tag	Year Installed	Manufacturer / Model	Serial Number	Fuel/ Source	Steam/ HHW	Input (MBH)	Output (MBH) or Efficiency (%)
	2005	Cleaver Brooks/M4S-1500 Series 100	4G 030106	No. 2 Fuel Oil	Steam	1500	1200

Air-handling Units								
Tag	Year Installed	Manufacturer / Model	Serial No.	System Type	Cooling Method	Heating Method	OA Control Method	Fan hp
AH-1	1993	Trane/MCAA006	K93F42921	CAV	None	HHW	Manual Damper	not listed
AH-2	1993	Trane/MCAA006	K93F42936	CAV	None	HHW	Manual Damper	not listed

AH-3	1993	Trane/MCAA006	K93F42917	CAV	None	HHW	Motorized Damper	not listed

Plumbing Fixtures and Domestic Hot Water

There is one men's and one women's restroom facility in the building. The table below summarizes the water fixtures in the building. Domestic hot water is provided by electric water heaters, located throughour the building, generally near the point of use. Observed were a 4.5 kW electric water heater with 40 gallon storage capacity (AO Smith Model EES 40 913), an instantaneous undersink water heater in the kitchenette of the office area, and a 4.5 kW electric water heater State Industries Model PV 40 20RSO located in one of the work areas (State Industries Model EN6-40-DORS 110).

Fixture Category	Quantity	Flow Rate(s)	Notes
Toilets	3	1.6 gpf	
Urinals	1	1.0 gpf	
Lavatories	2	2.2 gpm	
Other Sinks	1	--	Kitchenette sink in office area
Showers	0	N/A	
Other	--	--	There are utility sinks in some of the workshop spaces

Building 456 De-Icing Facility

General Description

The De-Icing Facility is a single-story building used for filling the de-icing trucks for the airport. The facility is generally unoccupied except as needed for truck filling and minor maintenance.

The building was upgraded and repurposed in 2016 from a naturally ventilated storage space to an enclosed facility to house the de-icing system and equipment. The building construction consists of ridged steel frame with insulated metal siding panels and a low slope standing seam metal roof insulated with fiberglass batt. There are also four overhead coiling doors with insulated panels.

Figure 1. De-Icing Facility Elevation

Lighting

The interior lighting in the building consists of high bay metal halide fixtures with manual switch controls. Wallpacks located on the exterior of the building are high pressure sodium.

HVAC Systems

The building is heated only by a fuel fired air turnover unit, set to maintain the space temperature at 55 degrees F. The table below summarizes the primary HVAC equipment in the building.

Terminal Units					
Equipment Type	Manufacturer / Model	Qty.	Cooling Method	Heating Method	Control Type
Air Turnover Unit	ThermoCycler/ Type 100L	1	N/A	Fuel Oil	Unit mounted thermostat

Plumbing Fixtures and Domestic Hot Water

Water service was brought to the building as part of the renovation for potential future use. There are currently no restroom facilities or other plumbing fixtures in the building.

Building 600 Life Flight of Maine/ Airport Storage/ C & L Aviation Group

General Description

Building 600 is a one-story building primarily housing Maine Life Flight with additional warehouse space utilized by other tenants. The main building has two hangar bays with administration space between including offices, restrooms, sleeping quarters, locker rooms and kitchen/break room. Warehouse spaces have been added onto each hangar.

The building construction consists of ridged steel frame with insulated metal siding panels and a low slope standing seam metal roof insulated with fiberglass batt. Each bay has a large insulated panel cantilever door.

Figure 1. Building 600 Front Elevations

Lighting

The interior lighting in the hangars consists of 4 lamp 4 foot T8 linear fluorescent fixtures. Lighting in the warehouse areas includes high-bay metal halide fixtures. All other areas have mainly 4 lamp 4 foot 32-watt T8 linear fluorescent fixtures. All lights are controlled by manual switches. Wallpacks located on the exterior of the building are high pressure sodium.

HVAC Systems

The hangar bays and warehouse areas heated only by gas-fired air turnover units, and propane infrared (IR) heaters. The main administration areas are conditioned by a 4-ton direct expansion (DX) split system and various window AC units and mini-split units. A fuel-fired boiler hot water boiler and constant flow primary pumping circulate hot water to baseboard heaters in the administration areas.

Boiler system controls are electric analog type. Space temperature controls are via non-programmable thermostats.

The tables below list the significant HVAC equipment in the buidlng.

Boiler Data							
Tag	Year Installed	Manufacturer / Model	Serial Number	Fuel/ Source	Steam/ HHW	Input (MBH)	Output (MBH) or Efficiency (%)
	2016	Weil McClain Gold/A/B-WGO-8 Burner: Beckett AFG	CP3767143	No. 2 Fuel Oil	HHW	Not listed	295

Split-system AHUs or Packaged Units (DX Equipment)						
Tag	Year Installed	Manufacturer / Model	Serial No.	System Type	Nom. Cooling Capacity (MBH)	Heating Method and Capacity (MBH or kW)
--		Johnson Controls/ GAW14L48C21S		Split System	48	None

DX Condensing Units						
Tag	Year Installed	Manufacturer / Model	Serial No.	Nom. Cooling Capacity (MBH)	System Type	Assoc. Indoor Unit Tag
--		Johnson Controls/GAW14L48	W1E7766953	48	Cooling Only	

Other Equipment					
Equipment Type	Manufacturer / Model	Qty.	Cooling Method	Heating Method	Control Type
Gas Fired Air Turnover Unit	ThermoCycler	2	None	Natual Gas	Thermostat

Figure 2 – Building 600 Air Turnover Unit

Figure 3 – Building 600 Boiler

Plumbing Fixtures and Domestic Hot Water

There are multiple restroom facilities in the building as well a kitchenette area. The table below summarizes the water fixtures in the building. Domestic hot water is provided by a 4.5 kW electric heat pump water heater with8 40 gallon storage capacity (Bradford White Model AeroTherm RE2H80R10B).

Fixture Category	Quantity	Flow Rate(s)	Notes
Toilets	5	3.5 gpf / 1.6 gpf	(2) Flush valve toilets observed to be higher flow of 3.5 gpf, other toilets were lower flow tank type fixtures
Urinals	0	N/A	
Lavatories	5	2.2 gpm	
Other Sinks	1	2.5 gpm	Kitchenette sink
Showers	0	N/A	

Fuel Farm Maintenance Office

General Description

The Fuel Farm Office is a small one story building comprised of offices, break/kitchen room and storage. The building is occupied seven days a week by 2 to 4 occupants.

The building construction consists of wood frame with siding and gypsum board interior finish with an asphalt shingle roof.

Figure 1. Fuel Farm Maintenance Office

Lighting

The interior lighting in the building is composed primarily of 4 lamp 4 foot 32-watt T8 linear fluorescent fixtures. All lights are controlled by manual switches. There is one high pressure sodium exterior light fixture on the front elevation of the building.

HVAC Systems

The building is conditioned via window units for air conditioning and electric baseboard heaters for space heating. The baseboard heaters are controlled by non-programmable thermostats. The table below summarizes the primary HVAC equipment in the building.

Terminal Units					
Equipment Type	**Manufacturer / Model**	**Qty.**	**Cooling Method**	**Heating Method**	**Control Type**
Window AC Unit	--	2	DX	None	Unit mounted therrmostat
Electric Baseboards	--	Multiple	N/A	Electricity	Non-programmable thermostats

Plumbing Fixtures and Domestic Hot Water

There is one restroom facility in the building as well a washing machine. The table below summarizes the water fixtures in the building. Domestic hot water is provided by a 4.5 kW electric water heater with 40 gallon storage capacity (State Industries Model PV 40 20RSO).

Fixture Category	Quantity	Flow Rate(s)	Notes
Toilets	1	1.6 gpf	
Urinals	0	--	
Lavatories	1	2.2 gpm	
Other Sinks	1	2.5 gpm	Breakroom sink
Showers	1	2.5 gpm	

Appendix B
ECM Matrix

(Provided Electronically)

Appendix F Instrument Approach Procedures

21336

BANGOR, MAINE

HI-ILS Z or LOC Z RWY 15

LOC/DME I-JVH	APCH CRS	Rwy ldg 11,440
109.5 Chan 32	150°	TDZE 192 Arpt Elev 192

AL-39 [USAF]

BANGOR INTL (KBGR)

DME required.

* When ALS inop, increase CAT E RVR to 40.
** When ALS inop, increase CAT CDE vis to 1⅜ miles.

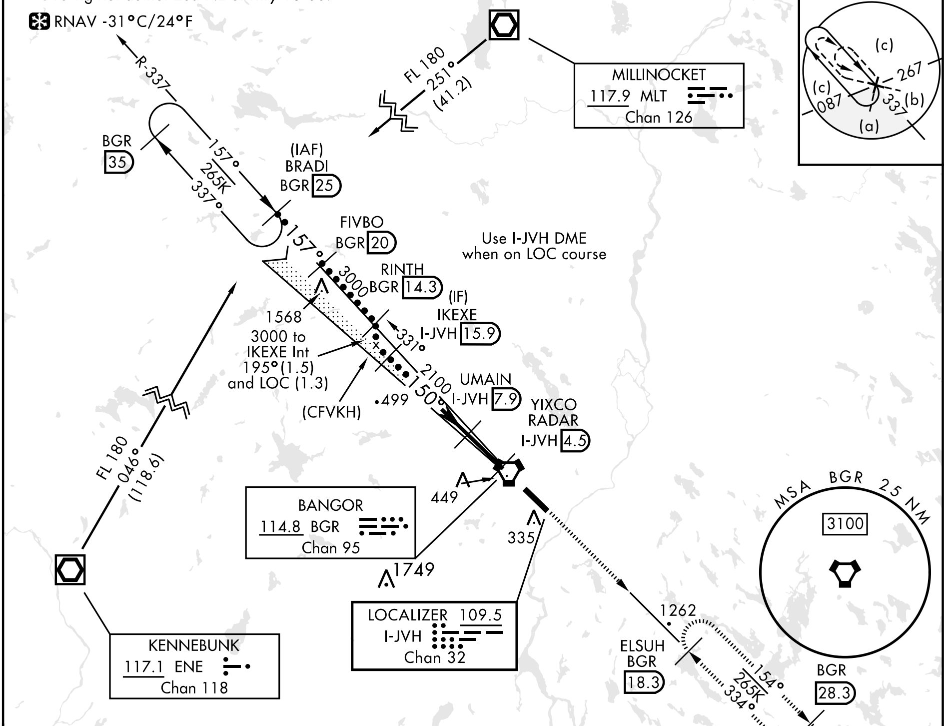
ALSF-2

MISSED APPROACH: Climb to 3000 via heading 150° and BGR VORTAC R-154 to ELSUH (R-154/18.3 DME) and hold.

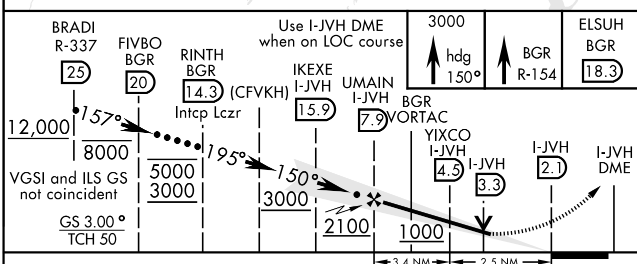
ATIS	APP CON	TOWER	GND CON	ASR
127.75	118.925 239.3	120.7 233.7	121.9 348.6	

*** Circling not authorized NE of Rwy 15-33.

RNAV -31°C/24°F

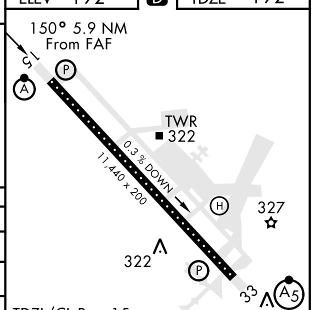


EMERG SAFE ALT 100 NM 7500



CATEGORY	C	D	E
S-ILS 15 *	392/18 200 (200-½)		
S-LOC 15 **	660/50 468 (500-1)		
CIRCLING ***	740-1½ 548 (600-1½)	820-2 628 (700-2)	880-2½ 688 (700-2½)

ELEV 192 | TDZE 192



TDZL/CL Rwy 15
HIRL Rwy 15-33

NE-1, 23 MAR 2023 to 20 APR 2023

NE-1, 23 MAR 2023 to 20 APR 2023

BANGOR, MAINE 44°48′N-68°50′W BANGOR INTL (KBGR)

Amdt 2 02DEC21

HI-ILS Z or LOC Z RWY 15

HI-VOR/DME or TACAN RWY 15

AL-39 [USAF] BANGOR INTL (KBGR)

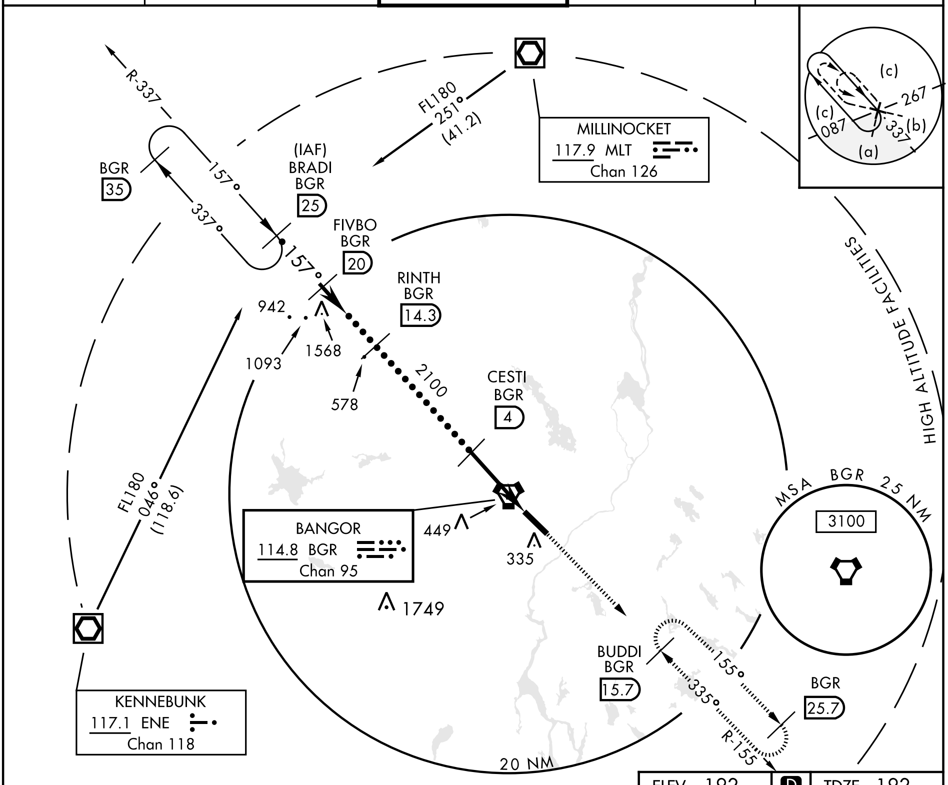
VORTAC BGR	APCH CRS	Rwy ldg 11,440
114.8 Chan 95	157°	TDZE 192 Arpt Elev 192

* When ALS inop, increase CAT E vis to 1¾ miles.
** Circling not authorized NE of Rwy 15-33.

ALSF-2

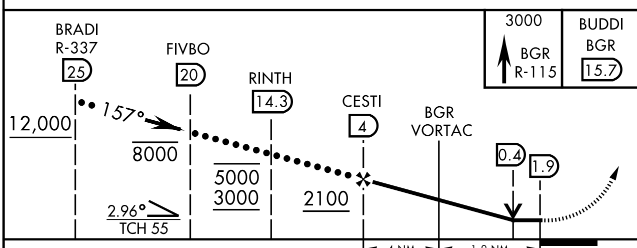
MISSED APPROACH: Climb to 3000 via BGR VORTAC R-155 to BUDDI (R-155/15.7 DME) and hold.

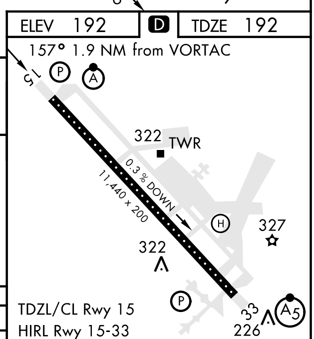
ATIS	APP CON	TOWER	GND CON	ASR
127.75	118.925 239.3	120.7 233.7	121.9 348.6	



EMERG SAFE ALT 100 NM 7500

NE-1, 23 MAR 2023 to 20 APR 2023





CATEGORY	C	D	E
S-15*	720/50 528 (600-1)	720/60 528 (600-1¼)	
CIRCLING **	720-1½ 528 (600-1½)	760-2 568 (600-2)	

FAF to MAP 5.9 NM					
Knots	120	140	160	180	200
Min:Sec	2:57	2:32	2:13	1:58	1:46

NE-1, 23 MAR 2023 to 20 APR 2023

BANGOR, MAINE

HI-VOR/DME or TACAN RWY 33

AL-39 [USAF]

BANGOR INTL (KBGR)

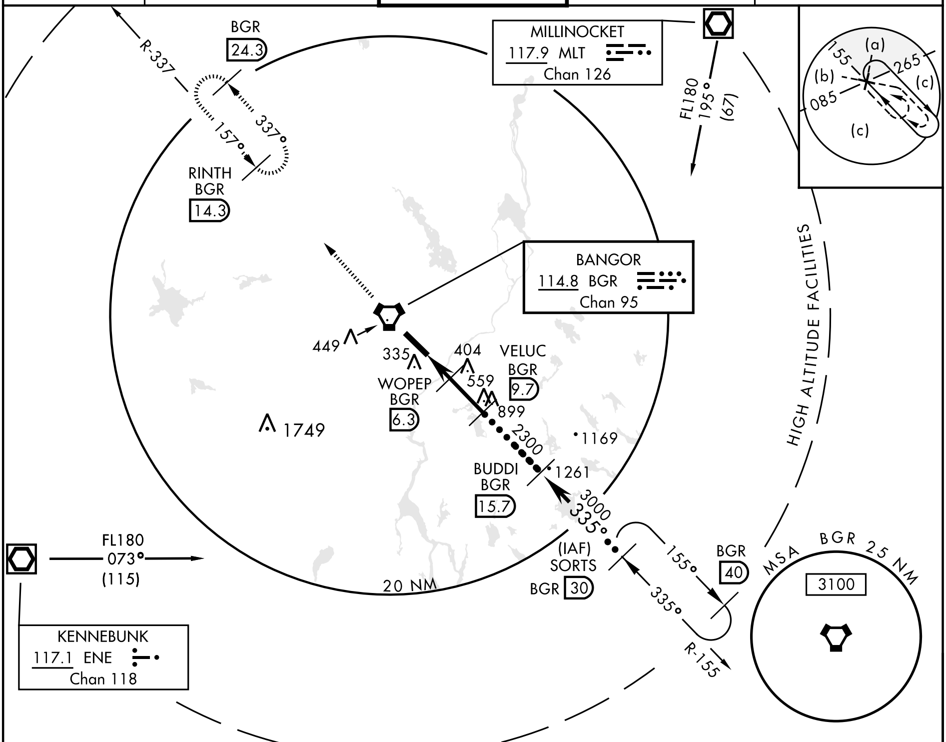
VORTAC BGR	APCH CRS	Rwy ldg 11,440
114.8 Chan 95	335°	TDZE 163 Arpt Elev 192

T * When ALS inop, increase CAT C RVR to 60 and vis to 1¼ miles, CAT D/E vis to 1½ miles.
** Circling not authorized NE of Rwy 15-33.

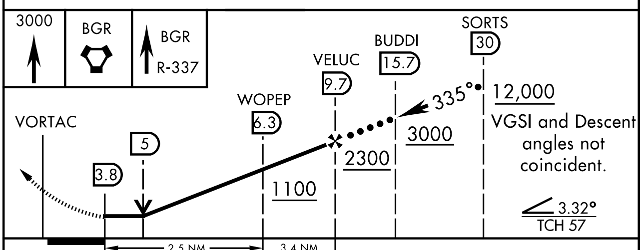
MALSR A5

MISSED APPROACH: Climb to 3000 direct BGR VORTAC then via BGR R-337 to RINTH (BGR 14.3 DME) and hold.

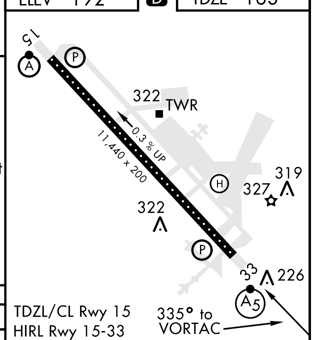
ATIS	APP CON	TOWER	GND CON	ASR
127.75	118.925 239.3	120.7 233.7	121.9 348.6	



EMERG SAFE ALT 100 NM 7500



ELEV 192 | D | TDZE 163



CATEGORY	C	D	E
S-33 *	600/40 437 (500-¾)	600/50 437 (500-1)	
CIRCLING **	660-1½ 468 (500-1½)	760-2 568 (600-2)	

FAF to MAP 5.9 NM

Knots	120	140	160	180	200
Min:Sec	2:57	2:32	2:13	1:58	1:46

NE-1, 23 MAR 2023 to 20 APR 2023

HI-VOR/DME or TACAN RWY 33

ILS RWY 33 (SA CAT I & II)
BANGOR INTL (BGR)

LOC/DME I-BGR	APP CRS	Rwy ldg 11440
109.5 Chan **32**	**330°**	TDZE **163** Apt Elev **192**

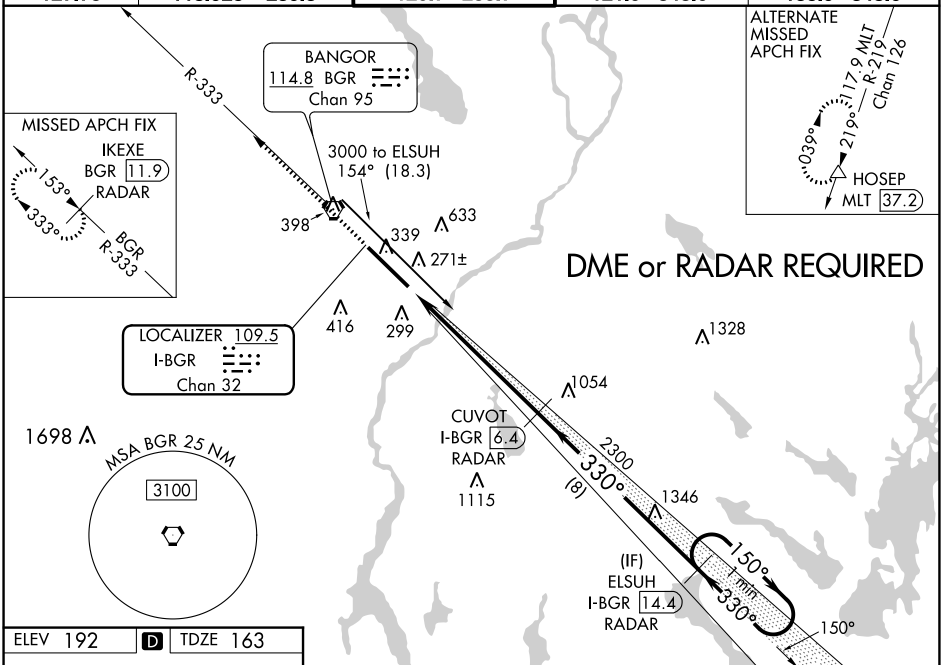
SA CAT I: Requires specific OPSPEC, MSPEC, or LOA approval and use of HUD to DH.
SA CAT II: Reduced lighting: requires specific OPSPEC, MSPEC, or LOA approval and use of Autoland or HUD to touchdown.

ASR

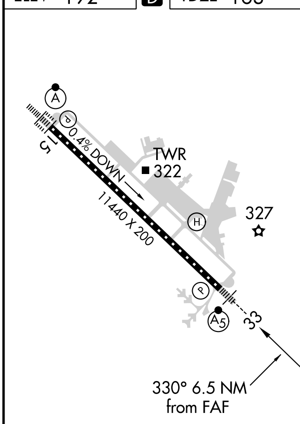
MALSR

MISSED APPROACH: Climb to 3000 on heading 330° and on BGR VORTAC R-333 to IKEXE/BGR VORTAC 11.9 DME/RADAR and hold.

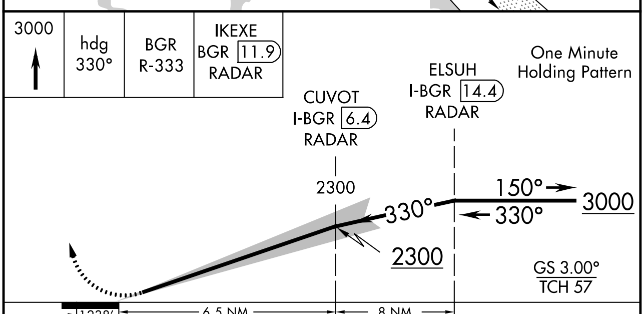
ATIS	BANGOR APP CON	BANGOR TOWER	GND CON	CLNC DEL
127.75	**118.925 239.3**	**120.7 233.7**	**121.9 348.6**	**135.9 348.6**



ELEV 192   D   TDZE 163



TDZ/CL Rwy 15
HIRL Rwy 15-33



CATEGORY	A	B	C	D	E
S-ILS 33	SA CAT I RA 173/14 150 DA 313				
S-ILS 33	SA CAT II RA 103/12 100 DA 263				

SA CATEGORY I & II ILS - SPECIAL AIRCREW & AIRCRAFT CERTIFICATION REQUIRED

NE-1, 23 MAR 2023 to 20 APR 2023

LOC/DME I-BGR **109.5** Chan **32**	APP CRS **330°**	Rwy ldg **11440** TDZE **163** Apt Elev **192**

ILS or LOC RWY 33
BANGOR INTL (BGR)

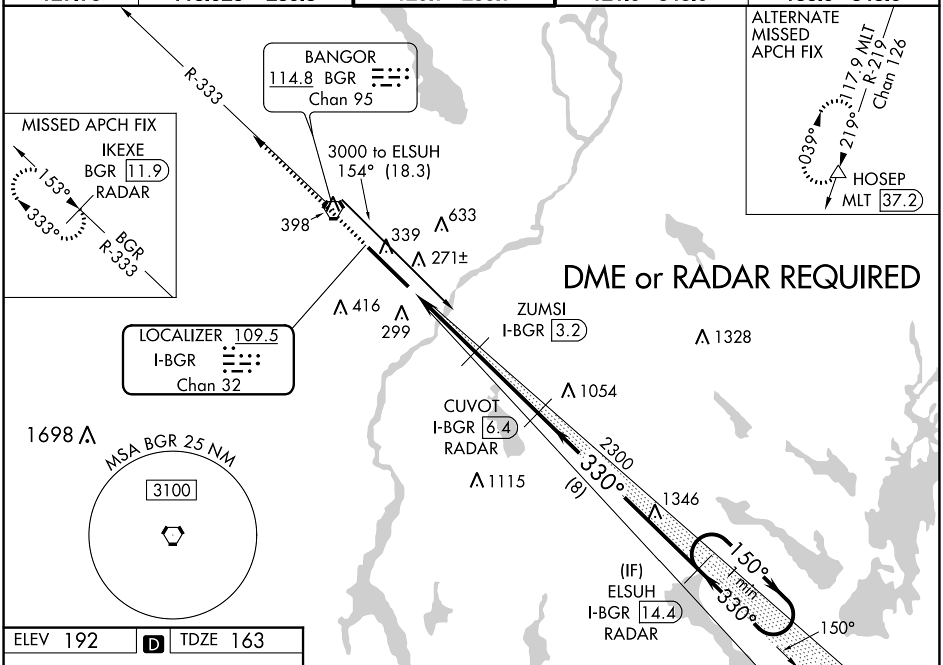
T A ASR

Inoperative table does not apply to S-LOC 33 Cats C/D/E. Circling NA NE of Rwy 15-33. DME or RADAR required. For inop ALS, increase Cat E S-ILS 33 visibility to RVR 4000. ZUMSI Minimums: For inop ALS, increase S-LOC 33 Cat E visibility to RVR 5000.
#RVR 1800 authorized with the use of FD or AP or HUD to DA.

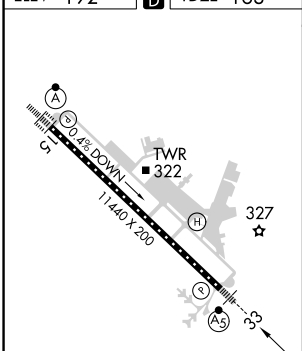
MALSR A5

MISSED APPROACH: Climb to 3000 on heading 330° and on BGR VORTAC R-333 to IKEXE/BGR VORTAC 11.9 DME/RADAR and hold.

ATIS	BANGOR APP CON	BANGOR TOWER	GND CON	CLNC DEL
127.75	118.925 239.3	120.7 233.7	121.9 348.6	135.9 348.6

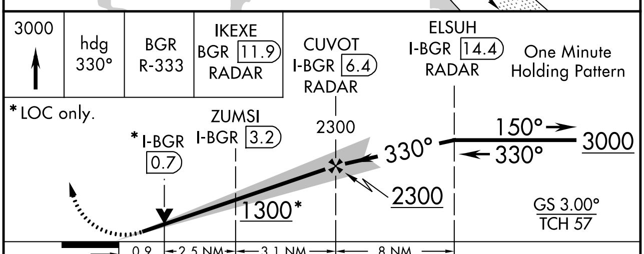


ELEV 192 D TDZE 163



330° 6.5 NM from FAF

TDZ/CL Rwy 15
HIRL Rwy 15-33



CATEGORY	A	B	C	D	E
S-ILS 33	#363/24 200 (200-½)				
S-LOC 33	1300/40 1137 (1200-¾)	1300/55 1137 (1200-1)	1300-3 1137 (1200-3)		
C CIRCLING	1300-1¼ 1108 (1200-1¼)	1300-1½ 1108 (1200-1½)	1300-3 1108 (1200-3)		
ZUMSI MINIMUMS					
S-LOC 33	500/24 337 (400-½)		500/26 337 (400-½)		
C CIRCLING	640-1 448 (500-1)	720-1 528 (600-1)	740-1½ 548 (600-1½)	820-2 628 (700-2)	880-2½ 688 (700-2½)

FAF to MAP 6.5 NM					
Knots	60	90	120	150	180
Min:Sec	6:30	4:20	3:15	2:36	2:10

NE-1, 23 MAR 2023 to 20 APR 2023

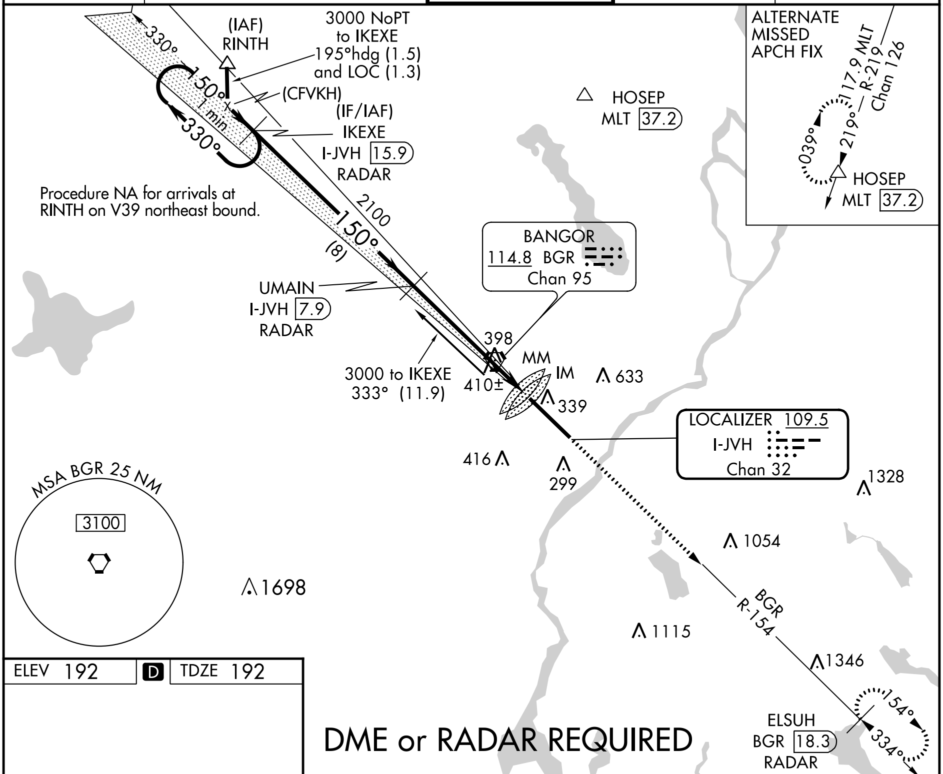
ILS Y RWY 15 (CAT II & III)

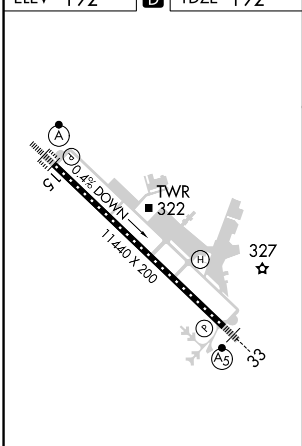
BANGOR INTL (BGR)

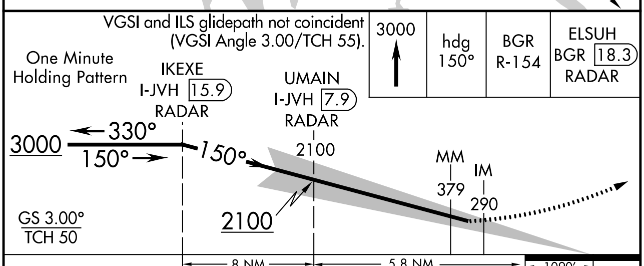
LOC/DME I-JVH 109.5 Chan 32	APP CRS 150°	Rwy ldg 11440 TDZE 192 Apt Elev 192

T A ASR	DME or RADAR required.	ALSF-2	MISSED APPROACH: Climb to 3000 on heading 150° and BGR VORTAC R-154 to ELSUH/BGR 18.3 DME/RADAR and hold.

ATIS	BANGOR APP CON	BANGOR TOWER	GND CON	CLNC DEL
127.75	118.925 239.3	120.7 233.7	121.9 348.6	135.9 348.6







CATEGORY	A	B	C	D
S-ILS 15	CAT II RA 113/12 100 DA 292			
S-ILS 15	CAT III RVR 06			

CATEGORY II & III ILS - SPECIAL AIRCREW & AIRCRAFT CERTIFICATION REQUIRED

NE-1, 23 MAR 2023 to 20 APR 2023

NE-1, 23 MAR 2023 to 20 APR 2023

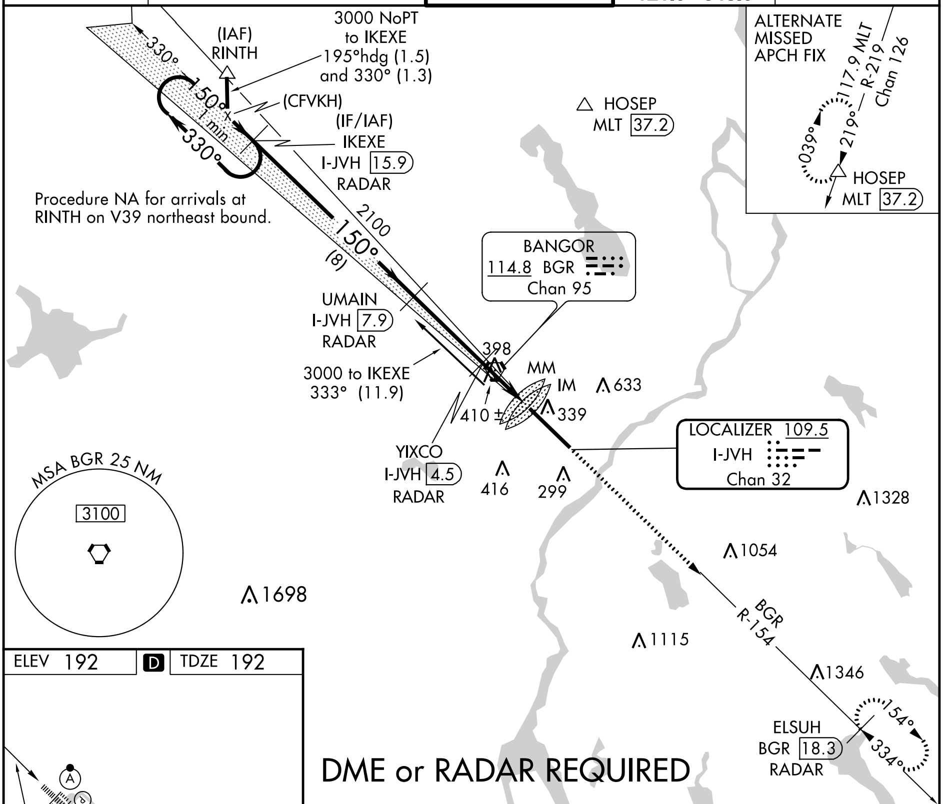
ILS Y or LOC Y RWY 15

BANGOR INTL (BGR)

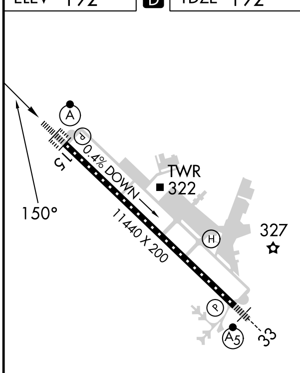
LOC/DME I-JVH 109.5 Chan 32	APP CRS 150°	Rwy Idg 11440 TDZE 192 Apt Elev 192

T A ASR	Circling NA NE of Rwy 15-33. DME or RADAR required. For inoperative ALS, increase S-ILS 15 Cat E visibility to RVR 4000, and S-LOC 15 Cat C/D/E visibility to 1⅜ SM.	ALSF-2 A	MISSED APPROACH: Climb to 3000 on heading 150° and BGR VORTAC R-154 to ELSUH/BGR 18.3 DME/RADAR and hold.

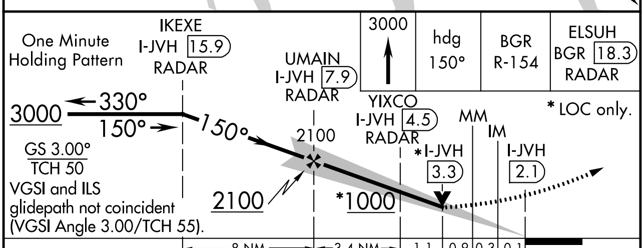
ATIS	BANGOR APP CON	BANGOR TOWER	GND CON	CLNC DEL
127.75	118.925 239.3	120.7 233.7	121.9 348.6	135.9 348.6



ELEV 192 D TDZE 192



TDZ/CL Rwy 15
HIRL Rwy 15-33



CATEGORY	A	B	C	D	E
S-ILS 15	392/18 200 (200-½)				
S-LOC 15	660/24 468 (500-½)		660/50 468 (500-1)		
C CIRCLING	660-1 468 (500-1)	720-1 528 (600-1)	740-1½ 548 (600-1½)	820-2 628 (700-2)	880-2½ 688 (700-2½)

FAF to MAP 5.8 NM

Knots	60	90	120	150	180
Min:Sec	5:48	3:52	2:54	2:19	1:56

NE-1, 23 MAR 2023 to 20 APR 2023

RNAV (GPS) RWY 15
BANGOR INTL (BGR)

WAAS CH 82307 W15A	APP CRS 150°	Rwy ldg 11440 TDZE 192 Apt Elev 192

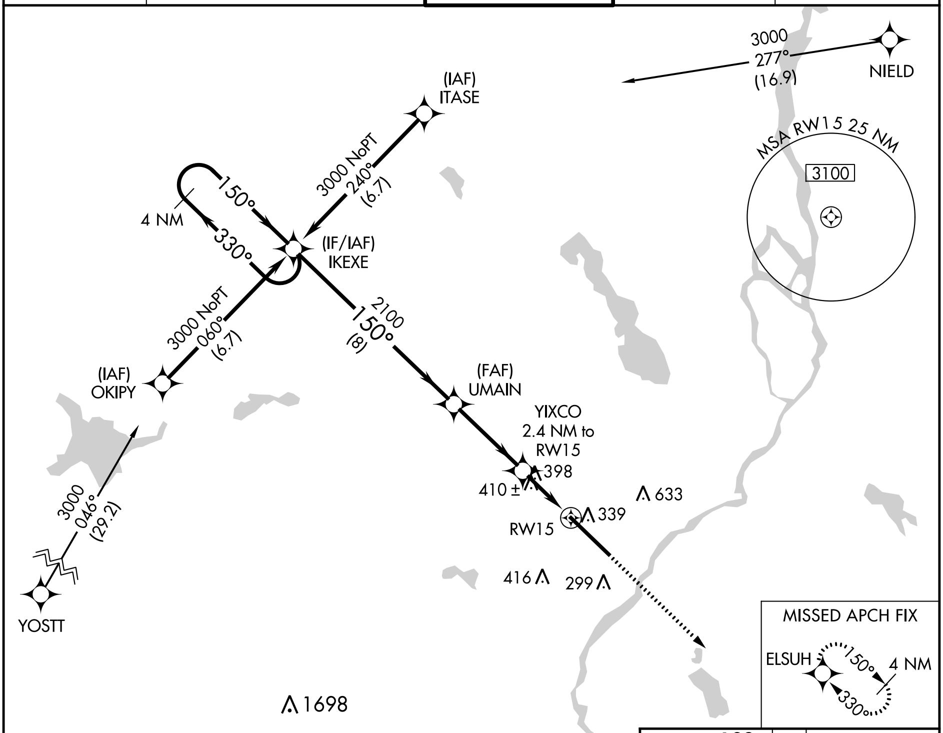
T A ASR

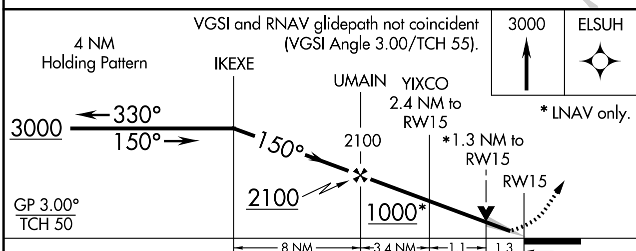
For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -19°C (-2°F) or above 54°C (130°F). DME/DME RNP-0.3 NA. For inoperative ALS, increase LPV Cat E visibility to RVR 4000, LNAV/VNAV all Cats visibility to RVR 6000, and LNAV Cats C/D/E visibility to 1⅜ SM. Circling NA NE of Rwy 15-33.

ALSF-2 (A)

MISSED APPROACH: Climb to 3000 direct ELSUH and hold.

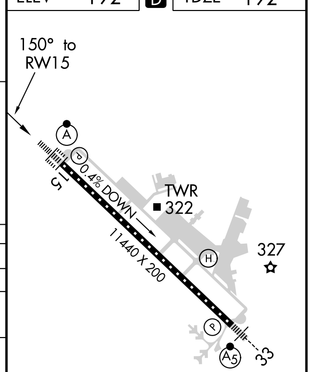
ATIS	BANGOR APP CON	BANGOR TOWER	GND CON	CLNC DEL
127.75	118.925 239.3	120.7 233.7	121.9 348.6	135.9 348.6





CATEGORY	A	B	C	D	E
LPV DA	392/24 200 (200-½)				
LNAV/ VNAV DA	541/40 349 (400-¾)				
LNAV MDA	660/24 468 (500-½)		660/50 468 (500-1)		
C CIRCLING	660-1 468 (500-1)	720-1 528 (600-1)	740-1½ 548 (600-1½)	820-2 628 (700-2)	880-2½ 688 (700-2½)

ELEV 192 D TDZE 192



TDZ/CL Rwy 15
HIRL Rwy 15-33

NE-1, 23 MAR 2023 to 20 APR 2023

RNAV (GPS) RWY 33

BANGOR INTL (BGR)

WAAS CH 78007 W33A	APP CRS 330°	Rwy ldg 11440 / TDZE 163 / Apt Elev 192

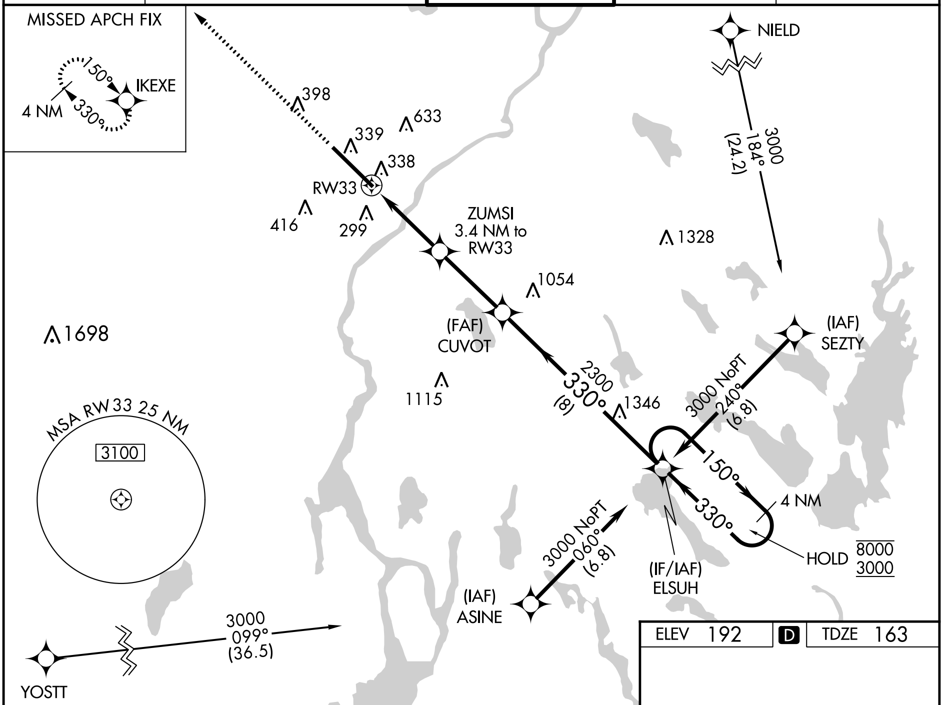
RNP APCH.

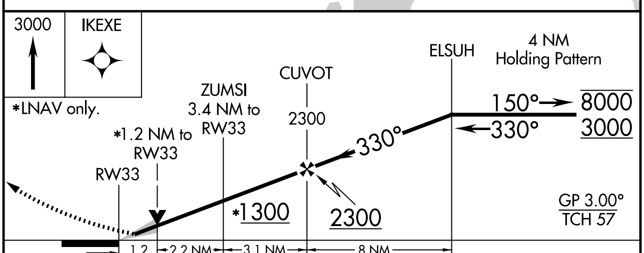
T A ASR Circling NA northeast of Rwys 15 and 33. For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -18°C or above 54°C. For inop ALS, increase LPV Cat E visibility to RVR 4000, LNAV/VNAV Cat E visibility to RVR 5500, and LNAV Cat E visibility to 1¼ SM.
**RVR 1800 authorized with use of FD or AP or HUD to DA.

MALSR A5

MISSED APPROACH: Climb to 3000 direct IKEXE and hold.

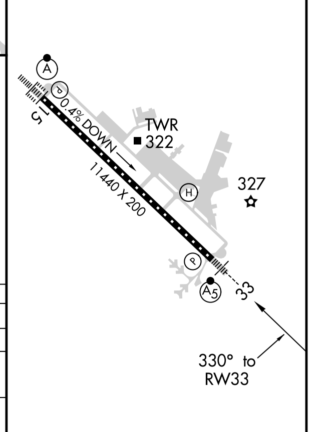
ATIS	BANGOR APP CON	BANGOR TOWER	GND CON	CLNC DEL
127.75	118.925 239.3	120.7 233.7	121.9 348.6	135.9 348.6





CATEGORY	A	B	C	D	E
LPV DA**	363/24 200 (200-½)				
LNAV/VNAV DA	519/30 356 (400-⅝)				
LNAV MDA	600/24 437 (500-½)		600/40 437 (500-¾)		
C CIRCLING	640-1 448 (500-1)	720-1 528 (600-1)	740-1½ 548 (600-1½)	820-2 628 (700-2)	880-2½ 688 (700-2½)

ELEV 192 D TDZE 163



TDZ/CL Rwy 15
HIRL Rwy 15-33

NE-1, 23 MAR 2023 to 20 APR 2023

INSTRUMENT APPROACH PROCEDURE CHARTS

IFR ALTERNATE AIRPORT MINIMUMS

Pilots must review the IFR Alternate Minimums Notes to determine alternate airport suitability.
NA designation on the approach chart means that pilots may not use that approach as an alternate due to unmonitored facility, absence of weather reporting service, or lack of adequate navigation coverage. Approaches with the NA designation are not listed in this section. designation on the approach chart indicates that the approach procedure has non-standard minimums (for aircraft other than helicopters) or restrictions (for all users) for its use as an alternate.

Alternate Minima (ref: 14 CFR 91.169)

	Precision Approach	Non-Precision Approach
Standard	**600-2**	**800-2**
Non-Standard or restrictions	As indicated below	As indicated below
Helicopters	For the selected approach: Ceiling: 200' above published ceiling Visibility: the greater of 1 SM visibility or the published visibility	
US Military (USA/USN/USAF)	See Service Regulations	

Note: For alternate airport flight planning purposes, precision approach operations include: ILS, PAR, and GLS, and Non-Precision approach operations include: NDB, VOR, LOC, TACAN, LDA, SDF, ASR, RNAV (GPS) and RNAV (RNP).

NAME ALTERNATE MINIMUMS

AUBURN/LEWISTON, ME

AUBURN/LEWISTON MUNI (LEW)........................**ILS or LOC Rwy 4**[1][3]
RNAV (GPS) Rwy 4[2]
RNAV (GPS) Rwy 22[3]

[1]LOC, Category C, 800-2½; Category D, 900-2¾.
[2]Category C, 800-2¼; Category D, 900-2¾;
[3]NA when local weather not available.

AUGUSTA, ME

AUGUSTA STATE (AUG)..........................**ILS or LOC Rwy 17**[1]
RNAV (GPS) Rwy 17[2]
RNAV (GPS) Rwy 35[2]
VOR Rwy 35[2]

NA when local weather not available.
[1]ILS, LOC, Category D, 900-2½.
[2]Category D, 900-2½.

NAME ALTERNATE MINIMUMS

BANGOR, ME

BANGOR INTL (BGR)..........**ILS or LOC Rwy 33**[1]
ILS Y or LOC Y Rwy 15[2]
RADAR-1[3]
RNAV (GPS) Rwy 15[3]
RNAV (GPS) Rwy 33[3]

[1]ILS, LOC, Categories A, B, 1200-2; Categories C, D, E, 1200-3.
[2]ILS, Category D, 700-2; Category E, 700-2½; LOC, Category E, 800-2½.
[3]Category E, 800-2½.

BAR HARBOR, ME

HANCOCK COUNTY/ BAR HARBOR (BHB)..........**ILS or LOC Rwy 22**[1]
RNAV (GPS) Rwy 4[2]
RNAV (GPS) Rwy 22[2]

[1]LOC, Category D, 800-2½.
[2]Category D, 800-2½.

BARRE-MONTPELIER, VT

EDWARD F KNAPP STATE (MPV)..........**RNAV (GPS) Rwy 17**

NA when local weather not available.
Categories A, B, 900-2; Category C, 1600-3; Category D, 1800-3.

AUBURN/LEWISTON, ME (CON'T)

AUBURN/LEWISTON MUNI (CON'T)

Rwy 22, trees beginning 3000' from DER, 501' right of centerline, up to 61' AGL/363' MSL.
Terrain 3890' from DER, 811' right of centerline, 375' MSL.
Trees beginning 4228' from DER, 1109' right of centerline, up to 95' AGL/439' MSL.
Tree 4971' from DER, 614' left of centerline, 58' AGL/414' MSL.
Tree 5547' from DER, 634' right of centerline, 60' AGL/428' MSL.
Rwy 35, trees, pole beginning 105' from DER, 9' left of centerline, up to 60' AGL/307' MSL.
Trees 129' from DER, 386' right of centerline, 60' AGL/300' MSL.
Trees, pole beginning 246' from DER, 14' right of centerline, up to 60' AGL/303' MSL.
Trees, pole beginning 869' from DER, 104' right of centerline, up to 72' AGL/312' MSL.
Tree 1877' from DER, 356' left of centerline, 104' AGL/344' MSL.

AUGUSTA, ME

AUGUSTA STATE (AUG)

TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES
AMDT 5 23FEB23 (23054) (FAA)

TAKEOFF MINIMUMS:
Rwy 8, 300-1⅛ or std. w/min. climb of 272' per NM to 600.
Rwy 17, 300-1⅛ or std. w/min. climb of 279' per NM to 600.
Rwy 26, 400-1⅞ or std. w/min. climb of 315' per NM to 700.

DEPARTURE PROCEDURE:
Rwy 26, climb on heading 260° to 800 before turning right.
Rwy 35, climb on heading 351° to 1000 before turning left.

TAKEOFF OBSTACLE NOTES:
Rwy 8, trees, fence, pole beginning 25' from DER, 48' right of centerline, up to 100' AGL/445' MSL.
Trees 117' from DER, 322' left of centerline, 100' AGL/442' MSL.
Trees beginning 310' from DER, 15' left of centerline, up to 100' AGL/445' MSL.
Tower 5173' from DER, 1866' left of centerline, 156' AGL/527' MSL.
Rwy 17, trees beginning 42' from DER, 5' right of centerline, up to 100' AGL/425' MSL.
Trees, poles, vehicle on road, building beginning 67' from DER, 51' left of centerline, up to 100' AGL/442' MSL.
Trees 3860' from DER, 1460' right of centerline, 100' AGL/448' MSL.
Trees beginning 4131' from DER, 1598' right of centerline, up to 100' AGL/481' MSL.
Rwy 26, pole 30' from DER, 258' right of centerline, 27' AGL/376' MSL.
Pole 34' from DER, 496' left of centerline, 30' AGL/379' MSL.
Trees beginning 50' from DER, 22' left of centerline, up to 100' AGL/442' MSL.
Trees beginning 100' from DER, 15' right of centerline, up to 100' AGL/442' MSL.
Trees beginning 2161' from DER, 47' left of centerline, up to 100' AGL/445' MSL.
Trees beginning 5821' from DER, 784' right of centerline, up to 100' AGL/501' MSL.
Tower 5819' from DER, 962' right of centerline, 186' AGL/573' MSL.
Tower 1.4 NM from DER, 1488' right of centerline, 180' AGL/665' MSL.
Tower 1.5 NM from DER, 1401' right of centerline, 199' AGL/658' MSL.

BANGOR, ME

BANGOR INTL (BGR)

TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES
AMDT 3 27APR17 (17117) (FAA)

TAKEOFF OBSTACLE NOTES:
Rwy 15, tree 1694' from DER, 868' left of centerline, 56' AGL/215'MSL.
Trees beginning 2436' from DER, 1116' left of centerline, up to 89' AGL/271' MSL.
Tree 3958' from DER, 1371' left of centerline, 87' AGL/278'MSL.

BAR HARBOR, ME

HANCOCK COUNTY/BAR HARBOR (BHB)

TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES
AMDT 4A 07MAR13 (21336) (FAA)

DEPARTURE PROCEDURE:
Rwy 17, climbing right turn via heading 220° to 2100 before proceeding on course.
Rwy 22, climb via heading 224° to 1100 before proceeding east or southeast bound.
Rwy 35, climb via heading 349° to 600 before proceeding on course.

TAKEOFF OBSTACLE NOTES:
Rwy 4, road 324' from DER, 524' left of centerline, 15' AGL/79' MSL.
Multiple trees beginning 119' from DER, 231' right of centerline, up to 60' AGL/193' MSL.
Rwy 17, bush 116' from DER, 164' left of centerline, 10' AGL/47' MSL.
Tree 245' from DER, 346' right of centerline, 44' AGL/82' MSL.
Rwy 22, multiple poles and trees beginning 562' from DER, 329' left of centerline, up to 60' AGL/135' MSL.
Terrain, multiple poles and trees beginning 450' left of DER, up to 60' AGL/142' MSL.
Power lines beginning 626' from DER, 359' right of centerline, 35' AGL/103' MSL.
Rwy 35, terrain and multiple trees beginning 35' from DER, 340' left of centerline, up to 60' AGL/217' MSL.
Glideslope antenna and multiple trees beginning 657' from DER, 565' right of centerline up to 60' AGL/146' MSL.

Appendix G Pavement Condition Index (PCI) Study

2020 Bangor International Airport Pavement Management Program

Document no: E2X42727-BGR-2020-PMP-0001
Revision no: 1.0

Bangor International Airport

Pavement Management Program
March 16, 2023

Jacobs

2020 Bangor International Airport Pavement Management Program

Client name:	Bangor International Airport		
Project name:	Pavement Management Program		
Client reference:		Project no:	E2X42727
Document no:	E2X42727-BGR-2020-PMP-0001	Project manager:	Heath Marsden
Revision no:	1.0	Prepared by:	Jonathan Lim
Date:	March 16, 2023		

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
1.0	Mar 23	Issued For Review	JL	EC		

Distribution of copies

Revision	Issue approved	Date issued	Issued to	Comments

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EXECUTIVE SUMMARY

Background

To help develop an Airport Pavement Management Program (PMP) for Bangor International Airport (BGR), the City of Bangor retained Jacobs Engineering Group Inc. to provide pavement inspection and pavement evaluation services at BGR.

A primary objective of an ongoing pavement evaluation and management program is to determine Maintenance and Rehabilitation (M&R) Capital Improvement needs by comparing the existing pavement condition to a benchmark called the Critical Pavement Condition Index (PCI). The Critical PCI values used to trigger rehabilitation, expressed on a scale of 0 to 100, are designated as 70 by BGR.

The results of the pavement evaluation study are documented in the following report which contains a description of work, the pavement evaluation results, and project recommendations. The appendices include PAVER performance models, PCI data, M&R plans for stop gap scenario, unlimited budget scenario and localized maintenance plans.

Existing Pavement Conditions

The 2020 surveyed area-weighted average Section PCI value is 68. The Critical PCI value for all segments are set at 70.

- Runway has a weighted average PCI of 65;
- Taxiway has a weighted average PCI of 64;
- Apron has a weighted average PCI of 73;
- Shoulder has a weighted average PCI of 63;
- Helipad has a weighted average PCI of 47.

Capital Improvement Program

Two work plans were developed via PAVER, a 10-year no capital intervention outlook and a 10-year unlimited budget outlook. The table below summarizes the 10-year unlimited budget M&R for airside pavement improvements. Without significant investment in the pavement infrastructure, the current overall (area-weighted) airside PCI of 68 is projected to drop to 41 after 10 years. The 10-year unlimited budget plan will increase the overall network weighted average PCI to 83 in 2030. The estimated cost for an unlimited budget plan through 2030 is approximately $135.3 million, at the time of analysis in 2021. The estimate does not account for inflation.

Table 1-1: 10 Year Unlimited Budget

Project Year	Calendar Year	Amount
1	2021	$103,284,400.13
2	2022	$2,608,375.00
3	2023	$13,434,556.05
4	2024	$0.00
5	2025	$6,332,354.90
6	2026	$215,660.95
7	2027	$0.00
8	2028	$0.00
9	2029	$192,510.00
10	2030	$9,279,026.45
	Total	**$135,346,883.49**

Contents

Appendices

1. INTRODUCTION

As part of a contract to provide Professional Civil Engineering Task Order Services to the city of Bangor, Jacobs Engineering Group Inc. (Jacobs) was awarded the 2020 Bangor International Airport (BGR) Pavement Condition Index (PCI) and Pavement Management Program (PMP) at Bangor International Airport (BGR).

The objective of this project is to evaluate existing airside pavement condition and update the PAVER inventory and network definition. Then analyze the condition of the pavement network as part of the PMP. Once analyzed, a 10-Year Capital Improvement Plan (CIP) for the airside pavement network will be developed. The recommended 10-Year CIP will be based primarily on the pavement condition and the pavement's "need" to receive maintenance and rehabilitation over the 10-year assessment period. An unlimited budget scenario is used to estimate the impact on overall pavement condition. Figure 1.1 graphically outlines the M&R development process.

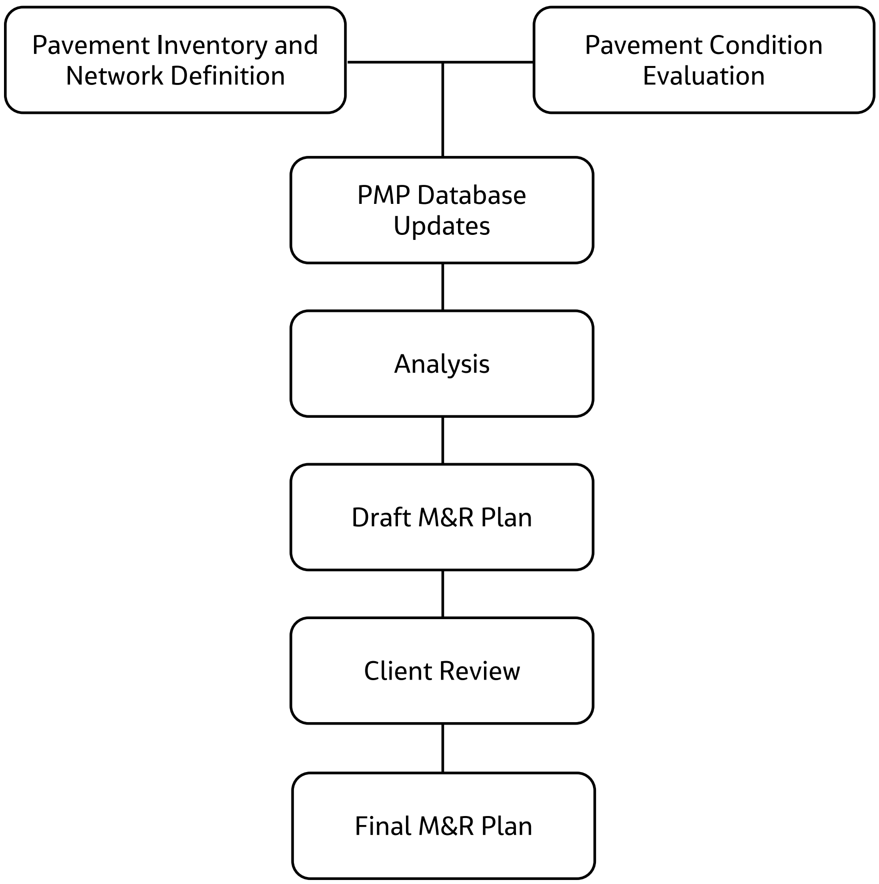


Figure 1.1: Development of the 10 Year M&R Plan

2. PAVEMENT INVENTORY AND NETWORK DEFINITION

The pavement inventory is used to create the initial network and to also plan the field inspection activities. The pavements within the system are defined in the PAVER database in terms of manageable units that help to organize the data into similar groups in accordance with ASTM D5340-20, Standard Test Method for Airport Pavement Condition Index Surveys. An organizational hierarchy is used to establish these units. The pavement network is subdivided into separate Branches with varying uses. Branches are then divided into Sections with similar pavement performance that have similar pavement section attributes. Sections are manageable units used to organize the data collection and are treated separately during the maintenance and rehabilitation planning stage.

Initial sectioning is performed based on areas of differing traffic characteristics, pavement structure, condition, importance or rank, and physical breaks in geometric alignment, recognizing that these attributes may impact pavement performance. As the systems inventory changes either by rehabilitation activities, realignment or adding features, the Sections are reviewed and updated as appropriate.

Updates to the BGR PMP pavement inventory have been made for the 2020 project. Figure 2.1 illustrates the construction contract review and PMP update process performed at BGR. Going forward, database updates from the construction contract review will be critical to the PMP analysis. The analysis output is a function of the quality of the data, and thus it is important to update the database with any changes to pavement sections due to construction activities.

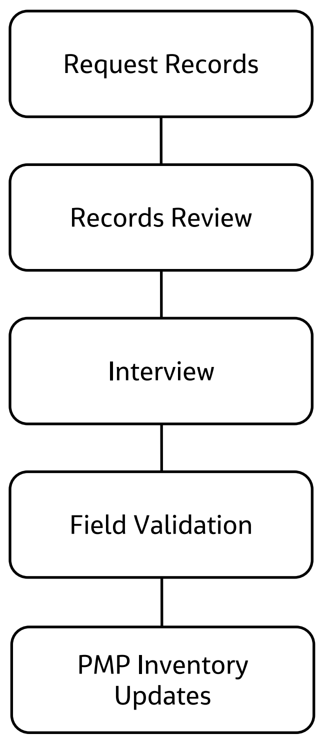


Figure 2.1: Update Pavement Construction Activities

The construction, rehabilitation and maintenance activities performed at BGR include:

(1) New construction associated with airport expansion,

(2) Pavement rehabilitation activities such as milling and placement of an overlay or reconstruction,

(3) Maintenance activities such as patching, sealing of cracks and joints, slab replacement and placing an overlay patch for a limited distance within a PMP Section to repair localized distress. Removal of pavements also occurred.

The new construction was reviewed and incorporated into the PMP. Likewise, the pavement rehabilitation and maintenance activities, referred to within this report as maintenance and rehabilitation (M&R), were identified during pavement inspections. These areas were identified by the improved pavement condition and reduced distress data since the 2014 PMP.

The construction or record drawings of the new pavements and M&R activities were provided by the BGR. The list of projects and rehabilitation projects received are listed in Table 2-1and provides a description of the pavement work, observations from the field review, and the status of the PMP database update.

Like the M&R activities, pavements receiving maintenance or removal since the 2014 PMP were identified during pavement inspections. These areas, identified by the improved pavement condition and reduced distress data, include maintenance activities noted in item 3 above. Table 2-2 provides details of the airside maintenance activities performed since 2014.

Table 2-1: New Construction Contract Summary

Contract	Contract Name/Description	Contract Year	Description of Work	Affected APMS Sections	Field Review Comments	Database Update Status
A.I.P. No. 3-23-0005-066-2015	Rehabilitate A Portion of Taxiway A	2015	Mill 6" HMA and replace. Reconstruct shoulders. From TW M approximately 1,560' east	TWA-150	N/A	Updated 2020
A.I.P. No. 3-23-0005-066-2015	Rehabilitate Dock Area Taxilane	2015	Mill 5" of PCC and replace with HMA & reconstruct shoulders	AD10-40	N/A	Updated 2020
A.I.P. No. 3-23-0005-066-2015	Reconstruct and Narrow Taxiway N Shoulders	2015	Remove existing shoulders and reconstruct 30' wide 3" HMA on 9" reclaimed base	TWNS-20	N/A	Updated 2020
A.I.P. No. 3-23-0005-067-2015	Reconstruct GA Apron – Southern Entrance	2015	Remove existing pavement and replace 8" of P-209 place 4" HMA	AGA-240	N/A	Updated 2020
A.I.P. No. 3-23-0005-067-2015	Gate 4 & 5 Trench drain	2015	Replace 197' wide by 475'section of PCC pavement and trench drain	AGA-300	N/A	Updated 2020
A.I.P. No. 3-23-0005-072-2018	Reconstruct Taxiway A (South End) And Remove Taxiway J	2018	Remove existing pavement and replace with 8" P-209 and 5" HMA from TW L east to RW 33	TWAS-120	N/A	Updated 2020
AIP # 3-23-0005-073-2019	Rehabilitate Taxiway A (North End)	2019	Mill about 700' of TW A at the 15-end mill existing asphalt and replace with 5" of HMA on PCC	TWA-140	N/A	Updated 2020
AIP # 3-23-0005-079-2021	Taxiway A Shoulders	2021	Reconstruct about 1,680' of shoulder west of TW M	TWAS-10	N/A	Updated 2020

Table 2-2: Maintenance Activities Summary

Feature	Affected APMS Sections	Maintenance Activity	Year Completed
Dock 10 2015	AD10-40	5″ P-401 ±8″ PCC Existing Gravel Base	2015
GA South Entrance 2015	AGA-240	4″ P-401 8″ P-209 Subbase Course	2015
TD Replacement 2015	AGA-300	14″ PCC 8″ P-209 P-154	2015
Taxiway A North 1 2019	TWA-130	4.5″ – 7.5″ P-401 ±11″ Bituminous Concrete Pavement ±5″ Base Course ±29″ Subbase Course	2019
Taxiway A North 2 2019	TWA-140	4.5″ – 7.5″ P-401 ±14″ PCC (Cracked and Seated) ±5″ Base Course ±29″ Subbase Course	2019
Taxiway A Center 1 2015	TWA-150	6″ P-401 ±12″ Bituminous Concrete Pavement ±6″ P-209	2015
Taxiway A Center 2 2015	TWA-160	6″ P-401 Existing Bituminous Concrete Pavement Existing Gravel Base Course	2015
Taxiway A South 1 2018	TWA-170	5″ P-401 5″ P-403 8″ P-209 5-15″ P-154 ±38″ Existing Gravel Fill	2018
Taxiway A South 2 2018	TWA-180	5″ P-401 ±1″ Bituminous Concrete Pavement 13-16″ PCC	2018
Taxiway A North Shoulder 2 2019	TWAS-100	4″ P-403 ±9″ Bituminous Concrete Pavement ±9: Base Course	2019
Taxiway A Center Shoulders 2015	TWAS-110	3″ P-403 Shim P-209 6″ Existing Base Course	2015
Taxiway A South Shoulders 1 2018	TWAS-120	4″ P-403 Shim P-209 6″ Existing Base Course	2018
Taxiway A North Shoulders 1 2019	TWAS-90	4″ P-403 Shim P-209 ±16″ Existing Base Course	2019
Taxiway N Shoulders 2015	TWNS-20	3″ P-401 9″ M-006 Reclaimed Base Course	2015

Appendix A summarizes the work history of the pavements by Section. Appendix B provides the updated network definition map of the airside network.

Figure 2.2 illustrates the breakdown of the airside pavements at BGR by pavement structure. AAC represents an asphalt concrete overlay over an asphalt concrete pavement, AC is an asphalt concrete pavement structure, ACR represents asphalt concrete reclamation, APC represents an asphalt concrete overlay over a PCC pavement, and PCC describes Portland cement concrete pavement structures.

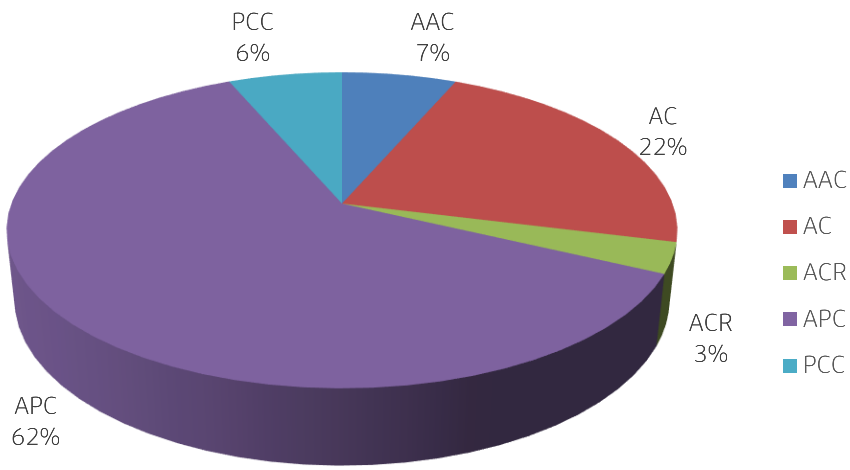


Figure 2.2: Percentage of Pavement by Structure

Table 2-3 provides the distribution of pavement Sections at BGR broken down by Branch and pavement type.

Table 2-3: Number of Sections by Branch and Pavement Type

Branch Type	Pavement Type					Totals
	AAC	AC	ACR	APC	PCC	
RUNWAY	0	1	1	5	0	**7**
TAXIWAY	3	6	0	14	0	**23**
APRON	2	7	0	9	12	**30**
SHOULDER-AF	0	4	1	3	0	**8**
HELIPAD	0	0	0	0	1	**1**
All	**5**	**18**	**2**	**31**	**13**	**69**

The breakdown of pavement areas evaluated for each branch type is provided in Table 2-4.

Table 2-4: Pavement Area by Feature Evaluated

Branch Type	Area Evaluated, SF	Percentage, %
RUNWAY	2,889,099	27.3%
TAXIWAY	1,631,069	15.4%
APRON	4,348,893	41.0%
SHOULDER-AF	1,716,556	16.2%
HELIPAD	10,000	0.1%
Grand Total	**10,595,617**	**100.0%**

Table 2-5 summarizes the total number of sections and pavement area by pavement age category.

Table 2-5: Sections Categorized by Use and Age

Age Category, Years	Number of Sections					Total Area, SF	Percentage, %
	RUNWAY	TAXIWAY	APRON	SHOULDER-AF	HELIPAD		
0-5	0	7	1	1	0	986,448	9.31%
6-10	0	0	8	0	0	1,090,992	10.30%
11-15	0	0	8	0	0	950,762	8.97%
16-20	6	7	7	4	0	5,362,354	50.61%
21-25	1	4	2	2	0	1,251,270	11.81%
Over 25	0	4	4	1	1	949,363	8.96%
Unknown	0	1	0	0	0	4,428	0.04%
Grand Total	7	23	30	8	1	10,595,617	100%

3. PAVEMENT CONDITION INSPECTIONS

The development of the pavement inspection plan and the survey results are discussed in this section.

3.1 DEVELOPMENT OF PAVEMENT INSPECTION PLAN

In 2020 Jacobs evaluated the airside pavement network. The scope of inspections included runway, taxiways, aprons, shoulders, and helipad within the airside operations area. Jacobs prepared an inspection plan for 2020 by considering BGR operations to minimize impacts to BGR.

Airside pavements with high aircraft traffic during the day were scheduled to be inspected during night time hours while lower traffic areas were scheduled for normal daytime inspections.

3.2 PAVEMENT INSPECTIONS

The scope of inspections in the airside pavement network included: runway, taxiways, aprons, shoulders and helipad.

The pavement inspections were performed in accordance with the methods outlined in FAA AC 150/5380-6C and ASTM D5340-20 "Standard Practice for Airport Pavement Condition Surveys" for runway, taxiways, aprons, shoulders and helipad. These procedures identify distress type, distress severity, and distress quantity for sample areas within each section that were used to determine the Pavement Condition Index (PCI) of each pavement section.

The inspection of all areas requires considerable effort. Therefore sections are broken into Sample Units as established in FAA AC 150/5380-7B and ASTM D5340-20. Sample Unit sizes are approximately 5000 ± 2000 square feet for AC-surfaced airfield pavements and 20 ± 8 slabs for PCC-surfaced pavements. A Sampling Plan is developed whereby a detailed distress survey is established on a subset of the Sample Units in order to achieve a statistically accurate representation of the pavement condition. The sampling interval used at BGR is provided in Table 3-1.

Table 3-1: Sampling Rate for Condition Surveys

PCC Pavements		**AC Pavements**	
N	**n**	**N**	**n**
1-3	All	1	1
4	3	2-3	2
5-7	4	4-9	3
8-10	5	10-40	4
11-16	6	>40	10%, but ≤17
17-28	7		
29-64	8		
65-89	9		
90	10%, but≤32		

Where *N = total number of sample units in section*
n = number of sample units to inspect

The Sample Units to inspect are determined by a systematic random sampling technique. The locations are determined such that they are distributed evenly throughout the Section. While the sampling technique is random, the survey of Sample Units from cycle-to-cycle is repeated so that direct comparisons with prior inspections can be made, providing a direct assessment of individual Sample Units. The Sample Units surveyed in 2020 are indicated on the network definition map in Appendix B.

PCI values range from 0 to 100, with 0 representing 'Failed' pavement and 100 being considered 'Good' pavement. Table 3-2 illustrates the PCI scale for BGR Sections.

Table 3-2: PCI Rating Scale

PCI Range	PCI Rating	Pavement Area, SF	Pavement Area, %
86-100	Good	1,859,662	18%
71-85	Satisfactory	1,742,834	16%
56-70	Fair	4,640,328	44%
41-55	Poor	1,616,418	15%
26-40	Very Poor	645,788	6%
11-25	Serious	90,587	1%
0-10	Failed	0	0%

Despite the condition ranges shown in Table 3-2, the rehabilitation required for a given pavement is based on a pavement's Branch-type and "critical condition." AC 150/5380-7B identifies the "critical condition" as the point in which a pavement begins to rapidly deteriorate and rehabilitation is triggered. Establishing a critical PCI as the target PCI implies that it is more economical to maintain pavement above, rather than below a PCI value, thus defining the critical PCI. The critical PCI for specific pavement types at BGR are as follows:

- Runway, taxiways, aprons, shoulders and helipad = 70

The pavement inspections were completed on 04/11/2020. Data was recorded in the field using GPS-based tablets with GIS software. Each pavement distress was entered into the software, which consisted of a detailed airport-wide pavement map with pre-entered Branches, Sections and Sample Units. The collection of all pavement distresses simplified data handling and management. Quality control checks included surveying overlapping Sample Units between inspectors to check for variance and comparison to prior survey data results both in the field and in the office by the inspection team supervisor. Appendix C includes detailed distress data in the "Re-Inspection Reports" for individual Sample Units.

3.3 SURVEY RESULTS

The distress data collected from the inspections was electronically updated in the PAVER software database and the PCI was calculated. The PCI data from the surveys is shown in this section and several appendices of this report.

The overall area-weighted PCI for the airside pavement is 68. The PCI represents the 2020 condition of the evaluated runway, taxiways, aprons, shoulder and helipad within the airside limits. Table 3-3 illustrates the area-weighted PCI and area-weighted age computed individually for the five branch types, and a distribution by PCI rating for the network is provided in Figure 3.1.

Table 3-3: Condition Summary by Branch Type

Branch Type	Area Weighted PCI	Area Weighted Age
RUNWAY	65	18.3
TAXIWAY	64	14.2
APRON	73	16.3
SHOULDER-AF	63	16.9
HELIPAD	47	65.0

Figure 3.1 illustrates the breakdown of PCI by PCI range for the various pavement types: runway, taxiways, aprons, shoulders and helipad.

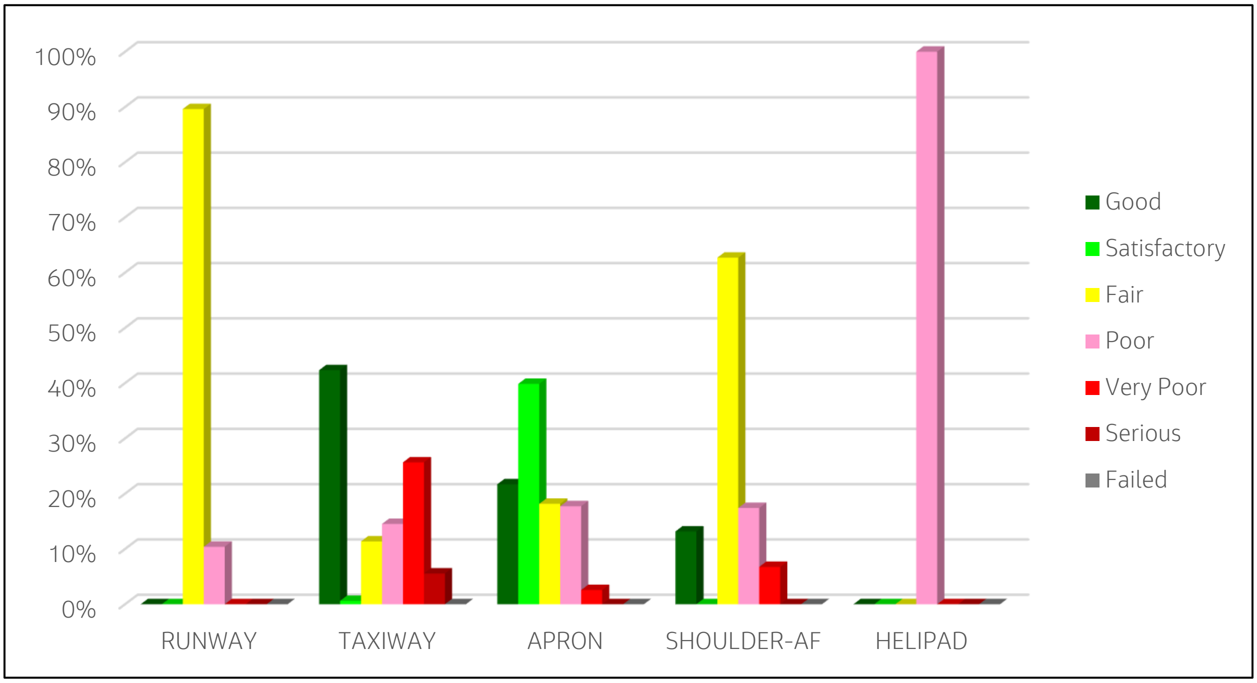


Figure 3.1: Percentage of Network within Each PCI Range by Branch Type

Additional area-weighted PCI data by Branch is shown in Appendix D. Appendix E contains a PCI map of the network definition.

A listing of Sections with a PCI lower than the critical PCI is provided in Appendix F. The critical PCI is the PCI at which rehabilitation is triggered. Sections with a PCI value greater than the critical PCI do not appear on this list, but as their condition deteriorates in the future they will require rehabilitation. Please note that Appendix F does not represent a future maintenance and rehabilitation plan.

4. PAVEMENT MANAGEMENT CUSTOMIZATION

The PMP can be used to generate M&R needs over a specified time period. The airside M&R was developed for runway, taxiways, aprons, shoulders and helipad at BGR. In addition to information regarding the airside pavement network and their conditions, the inputs required are PCI performance models to forecast future conditions, M&R treatment policies and M&R activities and costs. The following report sections describe these inputs.

4.1 PERFORMANCE MODEL SUMMARY

Performance prediction models or deterioration curves for PCI are used in the M&R needs analysis process. Pavement performance is modelled over time such that when the predicted performance is assessed in conjunction with a target PCI, a recommendation as to the appropriate M&R activity and associated timing for each pavement section is provided. The PCI performance models within PMP reflect pavement condition of airside pavements at BGR.

Two (2) pavement performance models were selected for use in the BGR airside PMP, as shown in Table 4-1. Appendix G provides further information for each model used in developing the M&R, including the data points, regression curve and coefficients and various statistics. Sections future performance is predicted by the models in PAVER based on the current PCI value, the age of the pavement, and how PCI will continue to degrade along the curve relative to the Sections age.

Table 4-1: PCI Performance Model Equations

Pavement Type	Performance Model Equation*
AC, ACR, APC	$PCI = 100 - 1.64717590808868\ X - 0.023277597501874\ X^2$
PCC	$PCI = 100 - 7.94033269357897E\text{-}07\ X - 0.113473825156689\ X^2$

*'X' = pavement age

Note: Models are grouped based on common distress characteristics, surface material, and similarities in how the pavement ages over time. In any instance where an inadequate number of sample units are available to create a viable statistical model, pavement types are grouped to create a performance model that provides information of confidence.

4.2 M&R POLICIES AND ACTIVITIES

The M&R treatment policies and activities for BGR currently within the PMP is identified in Table 4-2.

Table 4-2: Major M&R Unit Costs

PCI Range	Concrete Pavement Rehabilitation Activity	2021 Unit Cost, Concrete	Asphalt Pavement Rehabilitation Activity	2021 Unit Cost, Asphalt
0-40	Complete Reconstruction, Concrete	\$35/SF (\$315/SY)	Complete Reconstruction, Asphalt	\$20.00/SF (\$180/SY)
41-50	10% Slab Replacement	\$45/SF (\$405/SY)	Mill and Overlay with 10% pre-overlay repairs	\$15/SF (\$135/SY)
51-60	5% Slab Replacement	\$50/SF (\$450/SY)	Mill and Overlay with 5% pre-overlay repairs	\$14.11/SF (\$127/SY)
61-Critical PCI	N/A	N/A	Mill and Overlay	\$13.55/SF (\$122/SY)

Localized maintenance activities are provided only for Year 1 of the plan and are in Appendix K. The maintenance activities are performed to repair areas of localized distress. Table 4-3 provides the localized maintenance activities recommended for specific distress on asphalt pavement and Table 4-4 provides the localized maintenance activities for concrete surfaced pavement.

Table 4-3: Localized Maintenance Activities for Asphalt Pavements

Distress Type	Severity Level	Maintenance Action
Alligator Cracking	Low	Monitor
	Medium	Patching - Asphalt Full Depth
	High	Patching - Asphalt Full Depth
Bleeding	N/A	Monitor
Block Cracking	Low	Monitor
	Medium	Crack Sealing - Asphalt
	High	Crack Sealing - Asphalt
Corrugation	Low	Monitor
	Medium	Patching - Asphalt Partial Depth
	High	Patching - Asphalt Partial Depth
Depression	Low	Monitor
	Medium	Patching - Asphalt Partial Depth
	High	Patching - Asphalt Full Depth
Jet Blast	N/A	Monitor
Joint Reflection Cracking	Low	Monitor
	Medium	Crack Sealing - Asphalt
	High	Crack Sealing - Asphalt
Longitudinal and Transverse Cracking	Low	Monitor
	Medium	Crack Sealing - Asphalt
	High	Crack Sealing - Asphalt
Oil Spillage	N/A	Patching - Asphalt Partial Depth
Patching	Low	Monitor
	Medium	Patching - Asphalt Full Depth
	High	Patching - Asphalt Full Depth
Polished Aggregate	N/A	Monitor
Raveling	Low	Monitor
	Medium	Monitor
	High	Patching - Asphalt Partial Depth
Rutting	Low	Monitor
	Medium	Patching - Asphalt Full Depth
	High	Patching - Asphalt Full Depth
Shoving	Low	Monitor
	Medium	Surface Milling or Patching
	High	Patching - Asphalt Full Depth
Slippage Cracking	N/A	Patching - Asphalt Full Depth
Swelling	Low	Monitor
	Medium	Patching - Asphalt Full Depth

Distress Type	Severity Level	Maintenance Action
	High	Patching - Asphalt Full Depth
Weathering	Low	Monitor
	Medium	Monitor
	High	Monitor

Table 4-4: Localized Maintenance Activities for Concrete Pavements

Distress Type	Severity Level	Maintenance Action
Alkali Silica Reaction (ASR)	Low	Monitor
	Medium	Patching - Concrete Partial Depth
	High	Slab Replacement
Blow-Up	Low	Patching - Concrete Full Depth
	Medium	Patching - Concrete Full Depth
	High	Slab Replacement
Corner Break	Low	Monitor
	Medium	Crack Sealing - Concrete
	High	Patching - Concrete Full Depth
Linear Cracking	Low	Monitor
	Medium	Crack Sealing - Concrete
	High	Patching - Concrete Full Depth
Durability Cracking	Low	Monitor
	Medium	Patching - Concrete Full Depth
	High	Slab Replacement
Joint Seal Damage	Low	Monitor
	Medium	Joint Seal
	High	Joint Seal
Patching, Small	Low	Monitor
	Medium	Patching - Concrete Partial Depth
	High	Patching - Concrete Partial Depth
Patching, Large	Low	Monitor
	Medium	Patching - Concrete Full Depth
	High	Patching - Concrete Full Depth
Popouts	N/A	Monitor
Pumping	N/A	Monitor
Scaling	Low	Monitor
	Medium	Patching - Concrete Partial Depth
	High	Slab Replacement
Settlement/Faulting	Low	Monitor
	Medium	Grinding
	High	Grinding

Distress Type	Severity Level	Maintenance Action
Shattered Slab	Low	Monitor
	Medium	Crack Sealing - Concrete
	High	Slab Replacement
Shrinkage Cracking	N/A	Monitor
Spalling (Joint and Corner)	Low	Monitor
	Medium	Patching - Concrete Partial Depth
	High	Patching - Concrete Partial Depth

4.3 COSTS

The M&R costs were reviewed and updated in 2021 based on a joint effort between Jacobs and BGR using the most recently available cost data for construction and maintenance activities either recently completed or currently under contract with BGR. Table 4-2 provides the component costs for major M&R rehabilitation activities that were used to develop the costs in the treatment policy matrix. When developing costs for each year of the M&R, historical pricing data was used.

Localized maintenance activities are provided only for Year 1 of the plan and are in Appendix K. The unit costs from Table 4-5 are used for developing the maintenance costs.

The costs are for planning purposes only and reflect costs for pavement considerations within the manoeuvring area only. They do not include pavement grooving, mobilization, phasing, airport impacts, project design and implementation costs, user costs, or any other elements of the infrastructure such as lighting, electrical, signage, markings, etc.

Table 4-5: Unit Costs for Localized Maintenance

Maintenance Action	2021 Unit Cost
Patching - Asphalt Partial Depth	$10/SF
Patching - Asphalt Full Depth	$25/SF
Crack Sealing - Asphalt	$4/LF
Crack Sealing - Concrete	$4/LF
Joint Seal (Localized)	$4/LF
Grinding (Concrete, Localized)	$30/SF
Patching - Concrete Partial Depth	$40/SF
Patching - Concrete Full Depth	$80/SF
Slab Replacement - Concrete	$45/SF
Profile Milling/Surface Milling 1/4" to 1" (large quantity)	$0.75/SF

5. 10-YEAR MAINTENANCE AND REHABILITATION (M&R) PLAN

Based on the BGR's need to establish a M&R plan for the pavement network, the 10-Year Airside M&R Plan was developed for runway, taxiways, aprons, shoulders and helipad at BGR.

The condition data collected in 2020 and updated in the PMP were used to develop the 10-Year M&R Plan. In developing the M&R Plan, the data was analyzed under different fiscal scenarios. The analysis was analyzed for two extremes to provide a baseline for comparison purposes. This included a minimal funding "Stop Gap" scenario, which provides for only maintenance to keep the pavement in serviceable condition and an unlimited budget scenario which provides for M&R to be applied as functional condition reaches the condition limits within the treatment matrix. The following scenarios were analyzed to determine the impact on the network condition:

1. "Stop Gap" – maintenance to keep pavements serviceable only by patching, crack sealing, and joint sealing. No major M&R activities.

2. Unlimited Budget – M&R activities on pavements as they reach the PCI critical values provided in the treatment policy matrix in Section 4.2.

Figure 5.1 provides the impact on network PCI based on the two scenarios analyzed.

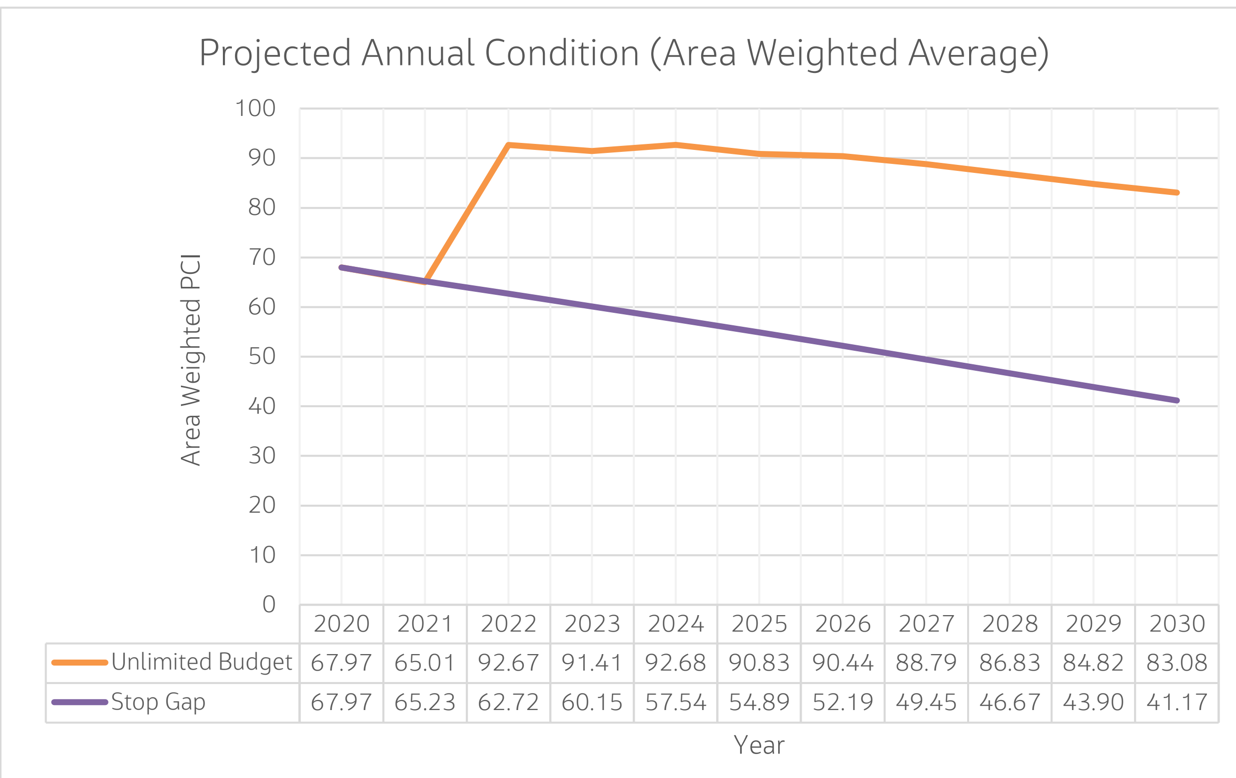


Figure 5.1: Budget Scenario Analysis

From the figure above, the PCI will deteriorate from 68 to 41 in ten years if no funds are allocated to the M&R plan, and it will increase from 68 to 83 under the unlimited budget scenario. The unlimited budget scenario shows an initial increase in PCI from 68 to 93 due to the influx of major capital improvement funding.

Table 5-1: Annual Predicted M&R Cost Estimate

Year	Cost, Million $
2021	$ 103.3 M
2022	$ 2.6 M
2023	$ 13.4 M
2024	$0
2025	$ 6.3 M
2026	$ 0.2 M
2027	$0
2028	$0
2029	$ 0.2 M
2030	$ 9.3 M
Total for 10 Years	**$ 135.3 M**

The M&R costs for the next ten (10) years are shown in Table 5-1. The estimates are generated at the time of analysis in 2021. The estimate does not account for inflation. The costs are for planning purposes only and reflect costs for pavement considerations within manoeuvring area only based on the visual inspections completed as part of the PMP. For a more detailed cost estimate of specific project, it is recommended BGR engage a design engineer to perform a more extensive pavement analysis and design to determine the best method of M&R for a specific area.

The 10-Year M&R Plan for the unlimited budget scenario are provided in Appendix I in tabular format and the exhibit is found in Appendix J. Appendix H exhibits the 10-Year M&R Plan for the stop gap scenario.

5.1 LOCALIZED MAINTENANCE PLAN

Sections requiring maintenance in the first year were identified based on pavement condition data collected in 2020. The maintenance activities and associated costs were developed based on the policies discussed in Section 4.2 and Section 4.3. The localized maintenance plan is presented in Appendix K. The 2021 maintenance cost is independent from major M&R activities and assumes that no major rehabilitation activities were performed.

6. SUMMARY

The objective of this condition report was to develop a 10-Year M&R Plan for the BGR airside pavement network. To accomplish this, pavement inspections were conducted for the runway, taxiways, aprons, shoulders and helipad to obtain pavement condition data for the airside pavement network. Contract reviews and updates to the APMS database were performed.

Upon completion of the update, an analysis was performed utilizing the performance models outlined in Section 4.1 and coupled with engineering judgment to produce a 10-Year M&R Plan. The10-Year M&R Plan has a projected total cost of approximately $135.3 million. Localized maintenance activities for the first year are estimated to be $3.5 million. The following summarizes observations based on the 2020 survey and analysis.

a. Condition evaluations were performed for runway, taxiways, aprons, shoulders and helipad, except those currently under construction or scheduled for near-term demolition. The evaluated airside pavement network was approximately 1,177,290 square yards.

b. The overall area-weighted PCI for the evaluated airside pavement is 68.

c. Unit costs for maintenance and rehabilitation activities were updated to reflect current airport construction costs based on data from recently completed or current on-going BGR projects.

d. Pavement branches were analyzed under two different fiscal scenarios including stop gap and unlimited budge scenarios as defined in Section 5.

Appendix A. WORK HISTORY REPORT

Work History Report

Pavement Database: 2020 Bangor PCI - 2021-09-17

Network: Bangor International **Branch:** AD10 Dock 10 **Section:** 10 **Surface:** APC
L.C.D. 10/31/201 **Use:** APRON **Rank:** P **Length:** 36.58 (M) **Width:** 33.53 (M) **True Area:** 1200.976178 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
10/31/2015	ML-OL	Mill and Overlay	0.00	127.00	☑	
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AD10 Dock 10 **Section:** 20 **Surface:** AC
L.C.D. 6/1/2005 **Use:** APRON **Rank:** O **Length:** 24.08 (M) **Width:** 13.41 (M) **True Area:** 326.0116317 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2005	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AD10 Dock 10 **Section:** 30 **Surface:** PCC
L.C.D. 10/31/201 **Use:** APRON **Rank:** P **Length:** 243.84 (M) **Width:** 42.67 (M) **True Area:** 10244.97563 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
10/31/2015	ML-OL	Mill and Overlay	0.00	127.00	☑	
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AD10 Dock 10 **Section:** 40 **Surface:** AC
L.C.D. 6/1/2015 **Use:** APRON **Rank:** P **Length:** 275.84 (M) **Width:** 41.45 (M) **True Area:** 11434.50616 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2015	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AD10 Dock 10 **Section:** 50 **Surface:** AC
L.C.D. 1/1/1900 **Use:** APRON **Rank:** P **Length:** 20.73 (M) **Width:** 20.73 (M) **True Area:** 429.5836569 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
1/1/1900	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AD10S Dock 10 Shoulder **Section:** 10 **Surface:** AAC
L.C.D. 6/1/2007 **Use:** SHOULDE **Rank:** P **Length:** 71.63 (M) **Width:** 28.04 (M) **True Area:** 1996.274510 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2007	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AD10S Dock 10 Shoulder **Section:** 20 **Surface:** AAC
L.C.D. 6/1/2010 **Use:** SHOULDE **Rank:** P **Length:** 68.58 (M) **Width:** 25.60 (M) **True Area:** 1752.443978 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2010	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AD10S Dock 10 Shoulder **Section:** 30 **Surface:**AC

L.C.D. 10/31/201 **Use:** SHOULDE **Rank:** P **Length:** 173.43 (M) **Width:** 31.09 (M) **True Area:** 5363.571206 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
10/31/2015	OL-AC	Overlay - AC	0.00	76.20	☑	
10/31/2015	RECON AC	Reconstruct with AC	0.00	76.20	☑	
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 10 **Surface:**AC

L.C.D. 6/1/1990 **Use:** APRON **Rank:** P **Length:** 356.31 (M) **Width:** 141.73 (M) **True Area:** 50585.96353 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1990	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 100 **Surface:**AC

L.C.D. 6/1/2006 **Use:** APRON **Rank:** P **Length:** 408.43 (M) **Width:** 19.20 (M) **True Area:** 7842.874636 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2006	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 110 **Surface:**AC

L.C.D. 6/1/2002 **Use:** APRON **Rank:** P **Length:** 167.64 (M) **Width:** 106.68 (M) **True Area:** 17883.8352 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2002	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 120 **Surface:**AC

L.C.D. 1/1/1900 **Use:** APRON **Rank:** P **Length:** 19.20 (M) **Width:** 19.20 (M) **True Area:** 368.7321657 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
1/1/1900	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 140 **Surface:**AC

L.C.D. 6/1/1998 **Use:** APRON **Rank:** P **Length:** 109.73 (M) **Width:** 83.82 (M) **True Area:** 9197.40096 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1998	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 150 **Surface:**AC

L.C.D. 6/1/2008 **Use:** APRON **Rank:** P **Length:** 32.00 (M) **Width:** 31.09 (M) **True Area:** 994.9915584 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2008	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 160 **Surface:**AC
L.C.D. 1/1/1900 **Use:** APRON **Rank:** P **Length:** 24.38 (M) **Width:** 24.38 (M) **True Area:** 594.579456 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
1/1/1900	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 170 **Surface:**AC
L.C.D. 6/1/2008 **Use:** APRON **Rank:** P **Length:** 145.39 (M) **Width:** 44.50 (M) **True Area:** 6469.953511 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2008	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 180 **Surface:**AC
L.C.D. 6/1/2008 **Use:** APRON **Rank:** P **Length:** 34.44 (M) **Width:** 8.53 (M) **True Area:** 293.9452185 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2008	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 190 **Surface:**AC
L.C.D. 6/1/2008 **Use:** APRON **Rank:** P **Length:** 100.58 (M) **Width:** 100.58 (M) **True Area:** 10117.14105 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2008	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 20 **Surface:**PCC
L.C.D. 6/1/1955 **Use:** APRON **Rank:** P **Length:** 134.72 (M) **Width:** 23.16 (M) **True Area:** 3112.389335 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 200 **Surface:**AC
L.C.D. 6/1/1993 **Use:** APRON **Rank:** P **Length:** 91.44 (M) **Width:** 65.23 (M) **True Area:** 5964.375168 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1993	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 210 **Surface:**AC
L.C.D. 6/1/2012 **Use:** APRON **Rank:** P **Length:** 670.86 (M) **Width:** 20.42 (M) **True Area:** 13700.13259 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2012	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 220 **Surface:**AC
L.C.D. 6/1/2012 **Use:** APRON **Rank:** P **Length:** 274.93 (M) **Width:** 38.10 (M) **True Area:** 10474.81776 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2012	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 230 **Surface:** AC

L.C.D. 6/1/2012 **Use:** APRON **Rank:** P **Length:** 274.93 (M) **Width:** 142.04 (M) **True Area:** 39050.12060 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2012	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 240 **Surface:** AC

L.C.D. 6/1/2015 **Use:** APRON **Rank:** P **Length:** 102.11 (M) **Width:** 63.70 (M) **True Area:** 6504.606345 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2015	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 250 **Surface:** PCC

L.C.D. 6/1/2004 **Use:** APRON **Rank:** P **Length:** 264.57 (M) **Width:** 78.64 (M) **True Area:** 20805.07838 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2004	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 260 **Surface:** PCC

L.C.D. 6/1/2011 **Use:** APRON **Rank:** P **Length:** 306.02 (M) **Width:** 29.26 (M) **True Area:** 8954.366607 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2011	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 270 **Surface:** PCC

L.C.D. 6/1/2010 **Use:** APRON **Rank:** P **Length:** 288.95 (M) **Width:** 14.63 (M) **True Area:** 4227.459932 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2010	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 280 **Surface:** PCC

L.C.D. 6/1/2007 **Use:** APRON **Rank:** P **Length:** 467.56 (M) **Width:** 3.66 (M) **True Area:** 1710.159160 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2007	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 290 **Surface:** PCC

L.C.D. 6/1/2005 **Use:** APRON **Rank:** P **Length:** 72.85 (M) **Width:** 68.28 (M) **True Area:** 4973.657149 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2005	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 30 **Surface:** APC

L.C.D. 6/1/1990 **Use:** APRON **Rank:** P **Length:** 236.52 (M) **Width:** 63.70 (M) **True Area:** 15058.20781 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1990	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 300 **Surface:**AC
L.C.D. 6/1/2015 **Use:** APRON **Rank:** P **Length:** 106.68 (M) **Width:** 3.96 (M) **True Area:** 422.708832 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2015	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 310 **Surface:**PCC
L.C.D. 6/1/2006 **Use:** APRON **Rank:** P **Length:** 8.53 (M) **Width:** 71.63 (M) **True Area:** 611.3020032 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2006	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 320 **Surface:**PCC
L.C.D. 6/1/2002 **Use:** APRON **Rank:** P **Length:** 109.12 (M) **Width:** 52.73 (M) **True Area:** 5753.856879 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2002	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 340 **Surface:**PCC
L.C.D. 6/1/1998 **Use:** APRON **Rank:** P **Length:** 264.87 (M) **Width:** 17.37 (M) **True Area:** 4601.766280 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1998	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 350 **Surface:**PCC
L.C.D. 9/1/2011 **Use:** APRON **Rank:** P **Length:** 67.67 (M) **Width:** 3.05 (M) **True Area:** 206.2447488 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
9/1/2011	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 360 **Surface:**PCC
L.C.D. 6/1/2008 **Use:** APRON **Rank:** P **Length:** 32.00 (M) **Width:** 91.44 (M) **True Area:** 2926.44576 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2008	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 370 **Surface:**PCC
L.C.D. 6/1/2012 **Use:** APRON **Rank:** P **Length:** 54.56 (M) **Width:** 27.43 (M) **True Area:** 1496.667974 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2012	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 40 **Surface:**AC
L.C.D. 10/31/201 **Use:** APRON **Rank:** P **Length:** 136.25 (M) **Width:** 189.59 (M) **True Area:** 25830.20382 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
10/31/2012	RECON AC	Reconstruct with AC	0.00	0.00	☑	
1/1/1950	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 50 **Surface:** AC
L.C.D. 10/31/201 **Use:** APRON **Rank:** P **Length:** 304.80 (M) **Width:** 190.20 (M) **True Area:** 57971.49696 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
10/31/2015	RECON AC	Reconstruct with AC	0.00	101.60	☑	
1/6/1990	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 60 **Surface:** AC
L.C.D. 10/31/201 **Use:** APRON **Rank:** P **Length:** 288.95 (M) **Width:** 80.16 (M) **True Area:** 23162.95754 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
10/31/2012	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 70 **Surface:** AC
L.C.D. 6/1/2007 **Use:** APRON **Rank:** P **Length:** 315.16 (M) **Width:** 36.88 (M) **True Area:** 11623.47094 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2007	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGA General Aviation A **Section:** 90 **Surface:** AC
L.C.D. 6/1/2006 **Use:** APRON **Rank:** P **Length:** 441.96 (M) **Width:** 55.78 (M) **True Area:** 24651.82166 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2006	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGAS General Aviation A **Section:** 10 **Surface:** AC
L.C.D. 6/1/2008 **Use:** APRON S **Rank:** P **Length:** 145.39 (M) **Width:** 9.75 (M) **True Area:** 1418.072002 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2008	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGAS General Aviation A **Section:** 20 **Surface:** AC
L.C.D. 6/1/1993 **Use:** APRON S **Rank:** P **Length:** 6.10 (M) **Width:** 97.54 (M) **True Area:** 594.579456 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1993	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AGAS General Aviation A **Section:** 30 **Surface:** AC
L.C.D. 6/1/2012 **Use:** APRON S **Rank:** P **Length:** 338.33 (M) **Width:** 9.14 (M) **True Area:** 3093.671232 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2012	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AHOLD Hold Apron **Section:** 10 **Surface:** APC
L.C.D. 6/1/2004 **Use:** APRON **Rank:** P **Length:** 47.24 (M) **Width:** 213.06 (M) **True Area:** 10059.41667 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2004	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AHOLD Hold Apron **Section:** 20 **Surface:**PCC
L.C.D. 6/1/2004 **Use:** APRON **Rank:** P **Length:** 60.96 (M) **Width:** 59.74 (M) **True Area:** 3638.774243 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2004	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AHOLD Hold Apron **Section:** 30 **Surface:**APC
L.C.D. 6/1/2004 **Use:** APRON **Rank:** P **Length:** 203.61 (M) **Width:** 65.53 (M) **True Area:** 13295.32710 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2004	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AHOLDS Hold Apron Should **Section:** 10 **Surface:**AC
L.C.D. 6/1/2004 **Use:** SHOULDE **Rank:** P **Length:** 229.21 (M) **Width:** 17.37 (M) **True Area:** 3941.788657 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2004	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** AHOLDS Hold Apron Should **Section:** 20 **Surface:**AC
L.C.D. 6/1/2004 **Use:** SHOULDE **Rank:** P **Length:** 226.77 (M) **Width:** 17.07 (M) **True Area:** 3846.025132 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2004	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** HELIA Helicopter Pad **Section:** 10 **Surface:**PCC
L.C.D. 6/1/1955 **Use:** HELIPAD **Rank:** P **Length:** 30.48 (M) **Width:** 30.48 (M) **True Area:** 929.0304 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** HELIT Helicopter Taxiwa **Section:** 10 **Surface:**AC
L.C.D. 6/1/1994 **Use:** TAXIWAY **Rank:** P **Length:** 43.89 (M) **Width:** 24.38 (M) **True Area:** 1065.649894 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1994	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** RW1533 Runway 15-33 **Section:** 10 **Surface:**ACR
L.C.D. 6/1/1995 **Use:** RUNWAY **Rank:** P **Length:** 304.80 (M) **Width:** 91.44 (M) **True Area:** 27870.912 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1995	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** RW1533 Runway 15-33 **Section:** 20 **Surface:**APC
L.C.D. 6/1/2002 **Use:** RUNWAY **Rank:** P **Length:** 743.71 (M) **Width:** 42.98 (M) **True Area:** 31958.64574 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2002	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** RW1533 Runway 15-33 **Section:** 30 **Surface:** APC
L.C.D. 6/1/2002 **Use:** RUNWAY **Rank:** P **Length:** 591.31 (M) **Width:** 30.48 (M) **True Area:** 18023.18976 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2002	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** RW1533 Runway 15-33 **Section:** 40 **Surface:** APC
L.C.D. 6/1/2003 **Use:** RUNWAY **Rank:** P **Length:** 1,798.32 (M) **Width:** 60.96 (M) **True Area:** 109625.5872 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2003	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** RW1533 Runway 15-33 **Section:** 50 **Surface:** APC
L.C.D. 6/1/2002 **Use:** RUNWAY **Rank:** P **Length:** 944.88 (M) **Width:** 38.40 (M) **True Area:** 36232.18558 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2002	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** RW1533 Runway 15-33 **Section:** 60 **Surface:** APC
L.C.D. 6/1/2002 **Use:** RUNWAY **Rank:** P **Length:** 822.96 (M) **Width:** 30.48 (M) **True Area:** 25083.8208 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2002	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** RW1533 Runway 15-33 **Section:** 70 **Surface:** AC
L.C.D. 6/1/2002 **Use:** RUNWAY **Rank:** P **Length:** 304.80 (M) **Width:** 64.01 (M) **True Area:** 19509.6384 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2002	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** RW1533S Runway 15-33 Sho **Section:** 10 **Surface:** APC
L.C.D. 6/1/2002 **Use:** SHOULDE **Rank:** P **Length:** 1,414.27 (M) **Width:** 30.48 (M) **True Area:** 43107.01056 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2002	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** RW1533S Runway 15-33 Sho **Section:** 20 **Surface:** APC
L.C.D. 6/1/2003 **Use:** SHOULDE **Rank:** P **Length:** 1,798.32 (M) **Width:** 30.48 (M) **True Area:** 54812.7936 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2003	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 10 **Surface:** APC
L.C.D. 6/1/1997 **Use:** TAXIWAY **Rank:** P **Length:** 929.03 (M) **Width:** 22.86 (M) **True Area:** 21239.96494 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1997	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 100 **Surface:**APC
L.C.D. 6/1/1994 **Use:** TAXIWAY **Rank:** P **Length:** 243.84 (M) **Width:** 26.21 (M) **True Area:** 6327.039834 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1994	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 110 **Surface:**AC
L.C.D. 6/1/1994 **Use:** TAXIWAY **Rank:** P **Length:** 287.43 (M) **Width:** 20.12 (M) **True Area:** 5773.458489 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1994	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 120 **Surface:**AC
L.C.D. 10/31/201 **Use:** TAXIWAY **Rank:** P **Length:** 346.25 (M) **Width:** 22.86 (M) **True Area:** 7915.803520 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
10/31/2015	MOL	Cold Mill and Overlay	0.00	152.40	☑	
6/1/1999	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 130 **Surface:**AC
L.C.D. 6/1/2019 **Use:** TAXIWAY **Rank:** P **Length:** 41.15 (M) **Width:** 69.49 (M) **True Area:** 2859.555571 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2019	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 140 **Surface:**AC
L.C.D. 6/1/2019 **Use:** TAXIWAY **Rank:** P **Length:** 165.81 (M) **Width:** 29.26 (M) **True Area:** 4851.768360 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2019	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 150 **Surface:**AC
L.C.D. 6/1/2015 **Use:** TAXIWAY **Rank:** P **Length:** 475.49 (M) **Width:** 22.86 (M) **True Area:** 10869.65568 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2015	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 160 **Surface:**AC
L.C.D. 6/1/2015 **Use:** TAXIWAY **Rank:** P **Length:** 76.20 (M) **Width:** 14.02 (M) **True Area:** 1068.38496 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2015	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 170 **Surface:**AC
L.C.D. 6/1/2018 **Use:** TAXIWAY **Rank:** P **Length:** 1,170.43 (M) **Width:** 27.74 (M) **True Area:** 32464.03829 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2018	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 180 **Surface:** AC
L.C.D. 6/1/2018 **Use:** TAXIWAY **Rank:** P **Length:** 10.97 (M) **Width:** 57.30 (M) **True Area:** 628.7677747 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2018	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 20 **Surface:** AC
L.C.D. 10/31/201 **Use:** TAXIWAY **Rank:** P **Length:** 124.66 (M) **Width:** 22.86 (M) **True Area:** 2846.991363 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
10/31/2015	ML-OL	Mill and Overlay	0.00	152.40	☑	
10/31/2015	ML-OL	Mill and Overlay	0.00	152.40	☑	
6/1/1999	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 30 **Surface:** AC
L.C.D. 6/1/1999 **Use:** TAXIWAY **Rank:** P **Length:** 640.99 (M) **Width:** 26.21 (M) **True Area:** 16765.29745 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1999	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 40 **Surface:** AC
L.C.D. 6/1/1996 **Use:** TAXIWAY **Rank:** P **Length:** 80.77 (M) **Width:** 29.57 (M) **True Area:** 2375.875402 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1996	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 50 **Surface:** APC
L.C.D. 6/1/1996 **Use:** TAXIWAY **Rank:** P **Length:** 561.14 (M) **Width:** 35.05 (M) **True Area:** 19641.65640 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1996	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 60 **Surface:** AC
L.C.D. 6/1/1996 **Use:** TAXIWAY **Rank:** P **Length:** 416.97 (M) **Width:** 3.96 (M) **True Area:** 1588.641983 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1996	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 70 **Surface:** AC
L.C.D. 6/1/1997 **Use:** TAXIWAY **Rank:** P **Length:** 321.56 (M) **Width:** 22.86 (M) **True Area:** 7352.983898 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1997	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 80 **Surface:** AC
L.C.D. 6/1/1995 **Use:** TAXIWAY **Rank:** P **Length:** 297.18 (M) **Width:** 14.33 (M) **True Area:** 4269.667639 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1995	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWA Taxiway 'A' **Section:** 90 **Surface:**APC
L.C.D. 6/1/1995 **Use:** TAXIWAY **Rank:** P **Length:** 399.90 (M) **Width:** 25.91 (M) **True Area:** 10297.29212 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1995	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWAS Taxiway 'A' Should **Section:** 10 **Surface:**AC
L.C.D. 6/1/1997 **Use:** SHOULDE **Rank:** P **Length:** 1,247.85 (M) **Width:** 18.29 (M) **True Area:** 22741.59672 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1997	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWAS Taxiway 'A' Should **Section:** 100 **Surface:**AC
L.C.D. 6/1/2019 **Use:** SHOULDE **Rank:** P **Length:** 72.54 (M) **Width:** 4.27 (M) **True Area:** 309.5529292 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2019	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWAS Taxiway 'A' Should **Section:** 110 **Surface:**AC
L.C.D. 6/1/2015 **Use:** SHOULDE **Rank:** P **Length:** 391.67 (M) **Width:** 14.02 (M) **True Area:** 5491.498694 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2015	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWAS Taxiway 'A' Should **Section:** 120 **Surface:**AC
L.C.D. 6/1/2018 **Use:** SHOULDE **Rank:** P **Length:** 1,181.40 (M) **Width:** 17.68 (M) **True Area:** 20885.34661 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2018	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWAS Taxiway 'A' Should **Section:** 130 **Surface:**AC
L.C.D. 1/1/1900 **Use:** SHOULDE **Rank:** P **Length:** 16.46 (M) **Width:** 16.46 (M) **True Area:** 270.9052646 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
1/1/1900	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWAS Taxiway 'A' Should **Section:** 20 **Surface:**AC
L.C.D. 6/1/1994 **Use:** SHOULDE **Rank:** P **Length:** 392.58 (M) **Width:** 16.15 (M) **True Area:** 6246.275505 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1994	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWAS Taxiway 'A' Should **Section:** 30 **Surface:**AC
L.C.D. 6/1/1999 **Use:** SHOULDE **Rank:** P **Length:** 923.85 (M) **Width:** 18.59 (M) **True Area:** 17199.34696 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1999	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWAS Taxiway 'A' Should **Section:** 40 **Surface:** AC
L.C.D. 6/1/2007 **Use:** SHOULDE **Rank:** P **Length:** 28.96 (M) **Width:** 39.01 (M) **True Area:** 1130.117171 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2007	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWAS Taxiway 'A' Should **Section:** 50 **Surface:** AC
L.C.D. 6/1/1995 **Use:** SHOULDE **Rank:** P **Length:** 561.14 (M) **Width:** 17.07 (M) **True Area:** 9555.805091 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1995	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWAS Taxiway 'A' Should **Section:** 60 **Surface:** AC
L.C.D. 7/29/1996 **Use:** SHOULDE **Rank:** P **Length:** 23.47 (M) **Width:** 13.72 (M) **True Area:** 319.6068961 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
7/29/1996	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWAS Taxiway 'A' Should **Section:** 70 **Surface:** ACR
L.C.D. 6/1/1997 **Use:** SHOULDE **Rank:** P **Length:** 287.43 (M) **Width:** 10.67 (M) **True Area:** 3129.385017 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1997	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWAS Taxiway 'A' Should **Section:** 80 **Surface:** AC
L.C.D. 6/1/1999 **Use:** SHOULDE **Rank:** P **Length:** 414.53 (M) **Width:** 16.46 (M) **True Area:** 6769.730251 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1999	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWAS Taxiway 'A' Should **Section:** 90 **Surface:** AC
L.C.D. 1/6/2019 **Use:** SHOULDE **Rank:** P **Length:** 206.96 (M) **Width:** 10.06 (M) **True Area:** 2081.678417 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
1/6/2019	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWB Taxiway 'B' **Section:** 10 **Surface:** APC
L.C.D. 6/1/2000 **Use:** TAXIWAY **Rank:** P **Length:** 395.02 (M) **Width:** 15.85 (M) **True Area:** 6205.932360 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2000	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWB Taxiway 'B' **Section:** 20 **Surface:** AC
L.C.D. 6/1/2000 **Use:** TAXIWAY **Rank:** P **Length:** 20.42 (M) **Width:** 20.42 (M) **True Area:** 417.0417465 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2000	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWBS Taxiway 'B' Should **Section:** 10 **Surface:**AC
L.C.D. 6/1/2000 **Use:** SHOULDE **Rank:** P **Length:** 362.10 (M) **Width:** 6.40 (M) **True Area:** 2346.563564 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2000	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWJ Taxiway 'J' **Section:** 10 **Surface:**APC
L.C.D. 6/1/2000 **Use:** TAXIWAY **Rank:** P **Length:** 250.85 (M) **Width:** 15.85 (M) **True Area:** 3975.878499 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2000	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWJ Taxiway 'J' **Section:** 20 **Surface:**AC
L.C.D. 6/1/2000 **Use:** TAXIWAY **Rank:** P **Length:** 17.07 (M) **Width:** 15.24 (M) **True Area:** 260.1285120 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2000	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWJS Taxiway 'J' Should **Section:** 10 **Surface:**APC
L.C.D. 6/1/2000 **Use:** SHOULDE **Rank:** P **Length:** 250.85 (M) **Width:** 13.41 (M) **True Area:** 3374.120424 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2000	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWJS Taxiway 'J' Should **Section:** 20 **Surface:**AC
L.C.D. 6/1/2000 **Use:** SHOULDE **Rank:** P **Length:** 47.55 (M) **Width:** 8.53 (M) **True Area:** 395.1212741 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2000	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWK Taxiway 'K' **Section:** 10 **Surface:**APC
L.C.D. 6/1/2004 **Use:** TAXIWAY **Rank:** P **Length:** 167.94 (M) **Width:** 22.86 (M) **True Area:** 3839.522848 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2004	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWK Taxiway 'K' **Section:** 20 **Surface:**APC
L.C.D. 6/1/2004 **Use:** TAXIWAY **Rank:** P **Length:** 21.03 (M) **Width:** 22.86 (M) **True Area:** 479.9426786 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2004	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWKS Taxiway 'K' Should **Section:** 10 **Surface:**AC
L.C.D. 6/1/2004 **Use:** SHOULDE **Rank:** P **Length:** 188.67 (M) **Width:** 21.34 (M) **True Area:** 4031.065691 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2004	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWL Taxiway 'L' **Section:** 10 **Surface:** APC
L.C.D. 6/1/1991 **Use:** TAXIWAY **Rank:** P **Length:** 234.39 (M) **Width:** 33.53 (M) **True Area:** 7842.480725 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1991	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWLS Taxiway 'L' Should **Section:** 10 **Surface:** APC
L.C.D. 6/1/1991 **Use:** SHOULDE **Rank:** P **Length:** 234.39 (M) **Width:** 33.53 (M) **True Area:** 7857.491998 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1991	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWM Taxiway 'M' **Section:** 10 **Surface:** APC
L.C.D. 6/1/2003 **Use:** TAXIWAY **Rank:** P **Length:** 128.02 (M) **Width:** 27.43 (M) **True Area:** 3509.480154 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2003	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWM Taxiway 'M' **Section:** 20 **Surface:** APC
L.C.D. 6/1/2003 **Use:** TAXIWAY **Rank:** P **Length:** 109.73 (M) **Width:** 22.86 (M) **True Area:** 2508.38208 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2003	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWMS Taxiway 'M' Shoul **Section:** 10 **Surface:** AC
L.C.D. 6/1/2003 **Use:** SHOULDE **Rank:** P **Length:** 109.73 (M) **Width:** 49.07 (M) **True Area:** 5383.295451 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2003	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWN Taxiway 'N' **Section:** 10 **Surface:** PCC
L.C.D. 6/1/1955 **Use:** TAXIWAY **Rank:** P **Length:** 425.20 (M) **Width:** 31.09 (M) **True Area:** 13245.71131 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWN Taxiway 'N' **Section:** 20 **Surface:** PCC
L.C.D. 6/1/1955 **Use:** TAXIWAY **Rank:** P **Length:** 117.04 (M) **Width:** 58.52 (M) **True Area:** 6863.513083 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWNS Taxiway 'N' Should **Section:** 10 **Surface:** AC
L.C.D. 10/31/201 **Use:** SHOULDE **Rank:** P **Length:** 487.68 (M) **Width:** 20.42 (M) **True Area:** 9951.105668 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
10/31/2015	RECON AC	Reconstruct with AC	0.00	76.20	☑	
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWNS Taxiway 'N' Should **Section:** 20 **Surface:**AC
L.C.D. 6/1/2015 **Use:** SHOULDE **Rank:** P **Length:** 290.47 (M) **Width:** 14.63 (M) **True Area:** 4249.756661 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2015	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWRW1533X TW/RW1533 Inter **Section:** 10 **Surface:**APC
L.C.D. 6/1/2002 **Use:** TAXIWAY **Rank:** P **Length:** 323.70 (M) **Width:** 14.33 (M) **True Area:** 4620.538267 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2002	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWRW1533X TW/RW1533 Inter **Section:** 20 **Surface:**APC
L.C.D. 6/1/2003 **Use:** TAXIWAY **Rank:** P **Length:** 182.88 (M) **Width:** 20.12 (M) **True Area:** 3669.086647 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2003	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWRW1533X TW/RW1533 Inter **Section:** 10 **Surface:**AC
L.C.D. 6/1/2002 **Use:** SHOULDE **Rank:** P **Length:** 183.18 (M) **Width:** 7.62 (M) **True Area:** 1411.672840 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2002	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWRW1533X TW/RW1533 Inter **Section:** 20 **Surface:**AC
L.C.D. 6/1/2003 **Use:** SHOULDE **Rank:** P **Length:** 204.22 (M) **Width:** 13.72 (M) **True Area:** 2801.026656 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/2003	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWX Taxiway 'X' **Section:** 10 **Surface:**PCC
L.C.D. 6/1/1955 **Use:** TAXIWAY **Rank:** P **Length:** 443.48 (M) **Width:** 35.36 (M) **True Area:** 15625.06686 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWX Taxiway 'X' **Section:** 20 **Surface:**PCC
L.C.D. 6/1/1955 **Use:** TAXIWAY **Rank:** P **Length:** 100.58 (M) **Width:** 36.88 (M) **True Area:** 3704.143609 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWX Taxiway 'X' **Section:** 30 **Surface:**PCC
L.C.D. 6/1/1955 **Use:** TAXIWAY **Rank:** P **Length:** 87.78 (M) **Width:** 41.15 (M) **True Area:** 3624.894529 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWX Taxiway 'X' **Section:** 40 **Surface:**PCC
L.C.D. 6/1/1955 **Use:** TAXIWAY **Rank:** P **Length:** 100.58 (M) **Width:** 36.88 (M) **True Area:** 3704.181700 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWX Taxiway 'X' **Section:** 50 **Surface:**PCC
L.C.D. 6/1/1955 **Use:** TAXIWAY **Rank:** P **Length:** 87.78 (M) **Width:** 41.15 (M) **True Area:** 3612.070195 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWXS Taxiway 'X' Should **Section:** 10 **Surface:**AC
L.C.D. 6/1/1955 **Use:** SHOULDE **Rank:** P **Length:** 473.05 (M) **Width:** 60.35 (M) **True Area:** 28499.25705 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWY Taxiway 'Y' **Section:** 10 **Surface:**APC
L.C.D. 6/1/1955 **Use:** TAXIWAY **Rank:** P **Length:** 240.18 (M) **Width:** 31.39 (M) **True Area:** 7510.265028 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWY Taxiway 'Y' **Section:** 20 **Surface:**PCC
L.C.D. 6/1/1955 **Use:** TAXIWAY **Rank:** P **Length:** 110.95 (M) **Width:** 32.92 (M) **True Area:** 3644.424606 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWY Taxiway 'Y' **Section:** 30 **Surface:**PCC
L.C.D. 6/1/1955 **Use:** TAXIWAY **Rank:** P **Length:** 110.95 (M) **Width:** 32.92 (M) **True Area:** 3644.424606 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWY Taxiway 'Y' **Section:** 40 **Surface:**PCC
L.C.D. 6/1/1955 **Use:** TAXIWAY **Rank:** P **Length:** 116.74 (M) **Width:** 31.70 (M) **True Area:** 3700.683900 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Network: Bangor International **Branch:** TWY Taxiway 'Y' **Section:** 50 **Surface:**PCC
L.C.D. 6/1/1955 **Use:** TAXIWAY **Rank:** P **Length:** 116.74 (M) **Width:** 31.70 (M) **True Area:** 3700.683900 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Work History Report

Pavement Database: 2020 Bangor PCI - 2021-09-17

Network: Bangor International **Branch:** TWYS Taxiway 'Y' Should **Section:** 10 **Surface:**AC

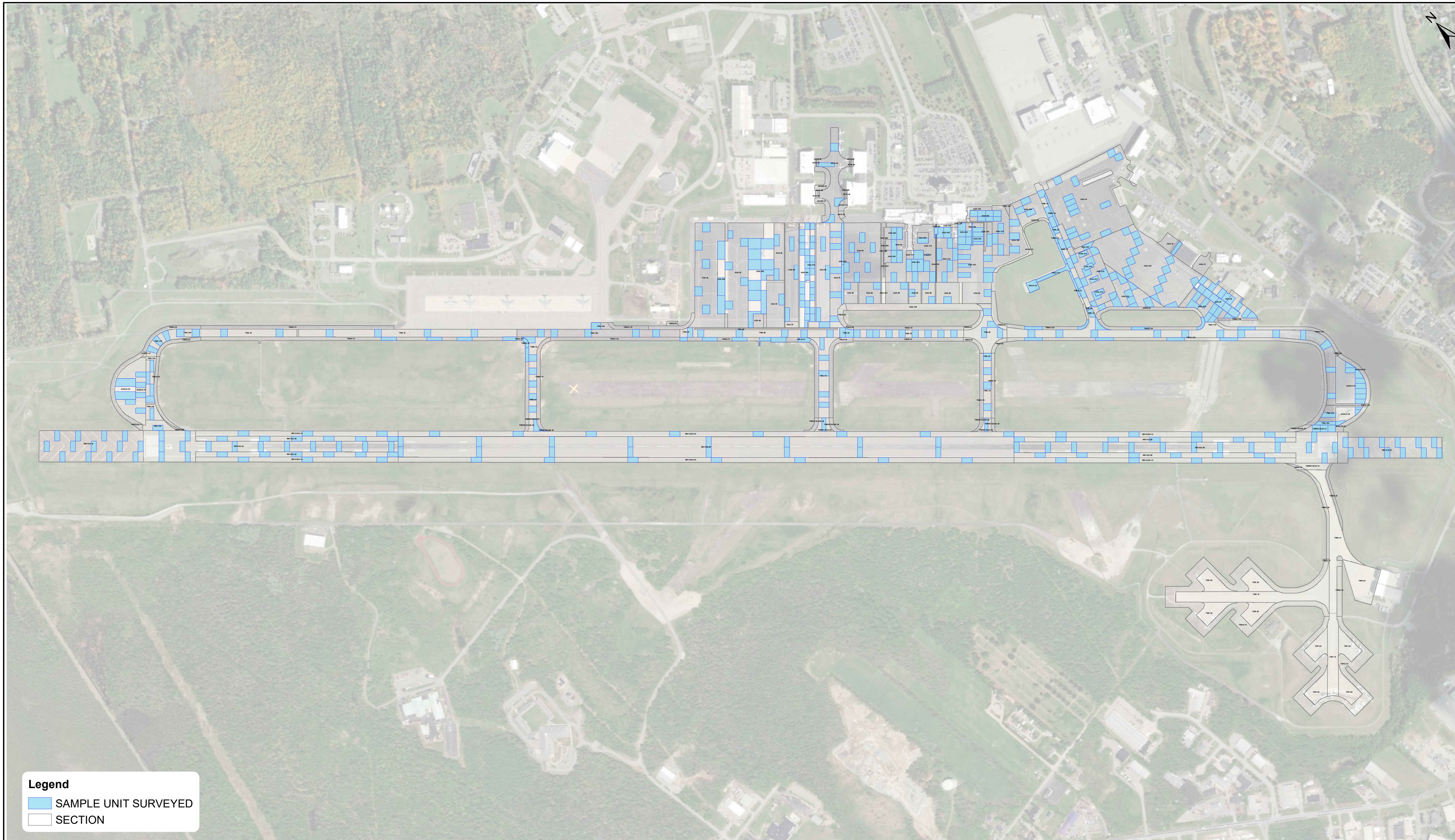
L.C.D. 6/1/1955 **Use:** SHOULDE **Rank:** P **Length:** 290.78 (M) **Width:** 68.28 (M) **True Area:** 19880.37354 (SqM

Work Date	Work Code	Work Description	Cost	Thickness (mm)	Major M&R	Comments
6/1/1955	NU-IN	New Construction - Initial	0.00	0.00	☑	

Summary:

Work Description	Section Count	Area Total (SqM)	Thickness Avg (mm)	Thickness STD (mm)
Cold Mill and Overlay	1	7,915.80	152.40	0.00
Mill and Overlay	4	17,139.93	139.70	12.70
New Construction - Initial	127	1,294,355.21	0.00	0.00
Overlay - AC	1	5,363.57	76.20	0.00
Reconstruct with AC	4	99,116.38	63.50	38.10

Appendix B. 2020 NETWORK DEFINITION EXHIBIT



Jacobs

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TEL: +1 603 666 7181 FAX: +1 603 666 7185
WEBSITE: WWW.JACOBS.COM

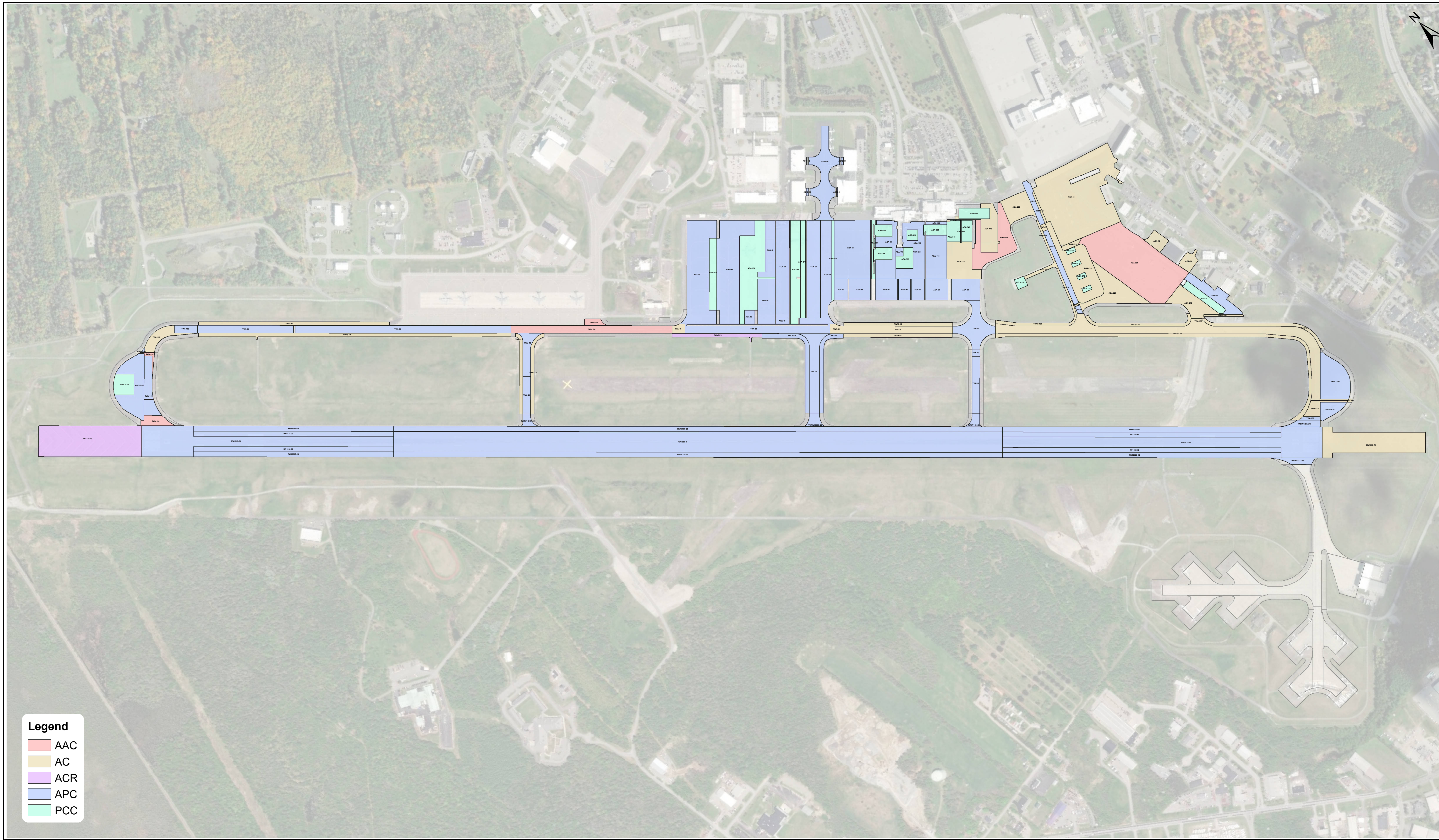
Client

BGR BANGOR INTERNATIONAL AIRPORT

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-0001			1.0

Title

SURVEYED SCOPE MAP
YEAR 2020



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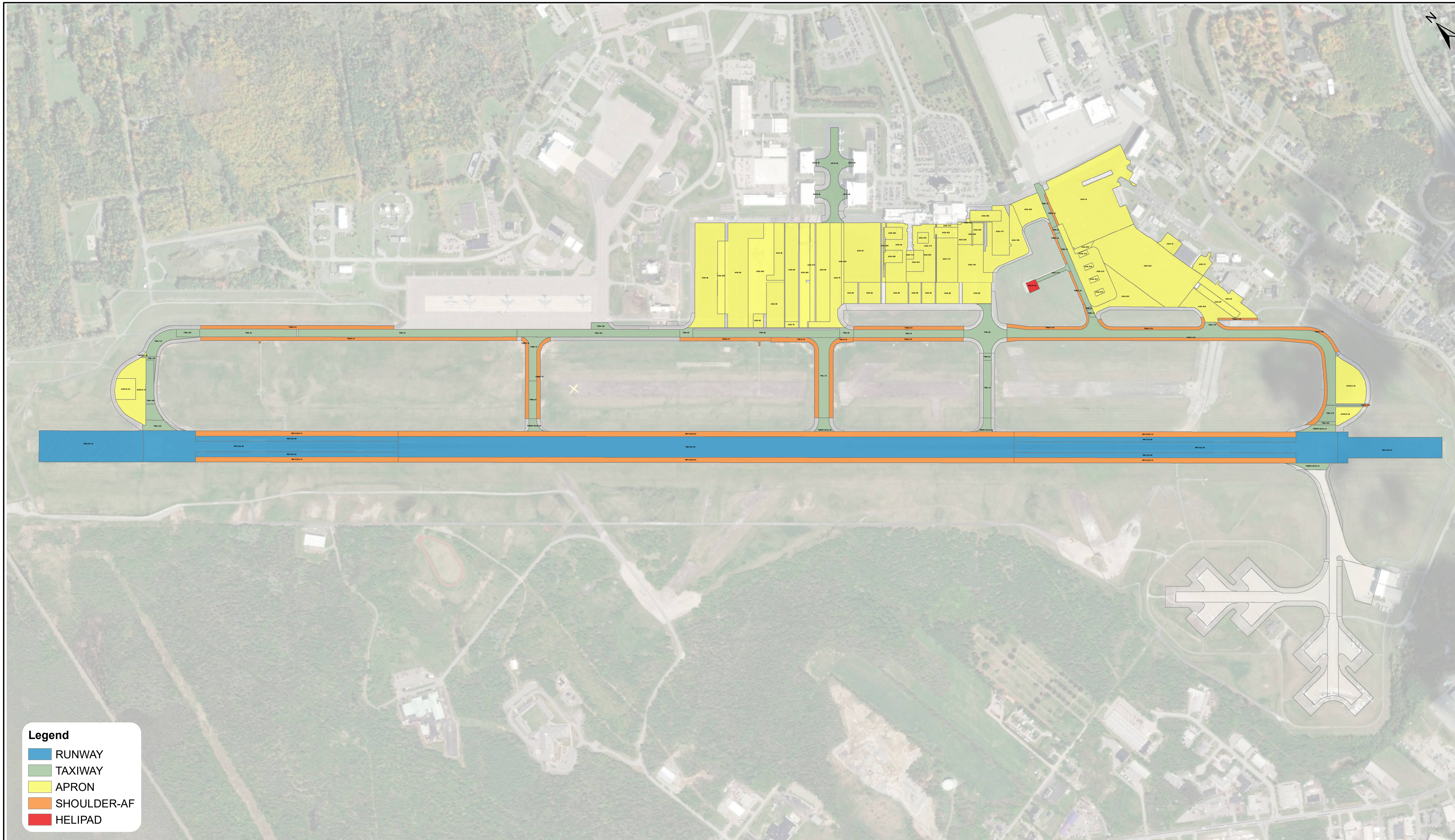
Client

BGR BANGOR INTERNATIONAL AIRPORT

Title	Project Name			
SURFACE TYPE MAP YEAR 2020	2020 BANGOR PCI			
	Company: JACOBS	Drawn By: JL	Chk/Approved: EC / RH	Drawn Date: OCT 21
	Drawing No: E2X42727-BGR-2020-0002			Version: 1.0



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BGR BANGOR INTERNATIONAL AIRPORT

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-0003			1.0

Title

PAVEMENT USE MAP
YEAR 2020

Appendix C. RE-INSPECTION REPORT

Re-Inspection Report

2020 Bangor PCI - 2020-11-27
Generated Date 11/27/2020

Network: BGR **Name:** Bangor International Airport

Branch: AD10 **Name:** Dock 10 **Use:** APRON **Area:** 254,416 SqFt

Section: 40 of 5 **From:** AD10 - STA: 201+10 **To:** STA: 210+15 **Last Const.:** 6/1/2015
Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P
Area: 123,080 SqFt **Length:** 905 Ft **Width:** 136 Ft
Slabs: **Slab Length:** 3,452 Ft **Slab Width:** Ft **Joint Length:** Ft
Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0
Section Comments:

Work Date: 6/1/2015 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 27 **Surveyed:** 4
Conditions: **PCI:** 94
Inspection Comments:

Sample Number: 21 **Type:** R **Area:** 4790.00 SqFt **PCI:** 100
Sample Comments:

<No Distress>

Sample Number: 23 **Type:** R **Area:** 5047.00 SqFt **PCI:** 84
Sample Comments:

56	SWELLING	M	82.12 SqFt

Sample Number: 4 **Type:** R **Area:** 5658.00 SqFt **PCI:** 95
Sample Comments:

48	L & T CR	L	13.82 Ft
50	PATCHING	L	.60 SqFt

Sample Number: 9 **Type:** R **Area:** 5946.00 SqFt **PCI:** 98
Sample Comments:

50	PATCHING	L	1.87 SqFt

Network:	BGR		**Name:**	Bangor International Airport			

Branch:	AGA	**Name:**	General Aviation Apron	**Use:**	APRON	**Area:**	4,285,583 SqFt

Section: 40 of 34 **From:** AGA - STA:11+51 **To:** STA: 16+28 **Last Const.:** 10/31/2012

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 278,034 SqFt **Length:** 447 Ft **Width:** 622 Ft

Slabs: **Slab Length:** 4,054 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 1/1/1950 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Work Date: 10/31/2012 **Work Type:** Reconstruct with AC **Code:** RECONAC **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 57 **Surveyed:** 9

Conditions: **PCI:** 70

Inspection Comments:

Sample Number: 11 **Type:** R **Area:** 4991.00 SqFt **PCI:** 84

Sample Comments:

48	L & T CR	L	22.94 Ft
48	L & T CR	M	80.98 Ft

Sample Number: 16 **Type:** R **Area:** 4750.00 SqFt **PCI:** 65

Sample Comments:

48	L & T CR	L	24.74 Ft
48	L & T CR	H	89.75 Ft
53	RUTTING	L	113.30 SqFt

Sample Number: 20 **Type:** R **Area:** 4750.00 SqFt **PCI:** 82

Sample Comments:

47	JT REF. CR	L	81.48 Ft
48	L & T CR	L	43.98 Ft
50	PATCHING	L	175.45 SqFt

Sample Number: 24 **Type:** R **Area:** 4750.00 SqFt **PCI:** 63

Sample Comments:

47	JT REF. CR	L	90.69 Ft
47	JT REF. CR	M	32.20 Ft
48	L & T CR	L	51.06 Ft
48	L & T CR	M	49.35 Ft
48	L & T CR	H	29.89 Ft
54	SHOVING	L	361.38 SqFt

Sample Number: 29 **Type:** R **Area:** 4750.00 SqFt **PCI:** 69

Sample Comments:

47	JT REF. CR	M	93.49 Ft
48	L & T CR	L	47.02 Ft
48	L & T CR	M	200.59 Ft

Sample Number: 33 **Type:** R **Area:** 4750.00 SqFt **PCI:** 66

Sample Comments:

47	JT REF. CR	L	47.26 Ft
48	L & T CR	L	57.00 Ft
48	L & T CR	H	90.59 Ft

Sample Number: 38 **Type:** R **Area:** 4728.00 SqFt **PCI:** 53

Sample Comments:

47	JT REF. CR	L	337.59 Ft
47	JT REF. CR	M	98.02 Ft
47	JT REF. CR	H	69.91 Ft
48	L & T CR	L	48.38 Ft
48	L & T CR	M	40.80 Ft
50	PATCHING	L	51.36 SqFt
54	SHOVING	L	681.78 SqFt

Sample Number: 46	**Type:** R	**Area:** 5517.00 SqFt	**PCI:** 76

Sample Comments:

48	L & T CR	L	17.57	Ft
48	L & T CR	M	26.36	Ft
50	PATCHING	H	60.55	SqFt

Sample Number: 55	**Type:** R	**Area:** 5109.00 SqFt	**PCI:** 73

Sample Comments:

47	JT REF. CR	L	523.41	Ft
48	L & T CR	L	22.09	Ft
50	PATCHING	L	.45	SqFt
57	WEATHERING	L	4690.44	SqFt

Network: BGR **Name:** Bangor International Airport

Branch: AGA **Name:** General Aviation Apron **Use:** APRON **Area:** 4,285,583 SqFt

Section: 90 of 34 **From:** AGA - STA: 21+00 **To:** STA: 35+50 **Last Const.:** 6/1/2006

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 265,350 SqFt **Length:** 1,450 Ft **Width:** 183 Ft

Slabs: **Slab Length:** 5,459 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2006 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 57 **Surveyed:** 9

Conditions: **PCI:** 80

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 4503.00 SqFt **PCI:** 76

Sample Comments:

47	JT REF. CR	L	66.11	Ft
48	L & T CR	L	96.88	Ft
48	L & T CR	M	29.58	Ft
57	WEATHERING	L	4225.01	SqFt

Sample Number: 14 **Type:** R **Area:** 4767.00 SqFt **PCI:** 87

Sample Comments:

48	L & T CR	L	64.67	Ft
50	PATCHING	L	.69	SqFt
57	WEATHERING	L	4445.43	SqFt

Sample Number: 18 **Type:** R **Area:** 4905.00 SqFt **PCI:** 85

Sample Comments:

47	JT REF. CR	L	204.16	Ft
57	WEATHERING	L	4598.34	SqFt

Sample Number: 27 **Type:** R **Area:** 3945.00 SqFt **PCI:** 85

Sample Comments:

47	JT REF. CR	L	110.88	Ft
48	L & T CR	L	6.90	Ft
57	WEATHERING	L	3793.43	SqFt

Sample Number: 31 **Type:** R **Area:** 4288.00 SqFt **PCI:** 78

Sample Comments:

47	JT REF. CR	L	311.40	Ft
48	L & T CR	L	17.75	Ft
57	WEATHERING	L	4103.02	SqFt

Sample Number: 36 **Type:** R **Area:** 4294.00 SqFt **PCI:** 75

Sample Comments:

47	JT REF. CR	L	132.20	Ft
48	L & T CR	L	97.53	Ft
48	L & T CR	M	31.87	Ft
57	WEATHERING	L	4062.38	SqFt

Sample Number: 44 **Type:** R **Area:** 5032.00 SqFt **PCI:** 74

Sample Comments:

47	JT REF. CR	L	70.73	Ft
48	L & T CR	L	112.37	Ft
48	L & T CR	M	37.42	Ft
50	PATCHING	L	.39	SqFt
57	WEATHERING	L	4769.29	SqFt

Sample Number: 53 **Type:** R **Area:** 4734.00 SqFt **PCI:** 81

Sample Comments:

45	DEPRESSION	L	28.00	SqFt
48	L & T CR	L	55.11	Ft

48	L & T CR	M	6.71	Ft
57	WEATHERING	L	4328.68	SqFt

Sample Number: 9 **Type:** R **Area:** 4757.00 SqFt **PCI:** 75

Sample Comments:

47	JT REF. CR	L	197.51	Ft
48	L & T CR	L	26.19	Ft
48	L & T CR	M	63.74	Ft
57	WEATHERING	L	4437.57	SqFt

Network: BGR **Name:** Bangor International Airport

Branch: AGA **Name:** General Aviation Apron **Use:** APRON **Area:** 4,285,583 SqFt

Section: 190 of 34 **From:** AGA - STA: 3+00 **To:** STA: 7+77 **Last Const.:** 6/1/2008

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 108,900 SqFt **Length:** 330 Ft **Width:** 330 Ft

Slabs: **Slab Length:** 2,579 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2008 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 20 **Surveyed:** 6

Conditions: **PCI:** 70

Inspection Comments:

Sample Number: 12 **Type:** R **Area:** 6196.00 SqFt **PCI:** 69

Sample Comments:

48	L & T CR	L	38.12	Ft
48	L & T CR	M	232.99	Ft
50	PATCHING	L	.27	SqFt
57	WEATHERING	L	5881.08	SqFt

Sample Number: 16 **Type:** R **Area:** 6196.00 SqFt **PCI:** 62

Sample Comments:

45	DEPRESSION	L	13.70	SqFt
48	L & T CR	L	40.69	Ft
48	L & T CR	M	319.73	Ft
50	PATCHING	L	70.38	SqFt
57	WEATHERING	L	5866.26	SqFt

Sample Number: 18 **Type:** R **Area:** 6103.00 SqFt **PCI:** 69

Sample Comments:

48	L & T CR	L	70.81	Ft
48	L & T CR	M	248.45	Ft
57	WEATHERING	L	5778.13	SqFt

Sample Number: 2 **Type:** R **Area:** 5811.00 SqFt **PCI:** 76

Sample Comments:

48	L & T CR	L	364.59	Ft
50	PATCHING	L	.22	SqFt
57	WEATHERING	L	5570.74	SqFt

Sample Number: 4 **Type:** R **Area:** 5082.00 SqFt **PCI:** 73

Sample Comments:

48	L & T CR	L	398.91	Ft
50	PATCHING	L	.22	SqFt
57	WEATHERING	L	4786.61	SqFt

Sample Number: 6 **Type:** R **Area:** 4684.00 SqFt **PCI:** 76

Sample Comments:

48	L & T CR	L	329.05	Ft
57	WEATHERING	L	4499.30	SqFt

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	AGA	**Name:**	General Aviation Apron	**Use:**	APRON	**Area:**	4,285,583 SqFt

Section: 290 of 34 **From:** AGA - STA: 12+87, 15+08 **To:** STA: 14+06, 16+28 **Last Const.:** 6/1/2005

Surface: PCC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 53,536 SqFt **Length:** 239 Ft **Width:** 224 Ft

Slabs: 157 **Slab Length:** 19 Ft **Slab Width:** 18 Ft **Joint Length:** 5,329 Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2005 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 10 **Surveyed:** 4

Conditions: **PCI:** 69

Inspection Comments:

Sample Number: 3 **Type:** R **Area:** 21.00 Slabs **PCI:** 82

Sample Comments:

65	JT SEAL DMG	L	1.00 Slabs
71	FAULTING	L	3.00 Slabs
74	JOINT SPALL	L	4.00 Slabs

Sample Number: 4 **Type:** R **Area:** 21.00 Slabs **PCI:** 75

Sample Comments:

63	LINEAR CR	M	1.00 Slabs
67	LARGE PATCH	L	1.00 Slabs
71	FAULTING	L	1.00 Slabs
74	JOINT SPALL	L	1.00 Slabs
74	JOINT SPALL	M	1.00 Slabs
75	CORNER SPALL	L	1.00 Slabs

Sample Number: 8 **Type:** R **Area:** 21.00 Slabs **PCI:** 54

Sample Comments:

63	LINEAR CR	M	1.00 Slabs
63	LINEAR CR	H	1.00 Slabs
65	JT SEAL DMG	H	1.00 Slabs
70	SCALING	M	1.00 Slabs
70	SCALING	H	1.00 Slabs
74	JOINT SPALL	L	6.00 Slabs
75	CORNER SPALL	L	1.00 Slabs

Sample Number: 9 **Type:** R **Area:** 21.00 Slabs **PCI:** 66

Sample Comments:

63	LINEAR CR	L	1.00 Slabs
63	LINEAR CR	M	1.00 Slabs
65	JT SEAL DMG	L	1.00 Slabs
67	LARGE PATCH	M	2.00 Slabs
74	JOINT SPALL	M	1.00 Slabs
75	CORNER SPALL	L	1.00 Slabs

Network: BGR **Name:** Bangor International Airport

Branch: AGA **Name:** General Aviation Apron **Use:** APRON **Area:** 4,285,583 SqFt

Section: 260 of 34 **From:** AGA - STA: 9+93 **To:** STA: 19+97 **Last Const.:** 6/1/2011

Surface: PCC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 96,384 SqFt **Length:** 1,004 Ft **Width:** 96 Ft

Slabs: 617 **Slab Length:** 12 Ft **Slab Width:** 12 Ft **Joint Length:** 14,321 Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2011 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 32 **Surveyed:** 18

Conditions: **PCI:** 93

Inspection Comments:

Sample Number: 10 **Type:** R **Area:** 20.00 Slabs **PCI:** 92

Sample Comments:

74	JOINT SPALL	L	4.00 Slabs
75	CORNER SPALL	L	1.00 Slabs

Sample Number: 12 **Type:** R **Area:** 20.00 Slabs **PCI:** 98

Sample Comments:

74	JOINT SPALL	L	1.00 Slabs

Sample Number: 14 **Type:** R **Area:** 20.00 Slabs **PCI:** 96

Sample Comments:

66	SMALL PATCH	L	1.00 Slabs
74	JOINT SPALL	L	2.00 Slabs

Sample Number: 16 **Type:** R **Area:** 20.00 Slabs **PCI:** 96

Sample Comments:

66	SMALL PATCH	L	1.00 Slabs
74	JOINT SPALL	L	2.00 Slabs

Sample Number: 18 **Type:** R **Area:** 17.00 Slabs **PCI:** 96

Sample Comments:

74	JOINT SPALL	L	2.00 Slabs

Sample Number: 19 **Type:** R **Area:** 20.00 Slabs **PCI:** 91

Sample Comments:

70	SCALING	M	1.00 Slabs
74	JOINT SPALL	L	3.00 Slabs

Sample Number: 2 **Type:** R **Area:** 20.00 Slabs **PCI:** 95

Sample Comments:

74	JOINT SPALL	L	3.00 Slabs

Sample Number: 21 **Type:** R **Area:** 20.00 Slabs **PCI:** 76

Sample Comments:

63	LINEAR CR	L	1.00 Slabs
63	LINEAR CR	M	1.00 Slabs
74	JOINT SPALL	L	2.00 Slabs
75	CORNER SPALL	M	2.00 Slabs

Sample Number: 23 **Type:** R **Area:** 20.00 Slabs **PCI:** 84

Sample Comments:

63	LINEAR CR	L	1.00 Slabs
63	LINEAR CR	M	1.00 Slabs

Sample Number: 25 **Type:** R **Area:** 20.00 Slabs **PCI:** 89

Sample Comments:

63	LINEAR CR	M	1.00 Slabs

Sample Number: 26 **Type:** R **Area:** 20.00 Slabs **PCI:** 96

Sample Comments:

74	JOINT SPALL	M	1.00 Slabs

Sample Number: 28 **Type:** R **Area:** 20.00 Slabs **PCI:** 97

Sample Comments:

66	SMALL PATCH	L	4.00 Slabs

Sample Number: 3 **Type:** R **Area:** 20.00 Slabs **PCI:** 94

Sample Comments:

74	JOINT SPALL	L	4.00 Slabs

Sample Number: 30 **Type:** R **Area:** 20.00 Slabs **PCI:** 98

Sample Comments:

74	JOINT SPALL	L	1.00 Slabs

Sample Number: 32 **Type:** R **Area:** 14.00 Slabs **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 5 **Type:** R **Area:** 20.00 Slabs **PCI:** 89

Sample Comments:

66	SMALL PATCH	L	2.00 Slabs
74	JOINT SPALL	L	4.00 Slabs
74	JOINT SPALL	M	1.00 Slabs

Sample Number: 7 **Type:** R **Area:** 20.00 Slabs **PCI:** 84

Sample Comments:

66	SMALL PATCH	L	1.00 Slabs
74	JOINT SPALL	L	4.00 Slabs
74	JOINT SPALL	M	2.00 Slabs
75	CORNER SPALL	L	1.00 Slabs

Sample Number: 9 **Type:** R **Area:** 20.00 Slabs **PCI:** 97

Sample Comments:

74	JOINT SPALL	L	2.00 Slabs

Network: BGR			**Name:** Bangor International Airport				
Branch: AGA	**Name:** General Aviation Apron		**Use:** APRON		**Area:** 4,285,583 SqFt		

Section: 360 of 34 **From:** AGA - STA: 7+90 **To:** STA: 8+95 **Last Const.:** 6/1/2008

Surface: PCC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 31,500 SqFt **Length:** 105 Ft **Width:** 300 Ft

Slabs: 140 **Slab Length:** 15 Ft **Slab Width:** 15 Ft **Joint Length:** 3,795 Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2008 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 8 **Surveyed:** 7

Conditions: **PCI:** 87

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 20.00 Slabs **PCI:** 81

Sample Comments:

65	JT SEAL DMG	L	1.00 Slabs
74	JOINT SPALL	L	2.00 Slabs
74	JOINT SPALL	M	4.00 Slabs

Sample Number: 3 **Type:** R **Area:** 20.00 Slabs **PCI:** 83

Sample Comments:

65	JT SEAL DMG	L	1.00 Slabs
74	JOINT SPALL	L	3.00 Slabs
74	JOINT SPALL	M	3.00 Slabs

Sample Number: 4 **Type:** R **Area:** 15.00 Slabs **PCI:** 98

Sample Comments:

65	JT SEAL DMG	L	1.00 Slabs

Sample Number: 5 **Type:** R **Area:** 20.00 Slabs **PCI:** 87

Sample Comments:

65	JT SEAL DMG	L	1.00 Slabs
66	SMALL PATCH	L	1.00 Slabs
74	JOINT SPALL	L	4.00 Slabs
74	JOINT SPALL	M	1.00 Slabs

Sample Number: 6 **Type:** R **Area:** 15.00 Slabs **PCI:** 76

Sample Comments:

63	LINEAR CR	M	2.00 Slabs
65	JT SEAL DMG	L	1.00 Slabs

Sample Number: 7 **Type:** R **Area:** 20.00 Slabs **PCI:** 87

Sample Comments:

65	JT SEAL DMG	L	1.00 Slabs
74	JOINT SPALL	L	2.00 Slabs
74	JOINT SPALL	M	2.00 Slabs

Sample Number: 8 **Type:** R **Area:** 15.00 Slabs **PCI:** 96

Sample Comments:

65	JT SEAL DMG	L	1.00 Slabs
74	JOINT SPALL	L	1.00 Slabs

Network: BGR		**Name:** Bangor International Airport			
Branch: AGA	**Name:** General Aviation Apron	**Use:** APRON	**Area:** 4,285,583 SqFt		

Section: 110 of 34 **From:** AGA - STA: 4+00 **To:** STA: 9+50 **Last Const.:** 6/1/2002

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 192,500 SqFt **Length:** 550 Ft **Width:** 350 Ft

Slabs: **Slab Length:** 4,383 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2002 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 34 **Surveyed:** 8

Conditions: **PCI:** 73

Inspection Comments:

Sample Number: 12 **Type:** R **Area:** 5836.00 SqFt **PCI:** 72

Sample Comments:

47	JT REF. CR	L	151.36	Ft
48	L & T CR	L	170.04	Ft
48	L & T CR	M	77.28	Ft
57	WEATHERING	L	5556.20	SqFt

Sample Number: 15 **Type:** R **Area:** 5631.00 SqFt **PCI:** 81

Sample Comments:

47	JT REF. CR	L	53.17	Ft
48	L & T CR	L	62.54	Ft
48	L & T CR	M	13.09	Ft
57	WEATHERING	L	4990.94	SqFt

Sample Number: 18 **Type:** R **Area:** 5845.00 SqFt **PCI:** 75

Sample Comments:

47	JT REF. CR	L	101.42	Ft
48	L & T CR	L	162.56	Ft
48	L & T CR	M	5.11	Ft
50	PATCHING	L	.99	SqFt
57	WEATHERING	L	5560.48	SqFt

Sample Number: 21 **Type:** R **Area:** 5164.00 SqFt **PCI:** 71

Sample Comments:

47	JT REF. CR	L	423.35	Ft
48	L & T CR	L	131.57	Ft
48	L & T CR	M	63.87	Ft
57	WEATHERING	L	4812.53	SqFt

Sample Number: 23 **Type:** R **Area:** 5641.00 SqFt **PCI:** 81

Sample Comments:

47	JT REF. CR	M	15.87	Ft
48	L & T CR	L	57.49	Ft
48	L & T CR	M	17.42	Ft
57	WEATHERING	L	5207.30	SqFt

Sample Number: 26 **Type:** R **Area:** 5640.00 SqFt **PCI:** 55

Sample Comments:

47	JT REF. CR	L	686.61	Ft
48	L & T CR	L	31.65	Ft
48	L & T CR	M	5.75	Ft
50	PATCHING	L	.32	SqFt
53	RUTTING	L	323.31	SqFt
57	WEATHERING	L	5112.13	SqFt

Sample Number: 29 **Type:** R **Area:** 5831.00 SqFt **PCI:** 77

Sample Comments:

48	L & T CR	L	127.14	Ft
48	L & T CR	M	51.24	Ft

50	PATCHING	L	.44	SqFt
57	WEATHERING	L	5383.40	SqFt

Sample Number: 32 **Type:** R **Area:** 5162.00 SqFt **PCI:** 72

Sample Comments:

47	JT REF. CR	L	96.76	Ft
48	L & T CR	L	202.93	Ft
48	L & T CR	M	65.82	Ft
57	WEATHERING	L	4910.95	SqFt

Network:	BGR			**Name:**	Bangor International Airport		

Branch:	AGA	**Name:**	General Aviation Apron	**Use:**	APRON	**Area:**	4,285,583 SqFt

Section: 50 of 34 **From:** AGA - STA: 10+00 **To:** STA: 20+00 **Last Const.:** 10/31/2015

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 624,000 SqFt **Length:** 1,000 Ft **Width:** 624 Ft

Slabs: **Slab Length:** 8,693 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 1/6/1990 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Work Date: 10/31/2015 **Work Type:** Reconstruct with AC **Code:** RECONAC **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 110 **Surveyed:** 13

Conditions: **PCI:** 75

Inspection Comments:

Sample Number: 104 **Type:** R **Area:** 5520.00 SqFt **PCI:** 74

Sample Comments:

47	JT REF. CR	L	395.01	Ft
48	L & T CR	L	310.71	Ft
57	WEATHERING	L	5395.37	SqFt

Sample Number: 16 **Type:** R **Area:** 6320.00 SqFt **PCI:** 79

Sample Comments:

48	L & T CR	L	205.97	Ft
48	L & T CR	M	20.32	Ft
57	WEATHERING	L	5954.94	SqFt

Sample Number: 2 **Type:** R **Area:** 6319.00 SqFt **PCI:** 80

Sample Comments:

48	L & T CR	L	95.26	Ft
48	L & T CR	M	54.15	Ft
57	WEATHERING	L	6180.60	SqFt

Sample Number: 24 **Type:** R **Area:** 6262.00 SqFt **PCI:** 73

Sample Comments:

48	L & T CR	L	130.44	Ft
48	L & T CR	M	144.10	Ft
57	WEATHERING	L	6071.16	SqFt

Sample Number: 31 **Type:** R **Area:** 5949.00 SqFt **PCI:** 81

Sample Comments:

48	L & T CR	L	162.26	Ft
48	L & T CR	M	8.79	Ft
57	WEATHERING	L	5746.19	SqFt

Sample Number: 46 **Type:** R **Area:** 3609.00 SqFt **PCI:** 73

Sample Comments:

48	L & T CR	L	116.09	Ft
48	L & T CR	M	83.70	Ft
57	WEATHERING	L	3442.60	SqFt

Sample Number: 53 **Type:** R **Area:** 5531.00 SqFt **PCI:** 70

Sample Comments:

48	L & T CR	L	106.18	Ft
48	L & T CR	M	173.42	Ft
57	WEATHERING	L	5392.04	SqFt

Sample Number: 60 **Type:** R **Area:** 5651.00 SqFt **PCI:** 77

Sample Comments:

48	L & T CR	L	96.61	Ft
48	L & T CR	M	72.51	Ft
57	WEATHERING	L	3406.55	SqFt

Sample Number: 68	**Type:** R	**Area:** 5551.00 SqFt	**PCI:** 74

Sample Comments:

48	L & T CR	L	136.36	Ft
48	L & T CR	M	112.63	Ft
57	WEATHERING	L	5402.88	SqFt

Sample Number: 75	**Type:** R	**Area:** 5642.00 SqFt	**PCI:** 80

Sample Comments:

48	L & T CR	L	161.57	Ft
48	L & T CR	M	30.85	Ft
57	WEATHERING	L	3402.98	SqFt

Sample Number: 9	**Type:** R	**Area:** 6260.00 SqFt	**PCI:** 71

Sample Comments:

48	L & T CR	L	54.32	Ft
48	L & T CR	M	215.15	Ft
57	WEATHERING	L	6071.10	SqFt

Sample Number: 90	**Type:** R	**Area:** 5407.00 SqFt	**PCI:** 75

Sample Comments:

47	JT REF. CR	L	400.81	Ft
48	L & T CR	L	225.35	Ft
50	PATCHING	L	.79	SqFt
57	WEATHERING	L	5248.66	SqFt

Sample Number: 97	**Type:** R	**Area:** 5408.00 SqFt	**PCI:** 67

Sample Comments:

47	JT REF. CR	L	296.31	Ft
48	L & T CR	L	308.34	Ft
50	PATCHING	L	2.97	SqFt
56	SWELLING	M	7.94	SqFt
57	WEATHERING	L	5208.35	SqFt

Network: BGR **Name:** Bangor International Airport

Branch: AGA **Name:** General Aviation Apron **Use:** APRON **Area:** 4,285,583 SqFt

Section: 340 of 34 **From:** AGA - STA: 11+31 **To:** STA: 20+00 **Last Const.:** 6/1/1998

Surface: PCC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 49,533 SqFt **Length:** 869 Ft **Width:** 57 Ft

Slabs: 220 **Slab Length:** 15 Ft **Slab Width:** 15 Ft **Joint Length:** 5,678 Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/1998 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 11 **Surveyed:** 9

Conditions: **PCI:** 38

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 23.00 Slabs **PCI:** 46

Sample Comments:

66	SMALL PATCH	L	2.00 Slabs
66	SMALL PATCH	M	1.00 Slabs
76	ASR	M	23.00 Slabs

Sample Number: 10 **Type:** R **Area:** 21.00 Slabs **PCI:** 13

Sample Comments:

66	SMALL PATCH	L	2.00 Slabs
74	JOINT SPALL	M	1.00 Slabs
76	ASR	M	17.00 Slabs
76	ASR	H	4.00 Slabs

Sample Number: 11 **Type:** R **Area:** 14.00 Slabs **PCI:** 31

Sample Comments:

66	SMALL PATCH	L	1.00 Slabs
76	ASR	M	13.00 Slabs
76	ASR	H	1.00 Slabs

Sample Number: 3 **Type:** R **Area:** 20.00 Slabs **PCI:** 48

Sample Comments:

66	SMALL PATCH	L	2.00 Slabs
76	ASR	M	20.00 Slabs

Sample Number: 4 **Type:** R **Area:** 16.00 Slabs **PCI:** 50

Sample Comments:

76	ASR	M	16.00 Slabs

Sample Number: 5 **Type:** R **Area:** 25.00 Slabs **PCI:** 38

Sample Comments:

66	SMALL PATCH	L	1.00 Slabs
66	SMALL PATCH	M	1.00 Slabs
67	LARGE PATCH	M	1.00 Slabs
70	SCALING	M	1.00 Slabs
76	ASR	M	25.00 Slabs

Sample Number: 6 **Type:** R **Area:** 20.00 Slabs **PCI:** 50

Sample Comments:

76	ASR	M	20.00 Slabs

Sample Number: 8 **Type:** R **Area:** 21.00 Slabs **PCI:** 16

Sample Comments:

66	SMALL PATCH	L	2.00 Slabs
76	ASR	M	11.00 Slabs
76	ASR	H	10.00 Slabs

Sample Number: 9 **Type:** R **Area:** 21.00 Slabs **PCI:** 48

Sample Comments:

66	SMALL PATCH	L	2.00	Slabs
76	ASR	L	6.00	Slabs
76	ASR	M	15.00	Slabs

Network: BGR **Name:** Bangor International Airport

Branch: AGA **Name:** General Aviation Apron **Use:** APRON **Area:** 4,285,583 SqFt

Section: 370 of 34 **From:** AGA - STA:14+84,16+17,17+50,18+83 **To:** STA: 15+29, 16+62, 17+95, 19+28 **Last Const.:** 6/1/2012

Surface: PCC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 16,110 SqFt **Length:** 179 Ft **Width:** 90 Ft

Slabs: 72 **Slab Length:** 15 Ft **Slab Width:** 15 Ft **Joint Length:** 1,879 Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2012 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 3 **Surveyed:** 3

Conditions: **PCI:** 100

Inspection Comments:

Sample Number: 2 **Type:** R **Area:** 18.00 Slabs **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 3 **Type:** R **Area:** 18.00 Slabs **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 4 **Type:** R **Area:** 18.00 Slabs **PCI:** 100

Sample Comments:

<No Distress>

Network: BGR		**Name:** Bangor International Airport					
Branch: AGA	**Name:** General Aviation Apron		**Use:** APRON		**Area:** 4,285,583 SqFt		

Section: 210 of 34 **From:** AGA - STA: 0+50 **To:** STA: 22+51 **Last Const.:** 6/1/2012

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 147,467 SqFt **Length:** 2,201 Ft **Width:** 67 Ft

Slabs: **Slab Length:** 3,281 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2012 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 33 **Surveyed:** 11

Conditions: **PCI:** 90

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 4050.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 11 **Type:** R **Area:** 4739.00 SqFt **PCI:** 91

Sample Comments:

48	L & T CR	L	7.15	Ft
48	L & T CR	M	21.10	Ft

Sample Number: 14 **Type:** R **Area:** 4641.00 SqFt **PCI:** 97

Sample Comments:

48	L & T CR	L	11.74	Ft

Sample Number: 17 **Type:** R **Area:** 4385.00 SqFt **PCI:** 85

Sample Comments:

45	DEPRESSION	H	1.50	SqFt
48	L & T CR	L	7.68	Ft

Sample Number: 20 **Type:** R **Area:** 6068.00 SqFt **PCI:** 90

Sample Comments:

48	L & T CR	L	20.16	Ft
48	L & T CR	M	25.85	Ft

Sample Number: 26 **Type:** R **Area:** 3676.00 SqFt **PCI:** 90

Sample Comments:

48	L & T CR	L	11.13	Ft
48	L & T CR	M	14.81	Ft

Sample Number: 29 **Type:** R **Area:** 2926.00 SqFt **PCI:** 87

Sample Comments:

48	L & T CR	M	12.07	Ft
50	PATCHING	L	59.57	SqFt

Sample Number: 3 **Type:** R **Area:** 4331.00 SqFt **PCI:** 97

Sample Comments:

48	L & T CR	L	5.06	Ft

Sample Number: 32 **Type:** R **Area:** 4215.00 SqFt **PCI:** 81

Sample Comments:

48	L & T CR	M	69.85	Ft
50	PATCHING	M	4.94	SqFt

Sample Number: 5 **Type:** R **Area:** 4377.00 SqFt **PCI:** 80

Sample Comments:

48	L & T CR	M	4.19	Ft
50	PATCHING	H	4.03	SqFt

Sample Number: 8 **Type:** R **Area:** 5368.00 SqFt **PCI:** 85

Sample Comments:

48	L & T CR	L	24.09	Ft
48	L & T CR	M	13.03	Ft
50	PATCHING	M	6.97	SqFt

Network: BGR	**Name:** Bangor International Airport		
Branch: AGA	**Name:** General Aviation Apron	**Use:** APRON	**Area:** 4,285,583 SqFt

Section: 70 of 34 **From:** AGA - STA: 1+55 **To:** STA: 11+59 **Last Const.:** 6/1/2007

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 125,114 SqFt **Length:** 1,034 Ft **Width:** 121 Ft

Slabs: **Slab Length:** 3,104 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2007 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 21 **Surveyed:** 6

Conditions: **PCI:** 81

Inspection Comments:

Sample Number: 13 **Type:** R **Area:** 6285.00 SqFt **PCI:** 86

Sample Comments:

48	L & T CR	L	104.44	Ft
50	PATCHING	L	.26	SqFt
57	WEATHERING	L	6071.88	SqFt

Sample Number: 17 **Type:** R **Area:** 4639.00 SqFt **PCI:** 94

Sample Comments:

57	WEATHERING	L	4432.52	SqFt

Sample Number: 19 **Type:** R **Area:** 5946.00 SqFt **PCI:** 68

Sample Comments:

47	JT REF. CR	L	672.66	Ft
48	L & T CR	L	70.62	Ft
56	SWELLING	L	127.79	SqFt
57	WEATHERING	L	5345.69	SqFt

Sample Number: 3 **Type:** R **Area:** 6307.00 SqFt **PCI:** 81

Sample Comments:

47	JT REF. CR	L	56.48	Ft
48	L & T CR	L	179.82	Ft
50	PATCHING	L	.18	SqFt
57	WEATHERING	L	6155.73	SqFt

Sample Number: 5 **Type:** R **Area:** 6303.00 SqFt **PCI:** 81

Sample Comments:

48	L & T CR	L	139.18	Ft
48	L & T CR	M	9.79	Ft
50	PATCHING	L	.08	SqFt
57	WEATHERING	L	6034.05	SqFt

Sample Number: 9 **Type:** R **Area:** 6294.00 SqFt **PCI:** 79

Sample Comments:

47	JT REF. CR	L	112.81	Ft
48	L & T CR	L	119.64	Ft
48	L & T CR	M	2.12	Ft
57	WEATHERING	L	6129.24	SqFt

Network: BGR		**Name:** Bangor International Airport			
Branch: AGA	**Name:** General Aviation Apron		**Use:** APRON	**Area:** 4,285,583 SqFt	

Section: 170 of 34 **From:** AGA - STA: 3+00 **To:** STA: 7+77 **Last Const.:** 6/1/2008

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 69,642 SqFt **Length:** 477 Ft **Width:** 146 Ft

Slabs: **Slab Length:** 2,008 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2008 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 12 **Surveyed:** 3

Conditions: **PCI:** 79

Inspection Comments:

Sample Number: 11 **Type:** R **Area:** 5862.00 SqFt **PCI:** 74

Sample Comments:

48	L & T CR	L	311.22	Ft
48	L & T CR	M	6.54	Ft
50	PATCHING	L	.27	SqFt
57	WEATHERING	L	5639.17	SqFt

Sample Number: 5 **Type:** R **Area:** 5507.00 SqFt **PCI:** 84

Sample Comments:

48	L & T CR	L	183.27	Ft
57	WEATHERING	L	5056.46	SqFt

Sample Number: 7 **Type:** R **Area:** 5500.00 SqFt **PCI:** 79

Sample Comments:

48	L & T CR	L	302.65	Ft
57	WEATHERING	L	5249.39	SqFt

Network: BGR			**Name:** Bangor International Airport				
Branch: AGA		**Name:** General Aviation Apron		**Use:** APRON		**Area:** 4,285,583 SqFt	

Section: 230 of 34 **From:** AGA - STA: 10+79 **To:** STA: 19+81 **Last Const.:** 6/1/2012

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 420,332 SqFt **Length:** 902 Ft **Width:** 466 Ft

Slabs: **Slab Length:** 2,778 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2012 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 87 **Surveyed:** 14

Conditions: **PCI:** 90

Inspection Comments:

Sample Number: 12 **Type:** R **Area:** 4900.00 SqFt **PCI:** 96

Sample Comments:

48	L & T CR	L	19.63	Ft

Sample Number: 18 **Type:** R **Area:** 4900.00 SqFt **PCI:** 96

Sample Comments:

48	L & T CR	L	34.43	Ft

Sample Number: 24 **Type:** R **Area:** 4900.00 SqFt **PCI:** 90

Sample Comments:

48	L & T CR	L	7.89	Ft
48	L & T CR	M	29.80	Ft

Sample Number: 30 **Type:** R **Area:** 4900.00 SqFt **PCI:** 93

Sample Comments:

48	L & T CR	L	7.81	Ft
48	L & T CR	M	8.23	Ft

Sample Number: 36 **Type:** R **Area:** 4900.00 SqFt **PCI:** 74

Sample Comments:

53	RUTTING	L	162.42	SqFt
53	RUTTING	M	23.43	SqFt

Sample Number: 43 **Type:** R **Area:** 3066.00 SqFt **PCI:** 97

Sample Comments:

48	L & T CR	L	4.30	Ft

Sample Number: 49 **Type:** R **Area:** 4900.00 SqFt **PCI:** 81

Sample Comments:

48	L & T CR	M	139.00	Ft

Sample Number: 5 **Type:** R **Area:** 4915.00 SqFt **PCI:** 90

Sample Comments:

48	L & T CR	L	36.66	Ft
48	L & T CR	M	10.90	Ft

Sample Number: 55 **Type:** R **Area:** 4900.00 SqFt **PCI:** 87

Sample Comments:

48	L & T CR	M	23.69	Ft
49	OIL SPILLAGE	L	104.14	SqFt

Sample Number: 61 **Type:** R **Area:** 4900.00 SqFt **PCI:** 87

Sample Comments:

48	L & T CR	L	9.28	Ft
48	L & T CR	M	62.77	Ft

Sample Number: 67 **Type:** R **Area:** 4900.00 SqFt **PCI:** 92

Sample Comments:

48	L & T CR	M	24.89	Ft

Sample Number: 74 **Type:** R **Area:** 3848.00 SqFt **PCI:** 92

Sample Comments:

48	L & T CR	L	4.62	Ft
48	L & T CR	M	14.53	Ft

Sample Number: 80 **Type:** R **Area:** 4630.00 SqFt **PCI:** 96

Sample Comments:

47	JT REF. CR	L	68.96	Ft

Sample Number: 86 **Type:** R **Area:** 4269.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Network:	BGR		**Name:**	Bangor International Airport			
Branch:	AGA	**Name:**	General Aviation Apron	**Use:**	APRON	**Area:**	4,285,583 SqFt

Section: 140 of 34 **From:** AGA - STA: 3+00 **To:** STA: 6+60 **Last Const.:** 6/1/1998

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 99,000 SqFt **Length:** 360 Ft **Width:** 275 Ft

Slabs: **Slab Length:** 1,949 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/1998 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 18 **Surveyed:** 5

Conditions: **PCI:** 66

Inspection Comments:

Sample Number: 10 **Type:** R **Area:** 4776.00 SqFt **PCI:** 72

Sample Comments:

48	L & T CR	L	55.51	Ft
48	L & T CR	M	137.00	Ft
57	WEATHERING	L	4340.20	SqFt

Sample Number: 14 **Type:** R **Area:** 5793.00 SqFt **PCI:** 83

Sample Comments:

48	L & T CR	L	78.15	Ft
48	L & T CR	M	19.44	Ft
57	WEATHERING	L	5476.91	SqFt

Sample Number: 18 **Type:** R **Area:** 8527.00 SqFt **PCI:** 51

Sample Comments:

47	JT REF. CR	L	48.56	Ft
47	JT REF. CR	M	23.74	Ft
48	L & T CR	L	379.47	Ft
48	L & T CR	M	127.77	Ft
50	PATCHING	M	8.90	SqFt
56	SWELLING	L	221.12	SqFt
56	SWELLING	M	254.93	SqFt
57	WEATHERING	L	8246.93	SqFt

Sample Number: 2 **Type:** R **Area:** 5791.00 SqFt **PCI:** 68

Sample Comments:

48	L & T CR	L	14.87	Ft
48	L & T CR	M	11.27	Ft
50	PATCHING	L	.27	SqFt
54	SHOVING	L	728.29	SqFt
57	WEATHERING	L	5229.34	SqFt

Sample Number: 6 **Type:** R **Area:** 5794.00 SqFt **PCI:** 66

Sample Comments:

48	L & T CR	L	211.54	Ft
48	L & T CR	M	213.44	Ft
50	PATCHING	L	.26	SqFt
57	WEATHERING	L	5557.93	SqFt

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	AGA	**Name:**	General Aviation Apron	**Use:**	APRON	**Area:**	4,285,583 SqFt

Section: 220 of 34 **From:** AGA - STA: 10+79 **To:** STA: 19+81 **Last Const.:** 6/1/2012

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 112,750 SqFt **Length:** 902 Ft **Width:** 125 Ft

Slabs: **Slab Length:** 2,708 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2012 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 24 **Surveyed:** 10

Conditions: **PCI:** 92

Inspection Comments:

Sample Number: 11 **Type:** R **Area:** 4900.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 14 **Type:** R **Area:** 3440.00 SqFt **PCI:** 73

Sample Comments:

48	L & T CR	M	13.13 Ft
48	L & T CR	H	52.75 Ft

Sample Number: 16 **Type:** R **Area:** 6951.00 SqFt **PCI:** 92

Sample Comments:

48	L & T CR	L	15.11 Ft
48	L & T CR	M	16.35 Ft

Sample Number: 18 **Type:** R **Area:** 4900.00 SqFt **PCI:** 88

Sample Comments:

48	L & T CR	L	28.38 Ft
48	L & T CR	M	26.50 Ft

Sample Number: 2 **Type:** R **Area:** 4493.00 SqFt **PCI:** 94

Sample Comments:

48	L & T CR	L	5.87 Ft
48	L & T CR	M	7.36 Ft

Sample Number: 21 **Type:** R **Area:** 2867.00 SqFt **PCI:** 91

Sample Comments:

48	L & T CR	M	19.20 Ft

Sample Number: 23 **Type:** R **Area:** 6673.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 4 **Type:** R **Area:** 4877.00 SqFt **PCI:** 94

Sample Comments:

48	L & T CR	L	5.10 Ft
48	L & T CR	M	5.92 Ft

Sample Number: 6 **Type:** R **Area:** 5908.00 SqFt **PCI:** 89

Sample Comments:

48	L & T CR	L	20.66 Ft
48	L & T CR	M	30.32 Ft

Sample Number: 9 **Type:** R **Area:** 4076.00 SqFt **PCI:** 84

Sample Comments:

48	L & T CR	M	84.44 Ft

Network:	BGR		**Name:**	Bangor International Airport			
Branch:	AGA	**Name:**	General Aviation Apron	**Use:**	APRON	**Area:**	4,285,583 SqFt

Section: 320 of 34 **From:** AGA - STA: 5+02, 7+74 **To:** STA: 7+06, 9+28 **Last Const.:** 6/1/2002

Surface: PCC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 61,934 SqFt **Length:** 358 Ft **Width:** 173 Ft

Slabs: 214 **Slab Length:** 17 Ft **Slab Width:** 17 Ft **Joint Length:** 6,755 Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2002 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 10 **Surveyed:** 8

Conditions: **PCI:** 81

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 26.00 Slabs **PCI:** 89

Sample Comments:

63	LINEAR CR	L	1.00 Slabs
65	JT SEAL DMG	L	1.00 Slabs
74	JOINT SPALL	L	2.00 Slabs
75	CORNER SPALL	M	1.00 Slabs

Sample Number: 10 **Type:** R **Area:** 24.00 Slabs **PCI:** 83

Sample Comments:

65	JT SEAL DMG	H	1.00 Slabs
74	JOINT SPALL	L	5.00 Slabs

Sample Number: 2 **Type:** R **Area:** 21.00 Slabs **PCI:** 66

Sample Comments:

65	JT SEAL DMG	H	1.00 Slabs
66	SMALL PATCH	L	1.00 Slabs
66	SMALL PATCH	M	1.00 Slabs
70	SCALING	H	1.00 Slabs
74	JOINT SPALL	H	1.00 Slabs

Sample Number: 3 **Type:** R **Area:** 21.00 Slabs **PCI:** 71

Sample Comments:

63	LINEAR CR	M	2.00 Slabs
65	JT SEAL DMG	H	1.00 Slabs
66	SMALL PATCH	M	1.00 Slabs
75	CORNER SPALL	L	1.00 Slabs

Sample Number: 4 **Type:** R **Area:** 21.00 Slabs **PCI:** 91

Sample Comments:

65	JT SEAL DMG	L	1.00 Slabs
74	JOINT SPALL	L	1.00 Slabs
74	JOINT SPALL	M	1.00 Slabs
75	CORNER SPALL	L	1.00 Slabs

Sample Number: 5 **Type:** R **Area:** 18.00 Slabs **PCI:** 84

Sample Comments:

65	JT SEAL DMG	H	1.00 Slabs
75	CORNER SPALL	M	1.00 Slabs

Sample Number: 8 **Type:** R **Area:** 12.00 Slabs **PCI:** 95

Sample Comments:

65	JT SEAL DMG	L	1.00 Slabs
75	CORNER SPALL	L	1.00 Slabs

Sample Number: 9 **Type:** R **Area:** 22.00 Slabs **PCI:** 76

Sample Comments:

63	LINEAR CR	L	2.00 Slabs
65	JT SEAL DMG	H	1.00 Slabs
66	SMALL PATCH	L	2.00 Slabs

74	JOINT SPALL	M	1.00	Slabs
75	CORNER SPALL	L	1.00	Slabs

Network:	BGR		**Name:**	Bangor International Airport			
Branch:	AGA	**Name:**	General Aviation Apron	**Use:**	APRON	**Area:**	4,285,583 SqFt

Section: 60 of 34 **From:** AGA - STA: 0+49 **To:** STA: 9+97 **Last Const.:** 10/31/2012

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 249,324 SqFt **Length:** 948 Ft **Width:** 263 Ft

Slabs: **Slab Length:** 4,317 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 10/31/2012 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 42 **Surveyed:** 6

Conditions: **PCI:** 76

Inspection Comments:

Sample Number: 12 **Type:** R **Area:** 5796.00 SqFt **PCI:** 76

Sample Comments:

47	JT REF. CR	L	465.07	Ft
48	L & T CR	L	210.24	Ft
57	WEATHERING	L	5560.40	SqFt

Sample Number: 19 **Type:** R **Area:** 5810.00 SqFt **PCI:** 73

Sample Comments:

47	JT REF. CR	L	465.26	Ft
48	L & T CR	L	285.45	Ft
50	PATCHING	L	.79	SqFt
57	WEATHERING	L	5644.19	SqFt

Sample Number: 26 **Type:** R **Area:** 6061.00 SqFt **PCI:** 83

Sample Comments:

48	L & T CR	L	183.54	Ft
50	PATCHING	L	.39	SqFt
57	WEATHERING	L	5544.58	SqFt

Sample Number: 33 **Type:** R **Area:** 6015.00 SqFt **PCI:** 82

Sample Comments:

48	L & T CR	L	257.92	Ft
57	WEATHERING	L	5142.21	SqFt

Sample Number: 40 **Type:** R **Area:** 6064.00 SqFt **PCI:** 66

Sample Comments:

47	JT REF. CR	L	478.05	Ft
48	L & T CR	L	433.11	Ft
48	L & T CR	M	131.81	Ft
57	WEATHERING	L	5760.39	SqFt

Sample Number: 5 **Type:** R **Area:** 5803.00 SqFt **PCI:** 78

Sample Comments:

47	JT REF. CR	L	332.90	Ft
48	L & T CR	L	192.49	Ft
57	WEATHERING	L	5638.19	SqFt

Network:	BGR		**Name:**	Bangor International Airport			
Branch:	AGA	**Name:**	General Aviation Apron	**Use:**	APRON	**Area:**	4,285,583 SqFt

Section: 270 of 34 **From:** AGA - STA: 0+49 **To:** STA: 9+97 **Last Const.:** 6/1/2010

Surface: PCC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 45,504 SqFt **Length:** 948 Ft **Width:** 48 Ft

Slabs: 232 **Slab Length:** 14 Ft **Slab Width:** 14 Ft **Joint Length:** 5,505 Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2010 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 15 **Surveyed:** 11

Conditions: **PCI:** 88

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 20.00 Slabs **PCI:** 89

Sample Comments:

66	SMALL PATCH	L	2.00 Slabs
74	JOINT SPALL	L	7.00 Slabs

Sample Number: 10 **Type:** R **Area:** 20.00 Slabs **PCI:** 75

Sample Comments:

66	SMALL PATCH	M	1.00 Slabs
74	JOINT SPALL	L	2.00 Slabs
74	JOINT SPALL	M	1.00 Slabs
74	JOINT SPALL	H	1.00 Slabs
75	CORNER SPALL	M	1.00 Slabs

Sample Number: 11 **Type:** R **Area:** 20.00 Slabs **PCI:** 92

Sample Comments:

66	SMALL PATCH	L	3.00 Slabs
74	JOINT SPALL	L	1.00 Slabs
74	JOINT SPALL	M	1.00 Slabs

Sample Number: 12 **Type:** R **Area:** 20.00 Slabs **PCI:** 91

Sample Comments:

66	SMALL PATCH	L	2.00 Slabs
74	JOINT SPALL	L	2.00 Slabs
74	JOINT SPALL	M	1.00 Slabs

Sample Number: 14 **Type:** R **Area:** 20.00 Slabs **PCI:** 91

Sample Comments:

66	SMALL PATCH	L	1.00 Slabs
74	JOINT SPALL	L	3.00 Slabs
74	JOINT SPALL	M	1.00 Slabs

Sample Number: 15 **Type:** R **Area:** 24.00 Slabs **PCI:** 79

Sample Comments:

63	LINEAR CR	M	1.00 Slabs
66	SMALL PATCH	L	4.00 Slabs
74	JOINT SPALL	L	3.00 Slabs
74	JOINT SPALL	M	3.00 Slabs

Sample Number: 3 **Type:** R **Area:** 20.00 Slabs **PCI:** 94

Sample Comments:

66	SMALL PATCH	L	1.00 Slabs
74	JOINT SPALL	L	3.00 Slabs

Sample Number: 4 **Type:** R **Area:** 20.00 Slabs **PCI:** 91

Sample Comments:

74	JOINT SPALL	L	3.00 Slabs
75	CORNER SPALL	M	1.00 Slabs

Sample Number:	6	**Type:**	R	**Area:**	20.00 Slabs	**PCI:**	91

Sample Comments:

66	SMALL PATCH	L	1.00	Slabs
74	JOINT SPALL	L	6.00	Slabs

Sample Number:	7	**Type:**	R	**Area:**	20.00 Slabs	**PCI:**	90

Sample Comments:

66	SMALL PATCH	L	1.00	Slabs
74	JOINT SPALL	L	7.00	Slabs

Sample Number:	8	**Type:**	R	**Area:**	20.00 Slabs	**PCI:**	87

Sample Comments:

66	SMALL PATCH	L	2.00	Slabs
66	SMALL PATCH	M	1.00	Slabs
74	JOINT SPALL	L	6.00	Slabs

Network:	BGR			**Name:**	Bangor International Airport		

Branch:	AGA	**Name:**	General Aviation Apron	**Use:**	APRON	**Area:**	4,285,583 SqFt

Section: 280 of 34 **From:** AGA - STA: 3+75 **To:** STA: 11+59 **Last Const.:** 6/1/2007

Surface: PCC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 18,408 SqFt **Length:** 1,534 Ft **Width:** 12 Ft

Slabs: 47 **Slab Length:** 23 Ft **Slab Width:** 17 Ft **Joint Length:** 337 Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2007 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 63

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 23.00 Slabs **PCI:** 60

Sample Comments:

63	LINEAR CR	L	4.00	Slabs
63	LINEAR CR	H	1.00	Slabs
65	JT SEAL DMG	L	1.00	Slabs
74	JOINT SPALL	L	1.00	Slabs
74	JOINT SPALL	H	3.00	Slabs

Sample Number: 2 **Type:** R **Area:** 22.00 Slabs **PCI:** 66

Sample Comments:

63	LINEAR CR	L	3.00	Slabs
66	SMALL PATCH	L	2.00	Slabs
70	SCALING	H	1.00	Slabs
74	JOINT SPALL	L	2.00	Slabs
74	JOINT SPALL	M	1.00	Slabs
75	CORNER SPALL	H	1.00	Slabs

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	AGA	**Name:**	General Aviation Apron	**Use:**	APRON	**Area:**	4,285,583 SqFt

Section: 350 of 34 **From:** AGA - STA: 5+56 **To:** STA: 7+78 **Last Const.:** 9/1/2011

Surface: PCC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 2,220 SqFt **Length:** 222 Ft **Width:** 10 Ft

Slabs: 13 **Slab Length:** 15 Ft **Slab Width:** 11 Ft **Joint Length:** 118 Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 9/1/2011 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 97

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 2210.00 Slabs **PCI:** 97

Sample Comments:

65	JT SEAL DMG	L	1.00 Slabs
75	CORNER SPALL	M	1.00 Slabs

Network: BGR **Name:** Bangor International Airport

Branch: AGA **Name:** General Aviation Apron **Use:** APRON **Area:** 4,285,583 SqFt

Section: 240 of 34 **From:** AGA - STA: 0+50 **To:** STA: 3+85 **Last Const.:** 6/1/2015

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 70,015 SqFt **Length:** 335 Ft **Width:** 209 Ft

Slabs: **Slab Length:** 1,424 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2015 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 14 **Surveyed:** 8

Conditions: **PCI:** 100

Inspection Comments:

Sample Number: 11 **Type:** R **Area:** 6182.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 13 **Type:** R **Area:** 4478.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 14 **Type:** R **Area:** 3585.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 2 **Type:** R **Area:** 4996.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 4 **Type:** R **Area:** 5000.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 6 **Type:** R **Area:** 5005.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 7 **Type:** R **Area:** 5007.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 9 **Type:** R **Area:** 3309.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Network: BGR			**Name:** Bangor International Airport				

Branch: AGA **Name:** General Aviation Apron **Use:** APRON **Area:** 4,285,583 SqFt

Section: 250 of 34 **From:** AGA - STA: 11+32 **To:** STA: 20+00 **Last Const.:** 6/1/2004
Surface: PCC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P
Area: 223,944 SqFt **Length:** 868 Ft **Width:** 258 Ft
Slabs: 358 **Slab Length:** 25 Ft **Slab Width:** 25 Ft **Joint Length:** 16,790 Ft
Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0
Section Comments:

Work Date: 6/1/2004 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 19 **Surveyed:** 13
Conditions: **PCI:** 54
Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 21.00 Slabs **PCI:** 85
Sample Comments:

63	LINEAR CR	L	2.00 Slabs
63	LINEAR CR	M	1.00 Slabs

Sample Number: 10 **Type:** R **Area:** 20.00 Slabs **PCI:** 48
Sample Comments:

62	CORNER BREAK	L	1.00 Slabs
63	LINEAR CR	L	4.00 Slabs
63	LINEAR CR	M	2.00 Slabs
65	JT SEAL DMG	H	1.00 Slabs
66	SMALL PATCH	L	2.00 Slabs
66	SMALL PATCH	H	1.00 Slabs
70	SCALING	L	1.00 Slabs
74	JOINT SPALL	L	1.00 Slabs
74	JOINT SPALL	M	1.00 Slabs
74	JOINT SPALL	H	1.00 Slabs

Sample Number: 11 **Type:** R **Area:** 20.00 Slabs **PCI:** 30
Sample Comments:

63	LINEAR CR	L	4.00 Slabs
66	SMALL PATCH	M	1.00 Slabs
67	LARGE PATCH	H	4.00 Slabs
70	SCALING	M	1.00 Slabs
71	FAULTING	L	1.00 Slabs
71	FAULTING	M	1.00 Slabs
74	JOINT SPALL	L	5.00 Slabs
74	JOINT SPALL	M	3.00 Slabs
74	JOINT SPALL	H	1.00 Slabs

Sample Number: 13 **Type:** R **Area:** 14.00 Slabs **PCI:** 64
Sample Comments:

63	LINEAR CR	L	4.00 Slabs
67	LARGE PATCH	H	1.00 Slabs
75	CORNER SPALL	M	1.00 Slabs

Sample Number: 14 **Type:** R **Area:** 20.00 Slabs **PCI:** 27
Sample Comments:

63	LINEAR CR	L	8.00 Slabs
63	LINEAR CR	M	4.00 Slabs
67	LARGE PATCH	L	2.00 Slabs
67	LARGE PATCH	H	3.00 Slabs
74	JOINT SPALL	M	1.00 Slabs
75	CORNER SPALL	M	1.00 Slabs

Sample Number: 16 **Type:** R **Area:** 20.00 Slabs **PCI:** 36
Sample Comments:

63	LINEAR CR	L	7.00 Slabs
63	LINEAR CR	M	3.00 Slabs
66	SMALL PATCH	M	1.00 Slabs

66	SMALL PATCH	H	5.00	Slabs
67	LARGE PATCH	L	3.00	Slabs
67	LARGE PATCH	M	1.00	Slabs
71	FAULTING	L	2.00	Slabs
72	SHAT. SLAB	L	1.00	Slabs

Sample Number: 17 **Type:** R **Area:** 18.00 Slabs **PCI:** 34

Sample Comments:

63	LINEAR CR	M	12.00	Slabs
66	SMALL PATCH	M	3.00	Slabs
66	SMALL PATCH	H	1.00	Slabs
75	CORNER SPALL	H	2.00	Slabs

Sample Number: 19 **Type:** R **Area:** 15.00 Slabs **PCI:** 73

Sample Comments:

63	LINEAR CR	L	2.00	Slabs
66	SMALL PATCH	M	1.00	Slabs
67	LARGE PATCH	M	1.00	Slabs
74	JOINT SPALL	M	1.00	Slabs

Sample Number: 3 **Type:** R **Area:** 21.00 Slabs **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 4 **Type:** R **Area:** 21.00 Slabs **PCI:** 80

Sample Comments:

63	LINEAR CR	L	1.00	Slabs
66	SMALL PATCH	M	1.00	Slabs
74	JOINT SPALL	L	1.00	Slabs
74	JOINT SPALL	M	2.00	Slabs
75	CORNER SPALL	M	1.00	Slabs

Sample Number: 6 **Type:** R **Area:** 20.00 Slabs **PCI:** 71

Sample Comments:

63	LINEAR CR	L	2.00	Slabs
65	JT SEAL DMG	H	1.00	Slabs
66	SMALL PATCH	L	3.00	Slabs
70	SCALING	L	1.00	Slabs
74	JOINT SPALL	L	3.00	Slabs
75	CORNER SPALL	M	1.00	Slabs

Sample Number: 7 **Type:** R **Area:** 20.00 Slabs **PCI:** 32

Sample Comments:

63	LINEAR CR	L	7.00	Slabs
65	JT SEAL DMG	H	1.00	Slabs
67	LARGE PATCH	M	1.00	Slabs
67	LARGE PATCH	H	4.00	Slabs
71	FAULTING	M	1.00	Slabs
74	JOINT SPALL	L	1.00	Slabs
74	JOINT SPALL	M	1.00	Slabs

Sample Number: 8 **Type:** R **Area:** 20.00 Slabs **PCI:** 28

Sample Comments:

63	LINEAR CR	L	8.00	Slabs
63	LINEAR CR	M	4.00	Slabs
65	JT SEAL DMG	H	1.00	Slabs
66	SMALL PATCH	L	2.00	Slabs
66	SMALL PATCH	M	1.00	Slabs
66	SMALL PATCH	H	1.00	Slabs
72	SHAT. SLAB	M	2.00	Slabs
74	JOINT SPALL	L	2.00	Slabs
74	JOINT SPALL	M	1.00	Slabs
75	CORNER SPALL	M	1.00	Slabs

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	AGA	**Name:**	General Aviation Apron	**Use:**	APRON	**Area:**	4,285,583 SqFt

Section:	200	of 34		**From:**	AGA - STA: 109+00	**To:**	STA: 112+00	**Last Const.:**	6/1/1993
Surface:	AC	**Family:**	DEFAULT	**Zone:**		**Category:**		**Rank:**	P
Area:	64,200 SqFt	**Length:**	300 Ft	**Width:**	214 Ft				
Slabs:		**Slab Length:**	1,150 Ft	**Slab Width:**	Ft			**Joint Length:**	Ft
Shoulder:		**Street Type:**		**Grade:**	0			**Lanes:**	0

Section Comments:

Work Date: 6/1/1993 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 12 **Surveyed:** 3

Conditions: **PCI:** 65

Inspection Comments:

Sample Number: 2 **Type:** R **Area:** 5378.00 SqFt **PCI:** 66

Sample Comments:

48	L & T CR	L	61.31	Ft
48	L & T CR	M	268.70	Ft
57	WEATHERING	L	5040.32	SqFt

Sample Number: 4 **Type:** R **Area:** 5256.00 SqFt **PCI:** 62

Sample Comments:

48	L & T CR	L	61.48	Ft
48	L & T CR	M	251.20	Ft
50	PATCHING	L	.49	SqFt
50	PATCHING	M	.43	SqFt
57	WEATHERING	L	4899.74	SqFt

Sample Number: 8 **Type:** R **Area:** 5378.00 SqFt **PCI:** 68

Sample Comments:

48	L & T CR	L	421.98	Ft
48	L & T CR	M	114.56	Ft
50	PATCHING	L	1.32	SqFt
57	WEATHERING	L	5105.68	SqFt

Network:	BGR			**Name:**	Bangor International Airport		

Branch:	AGA	**Name:**	General Aviation Apron	**Use:**	APRON	**Area:**	4,285,583 SqFt

Section: 20 of 34 **From:** TWA - STA:110+78 **To:** STA:115+20 **Last Const.:** 6/1/1955

Surface: PCC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 33,501 SqFt **Length:** 442 Ft **Width:** 76 Ft

Slabs: 134 **Slab Length:** 25 Ft **Slab Width:** 10 Ft **Joint Length:** 4,174 Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/1955 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 6 **Surveyed:** 6

Conditions: **PCI:** 61

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 28.00 Slabs **PCI:** 65

Sample Comments:

62	CORNER BREAK	L	1.00	Slabs
65	JT SEAL DMG	L	1.00	Slabs
66	SMALL PATCH	L	1.00	Slabs
70	SCALING	L	1.00	Slabs
70	SCALING	M	4.00	Slabs
73	SHRINKAGE CR	L	9.00	Slabs
74	JOINT SPALL	L	1.00	Slabs
74	JOINT SPALL	M	6.00	Slabs
75	CORNER SPALL	M	1.00	Slabs

Sample Number: 2 **Type:** R **Area:** 21.00 Slabs **PCI:** 45

Sample Comments:

65	JT SEAL DMG	L	1.00	Slabs
66	SMALL PATCH	M	2.00	Slabs
66	SMALL PATCH	H	1.00	Slabs
70	SCALING	M	2.00	Slabs
74	JOINT SPALL	L	5.00	Slabs
74	JOINT SPALL	M	3.00	Slabs
74	JOINT SPALL	H	2.00	Slabs
75	CORNER SPALL	L	4.00	Slabs
75	CORNER SPALL	M	1.00	Slabs
75	CORNER SPALL	H	1.00	Slabs

Sample Number: 3 **Type:** R **Area:** 21.00 Slabs **PCI:** 50

Sample Comments:

63	LINEAR CR	L	1.00	Slabs
65	JT SEAL DMG	L	1.00	Slabs
74	JOINT SPALL	L	2.00	Slabs
74	JOINT SPALL	M	4.00	Slabs
74	JOINT SPALL	H	3.00	Slabs
75	CORNER SPALL	M	2.00	Slabs
75	CORNER SPALL	H	1.00	Slabs

Sample Number: 4 **Type:** R **Area:** 21.00 Slabs **PCI:** 49

Sample Comments:

63	LINEAR CR	L	1.00	Slabs
63	LINEAR CR	H	2.00	Slabs
65	JT SEAL DMG	L	1.00	Slabs
74	JOINT SPALL	L	2.00	Slabs
74	JOINT SPALL	M	1.00	Slabs
75	CORNER SPALL	L	2.00	Slabs
75	CORNER SPALL	M	2.00	Slabs
75	CORNER SPALL	H	1.00	Slabs

Sample Number: 5 **Type:** R **Area:** 21.00 Slabs **PCI:** 76

Sample Comments:

63	LINEAR CR	L	2.00	Slabs
65	JT SEAL DMG	L	1.00	Slabs

70	SCALING	M	1.00	Slabs
74	JOINT SPALL	M	1.00	Slabs
75	CORNER SPALL	L	1.00	Slabs
75	CORNER SPALL	M	1.00	Slabs

Sample Number: 6 **Type:** R **Area:** 22.00 Slabs **PCI:** 77

Sample Comments:

63	LINEAR CR	L	7.00	Slabs
65	JT SEAL DMG	L	1.00	Slabs
74	JOINT SPALL	M	1.00	Slabs

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	AGA	**Name:**	General Aviation Apron	**Use:**	APRON	**Area:**	4,285,583 SqFt

Section: 10 of 34 **From:** TWB - STA:2+27, 5+18, 9+43 **To:** STA:4+19, 7+41, 16+97 **Last Const.:** 6/1/1990

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 544,503 SqFt **Length:** 1,169 Ft **Width:** 465 Ft

Slabs: **Slab Length:** 5,642 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/1990 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 110 **Surveyed:** 14

Conditions: **PCI:** 55

Inspection Comments:

Sample Number: 10 **Type:** R **Area:** 5057.00 SqFt **PCI:** 69

Sample Comments:

43	BLOCK CR	L	1037.42	SqFt
47	JT REF. CR	L	102.89	Ft
48	L & T CR	L	259.50	Ft

Sample Number: 104 **Type:** R **Area:** 4877.00 SqFt **PCI:** 67

Sample Comments:

43	BLOCK CR	L	2506.32	SqFt
50	PATCHING	L	54.22	SqFt

Sample Number: 17 **Type:** R **Area:** 5391.00 SqFt **PCI:** 17

Sample Comments:

41	ALLIGATOR CR	H	614.85	SqFt
43	BLOCK CR	L	3875.49	SqFt
53	RUTTING	L	552.47	SqFt

Sample Number: 2 **Type:** R **Area:** 5046.00 SqFt **PCI:** 28

Sample Comments:

41	ALLIGATOR CR	L	1272.85	SqFt
43	BLOCK CR	L	3514.49	SqFt
53	RUTTING	L	838.31	SqFt

Sample Number: 24 **Type:** R **Area:** 4553.00 SqFt **PCI:** 46

Sample Comments:

43	BLOCK CR	M	4274.63	SqFt
48	L & T CR	L	1.74	Ft

Sample Number: 39 **Type:** R **Area:** 5000.00 SqFt **PCI:** 34

Sample Comments:

43	BLOCK CR	L	2139.22	SqFt
43	BLOCK CR	M	2514.20	SqFt
48	L & T CR	L	40.47	Ft
48	L & T CR	M	14.83	Ft
48	L & T CR	H	161.51	Ft

Sample Number: 46 **Type:** R **Area:** 5000.00 SqFt **PCI:** 32

Sample Comments:

43	BLOCK CR	M	4816.45	SqFt
48	L & T CR	L	21.30	Ft
48	L & T CR	M	265.81	Ft
48	L & T CR	H	81.39	Ft
52	RAVELING	H	22.63	SqFt

Sample Number: 53 **Type:** R **Area:** 5000.00 SqFt **PCI:** 51

Sample Comments:

43	BLOCK CR	L	3991.54	SqFt
48	L & T CR	L	88.58	Ft
48	L & T CR	M	217.96	Ft

48	L & T CR	H	34.75	Ft

Sample Number: 60 **Type:** R **Area:** 5000.00 SqFt **PCI:** 76

Sample Comments:

48	L & T CR	L	326.71	Ft
48	L & T CR	M	137.69	Ft

Sample Number: 68 **Type:** R **Area:** 5000.00 SqFt **PCI:** 39

Sample Comments:

41	ALLIGATOR CR	H	160.60	SqFt
45	DEPRESSION	L	86.63	SqFt
48	L & T CR	M	332.09	Ft

Sample Number: 75 **Type:** R **Area:** 4980.00 SqFt **PCI:** 83

Sample Comments:

48	L & T CR	L	293.02	Ft

Sample Number: 82 **Type:** R **Area:** 4970.00 SqFt **PCI:** 81

Sample Comments:

48	L & T CR	L	240.16	Ft
50	PATCHING	M	25.38	SqFt

Sample Number: 89 **Type:** R **Area:** 5000.00 SqFt **PCI:** 71

Sample Comments:

48	L & T CR	L	529.62	Ft
48	L & T CR	M	46.90	Ft

Sample Number: 97 **Type:** R **Area:** 4983.00 SqFt **PCI:** 73

Sample Comments:

48	L & T CR	L	442.35	Ft
48	L & T CR	M	37.32	Ft

Network:	BGR			**Name:**	Bangor International Airport			
Branch:	AGA	**Name:**	General Aviation Apron		**Use:**	APRON	**Area:**	4,285,583 SqFt

Section:	30	of 34	**From:**	TWA - STA:109+36	**To:**	STA:117+12		**Last Const.:**	6/1/1990
Surface:	APC	**Family:**	DEFAULT	**Zone:**	**Category:**			**Rank:**	P
Area:	162,085 SqFt	**Length:**	776 Ft	**Width:**	209 Ft				
Slabs:		**Slab Length:**	1,755 Ft	**Slab Width:**	Ft			**Joint Length:**	Ft
Shoulder:		**Street Type:**		**Grade:**	0			**Lanes:**	0

Section Comments:

Work Date: 6/1/1990 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 14 **Surveyed:** 8

Conditions: **PCI:** 38

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 4467.00 SqFt **PCI:** 57

Sample Comments:

47	JT REF. CR	M	91.42	Ft
48	L & T CR	M	207.40	Ft
48	L & T CR	H	99.19	Ft

Sample Number: 10 **Type:** R **Area:** 4289.00 SqFt **PCI:** 39

Sample Comments:

43	BLOCK CR	M	103.52	SqFt
43	BLOCK CR	H	245.12	SqFt
47	JT REF. CR	L	12.59	Ft
47	JT REF. CR	M	98.12	Ft
47	JT REF. CR	H	11.25	Ft
48	L & T CR	M	238.48	Ft
48	L & T CR	H	51.88	Ft

Sample Number: 12 **Type:** R **Area:** 4861.00 SqFt **PCI:** 23

Sample Comments:

41	ALLIGATOR CR	M	499.17	SqFt
47	JT REF. CR	L	6.33	Ft
47	JT REF. CR	M	48.95	Ft
48	L & T CR	L	28.61	Ft
48	L & T CR	M	259.15	Ft
48	L & T CR	H	114.39	Ft
53	RUTTING	L	18.96	SqFt

Sample Number: 14 **Type:** R **Area:** 4413.00 SqFt **PCI:** 17

Sample Comments:

41	ALLIGATOR CR	L	7.52	SqFt
41	ALLIGATOR CR	M	901.60	SqFt
48	L & T CR	L	104.60	Ft
48	L & T CR	M	46.92	Ft
48	L & T CR	H	15.01	Ft
53	RUTTING	L	34.80	SqFt

Sample Number: 3 **Type:** R **Area:** 5184.00 SqFt **PCI:** 37

Sample Comments:

41	ALLIGATOR CR	L	105.93	SqFt
43	BLOCK CR	M	338.13	SqFt
47	JT REF. CR	M	77.49	Ft
48	L & T CR	L	45.92	Ft
48	L & T CR	M	367.27	Ft
56	SWELLING	M	397.60	SqFt

Sample Number: 5 **Type:** R **Area:** 5000.00 SqFt **PCI:** 53

Sample Comments:

43	BLOCK CR	M	436.93	SqFt
47	JT REF. CR	L	8.57	Ft
47	JT REF. CR	M	97.66	Ft
48	L & T CR	M	301.41	Ft

48	L & T CR	H	49.75	Ft

Sample Number: 6 **Type:** R **Area:** 4739.00 SqFt **PCI:** 34

Sample Comments:

43	BLOCK CR	M	506.36	SqFt
43	BLOCK CR	H	57.74	SqFt
47	JT REF. CR	M	59.43	Ft
47	JT REF. CR	H	67.37	Ft
48	L & T CR	L	49.43	Ft
48	L & T CR	M	240.42	Ft
48	L & T CR	H	49.82	Ft
56	SWELLING	M	14.58	SqFt

Sample Number: 8 **Type:** R **Area:** 4383.00 SqFt **PCI:** 39

Sample Comments:

43	BLOCK CR	M	599.00	SqFt
43	BLOCK CR	H	67.83	SqFt
47	JT REF. CR	L	8.91	Ft
47	JT REF. CR	M	67.27	Ft
47	JT REF. CR	H	19.90	Ft
48	L & T CR	L	13.25	Ft
48	L & T CR	M	176.68	Ft
48	L & T CR	H	73.39	Ft

Network: BGR		**Name:** Bangor International Airport	

Branch: AHOLD **Name:** Hold Apron **Use:** APRON **Area:** 290,556 SqFt

Section: 30 of 3 **From:** TWA - STA:125+12 **To:** STA:131+80 **Last Const.:** 6/1/2004

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 143,110 SqFt **Length:** 668 Ft **Width:** 215 Ft

Slabs: **Slab Length:** 2,095 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2004 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 32 **Surveyed:** 11

Conditions: **PCI:** 70

Inspection Comments:

Sample Number: 11 **Type:** R **Area:** 4509.00 SqFt **PCI:** 69

Sample Comments:

47	JT REF. CR	L	153.89	Ft
48	L & T CR	L	322.53	Ft
57	WEATHERING	L	4127.34	SqFt
57	WEATHERING	M	67.79	SqFt

Sample Number: 14 **Type:** R **Area:** 5071.00 SqFt **PCI:** 70

Sample Comments:

47	JT REF. CR	L	288.86	Ft
48	L & T CR	L	330.74	Ft
57	WEATHERING	L	4747.12	SqFt
57	WEATHERING	M	88.40	SqFt

Sample Number: 17 **Type:** R **Area:** 5265.00 SqFt **PCI:** 71

Sample Comments:

47	JT REF. CR	L	186.05	Ft
48	L & T CR	L	386.49	Ft
57	WEATHERING	L	4978.34	SqFt

Sample Number: 20 **Type:** R **Area:** 5104.00 SqFt **PCI:** 75

Sample Comments:

47	JT REF. CR	L	242.89	Ft
48	L & T CR	L	203.33	Ft
57	WEATHERING	L	4550.22	SqFt
57	WEATHERING	M	177.60	SqFt

Sample Number: 23 **Type:** R **Area:** 4133.00 SqFt **PCI:** 75

Sample Comments:

47	JT REF. CR	L	221.06	Ft
48	L & T CR	L	167.26	Ft
57	WEATHERING	L	3740.88	SqFt
57	WEATHERING	M	108.14	SqFt

Sample Number: 26 **Type:** R **Area:** 1497.00 SqFt **PCI:** 70

Sample Comments:

47	JT REF. CR	L	129.87	Ft
48	L & T CR	L	56.09	Ft
48	L & T CR	M	16.39	Ft
57	WEATHERING	L	1361.46	SqFt

Sample Number: 29 **Type:** R **Area:** 1643.00 SqFt **PCI:** 67

Sample Comments:

47	JT REF. CR	L	71.97	Ft
48	L & T CR	L	46.48	Ft
48	L & T CR	M	41.36	Ft
57	WEATHERING	L	1502.45	SqFt

Sample Number: 3 **Type:** R **Area:** 3130.00 SqFt **PCI:** 67

Sample Comments:

47	JT REF. CR	L	144.38	Ft
48	L & T CR	L	303.25	Ft
57	WEATHERING	L	2903.27	SqFt

Sample Number: 32 **Type:** R **Area:** 3148.00 SqFt **PCI:** 62

Sample Comments:

47	JT REF. CR	L	169.29	Ft
48	L & T CR	L	89.88	Ft
48	L & T CR	M	78.38	Ft
48	L & T CR	H	9.12	Ft
57	WEATHERING	L	2994.13	SqFt

Sample Number: 5 **Type:** R **Area:** 4750.00 SqFt **PCI:** 66

Sample Comments:

47	JT REF. CR	L	281.10	Ft
48	L & T CR	L	454.54	Ft
57	WEATHERING	L	4486.01	SqFt
57	WEATHERING	M	48.43	SqFt

Sample Number: 8 **Type:** R **Area:** 4763.00 SqFt **PCI:** 73

Sample Comments:

47	JT REF. CR	L	263.62	Ft
48	L & T CR	L	295.51	Ft
57	WEATHERING	L	4427.46	SqFt

Network: BGR	**Name:** Bangor International Airport		
Branch: AHOLD	**Name:** Hold Apron	**Use:** APRON	**Area:** 290,556 SqFt

Section: 20 of 3 **From:** TWA - STA:5+49 **To:** STA:7+49 **Last Const.:** 6/1/2004

Surface: PCC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 39,167 SqFt **Length:** 200 Ft **Width:** 196 Ft

Slabs: 63 **Slab Length:** 25 Ft **Slab Width:** 25 Ft **Joint Length:** 2,738 Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2004 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 3 **Surveyed:** 2

Conditions: **PCI:** 76

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 24.00 Slabs **PCI:** 69

Sample Comments:

63	LINEAR CR	L	4.00 Slabs
63	LINEAR CR	M	1.00 Slabs
65	JT SEAL DMG	L	1.00 Slabs
74	JOINT SPALL	L	3.00 Slabs
74	JOINT SPALL	H	1.00 Slabs
75	CORNER SPALL	L	2.00 Slabs

Sample Number: 3 **Type:** R **Area:** 24.00 Slabs **PCI:** 83

Sample Comments:

63	LINEAR CR	L	2.00 Slabs
63	LINEAR CR	M	1.00 Slabs
65	JT SEAL DMG	L	1.00 Slabs
66	SMALL PATCH	L	1.00 Slabs

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	AHOLD	**Name:**	Hold Apron	**Use:**	APRON	**Area:**	290,556 SqFt

Section: 10 of 3 **From:** TWA - STA:2+96 **To:** STA:9+95 **Last Const.:** 6/1/2004
Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P
Area: 108,279 SqFt **Length:** 155 Ft **Width:** 699 Ft
Slabs: **Slab Length:** 2,129 Ft **Slab Width:** Ft **Joint Length:** Ft
Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0
Section Comments:

Work Date: 6/1/2004 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 23 **Surveyed:** 5
Conditions: **PCI:** 76
Inspection Comments:

Sample Number: 10 **Type:** R **Area:** 4844.00 SqFt **PCI:** 72
Sample Comments:

48	L & T CR	L	285.98	Ft
48	L & T CR	M	7.06	Ft
50	PATCHING	L	.79	SqFt
57	WEATHERING	L	4635.44	SqFt

Sample Number: 12 **Type:** R **Area:** 4842.00 SqFt **PCI:** 80
Sample Comments:

48	L & T CR	L	236.63	Ft
57	WEATHERING	L	4622.74	SqFt

Sample Number: 14 **Type:** R **Area:** 4920.00 SqFt **PCI:** 81
Sample Comments:

47	JT REF. CR	L	124.12	Ft
48	L & T CR	L	12.83	Ft
48	L & T CR	M	2.45	Ft
50	PATCHING	L	1.37	SqFt
57	WEATHERING	L	2752.52	SqFt

Sample Number: 20 **Type:** R **Area:** 4843.00 SqFt **PCI:** 74
Sample Comments:

48	L & T CR	L	180.15	Ft
48	L & T CR	M	9.61	Ft
50	PATCHING	L	1.42	SqFt
57	WEATHERING	L	4565.25	SqFt
57	WEATHERING	M	89.83	SqFt

Sample Number: 8 **Type:** R **Area:** 4846.00 SqFt **PCI:** 73
Sample Comments:

48	L & T CR	L	218.43	Ft
48	L & T CR	M	89.51	Ft
50	PATCHING	L	2.18	SqFt
57	WEATHERING	L	4752.64	SqFt

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	HELIA	**Name:**	Helicopter Pad	**Use:**	HELIPAD	**Area:**	10,000 SqFt

Section: 10 of 1 **From:** TWB - STA:7+26 **To:** STA:8+23 **Last Const.:** 6/1/1955

Surface: PCC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 10,000 SqFt **Length:** 100 Ft **Width:** 100 Ft

Slabs: 16 **Slab Length:** 25 Ft **Slab Width:** 25 Ft **Joint Length:** 600 Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/1955 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 47

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 16.00 Slabs **PCI:** 47

Sample Comments:

63	LINEAR CR	L	13.00 Slabs
66	SMALL PATCH	M	4.00 Slabs
67	LARGE PATCH	M	3.00 Slabs
70	SCALING	L	1.00 Slabs
70	SCALING	M	3.00 Slabs

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	HELIT	**Name:**	Helicopter Taxiway	**Use:**	TAXIWAY	**Area:**	11,471 SqFt

Section:	10	of 1	**From:**	TWB - STA:7+63		**To:**	STA:8+43	**Last Const.:**	6/1/1994
Surface:	AC	**Family:**	DEFAULT	**Zone:**		**Category:**		**Rank:**	P
Area:	11,471 SqFt	**Length:**	144 Ft	**Width:**		80 Ft			
Slabs:		**Slab Length:**	820 Ft	**Slab Width:**		Ft		**Joint Length:**	Ft
Shoulder:		**Street Type:**		**Grade:**	0			**Lanes:**	0

Section Comments:

Work Date: 6/1/1994 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 24

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 5735.00 SqFt **PCI:** 17

Sample Comments:

41	ALLIGATOR CR	L	381.94	SqFt
48	L & T CR	L	129.21	Ft
48	L & T CR	M	364.91	Ft
48	L & T CR	H	93.20	Ft
50	PATCHING	M	225.71	SqFt
53	RUTTING	M	1807.04	SqFt
57	WEATHERING	L	5551.01	SqFt

Sample Number: 2 **Type:** R **Area:** 5782.00 SqFt **PCI:** 31

Sample Comments:

41	ALLIGATOR CR	L	352.91	SqFt
48	L & T CR	L	30.40	Ft
48	L & T CR	M	205.55	Ft
48	L & T CR	H	15.28	Ft
50	PATCHING	M	51.82	SqFt
50	PATCHING	H	59.30	SqFt
53	RUTTING	L	1138.81	SqFt
57	WEATHERING	L	5554.10	SqFt

Network: BGR **Name:** Bangor International Airport

Branch: RW1533 **Name:** Runway 15-33 **Use:** RUNWAY **Area:** 2,888,000 SqFt

Section: 40 of 7 **From:** RW1533 - STA:36+40 **To:** STA:95+40 **Last Const.:** 6/1/2003

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 1,180,000 SqFt **Length:** 5,900 Ft **Width:** 200 Ft

Slabs: **Slab Length:** 12,200 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2003 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 236 **Surveyed:** 16

Conditions: **PCI:** 70

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 5000.00 SqFt **PCI:** 70

Sample Comments:

47	JT REF. CR	L	494.15	Ft
48	L & T CR	L	216.97	Ft
48	L & T CR	M	51.28	Ft
57	WEATHERING	L	4729.74	SqFt

Sample Number: 104 **Type:** R **Area:** 5000.00 SqFt **PCI:** 76

Sample Comments:

47	JT REF. CR	L	414.08	Ft
48	L & T CR	L	172.34	Ft
57	WEATHERING	L	4764.03	SqFt

Sample Number: 119 **Type:** R **Area:** 5000.00 SqFt **PCI:** 70

Sample Comments:

47	JT REF. CR	L	491.33	Ft
48	L & T CR	L	216.60	Ft
48	L & T CR	M	81.52	Ft
57	WEATHERING	L	4470.37	SqFt

Sample Number: 134 **Type:** R **Area:** 5000.00 SqFt **PCI:** 67

Sample Comments:

47	JT REF. CR	L	554.45	Ft
47	JT REF. CR	M	17.62	Ft
48	L & T CR	L	133.50	Ft
48	L & T CR	M	6.98	Ft
57	WEATHERING	L	4627.05	SqFt

Sample Number: 148 **Type:** R **Area:** 5000.00 SqFt **PCI:** 69

Sample Comments:

47	JT REF. CR	L	523.50	Ft
48	L & T CR	L	273.24	Ft
48	L & T CR	M	19.80	Ft
57	WEATHERING	L	4718.84	SqFt

Sample Number: 16 **Type:** R **Area:** 5000.00 SqFt **PCI:** 69

Sample Comments:

47	JT REF. CR	L	544.68	Ft
48	L & T CR	L	84.77	Ft
48	L & T CR	M	17.95	Ft
57	WEATHERING	L	4651.61	SqFt

Sample Number: 163 **Type:** R **Area:** 5000.00 SqFt **PCI:** 69

Sample Comments:

47	JT REF. CR	L	526.49	Ft
48	L & T CR	L	200.24	Ft
48	L & T CR	M	24.17	Ft
57	WEATHERING	L	4662.74	SqFt

Sample Number: 178 **Type:** R **Area:** 5000.00 SqFt **PCI:** 69

Sample Comments:

47	JT REF. CR	L	529.70	Ft
48	L & T CR	L	147.49	Ft
48	L & T CR	M	30.97	Ft
57	WEATHERING	L	4669.14	SqFt

Sample Number: 193 **Type:** R **Area:** 5000.00 SqFt **PCI:** 69

Sample Comments:

47	JT REF. CR	L	425.85	Ft
48	L & T CR	L	67.76	Ft
48	L & T CR	M	40.79	Ft
50	PATCHING	L	.33	SqFt
57	WEATHERING	L	4745.99	SqFt

Sample Number: 207 **Type:** R **Area:** 5000.00 SqFt **PCI:** 70

Sample Comments:

47	JT REF. CR	L	329.42	Ft
48	L & T CR	L	182.81	Ft
48	L & T CR	M	16.20	Ft
50	PATCHING	L	.35	SqFt
57	WEATHERING	L	4809.80	SqFt

Sample Number: 222 **Type:** R **Area:** 5000.00 SqFt **PCI:** 76

Sample Comments:

47	JT REF. CR	L	419.49	Ft
48	L & T CR	L	131.59	Ft
57	WEATHERING	L	4487.33	SqFt

Sample Number: 30 **Type:** R **Area:** 5000.00 SqFt **PCI:** 69

Sample Comments:

47	JT REF. CR	L	507.14	Ft
48	L & T CR	L	157.69	Ft
48	L & T CR	M	46.22	Ft
57	WEATHERING	L	4633.21	SqFt

Sample Number: 45 **Type:** R **Area:** 5000.00 SqFt **PCI:** 70

Sample Comments:

47	JT REF. CR	L	468.48	Ft
48	L & T CR	L	116.71	Ft
48	L & T CR	M	16.02	Ft
57	WEATHERING	L	4797.24	SqFt

Sample Number: 60 **Type:** R **Area:** 5000.00 SqFt **PCI:** 69

Sample Comments:

47	JT REF. CR	L	521.72	Ft
48	L & T CR	L	192.94	Ft
48	L & T CR	M	70.67	Ft
57	WEATHERING	L	4821.53	SqFt

Sample Number: 75 **Type:** R **Area:** 5000.00 SqFt **PCI:** 70

Sample Comments:

47	JT REF. CR	L	461.15	Ft
48	L & T CR	L	57.67	Ft
48	L & T CR	M	41.13	Ft
57	WEATHERING	L	4639.87	SqFt

Sample Number: 89 **Type:** R **Area:** 5000.00 SqFt **PCI:** 73

Sample Comments:

47	JT REF. CR	L	324.95	Ft
48	L & T CR	L	164.47	Ft
48	L & T CR	M	39.92	Ft
57	WEATHERING	L	4770.98	SqFt

Network: BGR **Name:** Bangor International Airport

Branch: RW1533 **Name:** Runway 15-33 **Use:** RUNWAY **Area:** 2,888,000 SqFt

Section: 20 of 7 **From:** RW1533 - STA:12+00 **To:** STA:36+40 **Last Const.:** 6/1/2002

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 344,000 SqFt **Length:** 2,440 Ft **Width:** 141 Ft

Slabs: **Slab Length:** 5,482 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2002 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 69 **Surveyed:** 14

Conditions: **PCI:** 67

Inspection Comments:

Sample Number: 14 **Type:** R **Area:** 5000.00 SqFt **PCI:** 71

Sample Comments:

47	JT REF. CR	L	45.80	Ft
48	L & T CR	L	299.22	Ft
48	L & T CR	M	94.61	Ft
57	WEATHERING	L	4741.89	SqFt

Sample Number: 18 **Type:** R **Area:** 5000.00 SqFt **PCI:** 71

Sample Comments:

47	JT REF. CR	L	46.59	Ft
48	L & T CR	L	283.30	Ft
48	L & T CR	M	99.32	Ft
57	WEATHERING	L	4715.11	SqFt

Sample Number: 23 **Type:** R **Area:** 5000.00 SqFt **PCI:** 68

Sample Comments:

47	JT REF. CR	L	92.25	Ft
48	L & T CR	L	312.75	Ft
48	L & T CR	M	52.42	Ft
57	WEATHERING	L	4719.28	SqFt

Sample Number: 28 **Type:** R **Area:** 5000.00 SqFt **PCI:** 60

Sample Comments:

47	JT REF. CR	L	92.80	Ft
47	JT REF. CR	M	47.24	Ft
48	L & T CR	L	380.51	Ft
48	L & T CR	M	48.41	Ft
57	WEATHERING	L	4771.40	SqFt

Sample Number: 33 **Type:** R **Area:** 5000.00 SqFt **PCI:** 72

Sample Comments:

47	JT REF. CR	L	139.34	Ft
48	L & T CR	L	323.85	Ft
57	WEATHERING	L	4791.44	SqFt

Sample Number: 38 **Type:** R **Area:** 5000.00 SqFt **PCI:** 72

Sample Comments:

47	JT REF. CR	L	187.57	Ft
48	L & T CR	L	339.82	Ft
57	WEATHERING	L	4847.74	SqFt

Sample Number: 4 **Type:** R **Area:** 5109.00 SqFt **PCI:** 68

Sample Comments:

47	JT REF. CR	L	45.87	Ft
48	L & T CR	L	387.07	Ft
48	L & T CR	M	96.73	Ft
57	WEATHERING	L	4775.05	SqFt

Sample Number: 43	Type: R	Area: 5000.00 SqFt	PCI: 62

Sample Comments:

47	JT REF. CR	L	141.29	Ft
48	L & T CR	L	330.96	Ft
48	L & T CR	M	58.53	Ft
50	PATCHING	M	.98	SqFt
57	WEATHERING	L	4791.13	SqFt

Sample Number: 48	Type: R	Area: 5000.00 SqFt	PCI: 64

Sample Comments:

47	JT REF. CR	L	139.31	Ft
48	L & T CR	L	436.59	Ft
48	L & T CR	M	51.66	Ft
57	WEATHERING	L	4772.90	SqFt

Sample Number: 53	Type: R	Area: 5000.00 SqFt	PCI: 67

Sample Comments:

47	JT REF. CR	L	138.83	Ft
48	L & T CR	L	262.54	Ft
48	L & T CR	M	123.23	Ft
57	WEATHERING	L	4636.36	SqFt

Sample Number: 58	Type: R	Area: 5000.00 SqFt	PCI: 63

Sample Comments:

47	JT REF. CR	L	137.41	Ft
48	L & T CR	L	313.13	Ft
48	L & T CR	M	78.15	Ft
48	L & T CR	H	10.15	Ft
57	WEATHERING	L	4734.22	SqFt

Sample Number: 63	Type: R	Area: 5000.00 SqFt	PCI: 65

Sample Comments:

48	L & T CR	L	523.95	Ft
48	L & T CR	M	71.69	Ft
48	L & T CR	H	2.76	Ft
57	WEATHERING	L	4502.87	SqFt

Sample Number: 68	Type: R	Area: 5000.00 SqFt	PCI: 63

Sample Comments:

48	L & T CR	L	462.21	Ft
48	L & T CR	M	93.00	Ft
48	L & T CR	H	6.07	Ft
57	WEATHERING	L	4648.47	SqFt

Sample Number: 9	Type: R	Area: 5064.00 SqFt	PCI: 73

Sample Comments:

48	L & T CR	L	283.64	Ft
48	L & T CR	M	123.01	Ft
57	WEATHERING	L	4719.63	SqFt

Network: BGR **Name:** Bangor International Airport

Branch: RW1533 **Name:** Runway 15-33 **Use:** RUNWAY **Area:** 2,888,000 SqFt

Section: 30 of 7 **From:** RW1533 - STA:17+00 **To:** STA:36+40 **Last Const.:** 6/1/2002

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 194,000 SqFt **Length:** 1,940 Ft **Width:** 100 Ft

Slabs: **Slab Length:** 7,960 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2002 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 38 **Surveyed:** 12

Conditions: **PCI:** 64

Inspection Comments:

Sample Number: 10 **Type:** R **Area:** 5105.00 SqFt **PCI:** 66

Sample Comments:

47	JT REF. CR	L	744.89	Ft
48	L & T CR	L	114.53	Ft
48	L & T CR	M	97.51	Ft
57	WEATHERING	L	4834.81	SqFt

Sample Number: 13 **Type:** R **Area:** 5105.00 SqFt **PCI:** 63

Sample Comments:

47	JT REF. CR	L	738.62	Ft
48	L & T CR	L	124.57	Ft
48	L & T CR	M	198.47	Ft
57	WEATHERING	L	4608.81	SqFt

Sample Number: 16 **Type:** R **Area:** 5105.00 SqFt **PCI:** 67

Sample Comments:

47	JT REF. CR	L	744.32	Ft
48	L & T CR	L	237.46	Ft
48	L & T CR	M	108.43	Ft
57	WEATHERING	L	4641.75	SqFt

Sample Number: 19 **Type:** R **Area:** 5105.00 SqFt **PCI:** 64

Sample Comments:

47	JT REF. CR	L	800.73	Ft
48	L & T CR	L	162.71	Ft
48	L & T CR	M	55.81	Ft
50	PATCHING	L	1.42	SqFt
57	WEATHERING	L	4743.31	SqFt

Sample Number: 22 **Type:** R **Area:** 5105.00 SqFt **PCI:** 61

Sample Comments:

47	JT REF. CR	L	765.57	Ft
47	JT REF. CR	M	84.82	Ft
48	L & T CR	L	163.13	Ft
48	L & T CR	M	142.29	Ft
57	WEATHERING	L	4846.39	SqFt

Sample Number: 26 **Type:** R **Area:** 5105.00 SqFt **PCI:** 63

Sample Comments:

47	JT REF. CR	L	853.37	Ft
48	L & T CR	L	296.34	Ft
48	L & T CR	M	54.14	Ft
50	PATCHING	L	2.29	SqFt
57	WEATHERING	L	4708.40	SqFt

Sample Number: 29 **Type:** R **Area:** 5105.00 SqFt **PCI:** 61

Sample Comments:

47	JT REF. CR	L	755.70	Ft
48	L & T CR	L	234.80	Ft

48	L & T CR	M	189.05	Ft
50	PATCHING	L	.55	SqFt
57	WEATHERING	L	4728.80	SqFt

Sample Number: 3 **Type:** R **Area:** 5105.00 SqFt **PCI:** 62

Sample Comments:

47	JT REF. CR	L	743.57	Ft
48	L & T CR	L	119.67	Ft
48	L & T CR	M	67.43	Ft
48	L & T CR	H	2.58	Ft
57	WEATHERING	L	4814.92	SqFt

Sample Number: 32 **Type:** R **Area:** 5105.00 SqFt **PCI:** 64

Sample Comments:

47	JT REF. CR	L	748.74	Ft
48	L & T CR	L	219.34	Ft
48	L & T CR	M	177.90	Ft
57	WEATHERING	L	4773.93	SqFt

Sample Number: 35 **Type:** R **Area:** 5105.00 SqFt **PCI:** 65

Sample Comments:

47	JT REF. CR	L	814.69	Ft
48	L & T CR	L	403.92	Ft
48	L & T CR	M	80.38	Ft
57	WEATHERING	L	4841.70	SqFt

Sample Number: 38 **Type:** R **Area:** 5105.00 SqFt **PCI:** 64

Sample Comments:

47	JT REF. CR	L	805.26	Ft
48	L & T CR	L	415.35	Ft
48	L & T CR	M	95.92	Ft
57	WEATHERING	L	4711.89	SqFt

Sample Number: 7 **Type:** R **Area:** 5105.00 SqFt **PCI:** 66

Sample Comments:

47	JT REF. CR	L	789.22	Ft
48	L & T CR	L	116.93	Ft
48	L & T CR	M	60.32	Ft
57	WEATHERING	L	4737.17	SqFt

Network:	BGR		**Name:**	Bangor International Airport			

Branch:	RW1533	**Name:**	Runway 15-33	**Use:**	RUNWAY	**Area:**	2,888,000 SqFt

Section: 10 of 7 **From:** RW1533 - STA:2+00 **To:** STA:12+00 **Last Const.:** 6/1/1995

Surface: ACR **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 300,000 SqFt **Length:** 1,000 Ft **Width:** 300 Ft

Slabs: **Slab Length:** 2,602 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/1995 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 60 **Surveyed:** 13

Conditions: **PCI:** 52

Inspection Comments:

Sample Number: 13 **Type:** R **Area:** 5000.00 SqFt **PCI:** 49

Sample Comments:

48	L & T CR	L	42.71	Ft
48	L & T CR	M	789.81	Ft
57	WEATHERING	L	4810.15	SqFt

Sample Number: 17 **Type:** R **Area:** 5000.00 SqFt **PCI:** 50

Sample Comments:

48	L & T CR	L	45.96	Ft
48	L & T CR	M	623.15	Ft
48	L & T CR	H	45.19	Ft
57	WEATHERING	L	4842.76	SqFt

Sample Number: 22 **Type:** R **Area:** 5000.00 SqFt **PCI:** 47

Sample Comments:

48	L & T CR	L	163.84	Ft
48	L & T CR	M	563.47	Ft
48	L & T CR	H	6.86	Ft
57	WEATHERING	L	4847.82	SqFt

Sample Number: 27 **Type:** R **Area:** 5000.00 SqFt **PCI:** 52

Sample Comments:

48	L & T CR	L	219.09	Ft
48	L & T CR	M	541.45	Ft
57	WEATHERING	L	4884.99	SqFt

Sample Number: 31 **Type:** R **Area:** 5000.00 SqFt **PCI:** 58

Sample Comments:

48	L & T CR	L	20.54	Ft
48	L & T CR	M	505.90	Ft
57	WEATHERING	L	4913.70	SqFt

Sample Number: 36 **Type:** R **Area:** 5000.00 SqFt **PCI:** 54

Sample Comments:

48	L & T CR	L	43.46	Ft
48	L & T CR	M	585.08	Ft
57	WEATHERING	L	4859.20	SqFt

Sample Number: 4 **Type:** R **Area:** 5000.00 SqFt **PCI:** 48

Sample Comments:

48	L & T CR	L	189.08	Ft
48	L & T CR	M	698.30	Ft
57	WEATHERING	L	4887.94	SqFt

Sample Number: 40 **Type:** R **Area:** 5000.00 SqFt **PCI:** 61

Sample Comments:

48	L & T CR	L	22.68	Ft
48	L & T CR	M	355.24	Ft
50	PATCHING	L	1.39	SqFt

57	WEATHERING	L	4747.58	SqFt

Sample Number: 45 **Type:** R **Area:** 5000.00 SqFt **PCI:** 50

Sample Comments:

48	L & T CR	L	155.66	Ft
48	L & T CR	M	661.03	Ft
57	WEATHERING	L	4927.46	SqFt

Sample Number: 50 **Type:** R **Area:** 5000.00 SqFt **PCI:** 52

Sample Comments:

48	L & T CR	L	58.73	Ft
48	L & T CR	M	654.93	Ft
57	WEATHERING	L	4917.66	SqFt

Sample Number: 54 **Type:** R **Area:** 5000.00 SqFt **PCI:** 53

Sample Comments:

48	L & T CR	L	66.09	Ft
48	L & T CR	M	623.92	Ft
57	WEATHERING	L	4814.50	SqFt

Sample Number: 59 **Type:** R **Area:** 5000.00 SqFt **PCI:** 51

Sample Comments:

48	L & T CR	M	588.92	Ft
48	L & T CR	H	16.37	Ft
57	WEATHERING	L	4796.71	SqFt

Sample Number: 8 **Type:** R **Area:** 5000.00 SqFt **PCI:** 52

Sample Comments:

48	L & T CR	L	178.96	Ft
48	L & T CR	M	557.39	Ft
57	WEATHERING	L	4908.61	SqFt

Network:	BGR		**Name:**	Bangor International Airport			
Branch:	RW1533	**Name:**	Runway 15-33	**Use:**	RUNWAY	**Area:**	2,888,000 SqFt

Section: 50 of 7 **From:** RW1533 - STA:95+40 **To:** STA:126+40 **Last Const.:** 6/1/2002

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 390,000 SqFt **Length:** 3,100 Ft **Width:** 126 Ft

Slabs: **Slab Length:** 6,800 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2002 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 78 **Surveyed:** 14

Conditions: **PCI:** 60

Inspection Comments:

Sample Number: 15 **Type:** R **Area:** 5000.00 SqFt **PCI:** 66

Sample Comments:

48	L & T CR	L	433.65	Ft
48	L & T CR	M	213.69	Ft
57	WEATHERING	L	4649.14	SqFt

Sample Number: 20 **Type:** R **Area:** 5000.00 SqFt **PCI:** 48

Sample Comments:

47	JT REF. CR	M	44.36	Ft
48	L & T CR	L	169.87	Ft
48	L & T CR	M	372.40	Ft
48	L & T CR	H	54.21	Ft
57	WEATHERING	L	4638.14	SqFt

Sample Number: 26 **Type:** R **Area:** 5000.00 SqFt **PCI:** 48

Sample Comments:

47	JT REF. CR	L	116.70	Ft
47	JT REF. CR	M	25.63	Ft
48	L & T CR	L	338.10	Ft
48	L & T CR	M	289.98	Ft
48	L & T CR	H	23.99	Ft
57	WEATHERING	L	4635.34	SqFt

Sample Number: 31 **Type:** R **Area:** 5000.00 SqFt **PCI:** 48

Sample Comments:

41	ALLIGATOR CR	M	45.07	SqFt
48	L & T CR	L	278.20	Ft
48	L & T CR	M	186.84	Ft
48	L & T CR	H	68.77	Ft
57	WEATHERING	L	4666.10	SqFt

Sample Number: 37 **Type:** R **Area:** 5000.00 SqFt **PCI:** 37

Sample Comments:

41	ALLIGATOR CR	L	52.19	SqFt
41	ALLIGATOR CR	M	86.93	SqFt
48	L & T CR	L	79.61	Ft
48	L & T CR	M	343.15	Ft
48	L & T CR	H	5.07	Ft
57	WEATHERING	L	4672.16	SqFt

Sample Number: 4 **Type:** R **Area:** 5000.00 SqFt **PCI:** 66

Sample Comments:

48	L & T CR	L	536.86	Ft
48	L & T CR	M	52.49	Ft
57	WEATHERING	L	4703.94	SqFt

Sample Number: 43 **Type:** R **Area:** 5000.00 SqFt **PCI:** 59

Sample Comments:

48	L & T CR	L	198.55	Ft

48	L & T CR	M	264.07	Ft
48	L & T CR	H	47.95	Ft
57	WEATHERING	L	4681.49	SqFt

Sample Number: 48 **Type:** R **Area:** 5000.00 SqFt **PCI:** 59

Sample Comments:

47	JT REF. CR	L	46.91	Ft
48	L & T CR	L	206.18	Ft
48	L & T CR	M	299.99	Ft
57	WEATHERING	L	4660.10	SqFt

Sample Number: 54 **Type:** R **Area:** 5000.00 SqFt **PCI:** 66

Sample Comments:

47	JT REF. CR	L	46.26	Ft
48	L & T CR	L	240.91	Ft
48	L & T CR	M	170.59	Ft
57	WEATHERING	L	4747.06	SqFt

Sample Number: 59 **Type:** R **Area:** 5000.00 SqFt **PCI:** 67

Sample Comments:

48	L & T CR	L	390.06	Ft
48	L & T CR	M	208.21	Ft
57	WEATHERING	L	4688.10	SqFt

Sample Number: 65 **Type:** R **Area:** 5000.00 SqFt **PCI:** 73

Sample Comments:

48	L & T CR	L	293.19	Ft
48	L & T CR	M	62.14	Ft
57	WEATHERING	L	4629.56	SqFt

Sample Number: 70 **Type:** R **Area:** 5000.00 SqFt **PCI:** 69

Sample Comments:

47	JT REF. CR	L	144.35	Ft
48	L & T CR	L	192.32	Ft
48	L & T CR	M	103.32	Ft
57	WEATHERING	L	4558.71	SqFt

Sample Number: 76 **Type:** R **Area:** 5000.00 SqFt **PCI:** 64

Sample Comments:

48	L & T CR	L	626.70	Ft
48	L & T CR	M	67.33	Ft
57	WEATHERING	L	4723.41	SqFt

Sample Number: 9 **Type:** R **Area:** 5000.00 SqFt **PCI:** 66

Sample Comments:

48	L & T CR	L	514.67	Ft
48	L & T CR	M	104.50	Ft
57	WEATHERING	L	4711.60	SqFt

Network:	BGR		**Name:**	Bangor International Airport			
Branch:	RW1533	**Name:**	Runway 15-33	**Use:**	RUNWAY	**Area:**	2,888,000 SqFt

Section: 70 of 7 **From:** RW1533 - STA:126+40 **To:** STA:136+40 **Last Const.:** 6/1/2002

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 210,000 SqFt **Length:** 1,000 Ft **Width:** 210 Ft

Slabs: **Slab Length:** 2,600 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2002 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 42 **Surveyed:** 12

Conditions: **PCI:** 68

Inspection Comments:

Sample Number: 10 **Type:** R **Area:** 5000.00 SqFt **PCI:** 64

Sample Comments:

48	L & T CR	L	53.19	Ft
48	L & T CR	M	208.59	Ft
50	PATCHING	M	1.36	SqFt
57	WEATHERING	L	4881.39	SqFt

Sample Number: 13 **Type:** R **Area:** 5000.00 SqFt **PCI:** 67

Sample Comments:

48	L & T CR	L	52.59	Ft
48	L & T CR	M	248.60	Ft
57	WEATHERING	L	4878.79	SqFt

Sample Number: 17 **Type:** R **Area:** 5000.00 SqFt **PCI:** 68

Sample Comments:

48	L & T CR	M	244.62	Ft
50	PATCHING	L	.79	SqFt
57	WEATHERING	L	4903.68	SqFt

Sample Number: 20 **Type:** R **Area:** 5000.00 SqFt **PCI:** 71

Sample Comments:

48	L & T CR	L	3.78	Ft
48	L & T CR	M	167.03	Ft
50	PATCHING	L	36.18	SqFt
57	WEATHERING	L	4805.99	SqFt

Sample Number: 24 **Type:** R **Area:** 5000.00 SqFt **PCI:** 74

Sample Comments:

48	L & T CR	M	166.78	Ft
57	WEATHERING	L	4853.72	SqFt

Sample Number: 27 **Type:** R **Area:** 5000.00 SqFt **PCI:** 68

Sample Comments:

48	L & T CR	L	66.01	Ft
48	L & T CR	M	205.78	Ft
57	WEATHERING	L	4865.39	SqFt

Sample Number: 3 **Type:** R **Area:** 5000.00 SqFt **PCI:** 65

Sample Comments:

48	L & T CR	L	33.62	Ft
48	L & T CR	M	312.88	Ft
57	WEATHERING	L	4870.25	SqFt

Sample Number: 31 **Type:** R **Area:** 5000.00 SqFt **PCI:** 62

Sample Comments:

48	L & T CR	L	32.16	Ft
48	L & T CR	M	318.36	Ft
50	PATCHING	L	1.55	SqFt
57	WEATHERING	L	4868.02	SqFt

Sample Number:	34	Type:	R	Area:	5000.00 SqFt	PCI:	66

Sample Comments:

48	L & T CR	L	21.14	Ft
48	L & T CR	M	253.74	Ft
50	PATCHING	L	1.44	SqFt
57	WEATHERING	L	4897.85	SqFt

Sample Number:	38	Type:	R	Area:	5000.00 SqFt	PCI:	71

Sample Comments:

48	L & T CR	L	50.39	Ft
48	L & T CR	M	175.10	Ft
57	WEATHERING	L	4974.12	SqFt

Sample Number:	41	Type:	R	Area:	5000.00 SqFt	PCI:	73

Sample Comments:

48	L & T CR	L	6.84	Ft
48	L & T CR	M	179.86	Ft
57	WEATHERING	L	4835.65	SqFt

Sample Number:	6	Type:	R	Area:	5000.00 SqFt	PCI:	70

Sample Comments:

48	L & T CR	L	172.35	Ft
48	L & T CR	M	152.48	Ft
57	WEATHERING	L	4913.14	SqFt

Network: BGR		**Name:** Bangor International Airport	

Branch: RW1533	**Name:** Runway 15-33	**Use:** RUNWAY	**Area:** 2,888,000 SqFt

Section: 60 of 7 **From:** RW1533 - STA:95+40 **To:** STA:122+40 **Last Const.:** 6/1/2002

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 270,000 SqFt **Length:** 2,700 Ft **Width:** 100 Ft

Slabs: **Slab Length:** 11,000 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2002 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 54 **Surveyed:** 13

Conditions: **PCI:** 65

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 5000.00 SqFt **PCI:** 63

Sample Comments:

47	JT REF. CR	L	743.07	Ft
48	L & T CR	L	45.13	Ft
48	L & T CR	M	231.53	Ft
57	WEATHERING	L	4637.48	SqFt

Sample Number: 10 **Type:** R **Area:** 5000.00 SqFt **PCI:** 66

Sample Comments:

47	JT REF. CR	L	753.83	Ft
48	L & T CR	L	78.45	Ft
48	L & T CR	M	15.32	Ft
57	WEATHERING	L	4677.71	SqFt

Sample Number: 14 **Type:** R **Area:** 5000.00 SqFt **PCI:** 66

Sample Comments:

47	JT REF. CR	L	793.76	Ft
48	L & T CR	L	97.38	Ft
48	L & T CR	M	11.14	Ft
57	WEATHERING	L	4603.85	SqFt

Sample Number: 18 **Type:** R **Area:** 5000.00 SqFt **PCI:** 67

Sample Comments:

47	JT REF. CR	L	651.33	Ft
48	L & T CR	L	123.96	Ft
48	L & T CR	M	11.07	Ft
57	WEATHERING	L	4599.37	SqFt

Sample Number: 22 **Type:** R **Area:** 5000.00 SqFt **PCI:** 67

Sample Comments:

47	JT REF. CR	L	692.08	Ft
48	L & T CR	L	195.61	Ft
48	L & T CR	M	24.07	Ft
57	WEATHERING	L	4746.97	SqFt

Sample Number: 26 **Type:** R **Area:** 5000.00 SqFt **PCI:** 63

Sample Comments:

47	JT REF. CR	L	571.49	Ft
47	JT REF. CR	M	46.65	Ft
48	L & T CR	L	153.62	Ft
48	L & T CR	M	11.04	Ft
57	WEATHERING	L	4704.50	SqFt

Sample Number: 30 **Type:** R **Area:** 5000.00 SqFt **PCI:** 51

Sample Comments:

47	JT REF. CR	L	705.58	Ft
48	L & T CR	L	172.19	Ft
48	L & T CR	M	306.40	Ft
48	L & T CR	H	7.55	Ft

57	WEATHERING	L	4739.01	SqFt

Sample Number: 34 **Type:** R **Area:** 5000.00 SqFt **PCI:** 66

Sample Comments:

47	JT REF. CR	L	748.04	Ft
48	L & T CR	L	230.22	Ft
48	L & T CR	M	83.60	Ft
57	WEATHERING	L	4664.56	SqFt

Sample Number: 39 **Type:** R **Area:** 5000.00 SqFt **PCI:** 67

Sample Comments:

47	JT REF. CR	L	694.65	Ft
48	L & T CR	L	134.69	Ft
48	L & T CR	M	19.43	Ft
57	WEATHERING	L	4526.47	SqFt

Sample Number: 43 **Type:** R **Area:** 5000.00 SqFt **PCI:** 67

Sample Comments:

47	JT REF. CR	L	698.26	Ft
48	L & T CR	L	206.69	Ft
48	L & T CR	M	32.05	Ft
57	WEATHERING	L	4580.94	SqFt

Sample Number: 47 **Type:** R **Area:** 5000.00 SqFt **PCI:** 67

Sample Comments:

47	JT REF. CR	L	701.94	Ft
48	L & T CR	L	225.12	Ft
48	L & T CR	M	10.52	Ft
57	WEATHERING	L	4710.28	SqFt

Sample Number: 5 **Type:** R **Area:** 5000.00 SqFt **PCI:** 67

Sample Comments:

47	JT REF. CR	L	698.24	Ft
48	L & T CR	L	64.21	Ft
48	L & T CR	M	63.27	Ft
57	WEATHERING	L	4757.67	SqFt

Sample Number: 51 **Type:** R **Area:** 5000.00 SqFt **PCI:** 66

Sample Comments:

47	JT REF. CR	L	750.30	Ft
48	L & T CR	L	273.20	Ft
48	L & T CR	M	29.06	Ft
57	WEATHERING	L	4497.97	SqFt

Network:	BGR			**Name:**	Bangor International Airport				
Branch:	RW1533S	**Name:**	Runway 15-33 Shoulder		**Use:**	SHOULDER-AF	**Area:**	1,054,000 SqFt	

Section: 10 of 2 **From:** RW1533 - STA:17+00, STA:95+40 **To:** STA:36+40, STA:122+40 **Last Const.:** 6/1/2002

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 464,000 SqFt **Length:** 4,640 Ft **Width:** 100 Ft

Slabs: **Slab Length:** 18,960 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2002 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 92 **Surveyed:** 14

Conditions: **PCI:** 57

Inspection Comments:

Sample Number: 11 **Type:** R **Area:** 5105.00 SqFt **PCI:** 71

Sample Comments:

47	JT REF. CR	L	749.49	Ft
48	L & T CR	L	64.24	Ft
57	WEATHERING	L	4623.44	SqFt

Sample Number: 18 **Type:** R **Area:** 5105.00 SqFt **PCI:** 47

Sample Comments:

45	DEPRESSION	L	910.47	SqFt
47	JT REF. CR	L	748.33	Ft
48	L & T CR	L	172.57	Ft
48	L & T CR	M	6.28	Ft
57	WEATHERING	L	4805.17	SqFt

Sample Number: 24 **Type:** R **Area:** 5000.00 SqFt **PCI:** 51

Sample Comments:

47	JT REF. CR	L	310.70	Ft
47	JT REF. CR	M	279.99	Ft
47	JT REF. CR	H	75.63	Ft
48	L & T CR	L	11.64	Ft
48	L & T CR	M	132.36	Ft
57	WEATHERING	L	4680.09	SqFt

Sample Number: 31 **Type:** R **Area:** 5000.00 SqFt **PCI:** 55

Sample Comments:

47	JT REF. CR	L	517.45	Ft
47	JT REF. CR	M	200.47	Ft
48	L & T CR	L	118.70	Ft
48	L & T CR	M	118.11	Ft
57	WEATHERING	L	4650.61	SqFt

Sample Number: 37 **Type:** R **Area:** 5000.00 SqFt **PCI:** 62

Sample Comments:

47	JT REF. CR	L	469.84	Ft
47	JT REF. CR	M	95.62	Ft
48	L & T CR	L	317.75	Ft
48	L & T CR	M	126.70	Ft
57	WEATHERING	L	4653.67	SqFt

Sample Number: 44 **Type:** R **Area:** 5000.00 SqFt **PCI:** 48

Sample Comments:

47	JT REF. CR	L	360.61	Ft
47	JT REF. CR	M	350.64	Ft
48	L & T CR	L	302.99	Ft
48	L & T CR	M	58.48	Ft
57	WEATHERING	L	4692.73	SqFt

Sample Number: 5 **Type:** R **Area:** 5105.00 SqFt **PCI:** 62

Sample Comments:

47	JT REF. CR	L	663.47	Ft
47	JT REF. CR	M	97.26	Ft
48	L & T CR	L	231.27	Ft
48	L & T CR	M	35.11	Ft
57	WEATHERING	L	4690.72	SqFt

Sample Number: 51 **Type:** R **Area:** 5105.00 SqFt **PCI:** 57

Sample Comments:

47	JT REF. CR	L	397.24	Ft
47	JT REF. CR	M	258.03	Ft
48	L & T CR	L	98.85	Ft
57	WEATHERING	L	4848.74	SqFt

Sample Number: 57 **Type:** R **Area:** 5105.00 SqFt **PCI:** 58

Sample Comments:

47	JT REF. CR	L	487.97	Ft
47	JT REF. CR	M	164.62	Ft
48	L & T CR	L	60.75	Ft
48	L & T CR	M	19.33	Ft
57	WEATHERING	L	4766.02	SqFt

Sample Number: 64 **Type:** R **Area:** 5105.00 SqFt **PCI:** 60

Sample Comments:

47	JT REF. CR	L	423.52	Ft
47	JT REF. CR	M	140.65	Ft
48	L & T CR	L	175.07	Ft
48	L & T CR	M	100.87	Ft
57	WEATHERING	L	4702.69	SqFt

Sample Number: 70 **Type:** R **Area:** 5000.00 SqFt **PCI:** 56

Sample Comments:

47	JT REF. CR	L	514.52	Ft
47	JT REF. CR	M	184.21	Ft
48	L & T CR	L	85.40	Ft
48	L & T CR	M	55.47	Ft
57	WEATHERING	L	4671.44	SqFt

Sample Number: 77 **Type:** R **Area:** 5000.00 SqFt **PCI:** 46

Sample Comments:

47	JT REF. CR	L	457.92	Ft
47	JT REF. CR	M	242.27	Ft
47	JT REF. CR	H	74.64	Ft
48	L & T CR	L	41.35	Ft
48	L & T CR	M	257.47	Ft
57	WEATHERING	L	4707.65	SqFt

Sample Number: 83 **Type:** R **Area:** 5000.00 SqFt **PCI:** 57

Sample Comments:

47	JT REF. CR	L	327.55	Ft
47	JT REF. CR	M	130.67	Ft
47	JT REF. CR	H	11.76	Ft
48	L & T CR	L	168.36	Ft
48	L & T CR	M	104.69	Ft
57	WEATHERING	L	4660.50	SqFt

Sample Number: 90 **Type:** R **Area:** 5000.00 SqFt **PCI:** 63

Sample Comments:

47	JT REF. CR	L	537.54	Ft
47	JT REF. CR	M	71.40	Ft
48	L & T CR	L	141.38	Ft
48	L & T CR	M	116.30	Ft
57	WEATHERING	L	4619.47	SqFt

Network:	BGR		**Name:**	Bangor International Airport			
Branch:	RW1533S	**Name:**	Runway 15-33 Shoulder	**Use:**	SHOULDER-AF	**Area:**	1,054,000 SqFt

Section: 20 of 2 **From:** RW1533 - STA:36+40 **To:** STA:95+40 **Last Const.:** 6/1/2003

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 590,000 SqFt **Length:** 5,900 Ft **Width:** 100 Ft

Slabs: **Slab Length:** 23,800 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2003 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 118 **Surveyed:** 15

Conditions: **PCI:** 69

Inspection Comments:

Sample Number: 106 **Type:** R **Area:** 5000.00 SqFt **PCI:** 74

Sample Comments:

47	JT REF. CR	L	559.79	Ft
48	L & T CR	L	92.11	Ft
57	WEATHERING	L	4775.63	SqFt

Sample Number: 114 **Type:** R **Area:** 5000.00 SqFt **PCI:** 61

Sample Comments:

47	JT REF. CR	L	424.29	Ft
47	JT REF. CR	M	130.27	Ft
48	L & T CR	L	194.81	Ft
48	L & T CR	M	7.65	Ft
57	WEATHERING	L	4718.95	SqFt

Sample Number: 12 **Type:** R **Area:** 5000.00 SqFt **PCI:** 66

Sample Comments:

47	JT REF. CR	L	651.62	Ft
48	L & T CR	L	102.53	Ft
48	L & T CR	M	61.66	Ft
56	SWELLING	L	13.44	SqFt
57	WEATHERING	L	4566.55	SqFt

Sample Number: 19 **Type:** R **Area:** 5000.00 SqFt **PCI:** 71

Sample Comments:

47	JT REF. CR	L	749.38	Ft
48	L & T CR	L	73.92	Ft
57	WEATHERING	L	4766.02	SqFt

Sample Number: 27 **Type:** R **Area:** 5000.00 SqFt **PCI:** 68

Sample Comments:

47	JT REF. CR	L	625.40	Ft
47	JT REF. CR	M	47.68	Ft
48	L & T CR	L	97.89	Ft
57	WEATHERING	L	4651.88	SqFt

Sample Number: 35 **Type:** R **Area:** 5000.00 SqFt **PCI:** 68

Sample Comments:

47	JT REF. CR	L	700.56	Ft
48	L & T CR	L	45.72	Ft
48	L & T CR	M	3.20	Ft
57	WEATHERING	L	4557.72	SqFt

Sample Number: 4 **Type:** R **Area:** 5000.00 SqFt **PCI:** 73

Sample Comments:

47	JT REF. CR	L	597.16	Ft
48	L & T CR	L	69.37	Ft
57	WEATHERING	L	4671.45	SqFt

Sample Number: 43 **Type:** R **Area:** 5000.00 SqFt **PCI:** 73

Sample Comments:

47	JT REF. CR	L	615.31	Ft
48	L & T CR	L	264.55	Ft
57	WEATHERING	L	4764.06	SqFt

Sample Number: 51 **Type:** R **Area:** 5000.00 SqFt **PCI:** 68

Sample Comments:

47	JT REF. CR	L	623.11	Ft
47	JT REF. CR	M	28.74	Ft
48	L & T CR	L	83.50	Ft
57	WEATHERING	L	4528.04	SqFt

Sample Number: 59 **Type:** R **Area:** 5000.00 SqFt **PCI:** 73

Sample Comments:

47	JT REF. CR	L	646.35	Ft
48	L & T CR	L	42.10	Ft
57	WEATHERING	L	4565.27	SqFt

Sample Number: 67 **Type:** R **Area:** 5000.00 SqFt **PCI:** 69

Sample Comments:

47	JT REF. CR	L	559.77	Ft
47	JT REF. CR	M	46.26	Ft
48	L & T CR	L	67.69	Ft
57	WEATHERING	L	4714.22	SqFt

Sample Number: 74 **Type:** R **Area:** 5000.00 SqFt **PCI:** 68

Sample Comments:

47	JT REF. CR	L	617.97	Ft
48	L & T CR	L	171.36	Ft
48	L & T CR	M	36.55	Ft
57	WEATHERING	L	4575.53	SqFt

Sample Number: 82 **Type:** R **Area:** 5000.00 SqFt **PCI:** 74

Sample Comments:

47	JT REF. CR	L	612.83	Ft
48	L & T CR	L	26.86	Ft
57	WEATHERING	L	4709.97	SqFt

Sample Number: 90 **Type:** R **Area:** 5000.00 SqFt **PCI:** 62

Sample Comments:

47	JT REF. CR	L	678.78	Ft
47	JT REF. CR	M	33.21	Ft
48	L & T CR	L	29.59	Ft
48	L & T CR	M	1.77	Ft
50	PATCHING	L	.39	SqFt
57	WEATHERING	L	4579.54	SqFt

Sample Number: 98 **Type:** R **Area:** 5000.00 SqFt **PCI:** 63

Sample Comments:

47	JT REF. CR	L	620.44	Ft
48	L & T CR	L	114.84	Ft
48	L & T CR	M	77.10	Ft
48	L & T CR	H	3.74	Ft
57	WEATHERING	L	4808.20	SqFt

Network: BGR **Name:** Bangor International Airport

Branch: TWA **Name:** Taxiway 'A' **Use:** TAXIWAY **Area:** 1,712,935 SqFt

Section: 140 of 18 **From:** TWA - STA: 12+50, STA: 14+19 **To:** STA: 13+88, STA: 18+25 **Last Const.:** 6/1/2019

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 52,224 SqFt **Length:** 544 Ft **Width:** 96 Ft

Slabs: **Slab Length:** 1,594 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2019 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 12 **Surveyed:** 5

Conditions: **PCI:** 100

Inspection Comments:

Sample Number: 12 **Type:** R **Area:** 4456.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 2 **Type:** R **Area:** 4456.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 6 **Type:** R **Area:** 4936.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 8 **Type:** R **Area:** 4459.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 9 **Type:** R **Area:** 4456.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Network: BGR		**Name:** Bangor International Airport	

Branch: TWA	**Name:** Taxiway 'A'	**Use:** TAXIWAY	**Area:** 1,712,935 SqFt

Section: 150 of 18 **From:** TWA - STA: 101+40 **To:** STA: 117+00 **Last Const.:** 6/1/2015

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 117,000 SqFt **Length:** 1,560 Ft **Width:** 75 Ft

Slabs: **Slab Length:** 3,270 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2015 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 24 **Surveyed:** 5

Conditions: **PCI:** 91

Inspection Comments:

Sample Number: 11 **Type:** R **Area:** 4875.00 SqFt **PCI:** 94

Sample Comments:

57	WEATHERING	L	4580.75	SqFt

Sample Number: 18 **Type:** R **Area:** 4875.00 SqFt **PCI:** 90

Sample Comments:

48	L & T CR	L	22.66	Ft
57	WEATHERING	L	4533.41	SqFt

Sample Number: 21 **Type:** R **Area:** 4875.00 SqFt **PCI:** 87

Sample Comments:

48	L & T CR	L	45.73	Ft
50	PATCHING	L	.52	SqFt
57	WEATHERING	L	4618.82	SqFt

Sample Number: 4 **Type:** R **Area:** 4875.00 SqFt **PCI:** 92

Sample Comments:

50	PATCHING	L	.49	SqFt
57	WEATHERING	L	4706.71	SqFt

Sample Number: 6 **Type:** R **Area:** 4875.00 SqFt **PCI:** 91

Sample Comments:

48	L & T CR	L	9.45	Ft
57	WEATHERING	L	4564.13	SqFt

Network: BGR **Name:** Bangor International Airport

Branch: TWA **Name:** Taxiway 'A' **Use:** TAXIWAY **Area:** 1,712,935 SqFt

Section: 180 of 18 **From:** TWA - STA: 12+15 **To:** STA: 12+51 **Last Const.:** 6/1/2018

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 6,768 SqFt **Length:** 36 Ft **Width:** 188 Ft

Slabs: **Slab Length:** 461 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2018 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 100

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 6780.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Network:	BGR			**Name:**	Bangor International Airport				
Branch:	TWA	**Name:**	Taxiway 'A'	**Use:**	TAXIWAY	**Area:**	1,712,935 SqFt		

Section: 130 of 18 **From:** TWA - STA: 11+50, STA: 18+25 **To:** STA: 12+50, STA 18+60 **Last Const.:** 6/1/2019

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 30,780 SqFt **Length:** 135 Ft **Width:** 228 Ft

Slabs: **Slab Length:** 1,609 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2019 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 7 **Surveyed:** 1

Conditions: **PCI:** 100

Inspection Comments:

Sample Number: 2 **Type:** R **Area:** 4940.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Network: BGR **Name:** Bangor International Airport

Branch: TWA **Name:** Taxiway 'A' **Use:** TAXIWAY **Area:** 1,712,935 SqFt

Section: 170 of 18 **From:** TWA - STA: 12+51 **To:** STA: 50+91 **Last Const.:** 6/1/2018

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 349,440 SqFt **Length:** 3,840 Ft **Width:** 91 Ft

Slabs: **Slab Length:** 9,670 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2018 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 69 **Surveyed:** 14

Conditions: **PCI:** 100

Inspection Comments:

Sample Number: 13 **Type:** R **Area:** 5025.00 SqFt **PCI:** 96

Sample Comments:

48 L & T CR L 20.41 Ft

Sample Number: 18 **Type:** R **Area:** 6104.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 23 **Type:** R **Area:** 5025.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 27 **Type:** R **Area:** 5025.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 32 **Type:** R **Area:** 5025.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 37 **Type:** R **Area:** 5025.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 4 **Type:** R **Area:** 5033.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 42 **Type:** R **Area:** 5025.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 47 **Type:** R **Area:** 4709.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 51 **Type:** R **Area:** 6281.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 56 **Type:** R **Area:** 4616.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 61 **Type:** R **Area:** 4020.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 66 **Type:** R **Area:** 5844.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 8 **Type:** R **Area:** 5025.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	TWA	**Name:**	Taxiway 'A'	**Use:**	TAXIWAY	**Area:**	1,712,935 SqFt

Section:	160	of 18		**From:**	TWA - STA: 108+50	**To:**	STA: 111+00	**Last Const.:**	6/1/2015
Surface:	AC	**Family:**	DEFAULT	**Zone:**		**Category:**		**Rank:**	P
Area:	11,500 SqFt	**Length:**	250 Ft	**Width:**	46 Ft				
Slabs:		**Slab Length:**	590 Ft	**Slab Width:**	Ft	**Joint Length:**	Ft		
Shoulder:		**Street Type:**		**Grade:**	0	**Lanes:**	0		

Section Comments:

Work Date: 6/1/2015 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 2 **Surveyed:** 1

Conditions: **PCI:** 92

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 5818.00 SqFt **PCI:** 92

Sample Comments:

50	PATCHING	L	1.83	SqFt
57	WEATHERING	L	5435.39	SqFt

Network:	BGR		**Name:**	Bangor International Airport			
Branch:	TWA	**Name:**	Taxiway 'A'	**Use:**	TAXIWAY	**Area:**	1,712,935 SqFt

Section: 10 of 18 **From:** TWA - STA:15+63 **To:** STA:46+11 **Last Const.:** 6/1/1997

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 228,625 SqFt **Length:** 3,048 Ft **Width:** 75 Ft

Slabs: **Slab Length:** 6,349 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/1997 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 46 **Surveyed:** 6

Conditions: **PCI:** 28

Inspection Comments:

Sample Number: 12 **Type:** R **Area:** 5014.00 SqFt **PCI:** 29

Sample Comments:

41	ALLIGATOR CR	L	1052.34	SqFt
45	DEPRESSION	M	81.23	SqFt
48	L & T CR	L	510.08	Ft
53	RUTTING	L	479.95	SqFt
57	WEATHERING	L	4952.87	SqFt

Sample Number: 19 **Type:** R **Area:** 5021.00 SqFt **PCI:** 29

Sample Comments:

41	ALLIGATOR CR	L	1047.39	SqFt
45	DEPRESSION	M	71.20	SqFt
48	L & T CR	L	626.31	Ft
53	RUTTING	L	453.64	SqFt
57	WEATHERING	L	4752.00	SqFt

Sample Number: 26 **Type:** R **Area:** 5041.00 SqFt **PCI:** 28

Sample Comments:

41	ALLIGATOR CR	L	1076.65	SqFt
45	DEPRESSION	M	52.75	SqFt
48	L & T CR	L	627.13	Ft
53	RUTTING	L	370.78	SqFt
57	WEATHERING	L	4947.29	SqFt

Sample Number: 33 **Type:** R **Area:** 4909.00 SqFt **PCI:** 27

Sample Comments:

41	ALLIGATOR CR	L	1197.27	SqFt
48	L & T CR	L	533.27	Ft
48	L & T CR	M	84.67	Ft
53	RUTTING	L	348.38	SqFt
57	WEATHERING	L	4714.83	SqFt

Sample Number: 4 **Type:** R **Area:** 4992.00 SqFt **PCI:** 28

Sample Comments:

41	ALLIGATOR CR	L	1108.13	SqFt
45	DEPRESSION	M	73.22	SqFt
48	L & T CR	L	612.96	Ft
53	RUTTING	L	450.41	SqFt
57	WEATHERING	L	4885.23	SqFt

Sample Number: 40 **Type:** R **Area:** 4928.00 SqFt **PCI:** 30

Sample Comments:

41	ALLIGATOR CR	L	901.02	SqFt
48	L & T CR	L	380.98	Ft
48	L & T CR	M	141.46	Ft
53	RUTTING	L	378.01	SqFt
57	WEATHERING	L	4718.06	SqFt

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	TWA	**Name:**	Taxiway 'A'	**Use:**	TAXIWAY	**Area:**	1,712,935 SqFt

Section:	40	of 18	**From:**	TWA - STA:61+56, STA:76+91	**To:**	STA:62+86, STA:78+26		**Last Const.:**	6/1/1996
Surface:	AC	**Family:**	DEFAULT	**Zone:**		**Category:**		**Rank:**	P
Area:	25,574 SqFt	**Length:**	265 Ft	**Width:**	97 Ft				
Slabs:		**Slab Length:**	862 Ft	**Slab Width:**	Ft	**Joint Length:**	Ft		
Shoulder:		**Street Type:**		**Grade:**	0	**Lanes:**	0		

Section Comments:

Work Date: 6/1/1996 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 4 **Surveyed:** 3

Conditions: **PCI:** 27

Inspection Comments:

Sample Number: 2 **Type:** R **Area:** 4980.00 SqFt **PCI:** 23

Sample Comments:

41	ALLIGATOR CR	L	1089.28	SqFt
41	ALLIGATOR CR	M	36.73	SqFt
45	DEPRESSION	M	45.15	SqFt
48	L & T CR	L	326.96	Ft
48	L & T CR	M	69.72	Ft
53	RUTTING	L	298.98	SqFt
56	SWELLING	L	244.56	SqFt
57	WEATHERING	L	4771.46	SqFt

Sample Number: 3 **Type:** R **Area:** 5136.00 SqFt **PCI:** 30

Sample Comments:

41	ALLIGATOR CR	L	450.91	SqFt
48	L & T CR	L	239.83	Ft
48	L & T CR	M	74.25	Ft
48	L & T CR	H	50.85	Ft
53	RUTTING	L	172.00	SqFt
56	SWELLING	L	193.62	SqFt
57	WEATHERING	L	4690.83	SqFt

Sample Number: 4 **Type:** R **Area:** 6456.00 SqFt **PCI:** 27

Sample Comments:

41	ALLIGATOR CR	M	477.67	SqFt
48	L & T CR	L	389.09	Ft
48	L & T CR	M	153.02	Ft
50	PATCHING	L	4.85	SqFt
52	RAVELING	M	2.54	SqFt
53	RUTTING	L	416.28	SqFt
57	WEATHERING	L	6088.27	SqFt

Network: BGR		**Name:** Bangor International Airport	
Branch: TWA	**Name:** Taxiway 'A'	**Use:** TAXIWAY	**Area:** 1,712,935 SqFt

Section: 70 of 18 **From:** TWA - STA:78+26 **To:** STA:88+81 **Last Const.:** 6/1/1997
Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P
Area: 79,147 SqFt **Length:** 1,055 Ft **Width:** 75 Ft
Slabs: **Slab Length:** 2,259 Ft **Slab Width:** Ft **Joint Length:** Ft
Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0
Section Comments:

Work Date: 6/1/1997 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 17 **Surveyed:** 9
Conditions: **PCI:** 21
Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 4603.00 SqFt **PCI:** 11
Sample Comments:

41	ALLIGATOR CR	L	117.16	SqFt
41	ALLIGATOR CR	M	1630.50	SqFt
43	BLOCK CR	L	563.79	SqFt
48	L & T CR	L	363.90	Ft
48	L & T CR	M	49.06	Ft
48	L & T CR	H	2.81	Ft
50	PATCHING	L	.47	SqFt
53	RUTTING	L	351.55	SqFt
57	WEATHERING	L	4199.19	SqFt

Sample Number: 10 **Type:** R **Area:** 4650.00 SqFt **PCI:** 18
Sample Comments:

41	ALLIGATOR CR	L	544.02	SqFt
41	ALLIGATOR CR	M	310.69	SqFt
45	DEPRESSION	L	168.13	SqFt
48	L & T CR	L	353.82	Ft
48	L & T CR	M	40.00	Ft
50	PATCHING	L	100.05	SqFt
57	WEATHERING	L	4372.01	SqFt

Sample Number: 12 **Type:** R **Area:** 4650.00 SqFt **PCI:** 21
Sample Comments:

41	ALLIGATOR CR	L	750.08	SqFt
41	ALLIGATOR CR	M	225.33	SqFt
45	DEPRESSION	L	51.40	SqFt
48	L & T CR	L	404.12	Ft
48	L & T CR	M	42.98	Ft
57	WEATHERING	L	4371.91	SqFt

Sample Number: 14 **Type:** R **Area:** 4650.00 SqFt **PCI:** 21
Sample Comments:

41	ALLIGATOR CR	L	192.00	SqFt
41	ALLIGATOR CR	M	271.37	SqFt
43	BLOCK CR	L	571.79	SqFt
43	BLOCK CR	M	442.90	SqFt
45	DEPRESSION	M	100.06	SqFt
48	L & T CR	L	100.98	Ft
48	L & T CR	M	105.27	Ft
48	L & T CR	H	57.54	Ft
57	WEATHERING	L	4321.97	SqFt

Sample Number: 16 **Type:** R **Area:** 4650.00 SqFt **PCI:** 26
Sample Comments:

41	ALLIGATOR CR	L	809.10	SqFt
43	BLOCK CR	L	732.02	SqFt
45	DEPRESSION	L	72.45	SqFt
48	L & T CR	L	72.77	Ft
48	L & T CR	M	37.32	Ft

57	WEATHERING	L	4137.59	SqFt

Sample Number: 3 **Type:** R **Area:** 4650.00 SqFt **PCI:** 33

Sample Comments:

41	ALLIGATOR CR	L	650.49	SqFt
45	DEPRESSION	L	92.41	SqFt
48	L & T CR	L	319.39	Ft
48	L & T CR	M	277.24	Ft
57	WEATHERING	L	4463.88	SqFt

Sample Number: 4 **Type:** R **Area:** 4650.00 SqFt **PCI:** 25

Sample Comments:

41	ALLIGATOR CR	L	648.65	SqFt
41	ALLIGATOR CR	M	144.25	SqFt
45	DEPRESSION	L	72.02	SqFt
48	L & T CR	L	357.27	Ft
48	L & T CR	M	153.43	Ft
50	PATCHING	L	.06	SqFt
57	WEATHERING	L	4295.75	SqFt

Sample Number: 6 **Type:** R **Area:** 4650.00 SqFt **PCI:** 18

Sample Comments:

41	ALLIGATOR CR	L	607.54	SqFt
41	ALLIGATOR CR	M	253.80	SqFt
45	DEPRESSION	L	102.72	SqFt
48	L & T CR	L	370.05	Ft
48	L & T CR	M	99.33	Ft
50	PATCHING	M	.67	SqFt
57	WEATHERING	L	4442.75	SqFt

Sample Number: 8 **Type:** R **Area:** 4650.00 SqFt **PCI:** 17

Sample Comments:

41	ALLIGATOR CR	L	489.93	SqFt
41	ALLIGATOR CR	M	514.01	SqFt
45	DEPRESSION	L	97.18	SqFt
48	L & T CR	L	291.63	Ft
48	L & T CR	M	85.75	Ft
57	WEATHERING	L	4400.07	SqFt

Network:	BGR			**Name:**	Bangor International Airport		

Branch:	TWA	**Name:**	Taxiway 'A'	**Use:**	TAXIWAY	**Area:**	1,712,935 SqFt

Section: 100 of 18 **From:** TWA - STA:3+50, STA:13+38 **To:** STA:9+25, STA:15+63 **Last Const.:** 6/1/1994

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 68,104 SqFt **Length:** 800 Ft **Width:** 86 Ft

Slabs: **Slab Length:** 600 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/1994 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 3 **Surveyed:** 2

Conditions: **PCI:** 27

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 5625.00 SqFt **PCI:** 24

Sample Comments:

41	ALLIGATOR CR	L	1589.96	SqFt
48	L & T CR	L	684.81	Ft
48	L & T CR	M	32.47	Ft
53	RUTTING	L	457.55	SqFt
56	SWELLING	L	91.15	SqFt
57	WEATHERING	L	5417.77	SqFt

Sample Number: 3 **Type:** R **Area:** 5626.00 SqFt **PCI:** 29

Sample Comments:

41	ALLIGATOR CR	L	1110.68	SqFt
48	L & T CR	L	802.64	Ft
53	RUTTING	L	376.29	SqFt
56	SWELLING	L	123.17	SqFt
57	WEATHERING	L	5425.37	SqFt

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	TWA	**Name:**	Taxiway 'A'	**Use:**	TAXIWAY	**Area:**	1,712,935 SqFt

Section:	110	of 18		**From:**	TWA - STA:2+60, STA:7+20	**To:**	STA:3+50, STA:15+73	**Last Const.:**	6/1/1994
Surface:	AC	**Family:**	DEFAULT	**Zone:**		**Category:**		**Rank:**	P
Area:	62,145 SqFt	**Length:**	943 Ft	**Width:**	66 Ft				
Slabs:		**Slab Length:**	1,366 Ft	**Slab Width:**	Ft	**Joint Length:**	Ft		
Shoulder:		**Street Type:**		**Grade:**	0	**Lanes:**	0		

Section Comments:

Work Date: 6/1/1994 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 8 **Surveyed:** 3

Conditions: **PCI:** 43

Inspection Comments:

Sample Number: 3 **Type:** R **Area:** 4896.00 SqFt **PCI:** 62

Sample Comments:

45	DEPRESSION	H	31.95	SqFt
48	L & T CR	L	396.38	Ft
48	L & T CR	M	77.82	Ft
57	WEATHERING	L	4771.92	SqFt

Sample Number: 5 **Type:** R **Area:** 4890.00 SqFt **PCI:** 31

Sample Comments:

41	ALLIGATOR CR	L	529.72	SqFt
45	DEPRESSION	H	47.99	SqFt
48	L & T CR	L	443.19	Ft
48	L & T CR	M	26.64	Ft
53	RUTTING	L	150.38	SqFt
57	WEATHERING	L	4649.65	SqFt

Sample Number: 7 **Type:** R **Area:** 4895.00 SqFt **PCI:** 36

Sample Comments:

41	ALLIGATOR CR	L	317.15	SqFt
45	DEPRESSION	H	38.68	SqFt
48	L & T CR	L	417.47	Ft
48	L & T CR	M	40.20	Ft
53	RUTTING	L	284.32	SqFt
57	WEATHERING	L	4558.17	SqFt

Network:	BGR			**Name:**	Bangor International Airport		

Branch:	TWA	**Name:**	Taxiway 'A'	**Use:**	TAXIWAY	**Area:**	1,712,935 SqFt

Section: 50 of 18 **From:** TWA - STA:62+86, STA:88+81 **To:** STA:76+91, STA:93+17 **Last Const.:** 6/1/1996

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 211,421 SqFt **Length:** 1,841 Ft **Width:** 115 Ft

Slabs: **Slab Length:** 7,386 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/1996 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 61 **Surveyed:** 9

Conditions: **PCI:** 46

Inspection Comments:

Sample Number: 15 **Type:** R **Area:** 4655.00 SqFt **PCI:** 35

Sample Comments:

41	ALLIGATOR CR	L	324.09	SqFt
48	L & T CR	L	301.72	Ft
48	L & T CR	M	21.74	Ft
50	PATCHING	L	477.08	SqFt
53	RUTTING	L	116.71	SqFt
57	WEATHERING	L	4192.97	SqFt

Sample Number: 18 **Type:** R **Area:** 4655.00 SqFt **PCI:** 31

Sample Comments:

41	ALLIGATOR CR	L	81.19	SqFt
41	ALLIGATOR CR	M	187.00	SqFt
48	L & T CR	L	316.76	Ft
48	L & T CR	M	28.57	Ft
50	PATCHING	L	173.27	SqFt
57	WEATHERING	L	4164.00	SqFt

Sample Number: 2 **Type:** R **Area:** 4339.00 SqFt **PCI:** 28

Sample Comments:

41	ALLIGATOR CR	L	565.57	SqFt
45	DEPRESSION	L	74.66	SqFt
48	L & T CR	L	316.69	Ft
48	L & T CR	M	81.62	Ft
50	PATCHING	L	55.06	SqFt
53	RUTTING	L	295.28	SqFt
57	WEATHERING	L	4117.74	SqFt

Sample Number: 22 **Type:** R **Area:** 4655.00 SqFt **PCI:** 39

Sample Comments:

41	ALLIGATOR CR	L	614.99	SqFt
48	L & T CR	L	312.44	Ft
48	L & T CR	M	101.40	Ft
57	WEATHERING	L	4443.66	SqFt

Sample Number: 25 **Type:** R **Area:** 5083.00 SqFt **PCI:** 94

Sample Comments:

57	WEATHERING	L	4859.85	SqFt

Sample Number: 28 **Type:** R **Area:** 5037.00 SqFt **PCI:** 61

Sample Comments:

41	ALLIGATOR CR	L	213.08	SqFt
48	L & T CR	L	143.44	Ft

Sample Number: 32 **Type:** R **Area:** 5047.00 SqFt **PCI:** 39

Sample Comments:

41	ALLIGATOR CR	L	520.88	SqFt
41	ALLIGATOR CR	M	97.48	SqFt
48	L & T CR	L	94.51	Ft

48	L & T CR	M	7.04	Ft

Sample Number: 35 **Type:** R **Area:** 4998.00 SqFt **PCI:** 54

Sample Comments:

47	JT REF. CR	L	114.50	Ft
47	JT REF. CR	M	212.43	Ft
48	L & T CR	L	187.23	Ft
48	L & T CR	M	37.22	Ft
57	WEATHERING	L	2732.92	SqFt

Sample Number: 8 **Type:** R **Area:** 4655.00 SqFt **PCI:** 24

Sample Comments:

41	ALLIGATOR CR	L	1040.04	SqFt
41	ALLIGATOR CR	M	96.40	SqFt
48	L & T CR	L	394.65	Ft
48	L & T CR	M	11.12	Ft
50	PATCHING	L	270.51	SqFt
53	RUTTING	L	239.02	SqFt
57	WEATHERING	L	4494.11	SqFt

Network:	BGR		**Name:**	Bangor International Airport			
Branch:	TWAS	**Name:**	Taxiway 'A' Shoulders	**Use:**	SHOULDER-AF	**Area:**	1,034,744 SqFt

Section: 120 of 13 **From:** TWAS - STA: 12+15 **To:** STA: 50+91 **Last Const.:** 6/1/2018

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 224,808 SqFt **Length:** 3,876 Ft **Width:** 58 Ft

Slabs: **Slab Length:** 15,506 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2018 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 45 **Surveyed:** 9

Conditions: **PCI:** 99

Inspection Comments:

Sample Number: 13 **Type:** R **Area:** 4304.00 SqFt **PCI:** 98

Sample Comments:

50 PATCHING L 5.74 SqFt

Sample Number: 17 **Type:** R **Area:** 5100.00 SqFt **PCI:** 98

Sample Comments:

50 PATCHING L 9.59 SqFt

Sample Number: 2 **Type:** R **Area:** 5123.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 24 **Type:** R **Area:** 5100.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 28 **Type:** R **Area:** 5100.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 32 **Type:** R **Area:** 5100.00 SqFt **PCI:** 98

Sample Comments:

50 PATCHING L 4.17 SqFt

Sample Number: 35 **Type:** R **Area:** 5100.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 5 **Type:** R **Area:** 3249.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 9 **Type:** R **Area:** 5100.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Network:	BGR		**Name:**	Bangor International Airport			
Branch:	TWAS	**Name:**	Taxiway 'A' Shoulders	**Use:**	SHOULDER-AF	**Area:**	1,034,744 SqFt

Section:	70	of 13	**From:**	TWA - STA:60+90		**To:**	STA:70+33	**Last Const.:**	6/1/1997
Surface:	ACR	**Family:**	DEFAULT	**Zone:**		**Category:**		**Rank:**	P
Area:	33,684 SqFt	**Length:**	943 Ft	**Width:**	35 Ft				
Slabs:		**Slab Length:**	1,895 Ft	**Slab Width:**	Ft			**Joint Length:**	Ft
Shoulder:		**Street Type:**		**Grade:**	0			**Lanes:**	0

Section Comments:

Work Date: 6/1/1997 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 7 **Surveyed:** 4

Conditions: **PCI:** 26

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 2499.00 SqFt **PCI:** 49

Sample Comments:

45	DEPRESSION	M	177.06	SqFt
48	L & T CR	L	13.97	Ft
48	L & T CR	M	109.16	Ft
56	SWELLING	M	5.79	SqFt
57	WEATHERING	L	2338.83	SqFt

Sample Number: 3 **Type:** R **Area:** 5008.00 SqFt **PCI:** 45

Sample Comments:

45	DEPRESSION	L	483.56	SqFt
48	L & T CR	L	88.47	Ft
48	L & T CR	M	465.51	Ft
50	PATCHING	L	3.81	SqFt
56	SWELLING	M	8.90	SqFt
57	WEATHERING	L	4729.75	SqFt

Sample Number: 5 **Type:** R **Area:** 5008.00 SqFt **PCI:** 13

Sample Comments:

41	ALLIGATOR CR	L	446.54	SqFt
45	DEPRESSION	L	1372.31	SqFt
48	L & T CR	L	79.72	Ft
48	L & T CR	M	191.98	Ft
48	L & T CR	H	118.94	Ft
50	PATCHING	L	3.97	SqFt
50	PATCHING	M	89.84	SqFt
56	SWELLING	M	6.37	SqFt
56	SWELLING	H	11.30	SqFt
57	WEATHERING	L	4613.60	SqFt

Sample Number: 7 **Type:** R **Area:** 4189.00 SqFt **PCI:** 6

Sample Comments:

41	ALLIGATOR CR	M	895.97	SqFt
45	DEPRESSION	M	1050.30	SqFt
45	DEPRESSION	H	80.98	SqFt
48	L & T CR	L	8.67	Ft
48	L & T CR	M	52.83	Ft
48	L & T CR	H	106.56	Ft
50	PATCHING	M	1.92	SqFt
50	PATCHING	H	11.98	SqFt
57	WEATHERING	L	3463.58	SqFt

Network:	BGR		**Name:**	Bangor International Airport			
Branch:	TWAS	**Name:**	Taxiway 'A' Shoulders	**Use:**	SHOULDER-AF	**Area:**	1,034,744 SqFt

Section: 10 of 13 **From:** TWA - STA:15+73, STA:78+21 **To:** STA:46+07, STA:88+81 **Last Const.:** 6/1/1997

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 244,789 SqFt **Length:** 4,094 Ft **Width:** 60 Ft

Slabs: **Slab Length:** 14,297 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/1997 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 50 **Surveyed:** 4

Conditions: **PCI:** 44

Inspection Comments:

Sample Number: 26 **Type:** R **Area:** 4975.00 SqFt **PCI:** 56

Sample Comments:

48	L & T CR	L	410.32	Ft
48	L & T CR	M	322.65	Ft
48	L & T CR	H	5.84	Ft
57	WEATHERING	L	4720.86	SqFt

Sample Number: 29 **Type:** R **Area:** 4938.00 SqFt **PCI:** 42

Sample Comments:

48	L & T CR	L	179.76	Ft
48	L & T CR	M	528.14	Ft
50	PATCHING	L	860.16	SqFt
56	SWELLING	M	9.59	SqFt
57	WEATHERING	L	4643.20	SqFt

Sample Number: 31 **Type:** R **Area:** 4998.00 SqFt **PCI:** 36

Sample Comments:

48	L & T CR	L	238.94	Ft
48	L & T CR	M	464.95	Ft
48	L & T CR	H	33.77	Ft
50	PATCHING	M	6.20	SqFt
56	SWELLING	L	4.03	SqFt
56	SWELLING	M	626.45	SqFt
57	WEATHERING	L	4839.59	SqFt

Sample Number: 34 **Type:** R **Area:** 4942.00 SqFt **PCI:** 43

Sample Comments:

48	L & T CR	L	449.14	Ft
48	L & T CR	M	314.40	Ft
50	PATCHING	M	.31	SqFt
56	SWELLING	L	3.90	SqFt
56	SWELLING	M	362.36	SqFt
57	WEATHERING	L	4746.14	SqFt

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	TWB	**Name:**	Taxiway 'B'	**Use:**	TAXIWAY	**Area:**	71,289 SqFt

Section:	20	of 2		**From:**	XXX	**To:**	XXX	**Last Const.:**	1/1/1900
Surface:	AC	**Family:**	DEFAULT	**Zone:**		**Category:**		**Rank:**	P
Area:	4,489 SqFt	**Length:**	67 Ft	**Width:**	67 Ft				
Slabs:		**Slab Length:**	377 Ft	**Slab Width:**	Ft	**Joint Length:**	Ft		
Shoulder:		**Street Type:**		**Grade:**	0	**Lanes:**	0		

Section Comments:

Work Date: 1/1/1900 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 82

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 3385.00 SqFt **PCI:** 85

Sample Comments:

48	L & T CR	L	19.94	Ft
48	L & T CR	M	6.28	Ft
57	WEATHERING	L	3127.86	SqFt

Sample Number: 2 **Type:** R **Area:** 1043.00 SqFt **PCI:** 73

Sample Comments:

48	L & T CR	L	2.96	Ft
48	L & T CR	M	38.83	Ft
57	WEATHERING	L	472.43	SqFt

Network:	BGR		**Name:**	Bangor International Airport			
Branch:	TWB	**Name:**	Taxiway 'B'	**Use:**	TAXIWAY	**Area:**	71,289 SqFt

Section: 10 of 2 **From:** TWB - STA:2+78, 3+74, 12+14 **To:** STA:3+53, 11+46, 16+63 **Last Const.:** 6/1/2000

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 66,800 SqFt **Length:** 1,296 Ft **Width:** 52 Ft

Slabs: **Slab Length:** 2,917 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2000 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 14 **Surveyed:** 8

Conditions: **PCI:** 59

Inspection Comments:

Sample Number: 11 **Type:** R **Area:** 5121.00 SqFt **PCI:** 44

Sample Comments:

48	L & T CR	L	453.47	Ft
48	L & T CR	M	266.22	Ft
53	RUTTING	M	219.49	SqFt
57	WEATHERING	L	4841.36	SqFt

Sample Number: 12 **Type:** R **Area:** 5087.00 SqFt **PCI:** 58

Sample Comments:

48	L & T CR	L	536.81	Ft
48	L & T CR	M	145.86	Ft
53	RUTTING	L	168.92	SqFt
57	WEATHERING	L	4808.25	SqFt

Sample Number: 14 **Type:** R **Area:** 3949.00 SqFt **PCI:** 82

Sample Comments:

48	L & T CR	L	103.62	Ft
48	L & T CR	M	17.55	Ft
57	WEATHERING	L	1464.69	SqFt

Sample Number: 2 **Type:** R **Area:** 4581.00 SqFt **PCI:** 68

Sample Comments:

48	L & T CR	L	425.51	Ft
48	L & T CR	M	171.96	Ft
57	WEATHERING	L	4217.29	SqFt

Sample Number: 4 **Type:** R **Area:** 5089.00 SqFt **PCI:** 64

Sample Comments:

48	L & T CR	L	617.44	Ft
48	L & T CR	M	37.84	Ft
57	WEATHERING	L	4689.47	SqFt

Sample Number: 5 **Type:** R **Area:** 5057.00 SqFt **PCI:** 58

Sample Comments:

48	L & T CR	L	642.05	Ft
48	L & T CR	M	18.74	Ft
53	RUTTING	L	150.82	SqFt
57	WEATHERING	L	4666.79	SqFt

Sample Number: 7 **Type:** R **Area:** 5102.00 SqFt **PCI:** 50

Sample Comments:

48	L & T CR	L	290.30	Ft
48	L & T CR	M	455.79	Ft
53	RUTTING	L	193.37	SqFt
57	WEATHERING	L	4733.25	SqFt

Sample Number: 9 **Type:** R **Area:** 5098.00 SqFt **PCI:** 56

Sample Comments:

41	ALLIGATOR CR	L	28.58	SqFt

48	L & T CR	L	353.25	Ft
48	L & T CR	M	173.79	Ft
53	RUTTING	L	193.67	SqFt
57	WEATHERING	L	4809.78	SqFt

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	TWBS	**Name:**	Taxiway 'B' Shoulders	**Use:**	SHOULDER-AF	**Area:**	25,258 SqFt

Section: 10 of 1 **From:** TWB - STA:2+79, 8+43 **To:** STA:7+63, 15+47 **Last Const.:** 6/1/2000

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 25,258 SqFt **Length:** 1,188 Ft **Width:** 21 Ft

Slabs: **Slab Length:** 2,315 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2000 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 5 **Surveyed:** 4

Conditions: **PCI:** 58

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 6397.00 SqFt **PCI:** 71

Sample Comments:

48	L & T CR	L	685.80	Ft
50	PATCHING	L	.44	SqFt
50	PATCHING	M	5.97	SqFt

Sample Number: 2 **Type:** R **Area:** 4391.00 SqFt **PCI:** 59

Sample Comments:

45	DEPRESSION	L	257.86	SqFt
48	L & T CR	L	557.04	Ft
48	L & T CR	M	107.94	Ft
50	PATCHING	L	.07	SqFt

Sample Number: 3 **Type:** R **Area:** 4386.00 SqFt **PCI:** 57

Sample Comments:

48	L & T CR	L	377.84	Ft
48	L & T CR	M	346.95	Ft
50	PATCHING	L	215.62	SqFt

Sample Number: 4 **Type:** R **Area:** 5255.00 SqFt **PCI:** 43

Sample Comments:

45	DEPRESSION	L	135.25	SqFt
45	DEPRESSION	M	232.38	SqFt
48	L & T CR	L	392.74	Ft
48	L & T CR	M	306.71	Ft
56	SWELLING	L	45.84	SqFt
57	WEATHERING	L	4596.51	SqFt

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	TWK	**Name:**	Taxiway 'K'	**Use:**	TAXIWAY	**Area:**	46,494 SqFt

Section: 20 of 2 **From:** TWK - STA:9+31 **To:** STA:9+99 **Last Const.:** 6/1/2004

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 5,166 SqFt **Length:** 69 Ft **Width:** 75 Ft

Slabs: **Slab Length:** 288 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2004 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 72

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 5166.00 SqFt **PCI:** 72

Sample Comments:

45	DEPRESSION	L	140.12	SqFt
48	L & T CR	L	240.81	Ft
48	L & T CR	M	5.64	Ft
57	WEATHERING	L	4938.36	SqFt

Network: BGR		**Name:** Bangor International Airport	
Branch: TWK	**Name:** Taxiway 'K'	**Use:** TAXIWAY	**Area:** 46,494 SqFt

Section: 10 of 2 **From:** TWK - STA:3+80 **To:** STA:9+31 **Last Const.:** 6/1/2004

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 41,328 SqFt **Length:** 551 Ft **Width:** 75 Ft

Slabs: **Slab Length:** 1,252 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2004 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 8 **Surveyed:** 3

Conditions: **PCI:** 65

Inspection Comments:

Sample Number: 2 **Type:** R **Area:** 5166.00 SqFt **PCI:** 66

Sample Comments:

45	DEPRESSION	L	140.31	SqFt
48	L & T CR	L	327.20	Ft
48	L & T CR	M	21.38	Ft
50	PATCHING	L	1.46	SqFt
57	WEATHERING	L	4938.43	SqFt

Sample Number: 4 **Type:** R **Area:** 5166.00 SqFt **PCI:** 64

Sample Comments:

45	DEPRESSION	L	136.42	SqFt
48	L & T CR	L	409.14	Ft
48	L & T CR	M	7.02	Ft
50	PATCHING	L	.78	SqFt
57	WEATHERING	L	4919.46	SqFt

Sample Number: 7 **Type:** R **Area:** 5166.00 SqFt **PCI:** 66

Sample Comments:

45	DEPRESSION	L	137.50	SqFt
48	L & T CR	L	382.95	Ft
48	L & T CR	M	16.60	Ft
57	WEATHERING	L	4925.20	SqFt

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	TWL	**Name:**	Taxiway 'L'	**Use:**	TAXIWAY	**Area:**	84,416 SqFt

Section: 10 of 1 **From:** TWL - STA:3+80 **To:** STA:11+49 **Last Const.:** 6/1/1991

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 84,416 SqFt **Length:** 769 Ft **Width:** 110 Ft

Slabs: **Slab Length:** 2,132 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/1991 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 17 **Surveyed:** 5

Conditions: **PCI:** 26

Inspection Comments:

Sample Number: 13 **Type:** R **Area:** 5000.00 SqFt **PCI:** 24

Sample Comments:

41	ALLIGATOR CR	L	863.74	SqFt
45	DEPRESSION	L	33.80	SqFt
48	L & T CR	L	560.31	Ft
50	PATCHING	M	27.88	SqFt
53	RUTTING	L	660.60	SqFt
53	RUTTING	M	136.07	SqFt
57	WEATHERING	L	4761.70	SqFt

Sample Number: 15 **Type:** R **Area:** 5000.00 SqFt **PCI:** 26

Sample Comments:

41	ALLIGATOR CR	L	632.19	SqFt
43	BLOCK CR	L	798.49	SqFt
45	DEPRESSION	L	41.25	SqFt
48	L & T CR	L	259.91	Ft
53	RUTTING	M	376.16	SqFt
57	WEATHERING	L	4789.57	SqFt

Sample Number: 2 **Type:** R **Area:** 4965.00 SqFt **PCI:** 21

Sample Comments:

41	ALLIGATOR CR	L	748.05	SqFt
41	ALLIGATOR CR	M	123.79	SqFt
45	DEPRESSION	L	364.99	SqFt
48	L & T CR	L	340.08	Ft
48	L & T CR	M	10.31	Ft
53	RUTTING	L	629.41	SqFt
57	WEATHERING	L	4805.33	SqFt

Sample Number: 6 **Type:** R **Area:** 5000.00 SqFt **PCI:** 32

Sample Comments:

41	ALLIGATOR CR	L	336.77	SqFt
48	L & T CR	L	510.13	Ft
53	RUTTING	L	328.45	SqFt
53	RUTTING	M	200.85	SqFt
57	WEATHERING	L	4717.21	SqFt

Sample Number: 9 **Type:** R **Area:** 5000.00 SqFt **PCI:** 28

Sample Comments:

41	ALLIGATOR CR	L	718.76	SqFt
43	BLOCK CR	L	339.96	SqFt
45	DEPRESSION	L	65.30	SqFt
48	L & T CR	L	592.96	Ft
53	RUTTING	L	463.89	SqFt
57	WEATHERING	L	4755.88	SqFt

Network:	BGR			**Name:**	Bangor International Airport		

Branch:	TWLS	**Name:**	Taxiway 'L' Shoulders	**Use:**	SHOULDER-AF	**Area:**	84,577 SqFt

Section: 10 of 1 **From:** TWL - STA:3+80 **To:** STA:11+49 **Last Const.:** 6/1/1991

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 84,577 SqFt **Length:** 769 Ft **Width:** 110 Ft

Slabs: **Slab Length:** 4,272 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/1991 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 16 **Surveyed:** 2

Conditions: **PCI:** 33

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 6570.00 SqFt **PCI:** 29

Sample Comments:

41	ALLIGATOR CR	M	157.33	SqFt
45	DEPRESSION	L	683.37	SqFt
45	DEPRESSION	M	152.89	SqFt
48	L & T CR	L	42.07	Ft
48	L & T CR	M	518.47	Ft
50	PATCHING	L	34.11	SqFt
50	PATCHING	M	42.65	SqFt
57	WEATHERING	L	6057.84	SqFt

Sample Number: 3 **Type:** R **Area:** 5227.00 SqFt **PCI:** 38

Sample Comments:

45	DEPRESSION	L	91.18	SqFt
45	DEPRESSION	M	54.27	SqFt
45	DEPRESSION	H	69.78	SqFt
48	L & T CR	L	593.84	Ft
48	L & T CR	M	100.27	Ft
48	L & T CR	H	34.64	Ft
50	PATCHING	L	109.93	SqFt
57	WEATHERING	L	4956.45	SqFt

Network:	BGR			**Name:**	Bangor International Airport		
Branch:	TWM	**Name:**	Taxiway 'M'	**Use:**	TAXIWAY	**Area:**	64,776 SqFt

Section: 10 of 2 **From:** TWM - STA:7+29 **To:** STA:11+49 **Last Const.:** 6/1/2003

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 37,776 SqFt **Length:** 420 Ft **Width:** 90 Ft

Slabs: **Slab Length:** 1,293 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2003 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 8 **Surveyed:** 3

Conditions: **PCI:** 34

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 4979.00 SqFt **PCI:** 31

Sample Comments:

41	ALLIGATOR CR	L	519.18	SqFt
48	L & T CR	L	519.97	Ft
48	L & T CR	M	99.73	Ft
52	RAVELING	H	6.45	SqFt
53	RUTTING	L	128.58	SqFt
57	WEATHERING	L	4903.75	SqFt

Sample Number: 5 **Type:** R **Area:** 4722.00 SqFt **PCI:** 36

Sample Comments:

41	ALLIGATOR CR	L	272.33	SqFt
48	L & T CR	L	523.64	Ft
48	L & T CR	M	70.81	Ft
48	L & T CR	H	58.36	Ft
53	RUTTING	L	268.64	SqFt
57	WEATHERING	L	4566.89	SqFt

Sample Number: 7 **Type:** R **Area:** 4722.00 SqFt **PCI:** 36

Sample Comments:

41	ALLIGATOR CR	L	222.39	SqFt
45	DEPRESSION	L	70.47	SqFt
48	L & T CR	L	576.14	Ft
48	L & T CR	M	16.77	Ft
48	L & T CR	H	55.51	Ft
53	RUTTING	L	348.04	SqFt
57	WEATHERING	L	4539.81	SqFt

Network: BGR **Name:** Bangor International Airport

Branch: TWM **Name:** Taxiway 'M' **Use:** TAXIWAY **Area:** 64,776 SqFt

Section: 20 of 2 **From:** TWM - STA:3+69 **To:** STA:7+29 **Last Const.:** 6/1/2003

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 27,000 SqFt **Length:** 360 Ft **Width:** 75 Ft

Slabs: **Slab Length:** 870 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2003 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 6 **Surveyed:** 3

Conditions: **PCI:** 32

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 4500.00 SqFt **PCI:** 31

Sample Comments:

41	ALLIGATOR CR	L	342.56	SqFt
45	DEPRESSION	L	124.87	SqFt
48	L & T CR	L	558.41	Ft
48	L & T CR	M	25.33	Ft
48	L & T CR	H	57.14	Ft
53	RUTTING	L	393.07	SqFt
57	WEATHERING	L	4395.97	SqFt

Sample Number: 3 **Type:** R **Area:** 4500.00 SqFt **PCI:** 33

Sample Comments:

41	ALLIGATOR CR	L	249.76	SqFt
45	DEPRESSION	L	125.40	SqFt
48	L & T CR	L	509.59	Ft
48	L & T CR	M	3.86	Ft
48	L & T CR	H	55.26	Ft
50	PATCHING	L	.78	SqFt
53	RUTTING	L	566.99	SqFt
57	WEATHERING	L	4396.29	SqFt

Sample Number: 5 **Type:** R **Area:** 4500.00 SqFt **PCI:** 33

Sample Comments:

41	ALLIGATOR CR	L	242.41	SqFt
45	DEPRESSION	L	69.28	SqFt
48	L & T CR	L	459.26	Ft
48	L & T CR	M	55.26	Ft
48	L & T CR	H	54.28	Ft
50	PATCHING	L	1.57	SqFt
53	RUTTING	L	441.73	SqFt
57	WEATHERING	L	4307.56	SqFt

Network:	BGR		**Name:**	Bangor International Airport			
Branch:	TWMS	**Name:**	Taxiway 'M' Shoulders	**Use:**	SHOULDER-AF	**Area:**	57,945 SqFt

Section: 10 of 1 **From:** TWM - STA:3+69 **To:** STA:11+49 **Last Const.:** 6/1/2003

Surface: AC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 57,945 SqFt **Length:** 360 Ft **Width:** 161 Ft

Slabs: **Slab Length:** 3,360 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2003 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 12 **Surveyed:** 2

Conditions: **PCI:** 44

Inspection Comments:

Sample Number: 1 **Type:** R **Area:** 3846.00 SqFt **PCI:** 62

Sample Comments:

48	L & T CR	L	257.74	Ft
48	L & T CR	M	35.09	Ft
50	PATCHING	L	75.58	SqFt
56	SWELLING	L	109.89	SqFt
57	WEATHERING	L	3704.52	SqFt

Sample Number: 2 **Type:** R **Area:** 4760.00 SqFt **PCI:** 29

Sample Comments:

45	DEPRESSION	L	91.42	SqFt
48	L & T CR	L	296.42	Ft
48	L & T CR	M	175.74	Ft
50	PATCHING	M	39.39	SqFt
52	RAVELING	H	.62	SqFt
56	SWELLING	L	469.38	SqFt
56	SWELLING	M	130.99	SqFt
56	SWELLING	H	136.08	SqFt
57	WEATHERING	L	4504.25	SqFt

Network: BGR		**Name:** Bangor International Airport	

Branch: TWRW1533X	**Name:** TW/RW1533 Intersection	**Use:** TAXIWAY	**Area:** 89,229 SqFt

Section: 20 of 2	**From:** RW1533 - STA:48+66,76+21,91+45		**To:** STA:50+67,78+19,93+46	**Last Const.:** 6/1/2003
Surface: APC	**Family:** DEFAULT	**Zone:**	**Category:**	**Rank:** P
Area: 39,494 SqFt	**Length:** 600 Ft	**Width:** 66 Ft		
Slabs:	**Slab Length:** 1,779 Ft	**Slab Width:** Ft	**Joint Length:** Ft	
Shoulder:	**Street Type:**	**Grade:** 0	**Lanes:** 0	

Section Comments:

Work Date: 6/1/2003 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 8 **Surveyed:** 3

Conditions: **PCI:** 59

Inspection Comments:

Sample Number: 2 **Type:** R **Area:** 5661.00 SqFt **PCI:** 48

Sample Comments:

41	ALLIGATOR CR	L	63.71	SqFt
43	BLOCK CR	L	1473.35	SqFt
45	DEPRESSION	L	11.66	SqFt
48	L & T CR	L	527.31	Ft
48	L & T CR	M	94.90	Ft
53	RUTTING	L	19.20	SqFt
57	WEATHERING	L	5348.85	SqFt

Sample Number: 4 **Type:** R **Area:** 5369.00 SqFt **PCI:** 52

Sample Comments:

41	ALLIGATOR CR	L	187.04	SqFt
48	L & T CR	L	174.51	Ft
48	L & T CR	M	65.58	Ft
57	WEATHERING	L	5134.87	SqFt

Sample Number: 7 **Type:** R **Area:** 4043.00 SqFt **PCI:** 85

Sample Comments:

47	JT REF. CR	L	53.45	Ft
48	L & T CR	L	64.50	Ft
57	WEATHERING	L	3815.25	SqFt

Network:	BGR			**Name:**	Bangor International Airport		

Branch:	TWRW1533X	**Name:**	TW/RW1533 Intersection	**Use:**	TAXIWAY	**Area:**	89,229 SqFt

Section: 10 of 2 **From:** RW1533 - STA:12+25,111+11,121+33 **To:** STA:16+50,112+61,126+20 **Last Const.:** 6/1/2002

Surface: APC **Family:** DEFAULT **Zone:** **Category:** **Rank:** P

Area: 49,735 SqFt **Length:** 1,062 Ft **Width:** 47 Ft

Slabs: **Slab Length:** 1,868 Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Work Date: 6/1/2002 **Work Type:** New Construction - Initial **Code:** NU-IN **Is Major M&R:** True

Last Insp. Date: 11/4/2020 **TotalSamples:** 8 **Surveyed:** 3

Conditions: **PCI:** 65

Inspection Comments:

Sample Number: 2 **Type:** R **Area:** 4893.00 SqFt **PCI:** 67

Sample Comments:

48	L & T CR	L	698.73	Ft
57	WEATHERING	L	4632.59	SqFt

Sample Number: 3 **Type:** R **Area:** 4892.00 SqFt **PCI:** 65

Sample Comments:

48	L & T CR	L	553.07	Ft
48	L & T CR	M	20.06	Ft
57	WEATHERING	L	4388.24	SqFt

Sample Number: 4 **Type:** R **Area:** 4874.00 SqFt **PCI:** 62

Sample Comments:

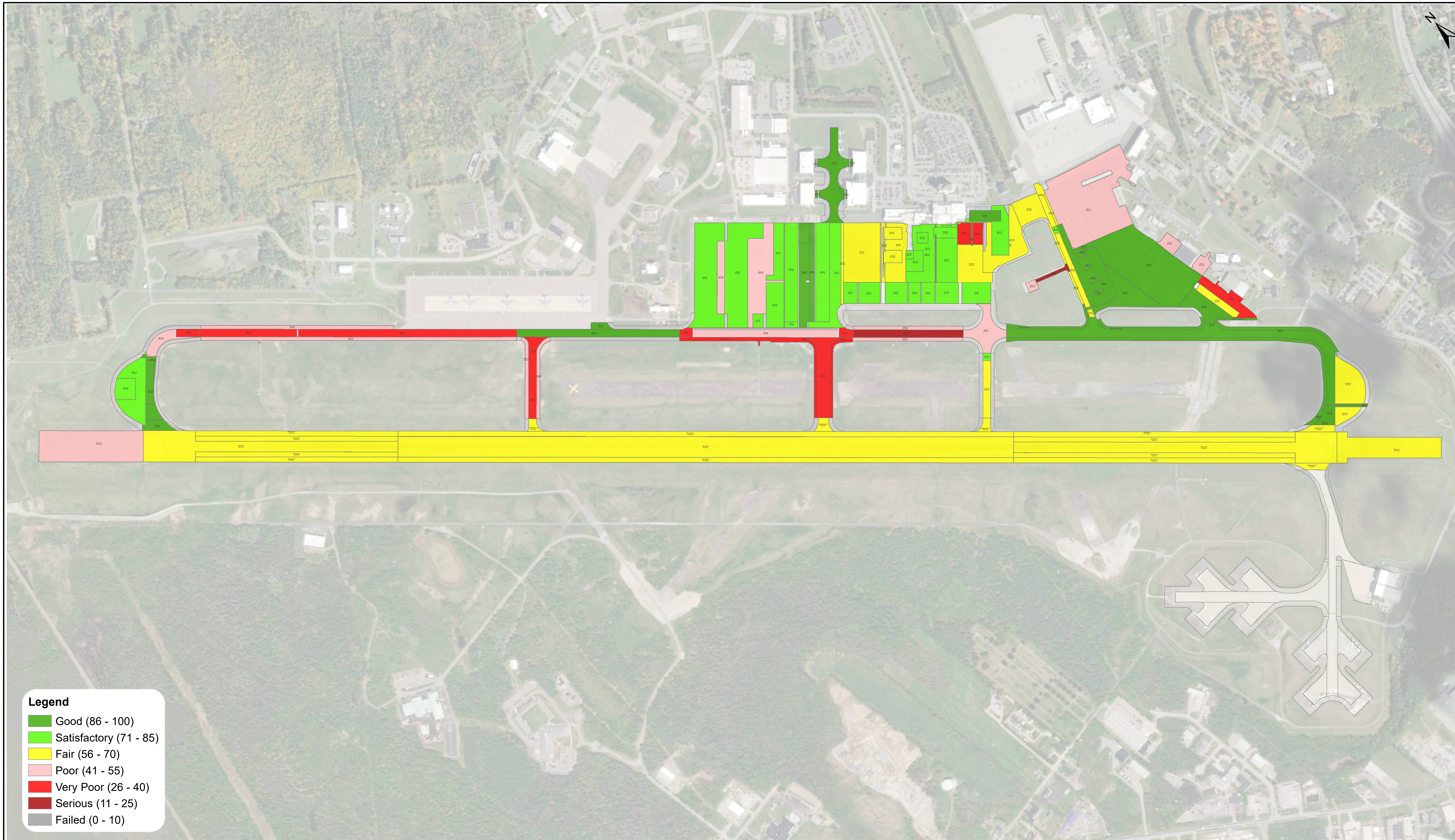
41	ALLIGATOR CR	L	11.45	SqFt
48	L & T CR	L	483.26	Ft
48	L & T CR	M	17.90	Ft
57	WEATHERING	L	4645.50	SqFt

Appendix D. 2020 AREA WEIGHTED PCI BY BRANCH

PCI Range	PCI Rating
86-100	Good
71-85	Satisfactory
56-70	Fair
41-55	Poor
26-40	Very Poor
11-25	Serious
0-10	Failed

Branch Name	Branch ID	Area Weighted PCI
Dock 10	AD10	94
General Aviation Apron	AGA	73
Helicopter Pad	HELIA	47
Helicopter Taxiway	HELIT	24
Hold Apron	AHOLD	73
Runway 15-33	RW1533	65
Runway 15-33 Shoulder	RW1533S	64
Taxiway 'A'	TWA	66
Taxiway 'A' Shoulders	TWAS	68
Taxiway 'B'	TWB	60
Taxiway 'B' Shoulders	TWBS	58
Taxiway 'K'	TWK	66
Taxiway 'L'	TWL	26
Taxiway 'L' Shoulders	TWLS	33
Taxiway 'M'	TWM	33
Taxiway 'M' Shoulders	TWMS	44
TW/RW1533 Intersection	TWRW1533X	62

Appendix E. 2020 PAVEMENT CONDITION INDEX (PCI) EXHIBIT



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TEL: +1 603 666 7181 FAX: +1 603 666 7185
WEBSITE: WWW.JACOBS.COM

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BGR BANGOR INTERNATIONAL AIRPORT

Title	Project Name			
SECTION PCI YEAR 2020	2020 BANGOR PCI			
	Company: JACOBS	Drawn By: JL	Chk/Approved: EC / RH	Drawn Date: OCT 21
	Drawing No: E2X42727-BGR-2020-0004			Version: 1.0

Appendix F. 2020 SECTION PCI LOWER THAN CRITICAL PCI

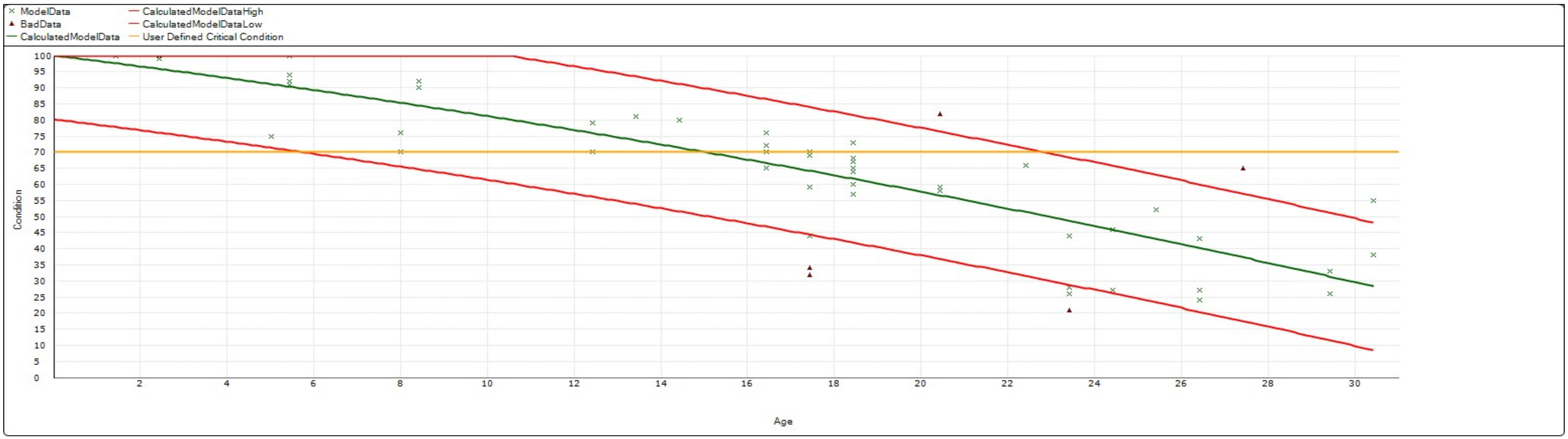
PCI Range	PCI Rating
86-100	Good
71-85	Satisfactory
56-70	Fair
41-55	Poor
26-40	Very Poor
11-25	Serious
0-10	Failed

PCI Range	Network Branch Section ID	Branch Name	Pavement Use	2020 PCI
11-25	BGR-TWA-70	Taxiway 'A'	TAXIWAY	21
	BGR-HELIT-10	Helicopter Taxiway	TAXIWAY	24
26-40	BGR-TWAS-70	Taxiway 'A' Shoulders	SHOULDER-AF	26
	BGR-TWL-10	Taxiway 'L'	TAXIWAY	26
	BGR-TWA-100	Taxiway 'A'	TAXIWAY	27
	BGR-TWA-40	Taxiway 'A'	TAXIWAY	27
	BGR-TWA-10	Taxiway 'A'	TAXIWAY	28
	BGR-TWM-20	Taxiway 'M'	TAXIWAY	32
	BGR-TWLS-10	Taxiway 'L' Shoulders	SHOULDER-AF	33
	BGR-TWM-10	Taxiway 'M'	TAXIWAY	34
	BGR-AGA-30	General Aviation Apron	APRON	38
	BGR-AGA-340	General Aviation Apron	APRON	38
41-55	BGR-TWA-110	Taxiway 'A'	TAXIWAY	43
	BGR-TWAS-10	Taxiway 'A' Shoulders	SHOULDER-AF	44
	BGR-TWMS-10	Taxiway 'M' Shoulders	SHOULDER-AF	44
	BGR-TWA-50	Taxiway 'A'	TAXIWAY	46
	BGR-HELIA-10	Helicopter Pad	HELIPAD	47
	BGR-RW1533-10	Runway 15-33	RUNWAY	52
	BGR-AGA-250	General Aviation Apron	APRON	54
	BGR-AGA-10	General Aviation Apron	APRON	55
56-70	BGR-RW1533S-10	Runway 15-33 Shoulder	SHOULDER-AF	57
	BGR-TWBS-10	Taxiway 'B' Shoulders	SHOULDER-AF	58
	BGR-TWB-10	Taxiway 'B'	TAXIWAY	59
	BGR-TWRW1533X-20	TW/RW1533 Intersection	TAXIWAY	59
	BGR-RW1533-50	Runway 15-33	RUNWAY	60
	BGR-AGA-20	General Aviation Apron	APRON	61

PCI Range	Network Branch Section ID	Branch Name	Pavement Use	2020 PCI
	BGR-AGA-280	General Aviation Apron	APRON	63
	BGR-RW1533-30	Runway 15-33	RUNWAY	64
	BGR-AGA-200	General Aviation Apron	APRON	65
	BGR-RW1533-60	Runway 15-33	RUNWAY	65
	BGR-TWK-10	Taxiway 'K'	TAXIWAY	65
	BGR-TWRW1533X-10	TW/RW1533 Intersection	TAXIWAY	65
	BGR-AGA-140	General Aviation Apron	APRON	66
	BGR-RW1533-20	Runway 15-33	RUNWAY	67
	BGR-RW1533-70	Runway 15-33	RUNWAY	68
	BGR-AGA-290	General Aviation Apron	APRON	69
	BGR-RW1533S-20	Runway 15-33 Shoulder	SHOULDER-AF	69
	BGR-AGA-190	General Aviation Apron	APRON	70
	BGR-AGA-40	General Aviation Apron	APRON	70
	BGR-AHOLD-30	Hold Apron	APRON	70
	BGR-RW1533-40	Runway 15-33	RUNWAY	70

Appendix G. PERFORMANCE MODELS

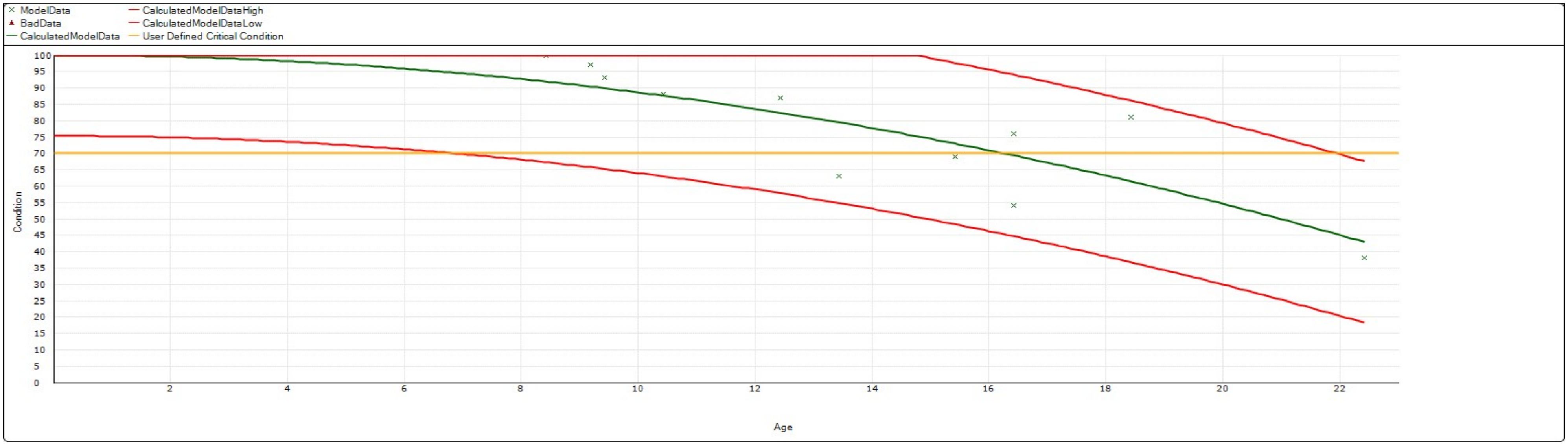
AAC, AC, ACR & APC



100 - 1.64717590808868 X^1 - 0.023277597501874 X^2

Coeff of correlation = 0.902
Approximate R^2 = 0.813
Standard deviation of error = 10.105
Absolute Mean of error = 7.442

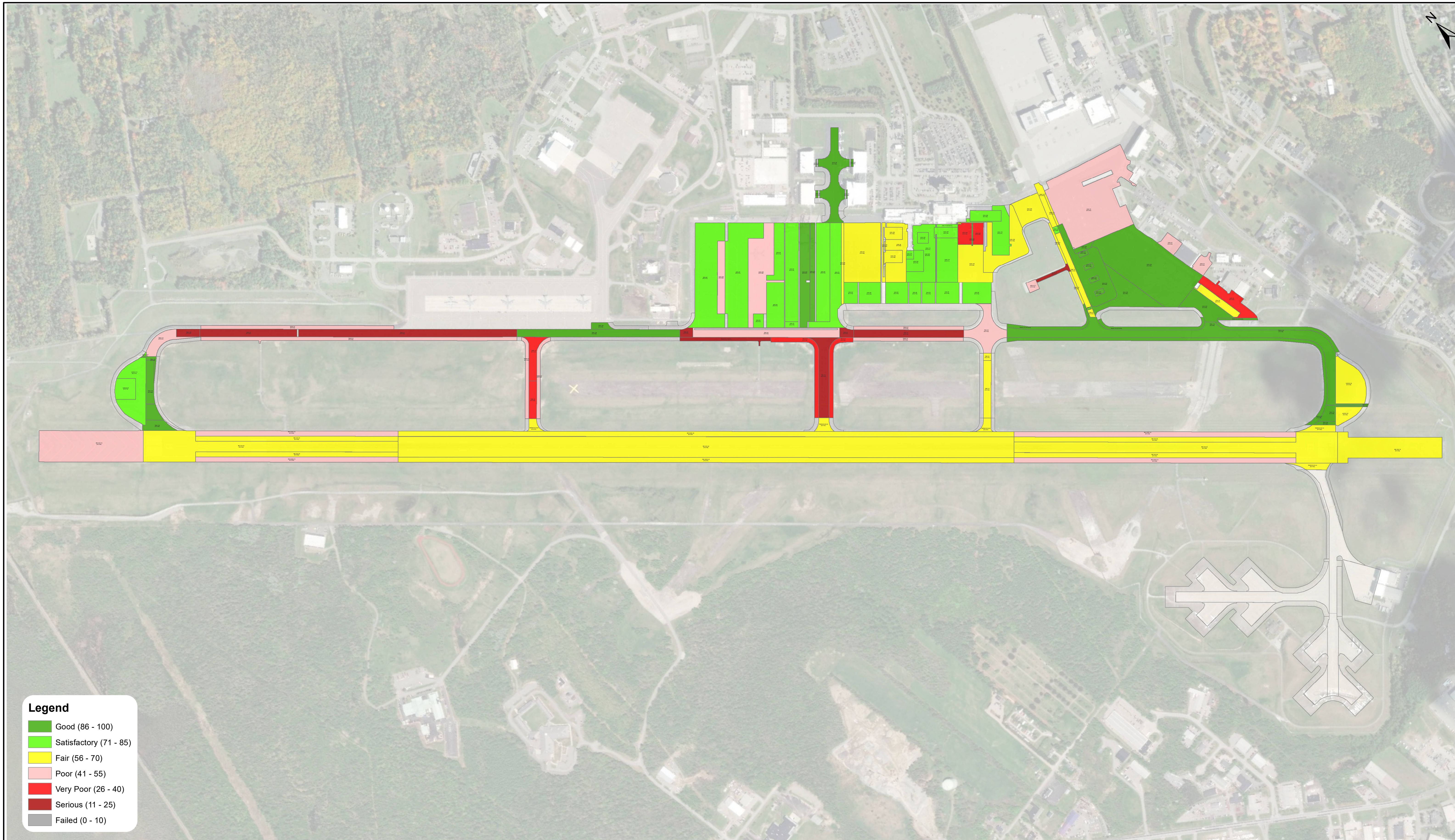
PCC



100 - 7.94033269357897E-07 X^1 - 0.113473825156689 X^2

Coeff of correlation = 0.841
Approximate R^2 = 0.707
Standard deviation of error = 12.581
Absolute Mean of error = 8.141
Arithmetic Mean of error = 0.718

Appendix H. 10-YEAR STOP GAP M&R PLAN EXHIBIT



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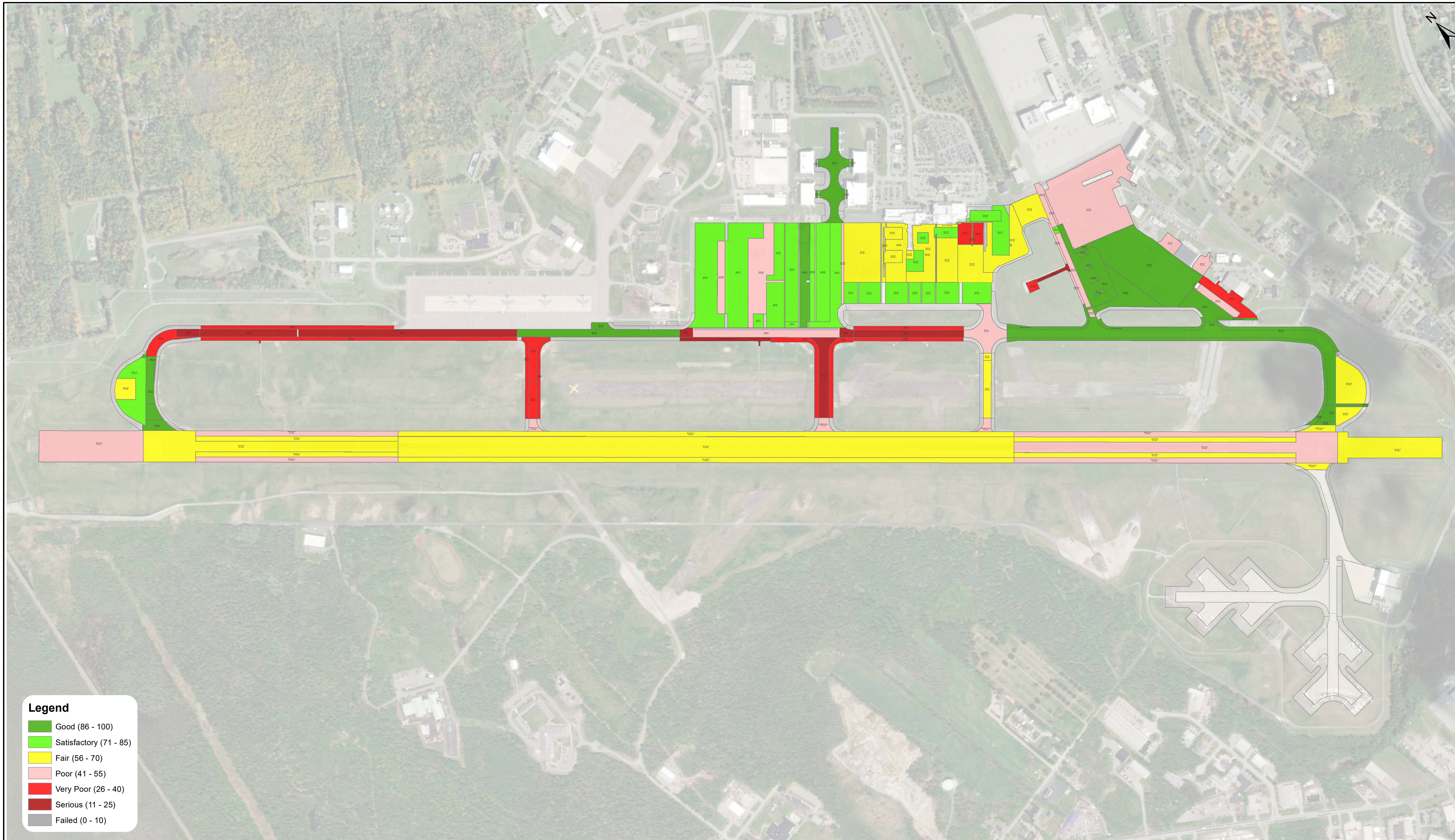
Client

BGR BANGOR INTERNATIONAL AIRPORT

Title

STOP GAP SCENARIO
YEAR 2021

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-1001			1.0



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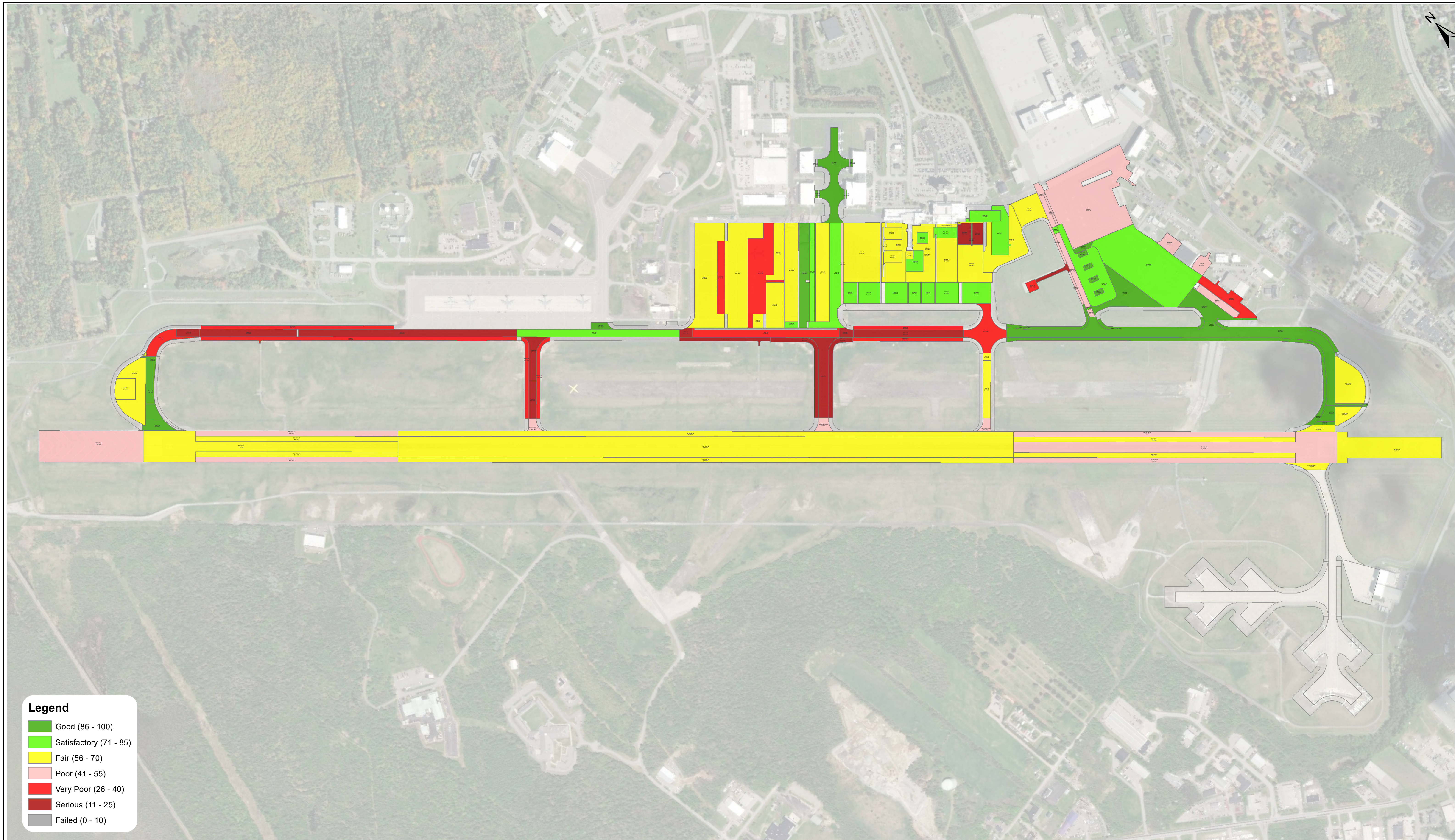
BGR BANGOR INTERNATIONAL AIRPORT

Title

STOP GAP SCENARIO
YEAR 2022

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-1002			1.0



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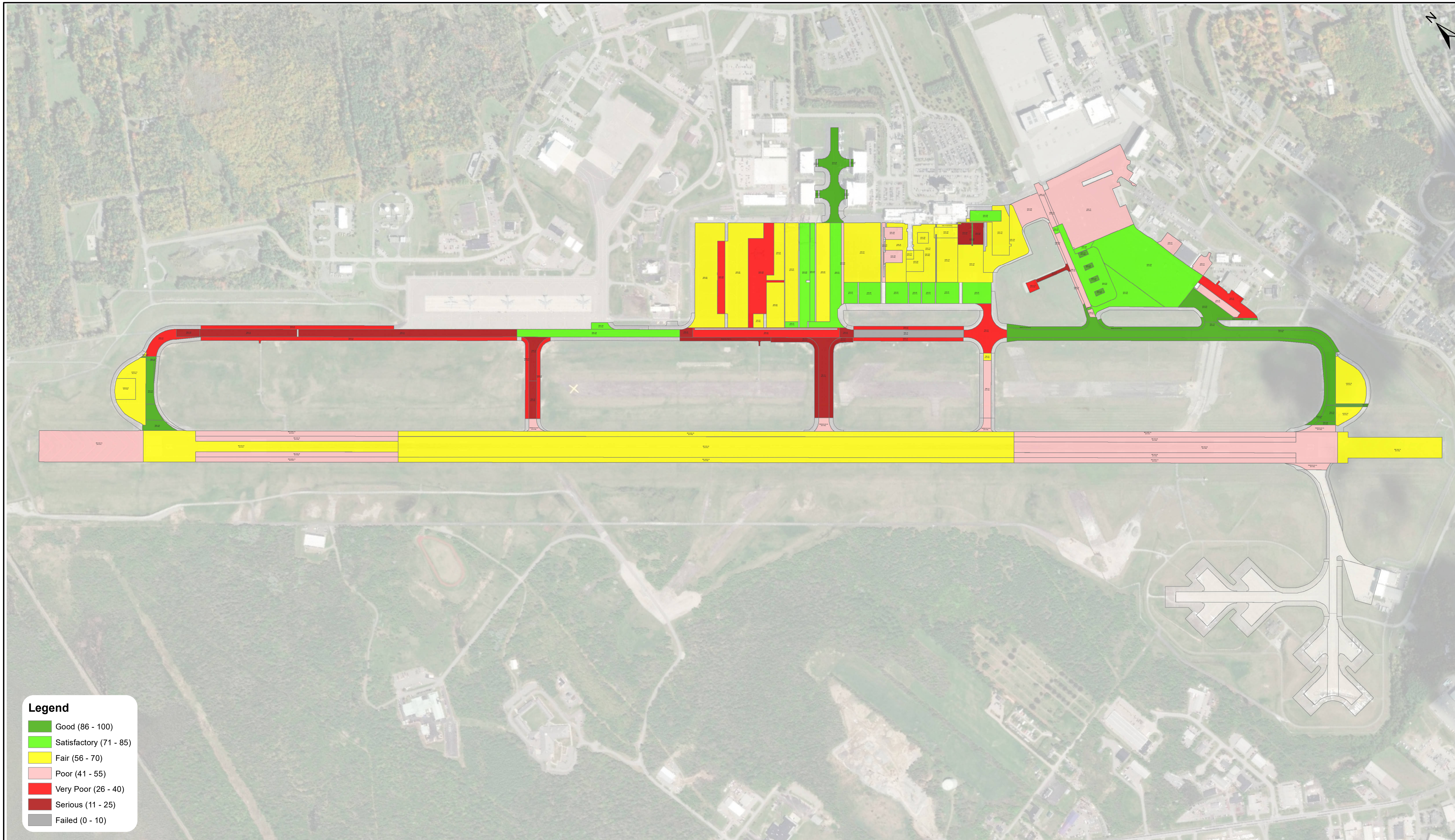
Title

STOP GAP SCENARIO
YEAR 2023

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-1003			1.0



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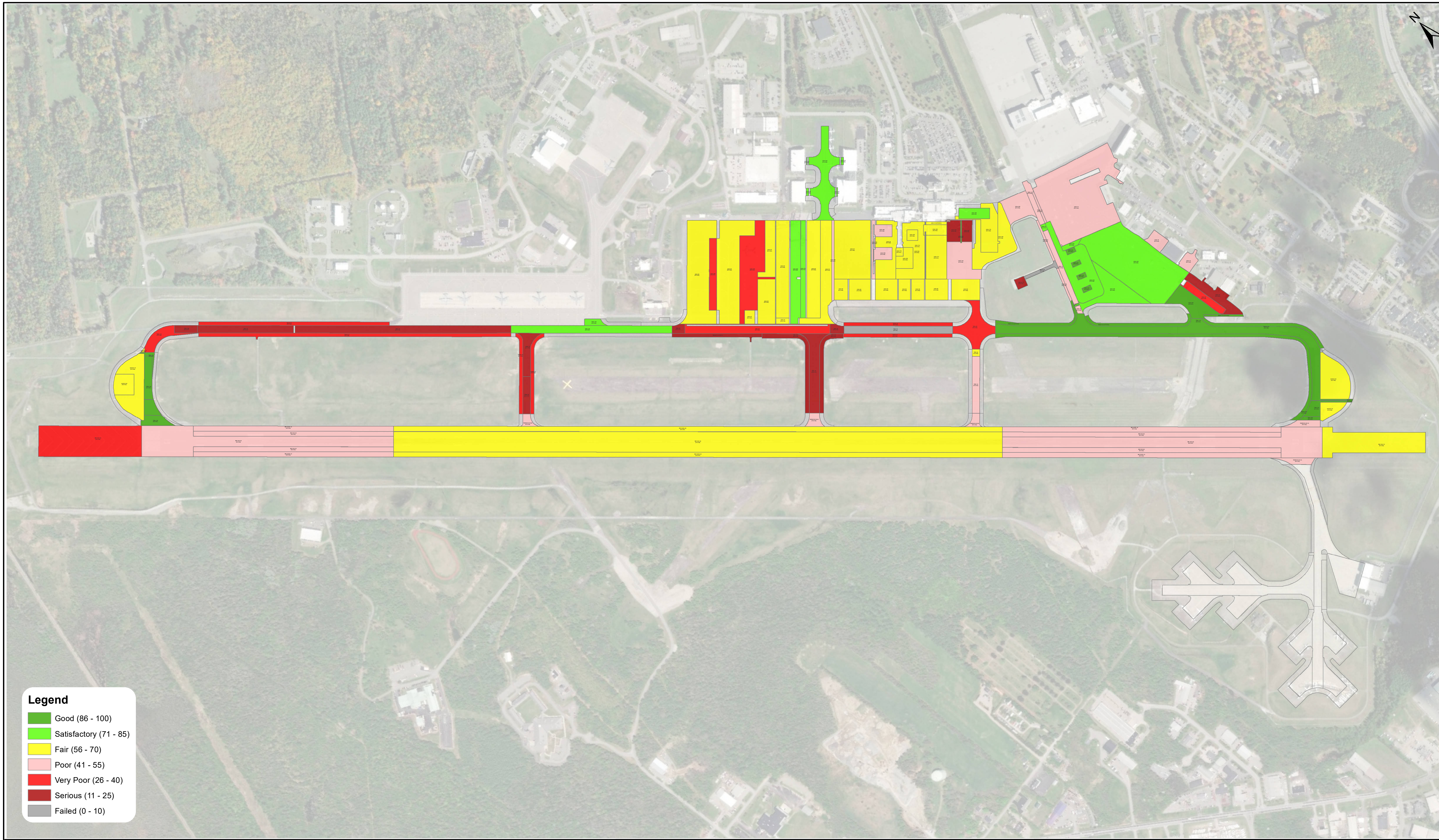
Title

STOP GAP SCENARIO
YEAR 2024

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-1004			1.0



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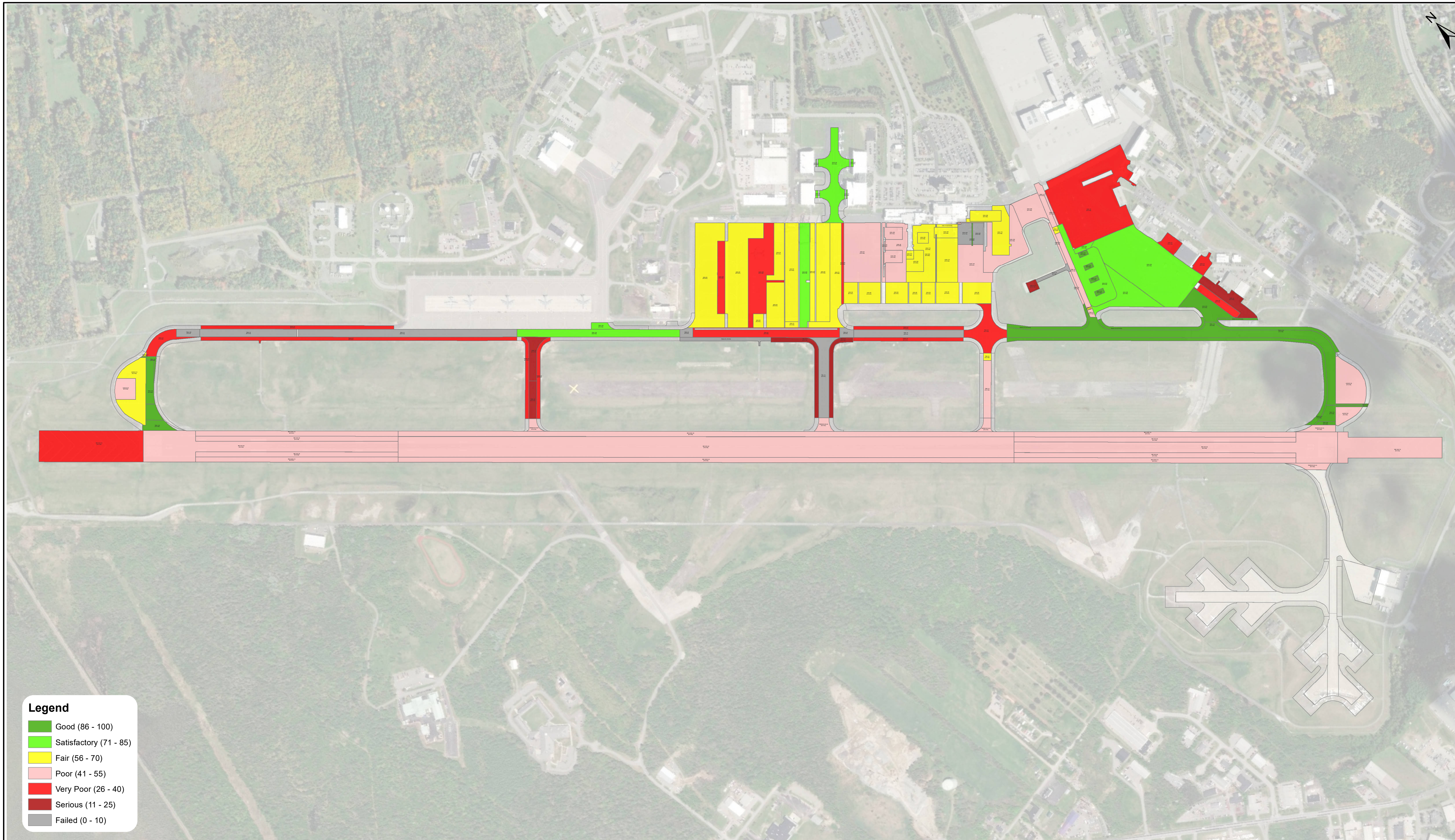
Title

STOP GAP SCENARIO
YEAR 2025

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-1005			1.0



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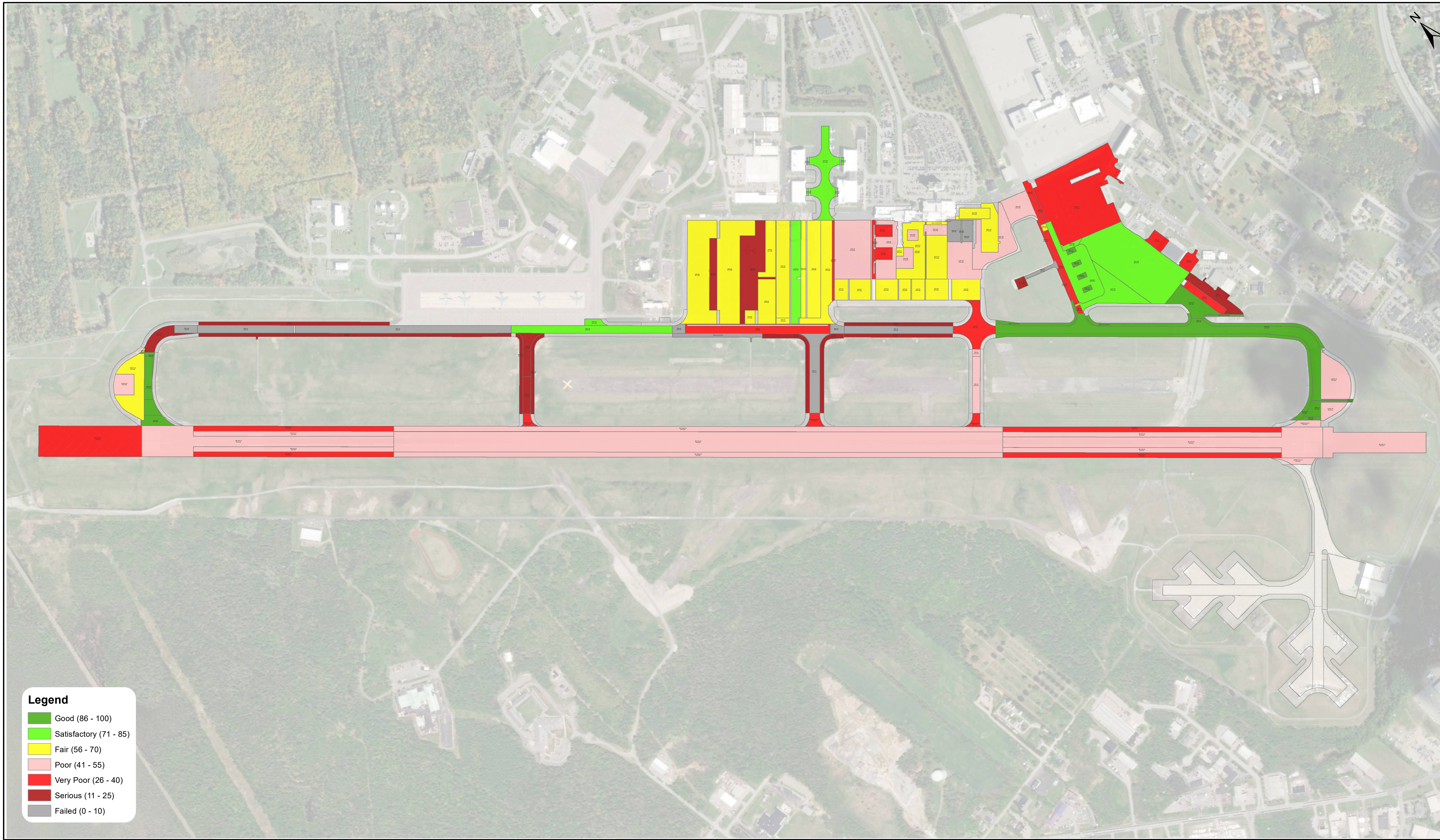
BGR BANGOR INTERNATIONAL AIRPORT

This drawing is not to be used in whole or part other than for the intended purpose and project, refer to the contract for full terms and conditions.

Title	Project Name			
STOP GAP SCENARIO YEAR 2026	2020 BANGOR PCI			
	Company: JACOBS	Drawn By: JL	Chk/Approved: EC / RH	Drawn Date: OCT 21
	Drawing No: E2X42727-BGR-2020-1006			Version: 1.0



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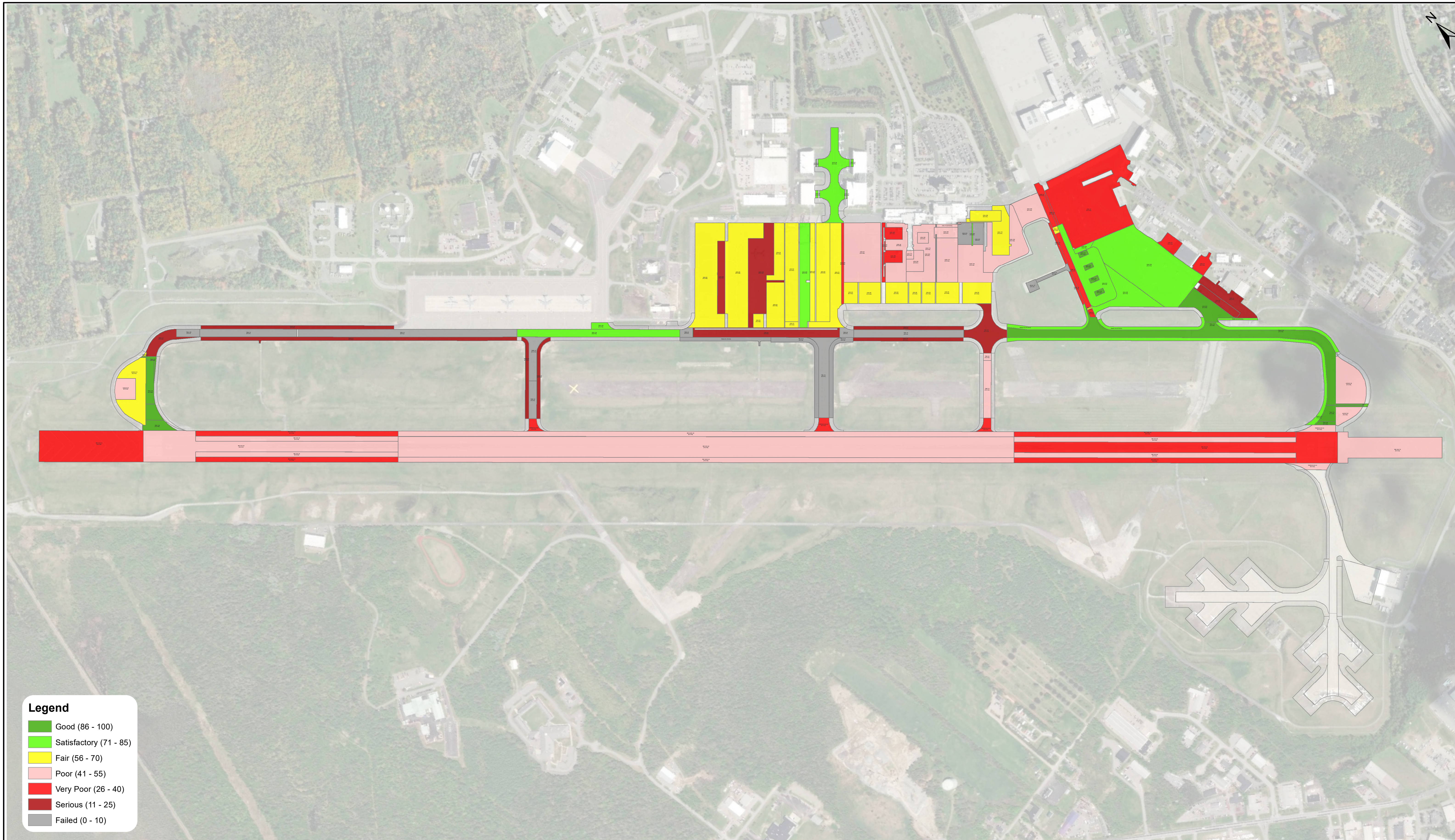
BGR BANGOR INTERNATIONAL AIRPORT

Title	Project Name			
STOP GAP SCENARIO YEAR 2027	2020 BANGOR PCI			
	Company: JACOBS	Drawn By: JL	Chk/Approved: EC / RH	Drawn Date: OCT 21
	Drawing No: E2X42727-BGR-2020-1007			Version: 1.0



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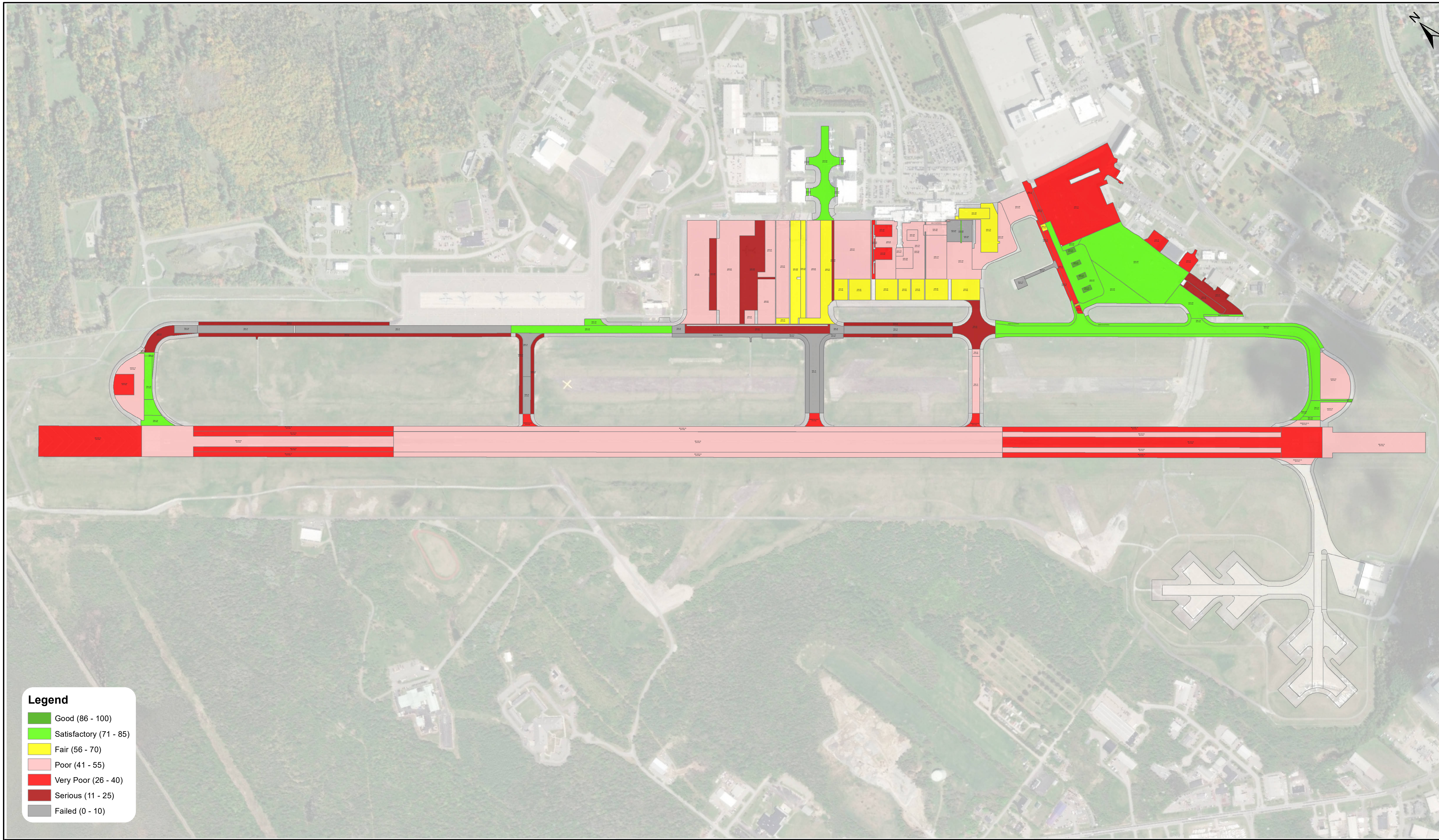
BGR BANGOR INTERNATIONAL AIRPORT

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-1008			1.0

Title

STOP GAP SCENARIO
YEAR 2028



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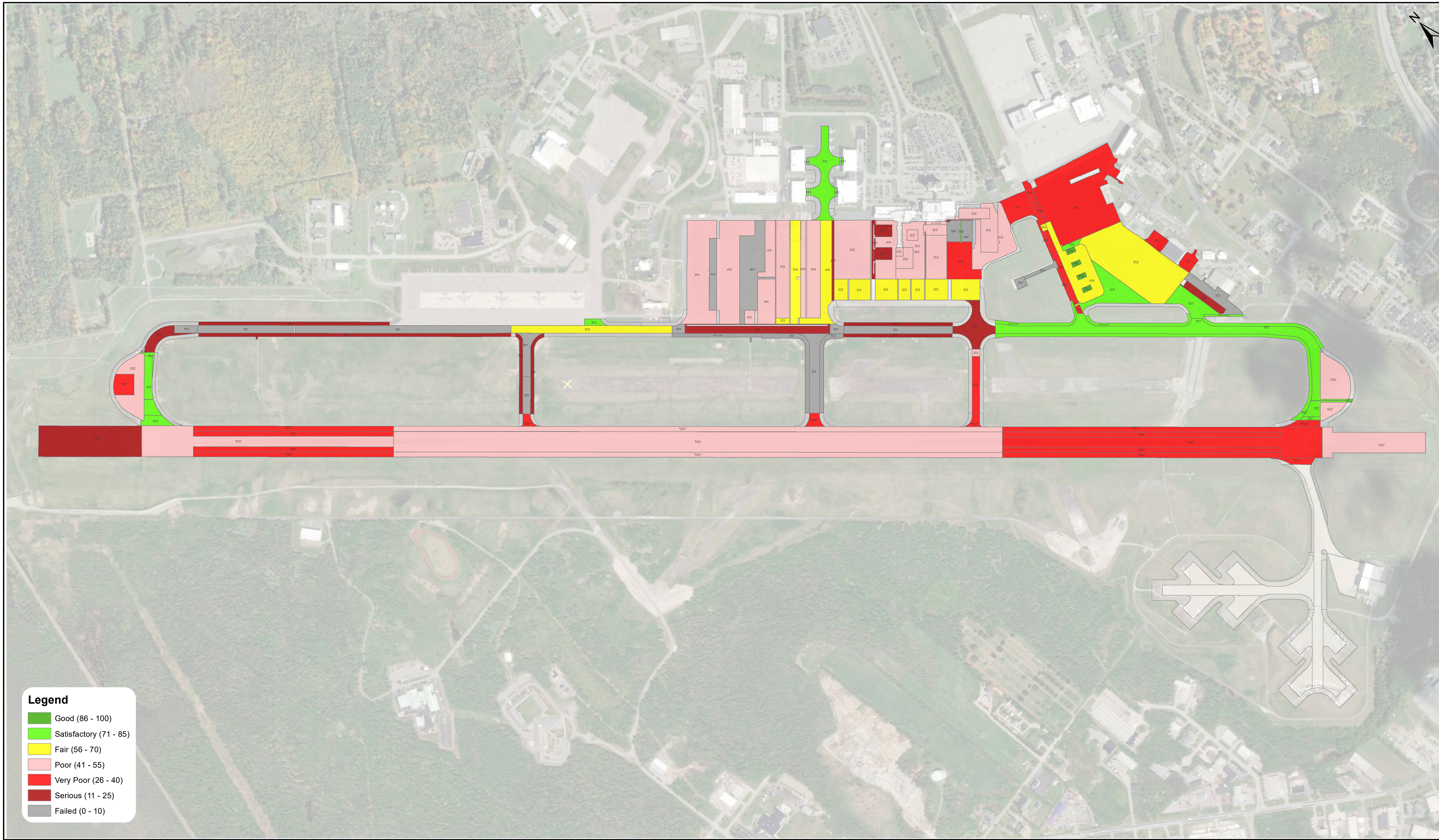
BGR BANGOR INTERNATIONAL AIRPORT

Title	Project Name			
STOP GAP SCENARIO YEAR 2029	2020 BANGOR PCI			
	Company: JACOBS	Drawn By: JL	Chk/Approved: EC / RH	Drawn Date: OCT 21
	Drawing No: E2X42727-BGR-2020-1009			Version: 1.0



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WEBSITE: WWW.JACOBS.COM

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BGR BANGOR INTERNATIONAL AIRPORT

Title

STOP GAP SCENARIO
YEAR 2030

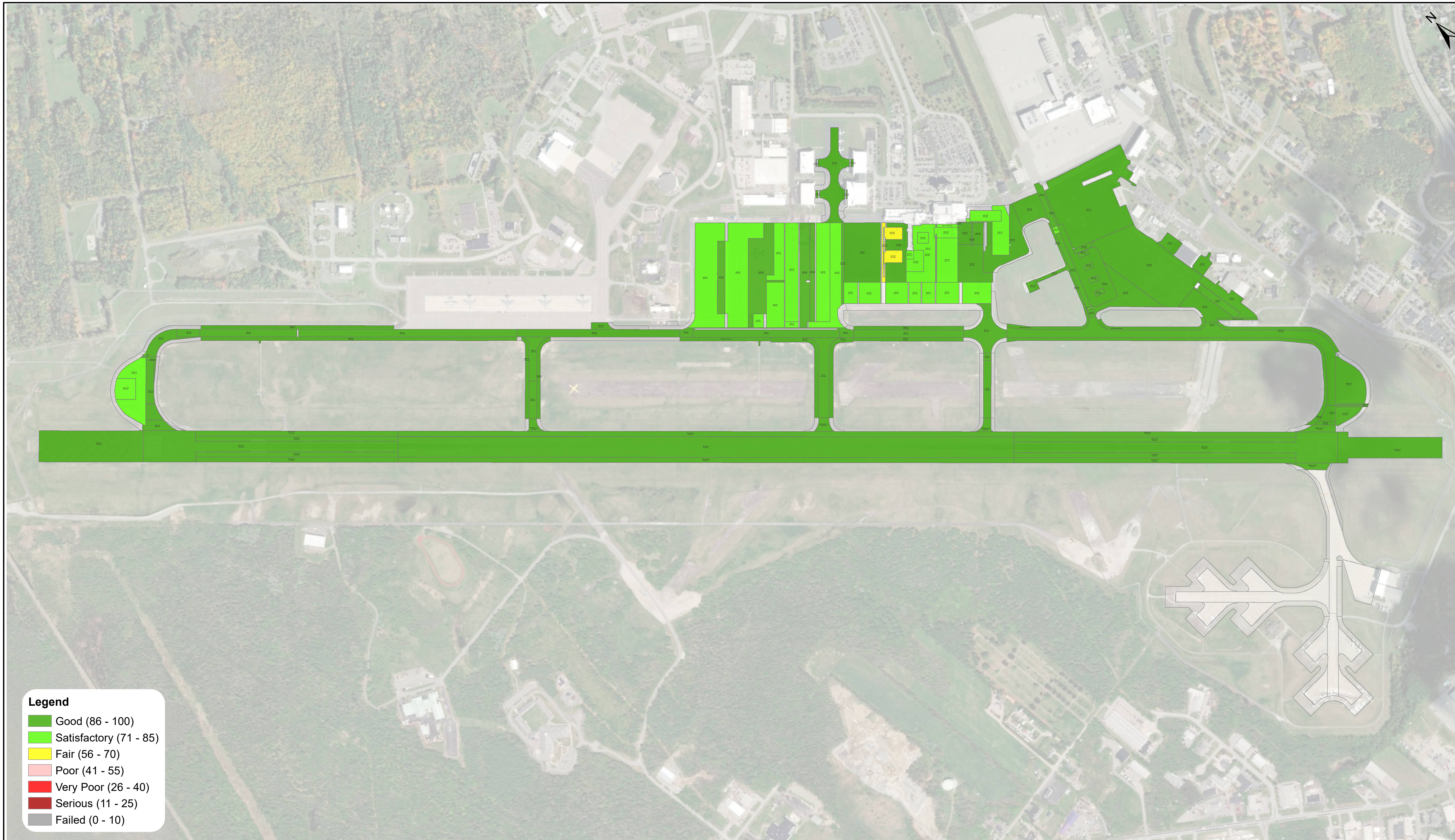
Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-1010			1.0

Appendix I. 2020 10-YEAR M&R PLAN

Work Year	Network Branch Section ID	Pavement Use	Surface	Area, SF	Work Type	Total
2021	BGR-AGA-10	APRON	AC	544,503	Mill and Overlay with 5% pre-overlay repairs	$7,682,934.23
2021	BGR-AGA-140	APRON	AC	99,000	Mill and Overlay	$1,341,450.00
2021	BGR-AGA-190	APRON	AC	108,900	Mill and Overlay	$1,475,595.00
2021	BGR-AGA-20	APRON	PCC	33,501	5% Slab Replacement	$83,753.70
2021	BGR-AGA-200	APRON	AC	64,200	Mill and Overlay	$869,910.00
2021	BGR-AGA-250	APRON	PCC	223,944	10% Slab Replacement	$1,007,748.00
2021	BGR-AGA-280	APRON	PCC	18,408	5% Slab Replacement	$46,020.00
2021	BGR-AGA-30	APRON	APC	162,085	Complete Reconstruction, AC	$3,241,704.00
2021	BGR-AGA-340	APRON	PCC	49,533	Complete Reconstruction, PCC	$1,733,655.00
2021	BGR-AGA-40	APRON	AC	278,034	Mill and Overlay	$3,767,360.70
2021	BGR-AHOLD-30	APRON	APC	143,110	Mill and Overlay	$1,939,136.57
2021	BGR-HELIA-10	HELIPAD	PCC	10,000	10% Slab Replacement	$45,000.00
2021	BGR-HELIT-10	TAXIWAY	AC	11,471	Complete Reconstruction, AC	$229,411.20
2021	BGR-RW1533-10	RUNWAY	ACR	300,000	Mill and Overlay with 10% pre-overlay repairs	$4,500,000.00
2021	BGR-RW1533-20	RUNWAY	APC	344,000	Mill and Overlay	$4,661,200.00
2021	BGR-RW1533-30	RUNWAY	APC	194,000	Mill and Overlay	$2,628,700.00
2021	BGR-RW1533-40	RUNWAY	APC	1,180,000	Mill and Overlay	$15,989,000.00
2021	BGR-RW1533-50	RUNWAY	APC	390,000	Mill and Overlay with 5% pre-overlay repairs	$5,502,900.00
2021	BGR-RW1533-60	RUNWAY	APC	270,000	Mill and Overlay	$3,658,500.00
2021	BGR-RW1533-70	RUNWAY	AC	210,000	Mill and Overlay	$2,845,500.00
2021	BGR-RW1533S-10	SHOULDER-AF	APC	464,000	Mill and Overlay with 5% pre-overlay repairs	$6,547,040.00
2021	BGR-RW1533S-20	SHOULDER-AF	APC	590,000	Mill and Overlay	$7,994,500.00
2021	BGR-TWA-10	TAXIWAY	APC	228,625	Complete Reconstruction, AC	$4,572,501.60
2021	BGR-TWA-100	TAXIWAY	APC	68,104	Complete Reconstruction, AC	$1,362,073.80
2021	BGR-TWA-110	TAXIWAY	AC	62,145	Complete Reconstruction, AC	$1,242,899.80
2021	BGR-TWA-40	TAXIWAY	AC	25,574	Complete Reconstruction, AC	$511,474.20
2021	BGR-TWA-50	TAXIWAY	APC	211,421	Mill and Overlay with 10% pre-overlay repairs	$3,171,315.45
2021	BGR-TWA-70	TAXIWAY	AC	79,147	Complete Reconstruction, AC	$1,582,937.20
2021	BGR-TWAS-10	SHOULDER-AF	AC	244,789	Mill and Overlay with 10% pre-overlay repairs	$3,671,827.65
2021	BGR-TWAS-70	SHOULDER-AF	ACR	33,684	Complete Reconstruction, AC	$673,688.40
2021	BGR-TWB-10	TAXIWAY	APC	66,800	Mill and Overlay with 5% pre-overlay repairs	$942,549.41
2021	BGR-TWBS-10	SHOULDER-AF	AC	25,258	Mill and Overlay with 5% pre-overlay repairs	$356,393.20

Work Year	Network Branch Section ID	Pavement Use	Surface	Area, SF	Work Type	Total
2021	BGR-TWK-10	TAXIWAY	APC	41,328	Mill and Overlay	$559,998.19
2021	BGR-TWK-20	TAXIWAY	APC	5,166	Mill and Overlay	$70,000.11
2021	BGR-TWL-10	TAXIWAY	APC	84,416	Complete Reconstruction, AC	$1,688,315.20
2021	BGR-TWLS-10	SHOULDER-AF	APC	84,577	Complete Reconstruction, AC	$1,691,546.80
2021	BGR-TWM-10	TAXIWAY	APC	37,776	Complete Reconstruction, AC	$755,514.60
2021	BGR-TWM-20	TAXIWAY	APC	27,000	Complete Reconstruction, AC	$540,000.00
2021	BGR-TWMS-10	SHOULDER-AF	AC	57,945	Mill and Overlay with 10% pre-overlay repairs	$869,179.65
2021	BGR-TWRW1533X-10	TAXIWAY	APC	49,735	Mill and Overlay	$673,910.06
2021	BGR-TWRW1533X-20	TAXIWAY	APC	39,494	Mill and Overlay with 5% pre-overlay repairs	$557,256.39
2022	BGR-AGA-110	APRON	AC	192,500	Mill and Overlay	$2,608,375.00
2023	BGR-AGA-290	APRON	PCC	53,536	5% Slab Replacement	$133,840.00
2023	BGR-AGA-50	APRON	AC	624,000	Mill and Overlay	$8,455,200.00
2023	BGR-AGA-60	APRON	AC	249,324	Mill and Overlay	$3,378,340.20
2023	BGR-AHOLD-10	APRON	APC	108,279	Mill and Overlay	$1,467,175.84
2025	BGR-AGA-170	APRON	AC	69,642	Mill and Overlay	$943,649.10
2025	BGR-AGA-70	APRON	AC	125,114	Mill and Overlay	$1,695,294.70
2025	BGR-AGA-90	APRON	AC	265,350	Mill and Overlay	$3,595,492.50
2025	BGR-AHOLD-20	APRON	PCC	39,167	5% Slab Replacement	$97,918.60
2026	BGR-AGA-320	APRON	PCC	61,934	5% Slab Replacement	$154,835.00
2026	BGR-TWB-20	TAXIWAY	AC	4,489	Mill and Overlay	$60,825.95
2029	BGR-AGA-270	APRON	PCC	45,504	5% Slab Replacement	$113,760.00
2029	BGR-AGA-360	APRON	PCC	31,500	5% Slab Replacement	$78,750.00
2030	BGR-AGA-210	APRON	AC	147,467	Mill and Overlay	$1,998,177.85
2030	BGR-AGA-230	APRON	AC	420,332	Mill and Overlay	$5,695,498.60
2030	BGR-TWA-150	TAXIWAY	AC	117,000	Mill and Overlay	$1,585,350.00

Appendix J. 10-YEAR UNLIMITED BUDGET M&R PLAN EXHIBIT



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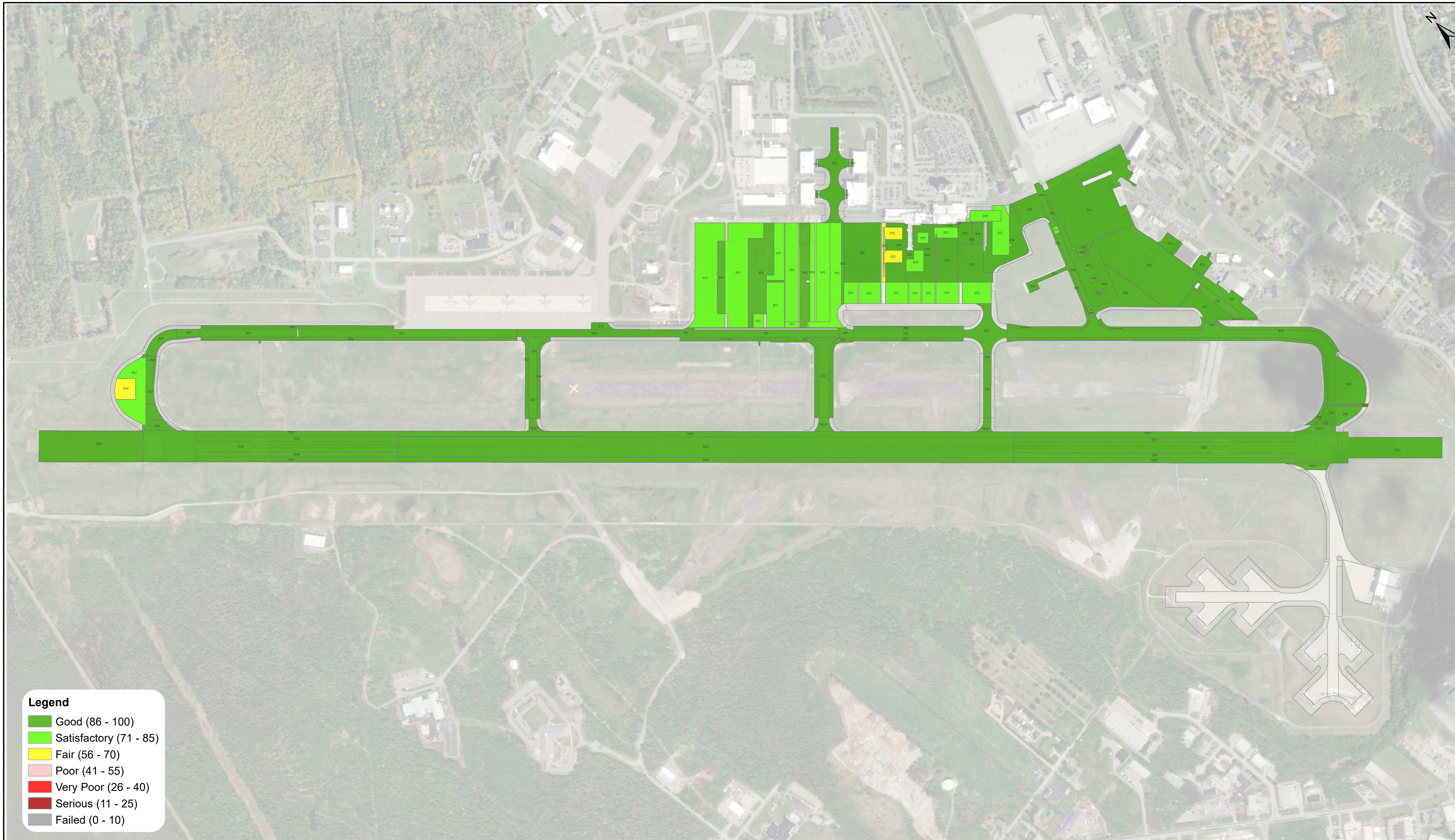
Client

BGR BANGOR INTERNATIONAL AIRPORT

Title

UNLIMITED BUDGET SCENARIO
YEAR 2021

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-2001			1.0



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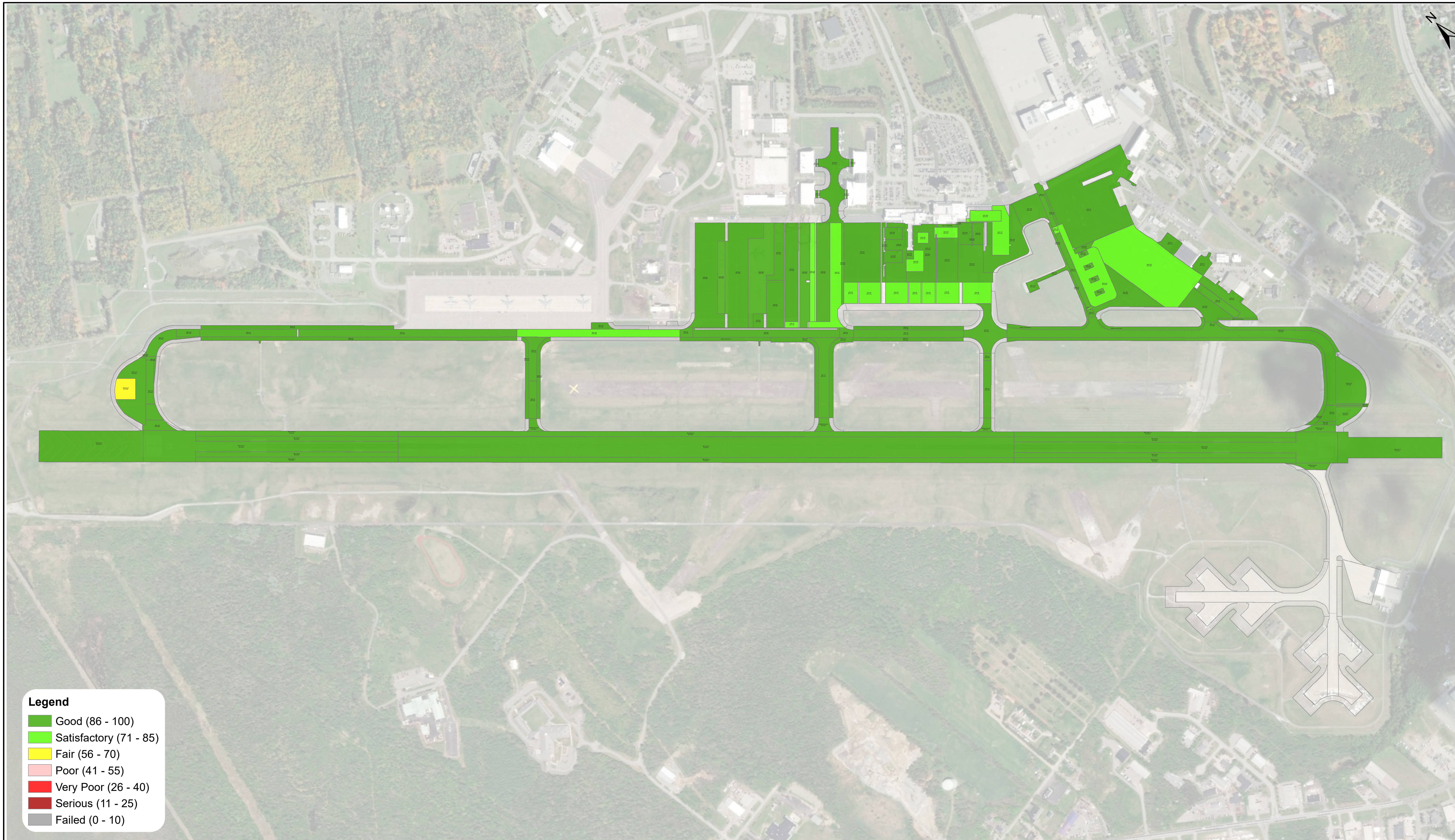
BGR BANGOR INTERNATIONAL AIRPORT

Title

UNLIMITED BUDGET SCENARIO
YEAR 2022

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-2002			1.0



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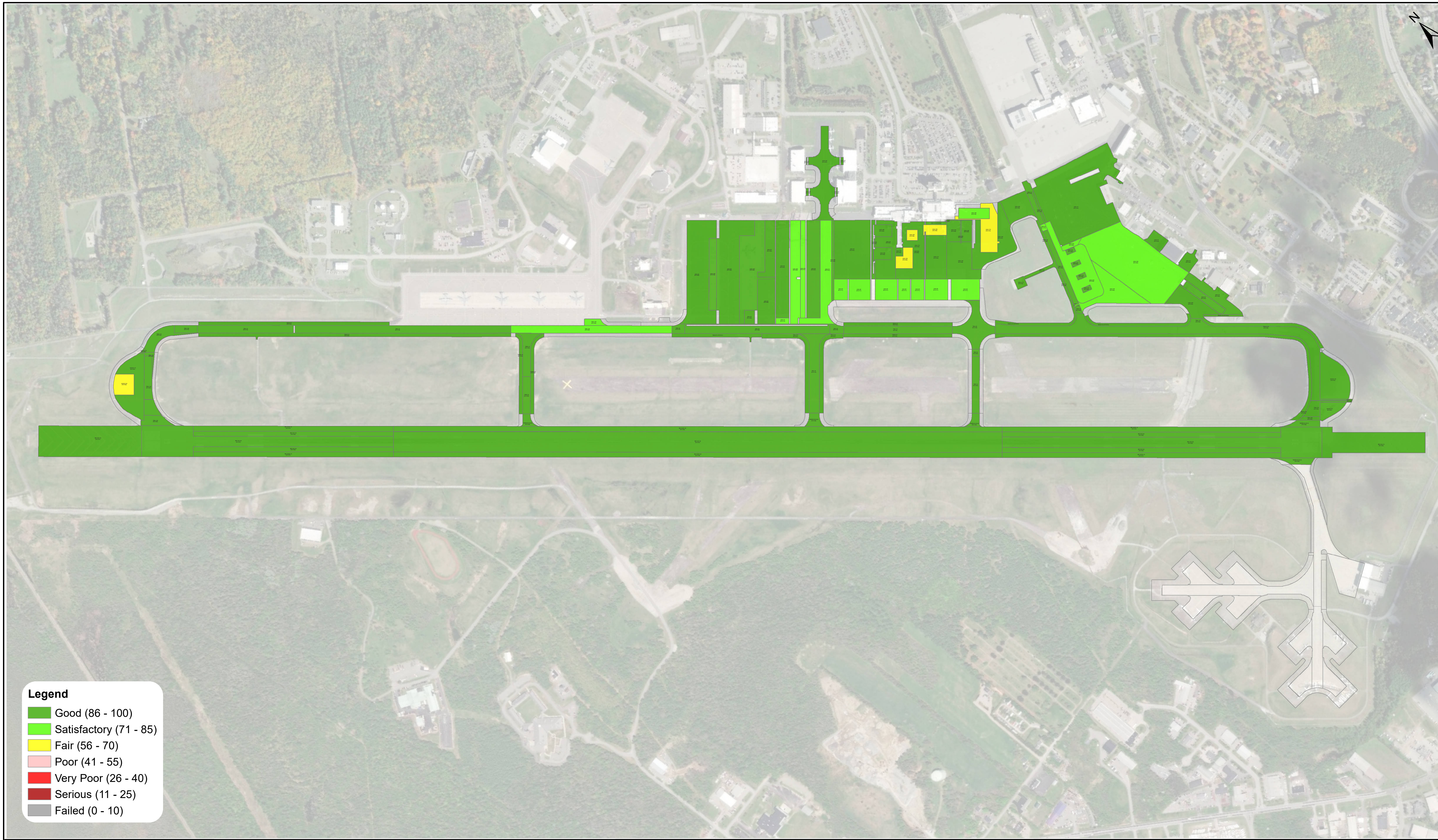
Title

UNLIMITED BUDGET SCENARIO
YEAR 2023

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-2003			1.0



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WEBSITE: WWW.JACOBS.COM

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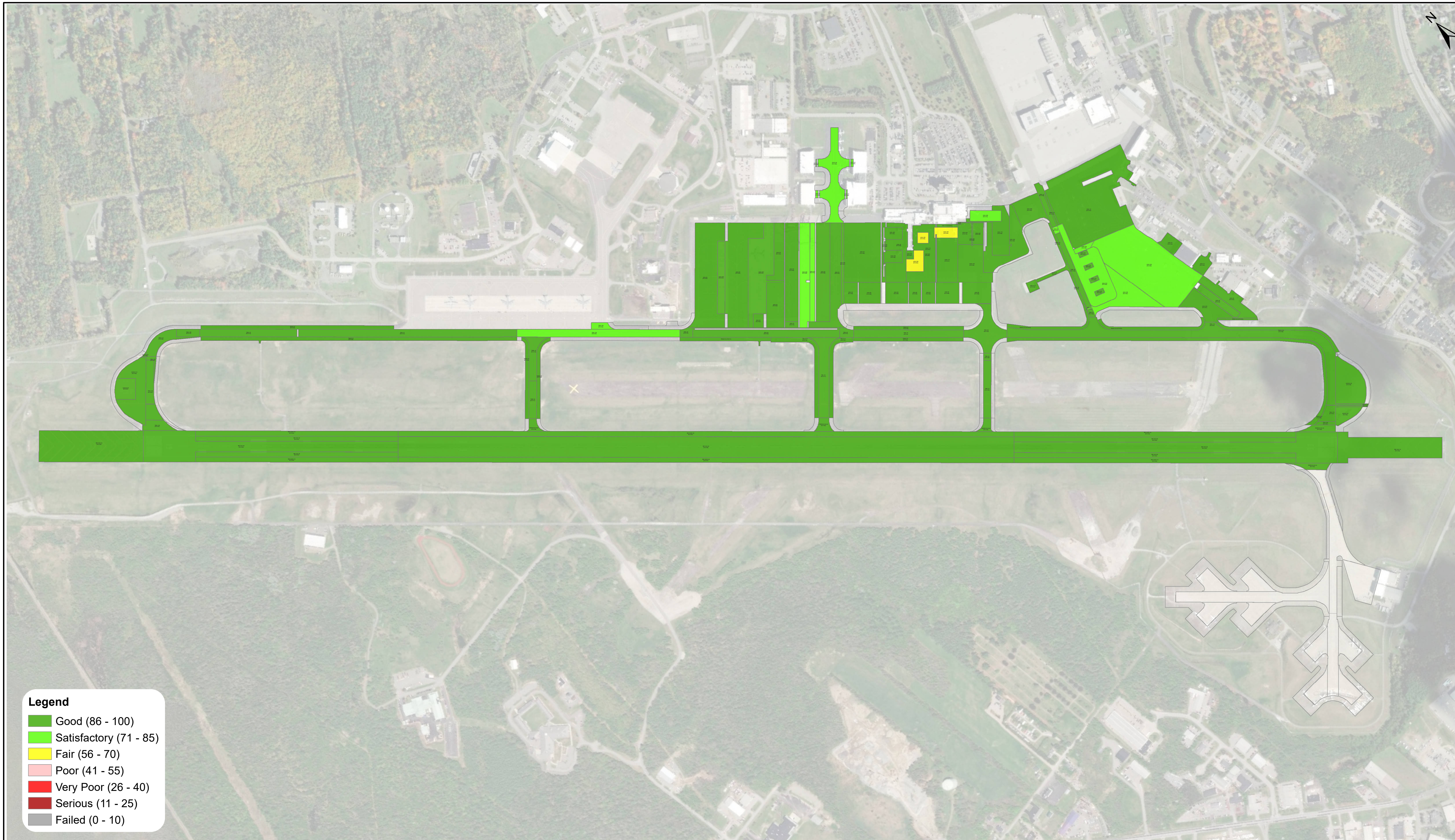
BGR BANGOR INTERNATIONAL AIRPORT

Title

UNLIMITED BUDGET SCENARIO
YEAR 2024

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-2004			1.0



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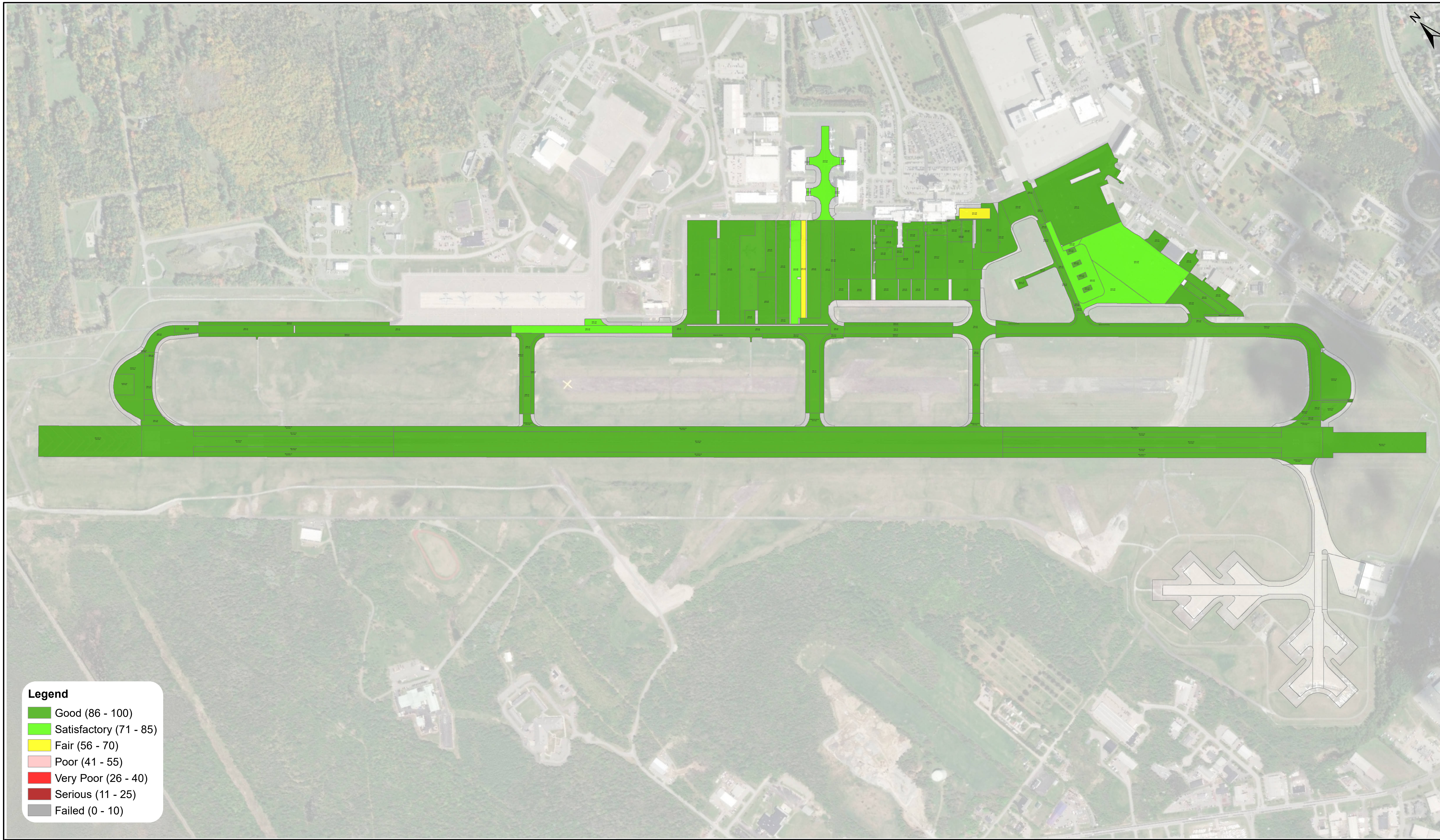
Client

BGR BANGOR INTERNATIONAL AIRPORT

Title

UNLIMITED BUDGET SCENARIO
YEAR 2025

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-2005			1.0



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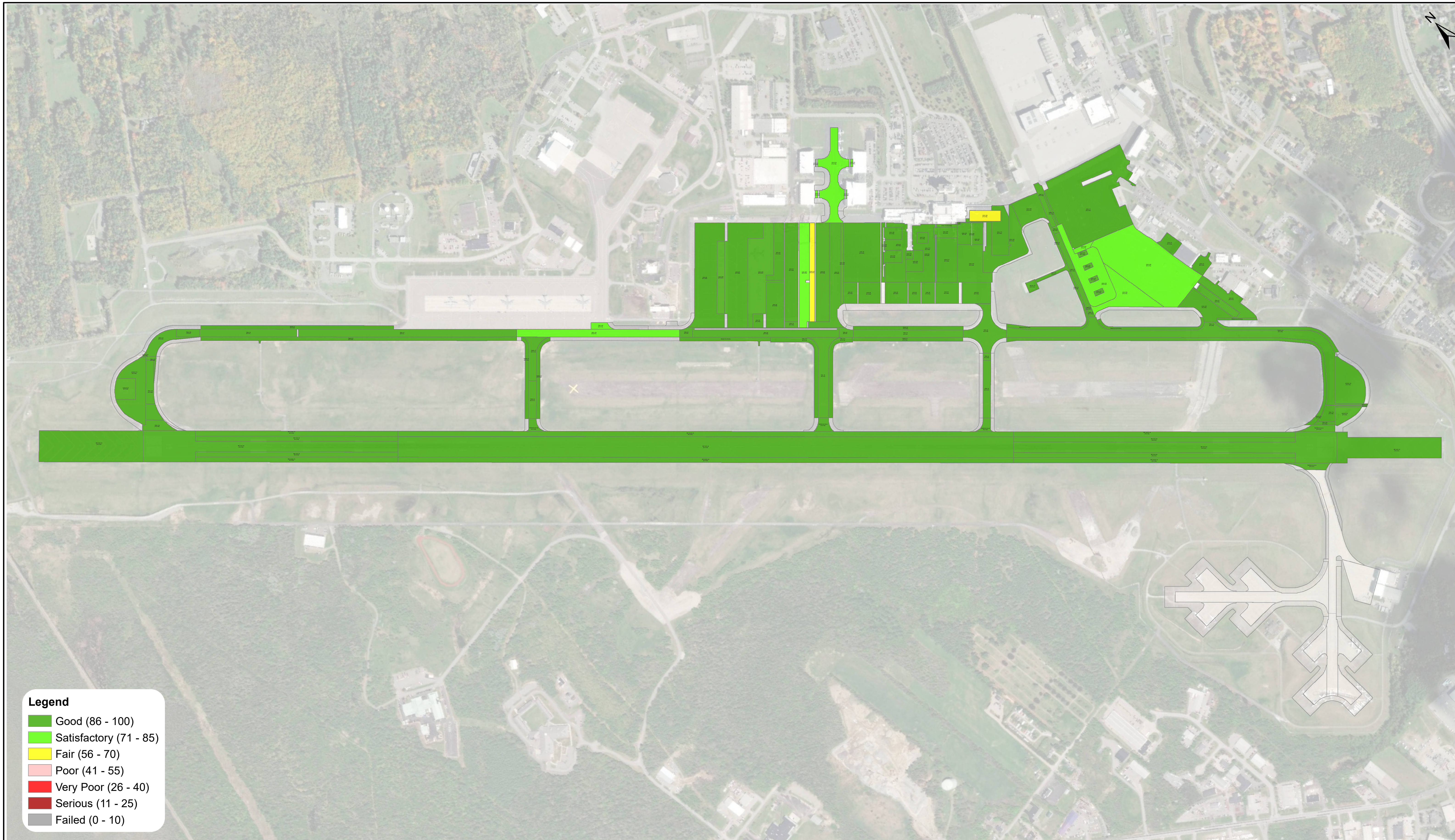
Title

UNLIMITED BUDGET SCENARIO
YEAR 2026

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-2006			1.0



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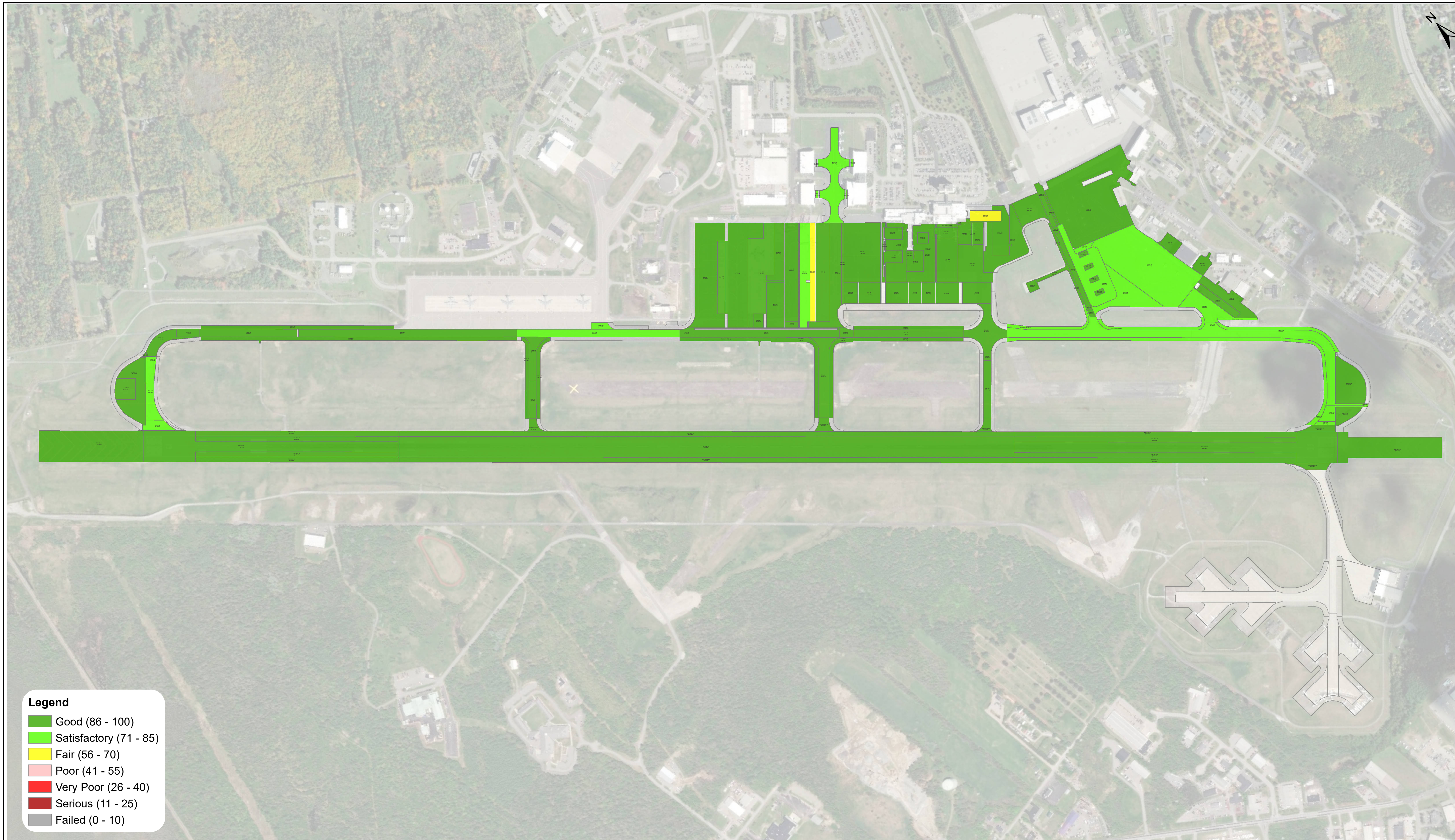
BGR BANGOR INTERNATIONAL AIRPORT

Project Name: 2020 BANGOR PCI			
Company: JACOBS	Drawn By: JL	Chk/Approved: EC / RH	Drawn Date: OCT 21
Drawing No: E2X42727-BGR-2020-2007			Version: 1.0

Title

UNLIMITED BUDGET SCENARIO
YEAR 2027



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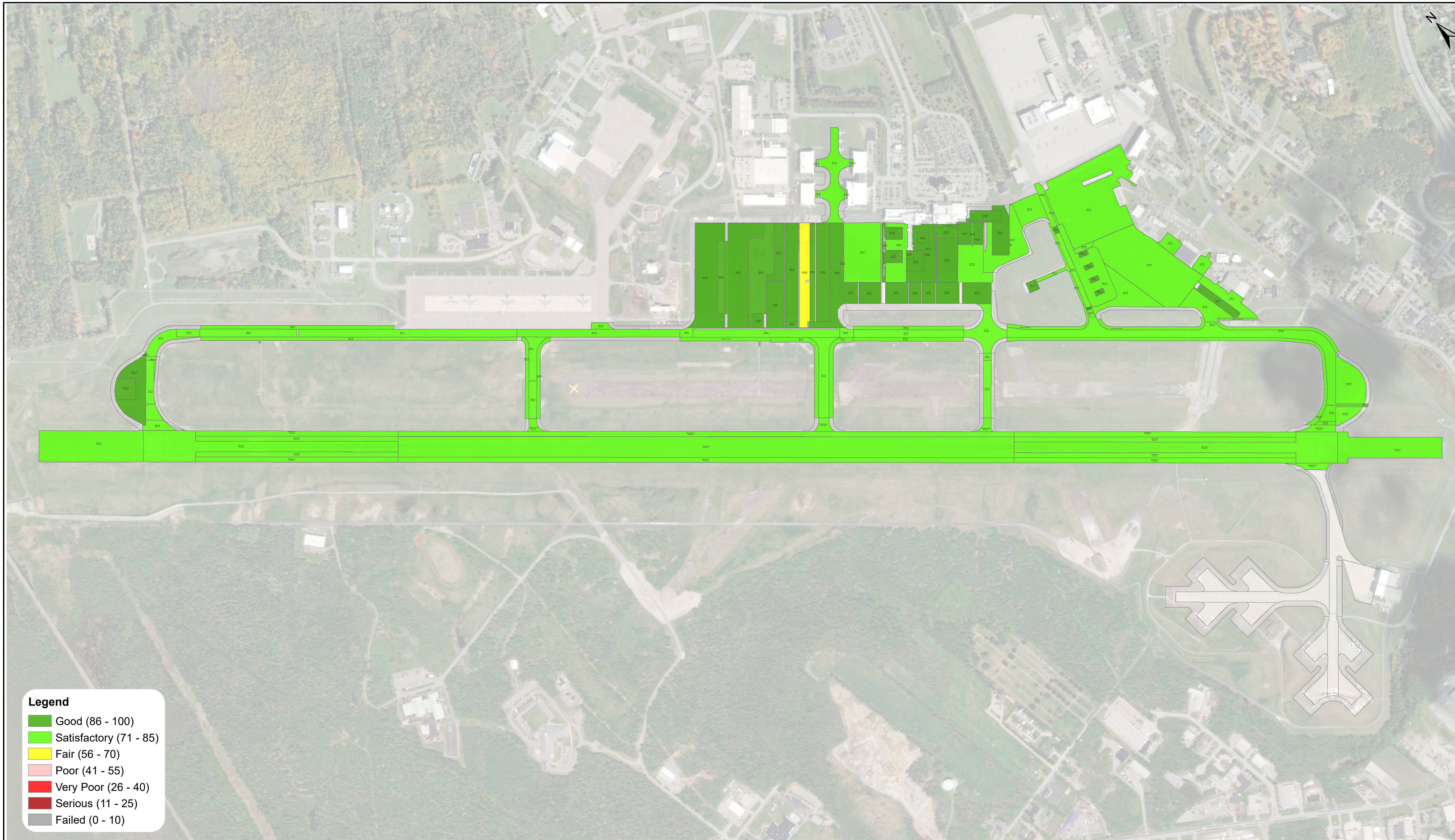
This drawing is not to be used in whole or part other than for the intended purpose and project, refer to the contract for full terms and conditions.

Title

UNLIMITED BUDGET SCENARIO
YEAR 2028

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-2008			1.0



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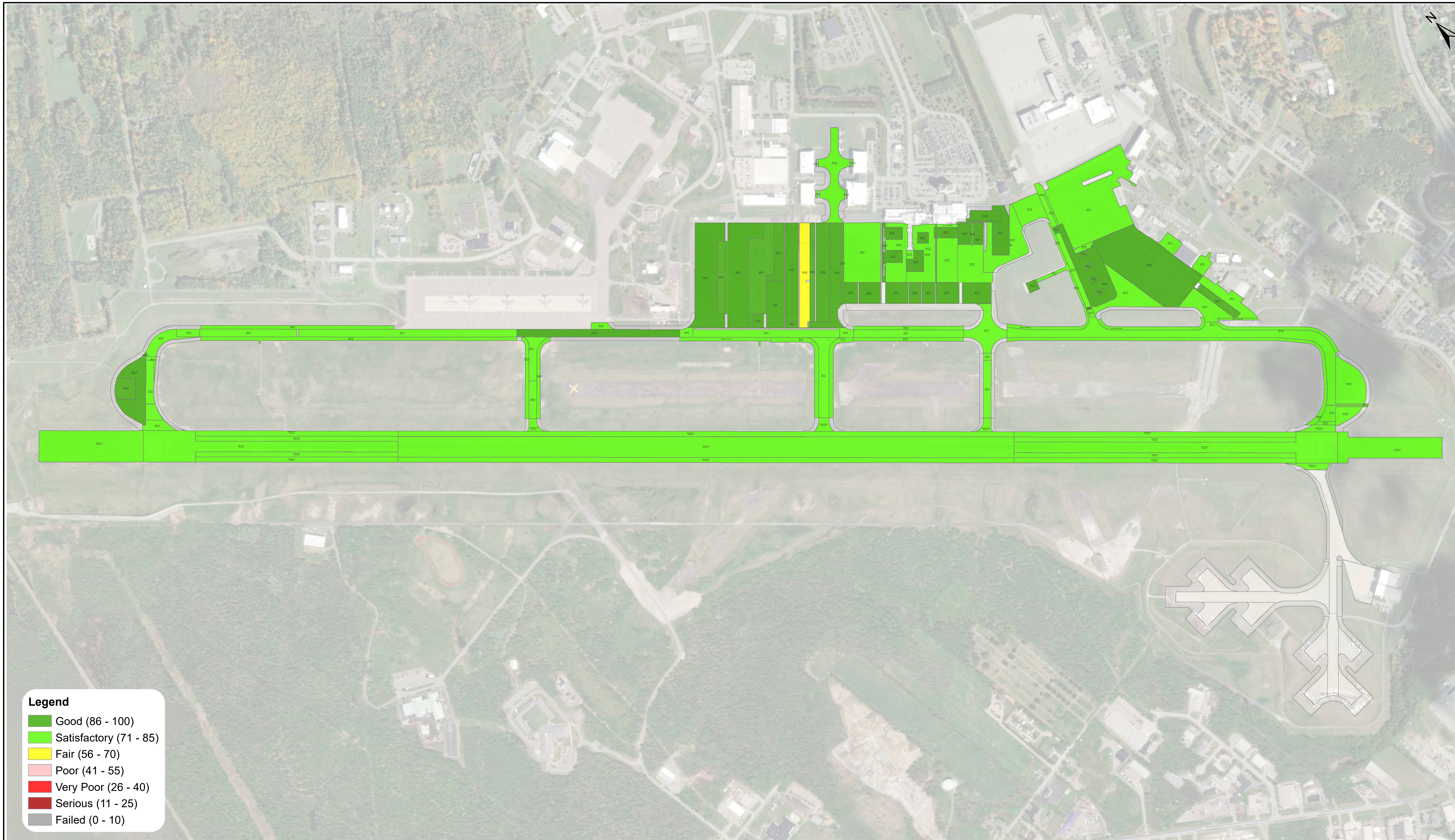
Client: BGR BANGOR INTERNATIONAL AIRPORT

Title: UNLIMITED BUDGET SCENARIO YEAR 2029

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-2009			1.0



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Client: BGR BANGOR INTERNATIONAL AIRPORT

Title: UNLIMITED BUDGET SCENARIO YEAR 2030

Project Name			
2020 BANGOR PCI			
Company	Drawn By	Chk/Approved	Drawn Date
JACOBS	JL	EC / RH	OCT 21
Drawing No			Version
E2X42727-BGR-2020-2010			1.0

Appendix K. 2021 LOCALIZED MAINTENANCE PLAN

Network Branch Section ID	Defect Description	Defect Severity	Work Description	Work Cost
BGR-AD10-40	SWELLING	Medium	Patching - AC Full Depth	$14,073.75
BGR-AGA-10	BLOCK CR	Medium	Crack Sealing - AC	$110,286.08
BGR-AGA-10	L & T CR	Medium	Crack Sealing - AC	$32,817.60
BGR-AGA-10	PATCHING	Medium	Patching - AC Full Depth	$6,458.25
BGR-AGA-10	L & T CR	High	Crack Sealing - AC	$8,656.16
BGR-AGA-10	ALLIGATOR CR	High	Patching - AC Full Depth	$159,036.75
BGR-AGA-10	RAVELING	High	Patching - AC Partial Depth	$1,765.30
BGR-AGA-110	JT REF. CR	Medium	Crack Sealing - AC	$272.96
BGR-AGA-110	L & T CR	Medium	Crack Sealing - AC	$5,154.84
BGR-AGA-140	JT REF. CR	Medium	Crack Sealing - AC	$305.76
BGR-AGA-140	L & T CR	Medium	Crack Sealing - AC	$6,568.24
BGR-AGA-140	PATCHING	Medium	Patching - AC Full Depth	$1,345.50
BGR-AGA-140	SWELLING	Medium	Patching - AC Full Depth	$23,546.00
BGR-AGA-170	L & T CR	Medium	Crack Sealing - AC	$107.60
BGR-AGA-190	L & T CR	Medium	Crack Sealing - AC	$10,242.80
BGR-AGA-20	CORNER SPALL	Medium	Patching - PCC Partial Depth	$775.20
BGR-AGA-20	JOINT SPALL	Medium	Patching - PCC Partial Depth	$4,133.20
BGR-AGA-20	SCALING	Medium	Patching - PCC Partial Depth	$11,496.00
BGR-AGA-20	SMALL PATCH	Medium	Patching - PCC Partial Depth	$215.20
BGR-AGA-20	CORNER SPALL	High	Patching - AC Partial Depth	$86.10
BGR-AGA-20	LINEAR CR	High	Patching - PCC Full Depth	$9,213.60
BGR-AGA-20	JOINT SPALL	High	Patching - PCC Partial Depth	$1,636.00
BGR-AGA-20	SMALL PATCH	High	Patching - PCC Partial Depth	$86.00
BGR-AGA-200	L & T CR	Medium	Crack Sealing - AC	$10,175.84
BGR-AGA-200	PATCHING	Medium	Patching - AC Full Depth	$269.00
BGR-AGA-210	L & T CR	Medium	Crack Sealing - AC	$1,946.20
BGR-AGA-210	PATCHING	Medium	Patching - AC Full Depth	$1,614.50
BGR-AGA-210	DEPRESSION	High	Patching - AC Full Depth	$430.50
BGR-AGA-210	PATCHING	High	Patching - AC Full Depth	$753.50
BGR-AGA-220	L & T CR	Medium	Crack Sealing - AC	$1,867.44
BGR-AGA-220	L & T CR	High	Crack Sealing - AC	$484.24
BGR-AGA-230	OIL SPILLAGE	Low	Patching - AC Partial Depth	$7,836.10
BGR-AGA-230	L & T CR	Medium	Crack Sealing - AC	$8,139.12
BGR-AGA-230	RUTTING	Medium	Patching - AC Full Depth	$3,794.25
BGR-AGA-250	LINEAR CR	Medium	Crack Sealing - PCC	$3,723.08
BGR-AGA-250	SHAT. SLAB	Medium	Crack Sealing - PCC	$572.16
BGR-AGA-250	FAULTING	Medium	Grinding (PCC, Localized)	$7,039.50

Network Branch Section ID	Defect Description	Defect Severity	Work Description	Work Cost
BGR-AGA-250	LARGE PATCH	Medium	Patching - PCC Full Depth	$42,280.80
BGR-AGA-250	CORNER SPALL	Medium	Patching - PCC Partial Depth	$775.20
BGR-AGA-250	JOINT SPALL	Medium	Patching - PCC Partial Depth	$3,702.80
BGR-AGA-250	SCALING	Medium	Patching - PCC Partial Depth	$5,855.60
BGR-AGA-250	SMALL PATCH	Medium	Patching - PCC Partial Depth	$1,248.80
BGR-AGA-250	JT SEAL DMG	High	Joint Seal (Localized)	$1,074.80
BGR-AGA-250	CORNER SPALL	High	Patching - AC Partial Depth	$75.30
BGR-AGA-250	LARGE PATCH	High	Patching - PCC Full Depth	$169,122.40
BGR-AGA-250	JOINT SPALL	High	Patching - PCC Partial Depth	$904.00
BGR-AGA-250	SMALL PATCH	High	Patching - PCC Partial Depth	$1,248.80
BGR-AGA-260	LINEAR CR	Medium	Crack Sealing - PCC	$263.76
BGR-AGA-260	CORNER SPALL	Medium	Patching - PCC Partial Depth	$387.60
BGR-AGA-260	JOINT SPALL	Medium	Patching - PCC Partial Depth	$1,808.40
BGR-AGA-260	SCALING	Medium	Patching - PCC Partial Depth	$3,616.80
BGR-AGA-270	LINEAR CR	Medium	Crack Sealing - PCC	$57.76
BGR-AGA-270	CORNER SPALL	Medium	Patching - PCC Partial Depth	$215.20
BGR-AGA-270	JOINT SPALL	Medium	Patching - PCC Partial Depth	$1,894.40
BGR-AGA-270	SMALL PATCH	Medium	Patching - PCC Partial Depth	$215.20
BGR-AGA-270	JOINT SPALL	High	Patching - PCC Partial Depth	$344.40
BGR-AGA-280	JOINT SPALL	Medium	Patching - PCC Partial Depth	$258.40
BGR-AGA-280	CORNER SPALL	High	Patching - AC Partial Depth	$32.30
BGR-AGA-280	LINEAR CR	High	Patching - PCC Full Depth	$5,511.20
BGR-AGA-280	JOINT SPALL	High	Patching - PCC Partial Depth	$1,033.20
BGR-AGA-280	SCALING	High	Slab Replacement - PCC	$18,357.75
BGR-AGA-290	LINEAR CR	Medium	Crack Sealing - PCC	$414.68
BGR-AGA-290	LARGE PATCH	Medium	Patching - PCC Full Depth	$26,522.40
BGR-AGA-290	JOINT SPALL	Medium	Patching - PCC Partial Depth	$947.20
BGR-AGA-290	SCALING	Medium	Patching - PCC Partial Depth	$5,511.20
BGR-AGA-290	JT SEAL DMG	High	Joint Seal (Localized)	$253.28
BGR-AGA-290	LINEAR CR	High	Patching - PCC Full Depth	$9,041.60
BGR-AGA-290	SCALING	High	Slab Replacement - PCC	$28,772.10
BGR-AGA-30	BLOCK CR	Medium	Crack Sealing - AC	$10,501.32
BGR-AGA-30	JT REF. CR	Medium	Crack Sealing - AC	$9,383.20
BGR-AGA-30	L & T CR	Medium	Crack Sealing - AC	$31,912.08
BGR-AGA-30	ALLIGATOR CR	Medium	Patching - AC Full Depth	$159,978.50
BGR-AGA-30	SWELLING	Medium	Patching - AC Full Depth	$49,083.50
BGR-AGA-30	BLOCK CR	High	Crack Sealing - AC	$1,961.96
BGR-AGA-30	JT REF. CR	High	Crack Sealing - AC	$1,711.28
BGR-AGA-30	L & T CR	High	Crack Sealing - AC	$7,874.00

Network Branch Section ID	Defect Description	Defect Severity	Work Description	Work Cost
BGR-AGA-320	LINEAR CR	Medium	Crack Sealing - PCC	$175.84
BGR-AGA-320	CORNER SPALL	Medium	Patching - PCC Partial Depth	$258.40
BGR-AGA-320	JOINT SPALL	Medium	Patching - PCC Partial Depth	$688.80
BGR-AGA-320	SMALL PATCH	Medium	Patching - PCC Partial Depth	$258.40
BGR-AGA-320	JT SEAL DMG	High	Joint Seal (Localized)	$818.88
BGR-AGA-320	JOINT SPALL	High	Patching - PCC Partial Depth	$430.40
BGR-AGA-320	SCALING	High	Slab Replacement - PCC	$16,856.10
BGR-AGA-340	LARGE PATCH	Medium	Patching - PCC Full Depth	$7,147.20
BGR-AGA-340	ASR	Medium	Patching - PCC Partial Depth	$478,520.40
BGR-AGA-340	JOINT SPALL	Medium	Patching - PCC Partial Depth	$301.20
BGR-AGA-340	SCALING	Medium	Patching - PCC Partial Depth	$2,970.80
BGR-AGA-340	SMALL PATCH	Medium	Patching - PCC Partial Depth	$258.40
BGR-AGA-340	ASR	High	Slab Replacement - PCC	$184,595.85
BGR-AGA-360	LINEAR CR	Medium	Crack Sealing - PCC	$133.84
BGR-AGA-360	JOINT SPALL	Medium	Patching - PCC Partial Depth	$2,884.80
BGR-AGA-40	JT REF. CR	Medium	Crack Sealing - AC	$5,641.72
BGR-AGA-40	L & T CR	Medium	Crack Sealing - AC	$10,040.68
BGR-AGA-40	JT REF. CR	High	Crack Sealing - AC	$1,763.76
BGR-AGA-40	L & T CR	High	Crack Sealing - AC	$5,301.84
BGR-AGA-40	PATCHING	High	Patching - AC Full Depth	$11,598.00
BGR-AGA-50	L & T CR	Medium	Crack Sealing - AC	$31,123.36
BGR-AGA-50	SWELLING	Medium	Patching - AC Full Depth	$2,610.25
BGR-AGA-60	L & T CR	Medium	Crack Sealing - AC	$3,698.16
BGR-AGA-70	L & T CR	Medium	Crack Sealing - AC	$166.68
BGR-AGA-90	L & T CR	Medium	Crack Sealing - AC	$4,359.60
BGR-AHOLD-10	L & T CR	Medium	Crack Sealing - AC	$1,937.00
BGR-AHOLD-20	LINEAR CR	Medium	Crack Sealing - PCC	$262.48
BGR-AHOLD-20	JOINT SPALL	High	Patching - PCC Partial Depth	$430.40
BGR-AHOLD-30	L & T CR	Medium	Crack Sealing - AC	$1,812.32
BGR-AHOLD-30	L & T CR	High	Crack Sealing - AC	$120.72
BGR-HELIA-10	LARGE PATCH	Medium	Patching - PCC Full Depth	$29,536.00
BGR-HELIA-10	SCALING	Medium	Patching - PCC Partial Depth	$12,314.00
BGR-HELIA-10	SMALL PATCH	Medium	Patching - PCC Partial Depth	$430.40
BGR-HELIT-10	L & T CR	Medium	Crack Sealing - AC	$2,272.96
BGR-HELIT-10	PATCHING	Medium	Patching - AC Full Depth	$8,691.75
BGR-HELIT-10	RUTTING	Medium	Patching - AC Full Depth	$44,993.25
BGR-HELIT-10	L & T CR	High	Crack Sealing - AC	$431.76
BGR-HELIT-10	PATCHING	High	Patching - AC Full Depth	$2,341.25
BGR-RW1533-10	L & T CR	Medium	Crack Sealing - AC	$143,051.20

Network Branch Section ID	Defect Description	Defect Severity	Work Description	Work Cost
BGR-RW1533-10	L & T CR	High	Crack Sealing - AC	$1,263.76
BGR-RW1533-20	JT REF. CR	Medium	Crack Sealing - AC	$926.52
BGR-RW1533-20	L & T CR	Medium	Crack Sealing - AC	$19,427.84
BGR-RW1533-20	PATCHING	Medium	Patching - AC Full Depth	$430.50
BGR-RW1533-20	L & T CR	High	Crack Sealing - AC	$372.72
BGR-RW1533-30	JT REF. CR	Medium	Crack Sealing - AC	$1,074.80
BGR-RW1533-30	L & T CR	Medium	Crack Sealing - AC	$16,817.60
BGR-RW1533-30	L & T CR	High	Crack Sealing - AC	$32.80
BGR-RW1533-40	JT REF. CR	Medium	Crack Sealing - AC	$1,039.36
BGR-RW1533-40	L & T CR	Medium	Crack Sealing - AC	$29,713.92
BGR-RW1533-50	JT REF. CR	Medium	Crack Sealing - AC	$1,560.36
BGR-RW1533-50	L & T CR	Medium	Crack Sealing - AC	$61,034.12
BGR-RW1533-50	ALLIGATOR CR	Medium	Patching - AC Full Depth	$21,205.00
BGR-RW1533-50	L & T CR	High	Crack Sealing - AC	$4,456.68
BGR-RW1533-60	JT REF. CR	Medium	Crack Sealing - AC	$775.60
BGR-RW1533-60	L & T CR	Medium	Crack Sealing - AC	$14,098.44
BGR-RW1533-60	L & T CR	High	Crack Sealing - AC	$126.00
BGR-RW1533-70	L & T CR	Medium	Crack Sealing - AC	$36,874.00
BGR-RW1533-70	PATCHING	Medium	Patching - AC Full Depth	$430.50
BGR-RW1533S-10	JT REF. CR	Medium	Crack Sealing - AC	$58,227.04
BGR-RW1533S-10	L & T CR	Medium	Crack Sealing - AC	$29,724.40
BGR-RW1533S-10	JT REF. CR	High	Crack Sealing - AC	$4,257.20
BGR-RW1533S-20	JT REF. CR	Medium	Crack Sealing - AC	$9,003.92
BGR-RW1533S-20	L & T CR	Medium	Crack Sealing - AC	$5,913.40
BGR-RW1533S-20	L & T CR	High	Crack Sealing - AC	$118.12
BGR-TWA-10	L & T CR	Medium	Crack Sealing - AC	$6,914.68
BGR-TWA-10	DEPRESSION	Medium	Patching - AC Partial Depth	$23,185.50
BGR-TWA-100	L & T CR	Medium	Crack Sealing - AC	$786.08
BGR-TWA-110	L & T CR	Medium	Crack Sealing - AC	$2,448.80
BGR-TWA-110	DEPRESSION	High	Patching - AC Full Depth	$14,908.00
BGR-TWA-40	L & T CR	Medium	Crack Sealing - AC	$1,833.32
BGR-TWA-40	ALLIGATOR CR	Medium	Patching - AC Full Depth	$22,792.50
BGR-TWA-40	DEPRESSION	Medium	Patching - AC Partial Depth	$1,076.40
BGR-TWA-40	L & T CR	High	Crack Sealing - AC	$313.64
BGR-TWA-50	JT REF. CR	Medium	Crack Sealing - AC	$4,165.36
BGR-TWA-50	L & T CR	Medium	Crack Sealing - AC	$5,661.40
BGR-TWA-50	ALLIGATOR CR	Medium	Patching - AC Full Depth	$51,128.50
BGR-TWA-70	BLOCK CR	Medium	Crack Sealing - AC	$1,022.32
BGR-TWA-70	L & T CR	Medium	Crack Sealing - AC	$6,742.80

Network Branch Section ID	Defect Description	Defect Severity	Work Description	Work Cost
BGR-TWA-70	ALLIGATOR CR	Medium	Patching - AC Full Depth	$166,679.25
BGR-TWA-70	PATCHING	Medium	Patching - AC Full Depth	$242.25
BGR-TWA-70	DEPRESSION	Medium	Patching - AC Partial Depth	$2,486.50
BGR-TWA-70	L & T CR	High	Crack Sealing - AC	$456.68
BGR-TWAS-10	L & T CR	Medium	Crack Sealing - AC	$80,398.96
BGR-TWAS-10	PATCHING	Medium	Patching - AC Full Depth	$3,014.00
BGR-TWAS-10	SWELLING	Medium	Patching - AC Full Depth	$319,015.50
BGR-TWAS-10	L & T CR	High	Crack Sealing - AC	$1,954.08
BGR-TWAS-70	L & T CR	Medium	Crack Sealing - AC	$6,610.24
BGR-TWAS-70	ALLIGATOR CR	Medium	Patching - AC Full Depth	$49,541.00
BGR-TWAS-70	PATCHING	Medium	Patching - AC Full Depth	$6,081.50
BGR-TWAS-70	SWELLING	Medium	Patching - AC Full Depth	$1,829.75
BGR-TWAS-70	DEPRESSION	Medium	Patching - AC Partial Depth	$26,791.40
BGR-TWAS-70	L & T CR	High	Crack Sealing - AC	$1,818.88
BGR-TWAS-70	DEPRESSION	High	Patching - AC Full Depth	$5,462.75
BGR-TWAS-70	PATCHING	High	Patching - AC Full Depth	$1,211.00
BGR-TWAS-70	SWELLING	High	Patching - AC Full Depth	$1,157.00
BGR-TWB-10	L & T CR	Medium	Crack Sealing - AC	$8,803.16
BGR-TWB-10	RUTTING	Medium	Patching - AC Full Depth	$9,391.50
BGR-TWB-20	L & T CR	Medium	Crack Sealing - AC	$182.40
BGR-TWBS-10	L & T CR	Medium	Crack Sealing - AC	$3,766.40
BGR-TWBS-10	PATCHING	Medium	Patching - AC Full Depth	$565.00
BGR-TWBS-10	DEPRESSION	Medium	Patching - AC Partial Depth	$3,595.10
BGR-TWK-10	L & T CR	Medium	Crack Sealing - AC	$480.32
BGR-TWK-20	L & T CR	Medium	Crack Sealing - AC	$22.32
BGR-TWL-10	L & T CR	Medium	Crack Sealing - AC	$139.12
BGR-TWL-10	ALLIGATOR CR	Medium	Patching - AC Full Depth	$12,620.75
BGR-TWL-10	PATCHING	Medium	Patching - AC Full Depth	$3,444.50
BGR-TWL-10	RUTTING	Medium	Patching - AC Full Depth	$60,278.00
BGR-TWLS-10	L & T CR	Medium	Crack Sealing - AC	$17,744.08
BGR-TWLS-10	ALLIGATOR CR	Medium	Patching - AC Full Depth	$31,672.75
BGR-TWLS-10	PATCHING	Medium	Patching - AC Full Depth	$9,499.25
BGR-TWLS-10	DEPRESSION	Medium	Patching - AC Partial Depth	$16,447.30
BGR-TWLS-10	L & T CR	High	Crack Sealing - AC	$993.44
BGR-TWLS-10	DEPRESSION	High	Patching - AC Full Depth	$14,854.25
BGR-TWM-10	L & T CR	Medium	Crack Sealing - AC	$1,961.96
BGR-TWM-10	L & T CR	High	Crack Sealing - AC	$1,192.92
BGR-TWM-10	RAVELING	High	Patching - AC Partial Depth	$172.20
BGR-TWM-20	L & T CR	Medium	Crack Sealing - AC	$675.84

Network Branch Section ID	Defect Description	Defect Severity	Work Description	Work Cost
BGR-TWM-20	L & T CR	High	Crack Sealing - AC	$1,333.32
BGR-TWMS-10	L & T CR	Medium	Crack Sealing - AC	$5,678.48
BGR-TWMS-10	PATCHING	Medium	Patching - AC Full Depth	$8,369.00
BGR-TWMS-10	SWELLING	Medium	Patching - AC Full Depth	$25,133.75
BGR-TWMS-10	SWELLING	High	Patching - AC Full Depth	$26,048.75
BGR-TWMS-10	RAVELING	High	Patching - AC Partial Depth	$43.10
BGR-TWRW1533X-10	L & T CR	Medium	Crack Sealing - AC	$515.76
BGR-TWRW1533X-20	L & T CR	Medium	Crack Sealing - AC	$1,682.40