CHAPTER 4 FACILITY REQUIREMENTS

4.1 INTRODUCTION

The analysis of facility requirements compares existing airport conditions with those needed to serve current and forecasted activity at Ontario Municipal Airport over the 20-year planning period. Landside components of the Airport were examined following FAA guidelines to determine the adequacy of facility design and capacity. Airside components were not a focus of this analysis, and their evaluation was limited to the useful life of facilities. Identified deficiencies will be further examined in the next chapter during the development of alternatives.

4.2 AIRPORT DESIGN CONSIDERATIONS

The design components of an airport are determined largely by the characteristics of the critical aircraft, the type of runway approach available, and the instrument approach visibility minimums. While these items are typically used to determine design standards, other features at or surrounding an airport may require additional consideration during the planning and design process.

4.2.1 CRITICAL AIRCRAFT

The most demanding aircraft type to regularly use an airport determines the applicable design standards for many facilities on the airfield. Regular use, whether it is current or forecasted, means a minimum of 500 annual operations. The aircraft type meeting these criteria is the critical aircraft of an airport and can be represented by a single aircraft or grouping of aircraft with similar physical and operational characteristics. The existing and future critical aircraft at Ontario Municipal Airport is designated a **B-II** and is represented by the **Beechcraft King Air 200** and **Air Tractor AT-802F Fire Boss**. **Table 4.1** summarizes the design characteristics associated with these aircraft.

TABLE 4.1
CRITICAL AIRCRAFT DESIGN CHARACTERISTICS

	Approach Speed (Knots)	Wingspan (Feet)	Tail Height (Feet)	Max Takeoff Weight (MTOW) (Pounds)	Main Gear Width (MGW) (Feet)	Cockpit to Main Gear (CMG) (Feet)
Beechcraft King Air 200	98	54.5	15	12,500	17.17	15
Air Tractor AT-802F Fire Boss	103	59.25	11.20	16,000	11	23.83
FAA Design Code	**AAC**	**ADG**		**AAC/ADG**	**TDG**	
Critical Aircraft Classification	**B**	**II**		**B-II**	**2A**	

Source: FAA Advisory Circular 150/5300-13B
AAC: Aircraft Approach Category
ADG: Aircraft Design Group
TDG: Taxiway Design Group

Mirroring the critical aircraft, the Airport Reference Code (ARC) is B-II for both the current and future planning periods. In meeting these standards, the Airport would be able to accommodate aircraft with approach speeds up to 121 knots, wingspans up to 79 feet, and tail heights up to 30 feet.

The critical aircraft at Ontario Municipal Airport is in Taxiway Design Group (TDG) 2 according to the design groups outlined in FAA AC 150/5300-13A, *Airport Design*; however, the AC was updated to AC 150/5300-13B during the development of this chapter. In the newer version, TDG 2 is separated into TDG 2A and TDG 2B. An aircraft with an MGW between 15 and 20 feet and CMG up to and equal to 40 feet classifies as TDG 2A. A TDG 2B aircraft has an MGW up to and equal to 20 feet and a CMG spanning 41 to 65 feet. Of the two aircraft representing the future critical aircraft at Ontario Municipal Airport, the Beechcraft King Air 200 has the largest TDG classification with an MGW of 17.17 feet and a CMG distance of 15 feet (see **Table 4.1**). The existing and future TDG at the Airport is, therefore, further classified as TDG 2A. As such, taxiways, taxilanes, and apron areas will be designed for aircraft with a main gear width spanning 15 to 20 feet and measuring up to 40 feet from cockpit to main gear. While this design code is applied to the Airport, taxiways and taxilanes can be built to different TDGs based on expected use.

4.2.2 INSTRUMENT APPROACH

In AC 150/5300-13B, the FAA has designated four categories of visibility for the purpose of airport design: visual (V), non-precision (NPA), approach procedure with vertical guidance (APV), and precision (PA) approaches. Runway 15/33 is designed to APV standards, meaning it has instrument approaches published to each runway end that provide both lateral and vertical course deviation information. There are Area Navigation (RNAV) Global Positioning System (GPS) instrument approach procedures (IAPs) published for both the Runway 15 End and Runway 33 End. The IAP approach types, which help keep pilots with instrument capabilities on the right course and glidepath into the Airport, include localizer performance with vertical guidance (LPV) and lateral navigation (LNAV) with vertical navigation (VNAV). **Table 4.2** summarizes the design standards of an APV approach and the Airport's current performance.

The straight-in approach to the Runway 15 End is listed as "not applicable" at night on the IAP due to the proximity of SW 4th Avenue. The Airport has installed a PAPI to mitigate the obstruction and is working with FAA Flight Procedures to remove the exception from the published IAP.

TABLE 4.2
APPROACH PROCEDURE WITH VERTICAL GUIDANCE (APV) DESIGN STANDARDS

	Non-Precision Standard	Runway 15 Performance	Runway 33 Performance
Minimum Visibility IFR Approach	>½ Statute Mile	≥1 Statute Mile	≥⅞ Statute Mile
Height Above Touchdown (HAT)	≥200 Feet	≥576	≥250
Approach Surface*	≥ ¾ Statute Mile	≥1 Statute Mile	≥⅞ Statute Mile
Starting Point	200 Feet After Runway End	200 Feet After Runway End	
Length	10,000 Feet	10,000 Feet	
Inner Width	400 Feet	400 Feet	
Outer Width	3,400 Feet	3,400 Feet	
Slope	Slope 20:1	Slope 20:1	
Approach Types (Vertica/Lateral)	Localizer Performance with Vertical Guidance (LPV), Lateral Navigation (LNAV)/Vertical Navigation (VNAV), Required Navigation Performance (RNP), or GBAS Landing System (GLS)	LPV, LNAV/VNAV	
Minimum Runway Length	3,200 Feet	5,006 Feet	
Runway Edge Lights	MIRL	MIRL	
Runway Markings	Non-Precision	Non-Precision	

Source: FAA AC 150/5300-13B and J-U-B
**Threshold Siting Surface (TSS), not CFR Part 77 Approach Surface*

4.2.3 VISIBILITY MINIMUMS

The existing 1 statute mile or greater visibility minimum on the Runway 15 End and ⅞ statute mile or greater minimum on the Runway 33 End meets the Airport's current and future demand.

4.3 NAVIGABLE AIRSPACE REQUIREMENTS

Title 14 Code of Federal Regulations (CFR) Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace* (CFR Part 77) applies to existing and manmade objects. These guidelines define the critical areas in the vicinity of airports that should be kept free of obstructions. The approach category and visibility minimum of each runway determines the size of the imaginary surfaces. CFR Part 77 does not include an APV approach category, therefore, non-precision standards apply to Runway 15/33. At Ontario Municipal Airport, where the Runway 15 End has a 1 statute mile or greater visibility minimum and the Runway 33 End a ⅞ statute mile or greater visibility minimum, the airspace is protected to the CFR Part 77 surface dimensions for a non-precision instrument runway with visibility minimums greater than ¾ statute miles.

The standards regulating the imaginary airspace surfaces for non-precision approach runways having visibility minimums greater than ¾ statute mile are described in Chapter 2. **Table 4.3** summarizes the size, slope, and dimension of each CFR Part 77 imaginary surface for non-precision approach runways with visibility minimums greater than ¾ statute mile.

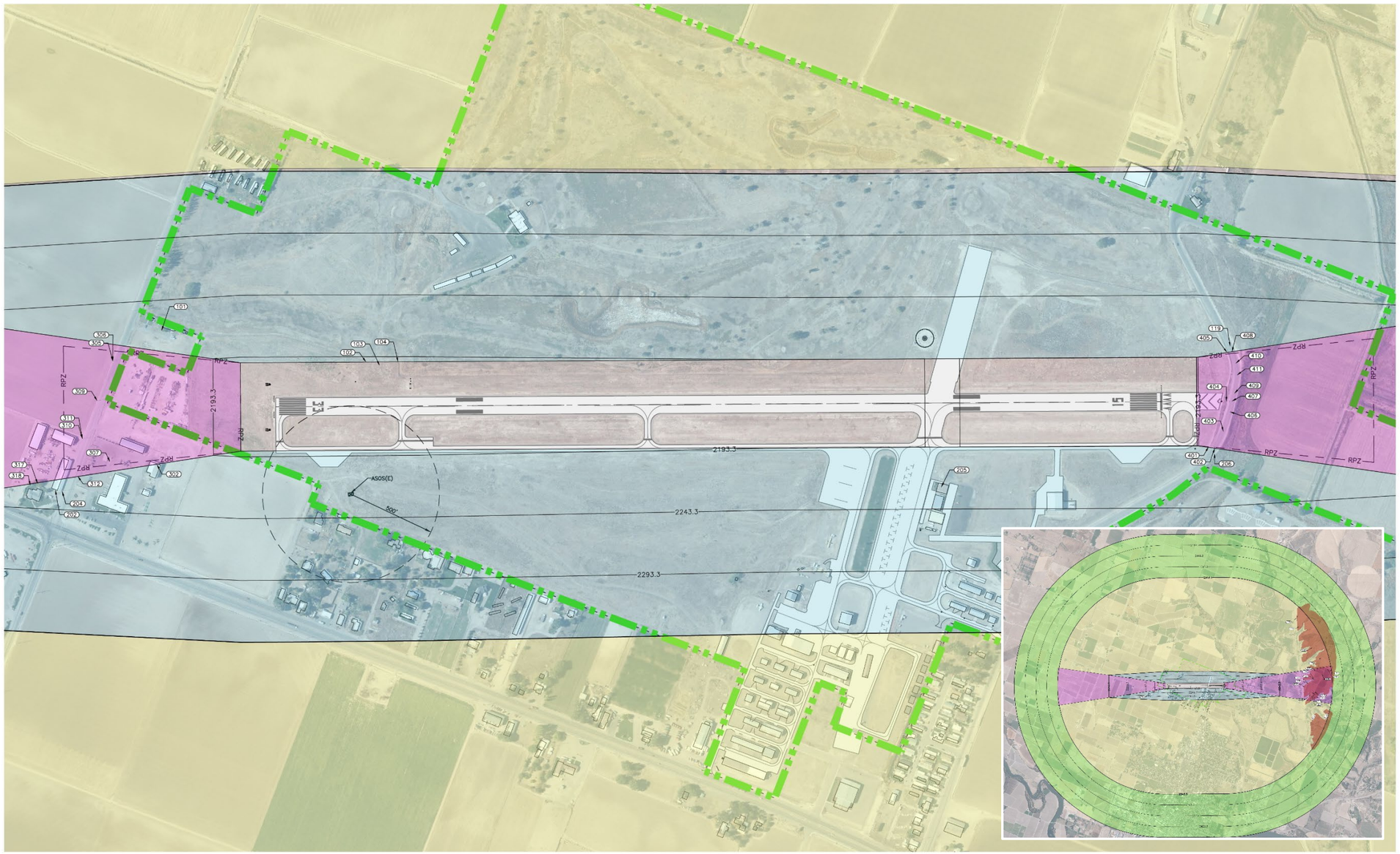
TABLE 4.3
CFR PART 77 NON-PRECISION IMAGINARY SURFACES

Imaginary Surface	>3/4 Statute Mile
Horizontal Surface	10,000 Foot Radius
Conical Surface	
Horizontal Distance	4,000 Feet
Slope	20:1
Primary Surface	500 Feet Wide
Approach Surface	
Inner Width	500 Feet
Outer Width	3,500 Feet
Horizontal Distance	10,000 Feet
Slope	34:1
Transitional Surface	7:1 Slope

Source: CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace

Any penetration to the CFR Part 77 imaginary surfaces, whether manmade or natural growth, is classified as an "obstruction," presumed to be a hazard to navigation, and is subject to an FAA aeronautical study which will determine whether the obstruction is in fact considered a hazard. The airport operator is not required to prevent or clear penetrations to the CFR Part 77 imaginary surfaces when the FAA determines these penetrations are not hazards. The imaginary surface obstructions at Ontario Municipal Airport are depicted in **Figure 4.1** and listed in **Table 4.4**.

FIGURE 4.1
ONTARIO MUNICIPAL AIRPORT CFR PART 77 AIRSPACE OBSTRUCTIONS



Source: J-U-B

TABLE 4.4
ONTARIO MUNICIPAL AIRPORT CFR PART 77 AIRSPACE OBSTRUCTIONS

POINT ID	OBJECT DESCRIPTION W/ FAA OBSTRUCTION ID NUMBER	HAT*	OBJECT TOP ELEVATION	PART 77 SURFACE ELEVATION	PENETRATION VALUE	13B APPROACH SURFACE ELEVATION	PENETRATION VALUE
101	Tree: 41-027456	43	2225	2219	6	N/A	N/A
102	Fence: 41-027553	4	2190	2189	1	N/A	N/A
103	Terrain 41-025178	3	2190	2189	1	N/A	N/A
104	Fence: 41-027514	5	2192	2189	3	N/A	N/A
105	Traverse Way: 41-041878	14	2204	2203	1	N/A	N/A
106	Building: 41-022065	9	2399	2343	56	N/A	N/A
107	Pole: 41-022066	21	2406	2343	63	N/A	N/A
108	Tree: 41-023773	109	2402	2343	59	2574	-172
109	Pole: 41-022060	25	2382	2343	39	2582	-200
110	Tree: 41-027625	61	2435	2343	92	N/A	N/A
111	Tree: 41-023772	63	2424	2343	81	2605	-181
112	Tree: 41-024503	84	2430	2343	87	2608	-178
113	Tree: 41-027627	79	2447	2343	104	2615	-168
114	Pole: 41-027583	46	2426	2343	83	N/A	N/A
115	Tree: 41-027545	64	2441	2343	98	2645	-204
116	Pole: 41-027626	39	2415	2343	72	2669	-254
117	Pole: 41-041899	43	2413	2343	70	2684	-271
201	Antenna: 41-027535	82	2266	2264	2	N/A	N/A
202	Tower: 41-022073	57	2240	2228	12	N/A	N/A
203	Transmission Line: 41-022094	47	2230	2228	2	N/A	N/A
204	Pole: 41-023793	47	2230	2228	2	N/A	N/A
205	Building: 41-022063	35	2227	2226	1	N/A	N/A
206	Traverse Way: 41-027507	20	2204	2200	4	N/A	N/A
207	Tower: 41-022075	47	2413	2343	70	2563	-150
208	Pole: 41-027547	44	2388	2343	45	2591	-203
209	Tree: 41-027548	72	2429	2343	86	2597	-168
210	Tree: 41-041864	71	2431	2343	88	2600	-169
211	Tree: 41-027549	58	2421	2343	78	2604	-183
212	Pole: 41-027501	41	2367	2343	24	N/A	N/A
213	Pole: 41-027546	30	2395	2343	52	2610	-215
214	Tree: 41-027550	67	2418	2343	75	N/A	N/A
301	Fence: 41-027458	7	2190	2190	0	N/A	N/A
302	Building: 41-022069	27	2210	2203	7	N/A	N/A
305	Transmission Line: 41-022101	30	2213	2210	3	2225	-12
306	Pole: 41-024212	30	2213	2210	3	2225	-12
307	Pole: 41-022104	29	2212	2211	2	2226	-14
309	Transmission Line: 41-022091	33	2216	2213	3	2229	-13

POINT ID	OBJECT DESCRIPTION W/ FAA OBSTRUCTION ID NUMBER	HAT*	OBJECT TOP ELEVATION	PART 77 SURFACE ELEVATION	PENETRATION VALUE	13B APPROACH SURFACE ELEVATION	PENETRATION VALUE
310	Transmission Line: 41-022095	38	2221	2215	6	2234	-13
311	Pole: 41-023794	38	2221	2215	6	2234	-13
312	Transmission Line: 41-022090	44	2227	2216	11	N/A	N/A
317	Tree: 41-027533	40	2224	2223	1	N/A	N/A
318	Tree: 41-024258	42	2226	2225	1	N/A	N/A
402	Traverse Way: 41-023778	15	2203	2196	7	N/A	N/A
403	Traverse Way: 41-023776	15	2201	2197	4	2201	0
406	Traverse Way: 41-023777	15	2200	2199	1	2202	-2
407	Traverse Way	15	2200	2199	1	2203	-3
408	Traverse Way	15	2204	2199	5	N/A	N/A
409	Traverse Way: 41-023779	15	2201	2199	2	2204	-3
410	Traverse Way: 41-023780	15	2203	2200	3	2204	-1
411	Traverse Way: 41-025184	14	2201	2200	1	2205	-4
412	Tree: 41-023775	31	2204	2203	1	2210	-6

Source: J-U-B Analysis
**HAT: Height Above Touchdown*

4.4 RUNWAY PROTECTION AREA REQUIREMENTS

In FAA AC 150/5300-13B, the FAA establishes dimensional and clearance standards for several surfaces on and around a runway to mitigate obstructions and improve the safe operation of aircraft. These include the Runway Safety Area (RSA), Runway Object Free Area (ROFA), Runway Obstacle Free Zone (ROFZ), and Runway Protection Zone (RPZ). The dimensional standards of the runway protection areas are determined from a Runway Design Code (RDC). A different visibility minimum applies to each end of Runway 15/33 at Ontario Municipal Airport, as such, certain protection area dimensions will vary from the Runway 15 End to the Runway 33 End.

The current RDC for the Runway 15 End is B-II-5000, with the visibility component representing a minimum not lower than 1 mile. The visibility minimum is not lower than ¾ miles on the Runway 33 End, therefore, the RDC is B-II-4000. The future RDCs are not forecasted to change over the 20-year planning horizon.

Table 4.5 summarizes the runway protection standards outlined in FAA AC 150/5300-13B, *Airport Design*, for A/B-II runways.

The following section describes the clearance, grading, and size criteria of the runway protection areas and identifies any non-standard concerns at the Ontario Municipal Airport.

TABLE 4.5 *A/B-II RUNWAY PROTECTION DESIGN STANDARDS*		
	Runway 15	**Runway 33**
Visibility Minimums	> 1 Mile	> ¾ Mile
Runway Protection Areas		
Runway Safety Area (RSA)		
Length Beyond Departure End	300’	300’
Length Prior to Threshold	300’	300’
Width	150’	150’
Runway Object Free Area (ROFA)		
Length Beyond Runway End	300’	300’
Length Prior to Threshold	300’	300’
Width	500’	500’
Runway Obstacle Free Zone (ROFZ)		
Length Beyond End	200’	200’
Width	400’	400’
Approach Runway Protection Zone (RPZ)		
Length	1,000’	1,700’
Inner Width	500’	1,000’
Outer Width	700’	1,510’
Departure Runway Protection Zone (RPZ)		
Length	1,000’	1,000’
Inner Width	500’	500’
Outer Width	700’	700’
Source: FAA Advisory Circular 150/5300-13B		

Runway Safety Areas (RSA) are designated by the FAA to improve the safety of aircraft that undershoot, overrun, or veer of the runway. The RSA is required to be:

- Clear and graded
- Drained by grading or storm sewers
- Capable of supporting snow removal, fire, and rescue equipment under dry conditions
- Graded to longitudinal and transverse surface gradient design standards

The RSA is centered on the runway centerline and its dimension based on the RDC of that runway. The design standards for a B-II-5000 and B-II-4000 runway both require the RSA to be 150 feet wide, extend 300 feet beyond the departure end, and begin 300 feet prior to the runway threshold. This area has no existing penetrations and meets the current and future RSA design standards.

Runway Object Free Areas (ROFA) are centered about the runway centerline and must be clear of all above-ground objects penetrating the lateral elevation of the RSA. Exceptions include objects that need to be in the ROFA for air navigation or aircraft ground maneuvering purposes and aircraft that are taxiing or in a hold position. The ROFA for Runway 15/33 is 500 feet wide, extends 300 feet beyond the departure end, and begins 300 feet prior to the runway threshold. This area has no existing penetrations and meets the current and future ROFA design standards.

Runway Obstacle Free Zones (ROFZ) function as both design and operational surfaces and must be kept clear of any object penetrations, including taxiing and parked aircraft, during operations. Frangible navigational aids are permitted in this area if their location is necessitated by function. The ROFZ at Ontario Municipal Airport is centered above the runway centerline and extends 200 feet beyond the end of the runway. The standard ROFZ width for a runway with large aircraft operations is 400 feet. This area has no existing penetrations and meets current and future design standards.

Runway Protection Zones (RPZ) function as a protection for people and property on the ground. The RPZ at Ontario Municipal Airport is centered about the extended runway centerline and is trapezoidal in shape. The approach RPZ on the Runway 33 End begins 200 feet from the runway threshold, is 1,700 feet long, and expands from a width of 1,000 feet to 1,510 feet. The Runway 15 End approach RPZ similarly begins 200 feet from the runway threshold but is 1,000 feet long and expands in width from 500 feet to 700 feet. The departure RPZs mirror the dimensions of the Runway 15 End approach RPZ but begin 200 feet beyond each runway end. Land uses in the RPZ permissible without further FAA evaluation are listed in **Table 4.6**.

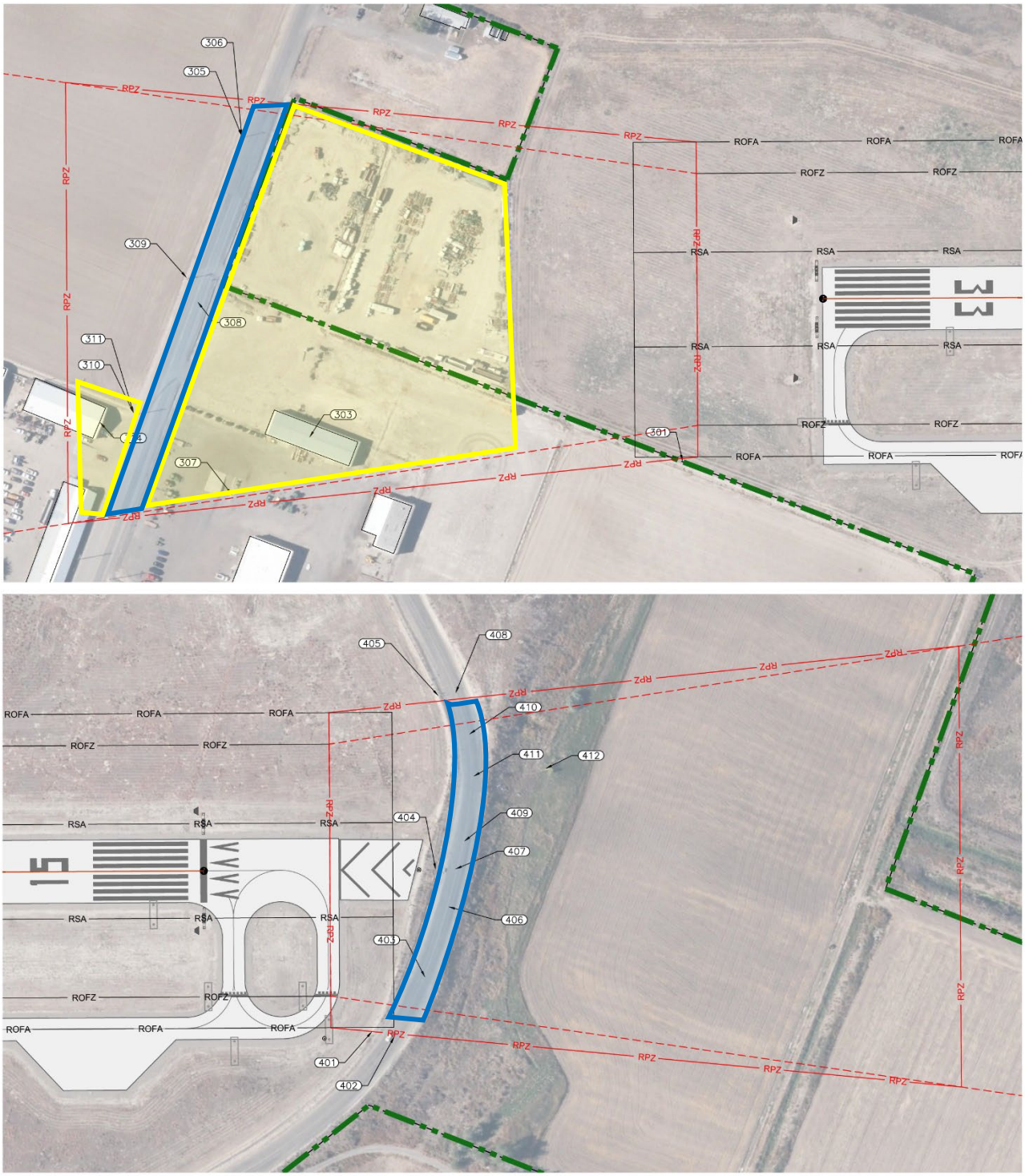
TABLE 4.6
RPZ PERMISSABLE LAND USES

Land Use	Minimum Requirements
Farming	Airport Design Clearance Standards
Irrigation Channels	AC 150/5200-33 and FAA/USDA *Wildlife Hazard Management at Airports* Manual
Airport Service Roads	Not public roads and controlled by airport operator
Underground Facilities	RSA Design Standards
NAVAIDS and facilities	Fixed-by-function
Above-Ground Fuel Tanks	For back-up generators to unstaffed NAVAIDS

Source: FAA AC 150/5300-13B

Objects within the Runway 33 End RPZ that do not fall under the permissible land uses listed in FAA AC 150/5300-13B include a public road (SW 18th Avenue), commercial business structures, and above ground utilities. On the Runway 15 End, SW 4th Avenue runs through the RPZ. Zoning ordinances are currently in place to protect the area from future incompatible objects and activities. Where practical, the City should consider opportunities that meet the FAA's preferred method of airport owner control and compatible land use enforcement.

FIGURE 4.2
ONTARIO MUNICIPAL AIRPORT RPZ OBJECTS



Source: J-U-B

4.5 AIRSIDE REQUIREMENTS

The Ontario Municipal Airport is included in the National Plan for Integrated Airport Systems (NPIAS) and is eligible to receive grants through the Airport Improvement Program (AIP). Airport improvements funded through this program must meet certain eligibility requirements outlined by the FAA in the AIP Handbook. The useful life of a facility is one such requirement that is used to determine project justification. Useful life refers to the length of time an asset or property is expected to be usable for the purpose it was acquired.

While this airport master plan effort did not encompass an extensive evaluation of existing airside facilities, it is recommended that the Airport budget and plan for the rehabilitation, reconstruction, or replacement of these facilities according to the useful life recommendations outlined in the AIP Handbook. **Table 4.7** lists the useful life of the airside facilities at Ontario Municipal Airport and the years when they were last updated. While the useful life of some of these facilities has been met, it does not automatically mean that rehabilitation, reconstruction, or replacement is needed.

TABLE 4.7
ONTARIO MUNICIPAL AIRPORT AIRSIDE FACILITIES USEFUL LIFE

	Useful Life	Last Completed
Runway Pavement		
Reconstruction	20 Years	2005
Rehabilitation	10 Years	2011
Seal Coat	3 Years	2022
Parallel Taxiway Pavement		
Reconstruction	20 Years	2005
Rehabilitation	10 Years	2011
Seal Coat	3 Years	2022
Airfield Lighting		
Runway	10 Years	2011
Taxiway		2017
NAVAIDS		
Rotating Beacon	15 Years	2013
Wind Cone		2011
REIL		2007/2017
PAPIs		2007/2017
Fencing		
Perimeter Fencing	20 Years	2018

Source: J-U-B

4.6 LANDSIDE REQUIREMENTS

Landside facilities provide the essential interface between the airside facilities and ground access to and from the Airport. The following section includes an analysis of existing landside facilities at the Ontario Municipal Airport to determine the adequacy of their design and capacity.

4.6.1 AIRCRAFT STORAGE FACILITIES

Hangars are typically a preferred aircraft storage solution at general aviation (GA) airports. These facilities provide a wide range of benefits, including aircraft protection from weather damage, secure aircraft storage, shelter for aircraft maintenance, and shared hangar/office space potential.

4.6.1.1 Hangar Design Considerations

Ontario Municipal Airport has three types of hangars: box, corporate, and T-hangar. Box hangars are typically stand-alone structures that store multiple aircraft types ranging in size and type. Corporate hangars are conventional hangars with integrated office spaces, and T-hangars have standard or nested configurations to store small aircraft.

The recommended hangar storage is based on the estimated number of units needed to meet existing and future demand. The corresponding square footage was determined using the average square footage of each hangar type at Ontario Municipal Airport (see **Table 4.8**). While T-Hangars are typically designed to store multiple aircraft, the estimated hangar size used in the analysis accounts for a single aircraft storage unit.

TABLE 4.8
HANGAR SIZE ESTIMATES

Type	Typical Size (Square Feet)	ADG
T-Hangar	1,127	I
Box Hangar	1,606	I & II (Small)
Corporate Hangar	7,838	I & II

Source: Ontario Municipal Airport Existing Hangars

4.6.1.2 Hangar Storage Area Recommendations

The hangar storage area analysis used the based aircraft fleet mix forecast from the previous chapter to determine the minimum number of hangared parking positions needed at the Airport over the 20-year planning period. It is estimated that 90 percent of based aircraft will require hangar storage. It can, however, be difficult to infer aircraft parking positions from hangar size alone. A small aircraft, for instance, could be stored in a hangar that might be sized to accommodate multiple or larger aircraft. For this reason, the recommended number of aircraft hangar units, and corresponding square footage, summarized in **Table 4.9** should be considered a minimum estimate of what the Airport will need to meet aircraft storage demand over the next 20 years.

TABLE 4.9 HANGAR STORAGE AREA RECOMMENDATIONS					
	Existing	Current Need	Forecasted		
	2021		2026	2031	2041
Aircraft Requiring Hangar Storage					
Based Aircraft	89		92	96	105
Hangared Aircraft (90%)	80		83	86	95
Hangar Area Recommendations					
T-Hangar Units					
% Of Hangared Aircraft	37%	36%	35%	34%	33%
Number of Units	26	29	29	29	31
Area (1,135 SF per Aircraft)	29,313	32,470	32,673	33,119	35,159
Box Hangar Area					
% Of Hangared Aircraft	58%	58%	59%	59%	60%
Number of Units	41	46	49	51	57
Area (3,247 SF per Aircraft)	61,897	74,501	78,438	81,848	91,039
Corporate Hangar Area					
% Of Hangared Aircraft	6%	6%	6%	7%	7%
Number of Units	4	5	5	6	7
Area (10,566 SF per Aircraft)	31,351	144,592	150,049	162,370	178,044
Total Hangar Area (SF)	**122,542**	**144,592**	**150,049**	**162,370**	**178,044**
Source: J-U-B Analysis					

4.6.2 AIRCRAFT PARKING AREAS

Parking aprons should provide a location for based aircraft or itinerant aircraft to park without impeding on other parked, refueling, or taxiing aircraft. Aircraft parking at Ontario Municipal Airport is spread across the main, jet, BLM, and Life Flight aprons and includes 36 small aircraft tie downs, 3 jet positions, and 1 helipad. **Table 4.10** summarizes the number and type of aircraft parking positions at the Airport and the corresponding apron dimensions.

TABLE 4.10 EXISTING AIRCRAFT PARKING AREAS			
Apron	Parking Positions	Aircraft Type	Total Area (Square Feet)
Main	27	Small	35,100
Jet	3	Jet	45,600
BLM	7	Small	13,250
Life Flight			
Aircraft Apron	2	Small	8,000
Helipad	1	Rotor	3,600
Total	**40**		**105,550**
Source: J-U-B			

4.6.2.1 Apron Design Considerations

The minimum parking position sizing guidance provided by the FAA in AC 150/5300-13B is based on the wingspan and length of the aircraft requiring accommodation. The sizing guidance for ADG I and ADG II parking positions is listed in **Table 4.11**. The helicopter apron recommended dimensions were based on AC 150/5390-2C, *Heliport Design*. According to this guidance, the rotor diameter and overall length of the design helicopter determine the minimum recommended heliport area. There are two Enstrom F28F and two Enstrom 480B helicopters based at the Airport. The rotor diameters of both aircraft are identical; however, the overall length of the 480B helicopter is longer by two feet. As such, the helicopter parking area analysis referenced the size recommendations for the Enstrom 480B (see **Table 4.11**). All sizes listed in **Table 4.11** are a minimum recommendation and do not account for adjacent apron taxilanes nor ancillary service areas, such as a fuel station.

TABLE 4.11
MINIMUM AIRCRAFT PARKING POSITION DIMENSIONS

Aircraft Parking Positions			
ADG	**Wingspan**	**Length**	**Area**
I	49 Feet	<30 Feet 30-45 Feet	2,065 Square Feet 2,950 Square Feet
II	79 Feet	45-60 Feet	5,785 Square Feet
Helicopter Parking Positions			
Helicopter	**Rotor Diameter / TLOF**	**Length / FATO**	**Area (Including Safety Area)**
Enstrom 480B	32 Feet	30 Feet	7,225 Feet

Source: FAA AC 150/5300-13B Table E-1 and AC 150/5390-2C, Heliport Design
TLOF: Touchdown and Liftoff Area
FATO: Final Approach and Takeoff

To best optimize space, each designated parking area should be designed to a particular group of aircraft anticipated to use the Airport.

4.6.2.2 Based Aircraft Apron Parking

The based aircraft forecast from Chapter 3 helped to determine the demand for local aircraft apron area. Of the aircraft expected to be based at Ontario Municipal Airport over the 20-year planning period, it is anticipated that 90 percent will require hangar storage and 10 percent apron parking accommodations. In accordance with FAA guidance in AC 150/5300-13B, an additional 10 percent was added for supplemental parking positions. The total number of based aircraft expected to need apron parking is summarized in **Table 4.12**.

TABLE 4.12 ONTARIO MUNICIPAL AIRPORT LOCAL PARKING NEEDS ASSESSMENT				
	Existing	Forecasted		
	2021	2026	2031	2041
Number of Based Aircraft	89	92	96	105
Based Aircraft Requiring Apron Parking (20% of Based Aircraft)	18	18	19	21
Source: J-U-B Analysis				

4.6.2.3 Itinerant Aircraft Apron Parking

The itinerant parking apron analysis used the itinerant and local aircraft operations split and peak period forecasts from the previous chapter to determine the minimum number of aircraft parking positions needed at the Airport over the 20-year planning period.

The itinerant and local operations split at the Airport is 62 percent itinerant and 38 percent local. While these percentages correspond to total annual operations, it can be assumed that a similar split would occur on the peak design day. Of the 62 percent itinerant operations occurring on the peak design day, half will require apron parking at some point. The Airport should have, at a minimum, enough parking positions to simultaneously accommodate approximately 75 percent of those itinerant aircraft requiring apron parking. **Table 4.13** presents the results of this analysis, and the minimum parking positions needed at the Airport over the short, medium, and long-term planning periods.

TABLE 4.13 ONTARIO MUNICIPAL AIRPORT ITINERANT PARKING NEEDS ASSESSMENT				
	Existing	Forecasted		
	2021	2026	2031	2041
Peak Day Operations	61	64	67	74
Peak Day Itinerant Operations (62% of Peak Day Operations)	38	40	42	46
Itinerant Aircraft Requiring Apron Parking (50% of Peak Day Itinerant Operations)	19	20	21	23
Recommended Itinerant Parking Positions (75% of Itinerant Aircraft Requiring Parking)	14	15	16	17
Source: J-U-B Analysis				

4.6.2.4 Aircraft Parking Apron Recommendations

The based aircraft and aircraft operations fleet mix forecasts were used in the final step of the analysis to determine the number and parking dimensions of each aircraft type needing apron accommodations. Most single-engine and ultralight aircraft fall into ADG I and multi-engine, turboprop, and jet aircraft into ADG II. The area recommendation for ADG I is divided into an

additional group based on aircraft length; however, an average of the ADG I areas was used to complete this analysis.

The number of based aircraft requiring apron parking (see **Table 4.12**) was broken down by aircraft type using the based aircraft fleet mix forecast from the previous chapter. The same steps were taken to determine the number of itinerant aircraft requiring parking (see **Table 4.13**) but using the operations fleet mix forecast. The results were combined to find the total number of apron positions and apron area needed to accommodate helicopters and ADG I and ADG II aircraft at Ontario Municipal Airport. This analysis and the resulting aircraft parking area recommendations for the 20-year planning period are summarized in **Table 4.14**.

TABLE 4.14
AIRCRAFT PARKING APRON AREA RECOMMENDATIONS

	Existing	Current Need	Forecasted Need		
	2021		2026	2031	2041
ADG I					
% Total Based Aircraft		94%	95%	94%	92%
Based Aircraft Apron Positions		17	17	18	19
% Total Annual Operations		79%	78%	77%	74%
Itinerant Apron Positions		11	12	12	13
Total ADG I Apron Positions	**36**	**28**	**29**	**30**	**32**
Area (2,508 SF per Position)	**56,350**	**70,144**	**72,718**	**75,225**	**80,240**
ADG II					
% Total Based Aircraft		1%	1%	1%	3%
Based Aircraft Apron Positions		0	0	0	1
% Total Annual Operations		18%	19%	19%	21%
Itinerant Apron Positions		3	3	3	3
Total ADG II Apron Positions	**3**	**3**	**3**	**3**	**4**
Area (5,785 SF per Position)	**45,600**	**16,030**	**17,355**	**17,355**	**23,140**
Helicopter					
% Total Based Aircraft		5%	4%	5%	5%
Based Aircraft Apron Positions		1	1	1	1
% Total Annual Operations		3%	3%	4%	5%
Itinerant Apron Positions		0	0	1	1
Total Helicopter Apron Positions	**1**	**1**	**1**	**2**	**2**
Area (7,225 SF per Position)	**3,600**	**7,225**	**7,225**	**14,450**	**14,450**
Total Recommended Apron Area	**105,550**	**93,399**	**97,298**	**107,030**	**117,830**

Source: J-U-B Analysis
**Average of the two ADG I minimum parking areas listed in Table 4.11.*

4.6.3 GA TERMINAL FACILITIES

GA terminal buildings provide facilities to pilots, passengers, and airport staff and are commonly hubs of activity at an airport. At Ontario Municipal Airport, the GA terminal is owned and maintained by the FBO. The facility includes space for flight planning, airport management, and storage. Additional facilities include a meeting room and two restrooms.

The FAA does not have dimensional standards for GA terminal facilities or a method to determine adequate facility sizing based on peak day traffic. However, FAA AC 150/5360-13B does recommend the facility planning guidance published by the National Academy of Sciences in the *Airport Cooperative Research Program Report 113: Guidebook on General Facility Planning* (Guidebook). According to these guidelines, a factor of 2.5 people per peak-hour operation is assumed. The Airport should have approximately 125 square feet of GA terminal facility per person to accommodate peak-hour traffic. **Table 4.15** outlines the GA terminal facility space recommendations at Ontario Municipal Airport.

TABLE 4.15
GA TERMINAL FACILITY AREA RECOMMENDATIONS

	Existing	Current Need	Forecasted Need		
	2021		2026	2031	2041
Peak-Hour Operations	9		10	10	11
People per Operation		2.5	2.5	2.5	2.5
Recommended GA Terminal Facility Area (125 SF per Person)	**1,984**	**2,813**	**3,125**	**3,125**	**3,438**

Source: National Academies of Sciences, Engineering, and Medicine Guidebook on General Aviation Facility Planning (2014) and J-U-B

4.6.4 FUEL STORAGE

The fuel storage and delivery system are owned by the FBO at Ontario Municipal Airport. The fuel facilities are located east of Silverhawk Aviation Academy hangars. Storage tanks adjacent to the hangar feed into a single fuel island, approximately 30 feet to the south, with a self-serve fuel control system and credit card reader. Silverhawk Aviation Academy, the FBO, manages fuel sales at Ontario Municipal Airport and owns a 2,000-gallon AvGas fuel truck and a 4,000-gallon Jet A fuel truck to service Airport users.

The current location of the fueling system limits the number and size of aircraft that can access the pump. It is recommended that the fuel island and storage tanks be relocated to provide more convenient access to aircraft and fuel delivery trucks. If the fueling facility is moved, the Airport should take into consideration fuel capacity, above or below grade storage options, tank locations, and alternative piping and pumping systems.

4.6.5 PERIMETER FENCING

The Air Operations Area (AOA) encompasses the parts of a GA airport that are intended to facilitate aeronautical operations. This typically includes the area within the perimeter fence. While there are no Transportation Security Administration standards or requirements for GA security, fencing the AOA can deter unauthorized airport access and limit or impede

individuals or vehicles from inadvertently entering the airfield.

Ontario Municipal Airport should have a minimum 4-foot-high chain link fence around the perimeter of the AOA boundary to meet the basic fencing guidelines for a local GA airport in an urban cluster. The perimeter fencing at the Airport is comprised of a 6-foot wire mesh fence and 6-foot security fencing topped by 3 strands of barbed wire. While the Airport exceeds the FAA's recommended 4-foot fence minimum, the residential properties adjacent to the east side of the Airport property, proximity of SW 4th Avenue to the Runway 15 End, and access along State Highway 201 could pose a unique risk to airport safety and may warrant additional security measures.

Existing barbed wire perimeter fencing should be maintained north of the Runway 15 End and around the east side hangars. The perimeter fence along the east edge of the property should be updated to a 6-foot fence topped by barbed wire to provide a safety barrier between Runway 15/33 and neighboring residential properties.

4.6.6 AIRPORT UTILITIES AND INFRASTRUCTURE

Ontario Municipal Airport has access to basic utilities, although not all are developed for use on the airfield. Power to the Airport is provided by Idaho Power and can be expanded as needed. A domestic well on the Airport property supplies potable water to those facilities not connected to the City water main line running along the western edge of the existing hangar area. Additional water lines are planned along the northern and southern edges of the developed hangar area.

Individual, on-site septic systems are currently used for some wastewater disposal on the Airport. Municipal sewer system connections are currently limited to the FBO, Life Flight, and BLM facilities. A sewer line extension is planned along the northern edge of the existing hangar area.

Ontario Municipal Airport should look for opportunities to improve utility availability whenever possible. Enhanced utilities are an important factor to businesses and large hangar developers when deciding on relocating to an airport, making these extensions especially important to the development of the west side of the Airport.

4.6.7 AIRPORT ACCESS AND CIRCULATION

Ontario Municipal Airport is located approximately 2 miles west of the City of Ontario's central business district. The Airport has a single access point from State Highway 201, which borders the eastern edge of the existing hangar area. SW 4th Avenue cuts through the northern portion of the property and provides an additional two access points. The main entry to the Airport is one of these two access points and is located between the fire station and Life Flight hangar. The main entrance provides access to the FBO facilities, GA terminal building, Life Flight hangar, and fire station. The remaining two gated entry points provide direct access to the east side hangar area.

Any reconfiguration of vehicle access at the Airport should maintain or improve connectivity while reducing the risk of vehicle/aircraft and vehicle accidents. The Airport should plan for additional entry points that will improve access for existing users and serve to attract and accommodate future economic development on the west side of the property.

Enhancements to the main entrance are recommended to improve the Airport's public

interface, economic appeal, and business potential. Considering different areas to relocate the GA terminal building is one such improvement that, if combined with a restaurant and observation deck, could cultivate new interest in the Airport from members of the non-flying public, itinerant traffic, and local airport users.

4.6.8 VEHICLE PARKING

The GA terminal building parking lot is approximately 7,536 square feet with 18 designated vehicle parking spaces. Life Flight and BLM also have designated vehicle parking positions located near their respective facilities.

The vehicle parking need analysis referenced the facility planning guidance published by the National Academy of Sciences in the *Airport Cooperative Research Program Report 113: Guidebook on General Facility Planning* (Guidebook). According to these guidelines, a single parking space measures 200 square feet. A safety buffer of five feet on the outer edges of a parking lot and 25 feet between rows of parking spaces for a driving lane are also assumed. From these assumptions, a reasonable 350 square feet per parking space was applied to the vehicle parking forecast.

The GA terminal building vehicle parking demand forecast assumed the following:

- 2.5 parking spaces per peak hour operation
- 1 parking space per 200 square feet of GA terminal building office space
- 1 parking space for 50% of based aircraft tiedown positions

The current designated office space in the GA terminal building is approximately 1,190 square feet, which compares to 60 percent of the building's total 1,984 square feet. To show a growth in office space need and related vehicle parking, the 60 percent was applied to the GA terminal facility area recommendations provided in **Table 4.15**.

A summary of the minimum vehicle parking accommodations recommended at Ontario Municipal Airport are summarized in **Table 4.16**.

TABLE 4.16
GA TERMINAL VEHICLE PARKING AREA RECOMMENDATIONS

	Existing	Current Need	Forecasted Need		
	2021		2026	2031	2041
Peak-Hour Operations	9		10	10	11
Parking Spaces (2.5 per Operation)		23	25	25	28
GA Terminal Building Office Space (SF)	1,190	1,688	1,875	1,875	2,063
Parking Spaces (1 per 200 SF)		8	9	9	10
Based Aircraft Tiedown Positions	40	32	33	35	38
Parking Spaces (50% Tiedown Positions)		16	17	18	19
Recommended GA Terminal Facility Vehicle Parking Spaces	18	47	51	52	57
Recommended GA Terminal Facility Vehicle Parking Area (350 SF per Space)	**7,536**	**16,450**	**17,850**	**18,200**	**19,950**

Source: National Academies of Sciences, Engineering, and Medicine Guidebook on General Aviation Facility Planning (2014) and J-U-B

4.7 ADDITIONAL RECOMMENDATIONS

It is important for an airport master plan to consider additional infrastructure needs based on unique airport circumstances and potentially impactful trends emerging in aviation. This section considers the advantageous location of Ontario Municipal Airport and the potential impact of electric vehicle innovations on airport facilities.

4.7.1 BUSINESS DEVELOPMENT POTENTIAL

As discussed in prior chapters, the Airport Sponsor is committed to growing the aviation and non-aviation commercial opportunities on and near the Ontario Municipal Airport. The western portion of the Airport is one such area identified by the City to accommodate this future growth. While current operations may not justify immediate development, it is advantageous of the Airport to put in place a plan for airside and landside facilities that supports future commercial development west of Runway 15/33.

The Airport's location also provides an opportunity to draw business from the City of Ontario. A restaurant with an observation deck is one such opportunity suggested by the Technical Advisory Committee (TAC) that would attract both non-airport user and pilot traffic.

4.7.2 ELECTRIC VERTICAL TAKE-OFF AND LANDING (EVTOL) FACILITIES

The aviation industry is always evolving and new aviation trends emerging that may influence airport capacity and facility needs. One that is likely to impact airport planning in the years to come is the introduction of Advanced Air Mobility (AAM) into the nation's airspace.

The electric vertical take-off and landing (eVTOL) aircraft are expected to play an important role in AAM as a new type of lightweight electrical aircraft. Chapter 3 contains a more in-depth analysis of emerging eVTOL trends and the associated infrastructure needed to support the operation of these aircraft.

The FAA is in the process of adapting existing aviation regulations to prepare aircraft, airspace, operations, infrastructure, and communities to accommodate this new technology. A vertiport standard did not exist at the time of this planning effort; however, the FAA has issued draft interim guidance in Engineering Brief No. 105, *Vertiport Design* to support the design and operation of facilities planned for initial eVTOL operations.

The AAM industry is making rapid strides and the Airport is recommended to stay abreast of related developments. Facility configurations should consider the potential for infrastructure development that could accommodate eVTOL aircraft.

4.7.3 ELECTRICAL INFRASTRUCTURE AND CHARGING PORT FACILITIES

The recent rise in electric transportation trends is expected to significantly impact electric utility planning and grid operations. It is likely during the 20-year planning period that Ontario Municipal Airport will see an increased demand for electric car ports and aircraft charging options.

Appropriate charging infrastructure will be crucial to support the emerging electrification of aircraft and arrival of eVTOLs onto the aviation market. These are young industries and details on how aircraft will be electrified, charging standard requirements, and grid infrastructure needs are still emerging. Any opportunity to improve or expand utilities at Ontario Municipal Airport should also consider facilities that support electric aircraft recharging capabilities.

The demand for electric car ports will likely develop sooner than those for aircraft and should be considered during any improvement or expansion of Airport parking areas. Various charging options exist for cars, but the most common ports are capable of power outputs ranging between 6 and 350 kilowatts.

4.8 SUMMARY

This chapter has outlined both the airside and landside facility requirements for Ontario Municipal Airport over the 20-year planning period. The resulting recommendations are listed in **Table 4.17**.

TABLE 4.17
AIRSIDE AND LANDSIDE FACILITY REQUIREMENT RECOMMENDATIONS

	Existing	Current Need	Forecast		
	2021		2026	2031	2041
Hangar Aircraft Storage					
Based Aircraft	89		92	96	105
Hangar Units					
T-Hangars	26	29	29	29	31
Box Hangars	41	46	49	51	57
Corporate Hangars	4	5	5	6	7
Hangar Area (SF)					
T-Hangars	29,313	32,470	32,673	33,119	35,159
Box Hangars	61,897	74,501	78,438	81,848	91,039
Corporate Hangars	31,351	37,621	38,938	47,403	51,847
Total Hangar Area	122,542	144,592	150,049	162,370	178,044
Aircraft Parking Positions					
ADG I Parking Positions					
Based Aircraft	36	17	17	18	19
Itinerant Aircraft		11	12	12	13
ADG II Parking Positions					
Based Aircraft	3	0	0	0	1
Itinerant Aircraft		3	3	3	3
Helicopter Parking Positions					
Based Aircraft	1	1	1	1	1
Itinerant Aircraft		1	1	2	2
Aircraft Parking Apron (SF)					
ADG I Aircraft Apron Area	56,350	70,144	72,718	75,225	80,240
ADG II Aircraft Apron Area	45,600	16,030	17,355	17,335	23,140
Helicopter Apron Area	3,600	7,225	7,225	14,450	14,450
Total Apron Area	105,550	93,399	97,298	107,030	117,830
Support Facilities					
GA Terminal Building					
Area (SF)	1,984	2,813	3,125	3,125	3,438
Auto Parking					
Vehicle Parking Spaces	18	47	51	52	57
Vehicle Parking Area (SF)	7,536	16,450	17,850	18,200	19,950

Source: J-U-B Analysis