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## Chapter 2: Alternatives

This chapter evaluates a range of alternatives and compares them based on their ability to meet the Purpose and Need. The alternatives have been identified to determine the alternative that would best provide the facilities necessary to give adequate wind coverage for all aircraft that use the Airport on a regular basis, to satisfy near-term user needs, and to meet FAA airport design standards. This chapter includes an evaluation of a no-action alternative and three build alternatives.

### 2.1 No-Action Alternative

The No-Action Alternative represents what would occur if the airport sponsor were to maintain and make no changes to the existing airfield configuration. Runway 10/28 would remain the only runway at the Airport and no property acquisition would be necessary. This alternative would not meet the Purpose and Need because it does not provide at least 95 wind coverage for all aircraft that regularly use the Airport. However, as NEPA requires, the No-Action Alternative is carried forward in the EA as a baseline for comparison with the other alternatives.

#### 2.1.1 Provide Adequate Crosswind Coverage

This alternative does not provide at least 95 percent wind coverage for all aircraft that regularly use the Airport.

#### 2.1.2 Meet FAA Airport Design Standards

This objective does not apply to the No-Action Alternative, as it does not provide a turf crosswind runway at the Airport.

#### 2.1.3 Provide Adequate Runway Length

This objective does not apply to the No-Action Alternative, as it does not provide a turf crosswind runway at the Airport.

#### 2.1.4 Minimize Incompatible Land Use

This objective does not apply to the No-Action Alternative, as it does not provide a turf crosswind runway at the Airport.

### 2.2 Build Alternatives

This section presents and evaluates three alternatives for building a new turf crosswind runway at the Airport. These alternatives were developed based on their ability to maximize runway length and maintain runway protection zones (RPZs) entirely within the ultimate Airport property boundary. Construction of each alternative would require on-site grading and equipment staging; however, it is not expected that these activities would materially differ in terms of environmental impact. The alternatives include:

- Build Alternative 1: Turf Crosswind Runway 2/20
- Build Alternative 2: Turf Crosswind Runway 16/34
- Build Alternative 3: Turf Crosswind Runway 6/24

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Project components for all the Build Alternatives would include borrow sites, a staging area, and a haul route connecting the staging area to the main access roads near the terminal and hangar area on the east side of the Airport. Other specific project components include:

- Earthwork – on-site excavation to meet grading standards and placement of on-site borrow,
- Asphalt bituminous pavement for the primary Runway intersection,
- Aggregate base course for the primary Runway intersection,
- Storm pipe installation,
- Existing electrical modifications; specifically the removal of primary runway edge lighting where the crosswind runway intersects the primary runway,
- Installing crosswind Runway hold position signs, specifically adding two lighted signs and two unlighted signs for the crosswind runway and primary runway intersection,
- Topsoil,
- Seeding and mulching, and
- Land acquisition of approximately 17 acres.

Tree clearing, underground electric/utilities, and additional lighting are not required for the Build Alternatives. Construction is anticipated to start in May 2024.

### **2.2.1 Build Alternative 1: Turf Crosswind Runway 2/20**

This alternative would add a turf crosswind runway in a 2/20 orientation running southwest to northeast and crossing Runway 10/28 near the Runway 10 end. The new runway would be 1,185 feet long and 120 feet wide, with most of the runway north of Runway 10/28. Build Alternative 1 is shown in **Figure 2-1**.

#### *2.2.1.1 Provide Adequate Crosswind Coverage*

This alternative would improve the Airport's 10.5-knot wind coverage in visual meteorological conditions (VMC) from 88.96 percent to 95.33 percent, an improvement of 6.37 percent.

#### *2.2.1.2 Meet FAA Airport Design Standards*

This turf crosswind runway alternative meets all applicable FAA airport design standards. Runway 10/28 also serves as a taxiway under this alternative and therefore this alternative creates a new runway/taxiway intersection. FAA Advisory Circular (AC) 150/5300-13B, *Airport Design*, Section 4.8.1, recommends that a taxiway intersect a runway at a right angle, but allows a deviation of up to 15 degrees when a 90-degree angle is not practicable, allowing for a runway/taxiway intersection with a 75-degree angle at its most acute. This turf crosswind runway alternative intersects Runway 10/28 at a 77-degree angle at its most acute, which is within the permitted 15-degree deviation from a right angle.

#### *2.2.1.3 Provide Adequate Runway Length*

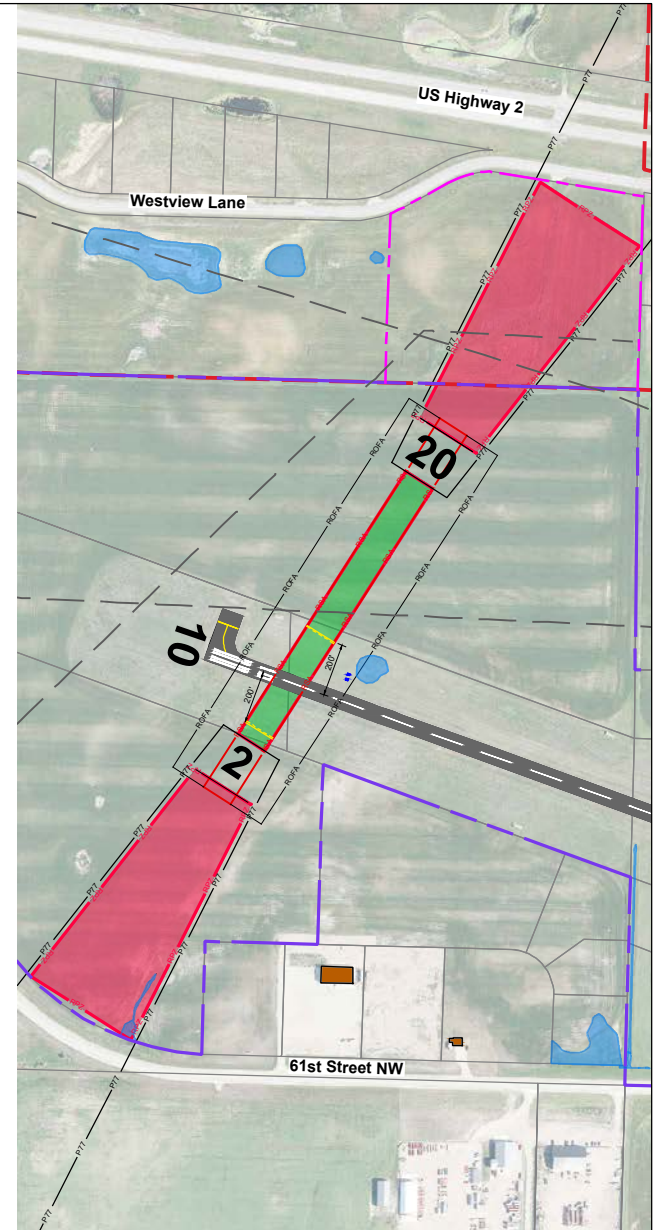
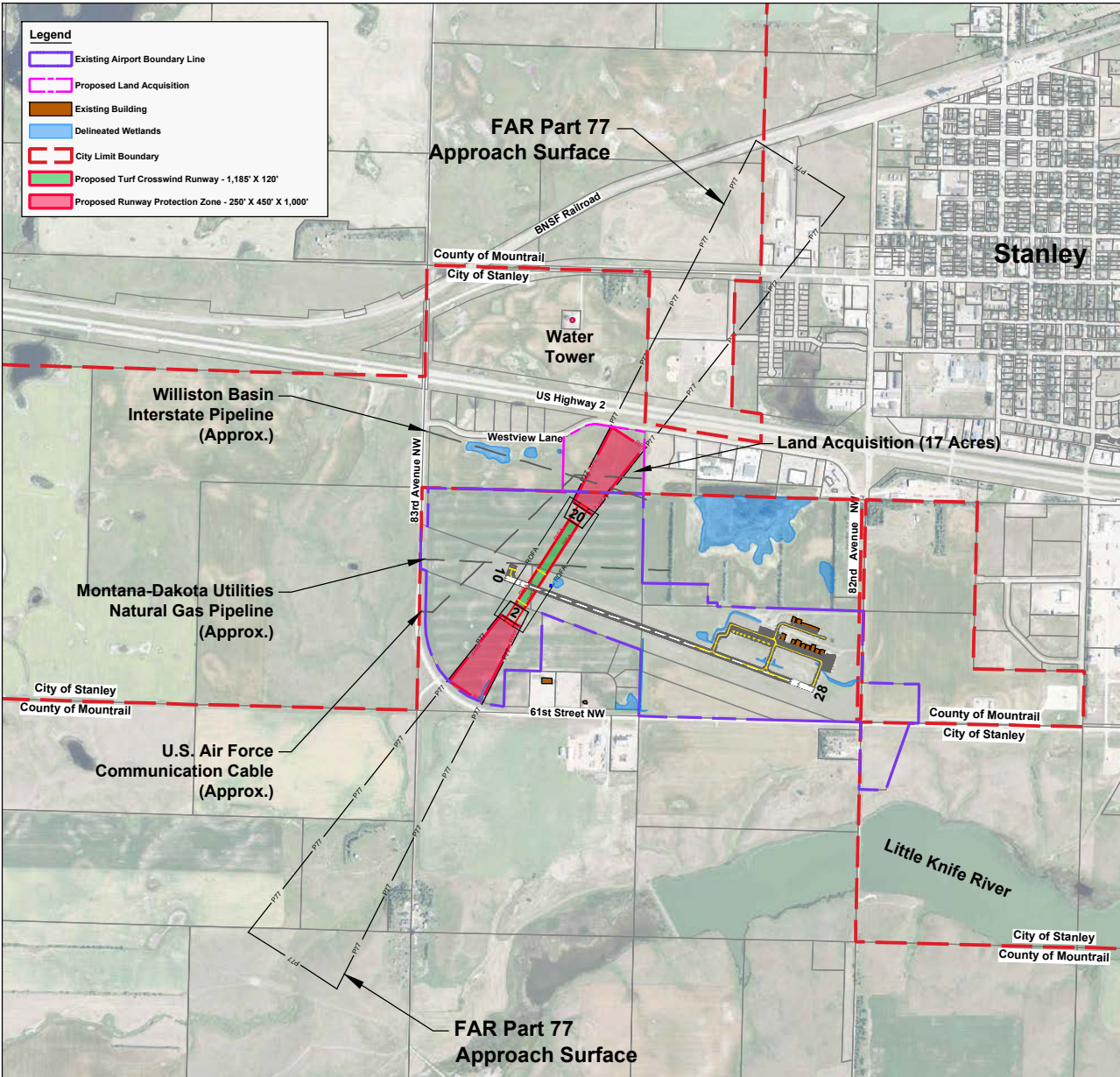
At 1,185 feet, the proposed runway would meet the manufacturer's published runway length needs for the less crosswind capable aircraft expected to regularly use the runway.

#### *2.2.1.4 Minimize Incompatible Land Use*

The Airport currently owns the land that this turf crosswind runway alternative would be built upon, as well land over which the Runway 2 RPZ would sit. To meet RPZ land use control requirements, the Airport would need to acquire approximately 17 acres of land over which part of the Runway 20 RPZ would sit.

Landing aircraft generally approach and depart a runway along its extended centerline. This dictates where aircraft fly on approach and departure, which may be above noise-sensitive land uses (such as residential) and obstacles in the runway approach and departure paths. This alternative does not affect any noise-sensitive land uses, nor does it have any obstacles in its approach and departure paths.

There are three underground utility lines that run beneath the Airport: a Montana-Dakota Utilities (MDU) natural gas pipeline, a Williston Basin Interstate (WBI) natural gas pipeline, and a U.S. Air Force (USAF) missile communication cable (MCC). All three of these underground utility lines are north of Runway 10/28. The MDU pipeline runs east-west, the WBI pipeline runs southeast-northwest, and the USAF MCC runs northeast-southwest. This turf crosswind runway alternative crosses the MDU pipeline, while the Runway 20 RPZ overlays the USAF MCC and WBI pipeline.



STANLEY MUNICIPAL AIRPORT  
 STANLEY, ND

4545300-230576.01  
 01/9/2024

BUILD ALTERNATIVE 1: TURF CROSSWIND RUNWAY 2/20



FIGURE 2-1

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## **2.2.2 Build Alternative 2: Turf Crosswind Runway 16/34**

This alternative would add a turf crosswind runway in a 16/34 orientation running northwest to southeast and crossing Runway 10/28 near the Runway 10 end. The new runway would be 1,580 feet long and 120 feet wide, with most of the runway north of Runway 10/28. Build Alternative 2 is shown in **Figure 2-2**.

### *2.2.2.1 Provide Adequate Crosswind Coverage*

This alternative would improve the Airport's 10.5-knot VMC wind coverage from 88.96 percent to 97.65 percent, an improvement of 8.69 percent.

### *2.2.2.2 Meet FAA Airport Design Standards*

This turf crosswind runway alternative does not meet all applicable FAA airport design standards, as it intersects Runway 10/28 at a 59-degree angle at its most acute, which is outside the permitted 15-degree deviation from a right angle.

### *2.2.2.3 Provide Adequate Runway Length*

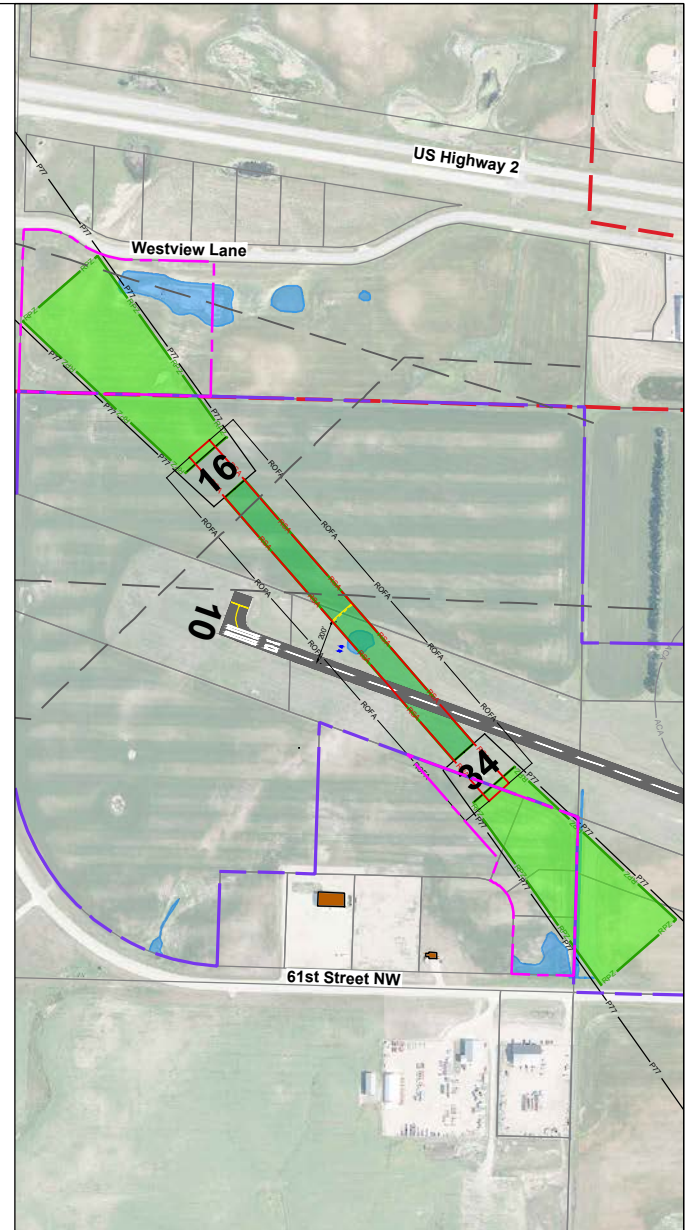
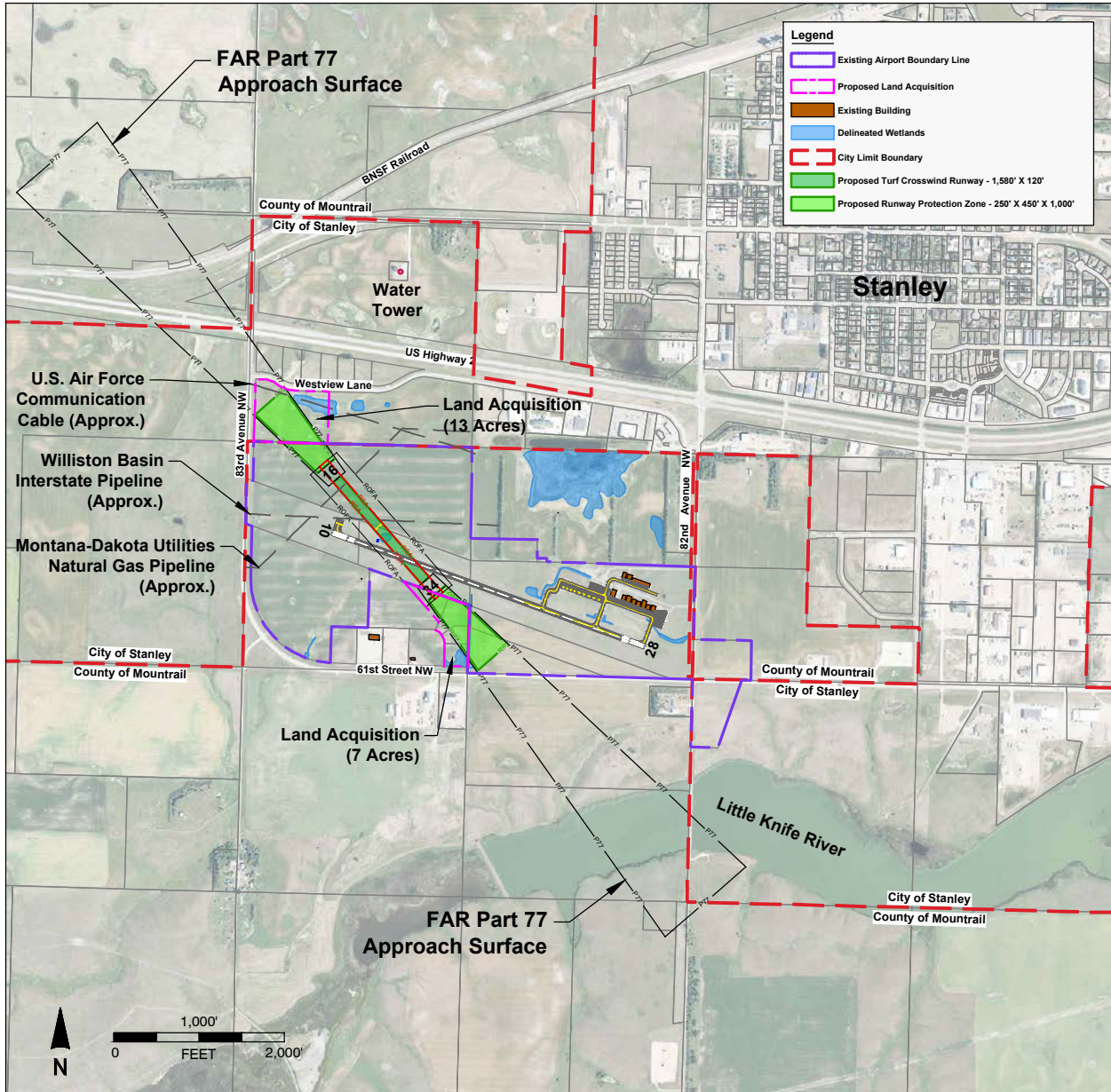
At 1,580 feet, the proposed runway would meet the manufacturer's published runway length needs for the less crosswind capable aircraft expected to regularly use the runway.

### *2.2.2.4 Minimize Incompatible Land Use*

The Airport currently owns the land that this turf crosswind runway alternative would be built upon. To meet RPZ land use control requirements, the Airport would need to acquire approximately 13 acres of land over which part of the Runway 16 RPZ would sit and approximately 7 acres of land over which the Runway 34 RPZ would sit.

This alternative does not affect any noise-sensitive land uses, nor does it have any obstacles in its approach and departure paths.

This turf crosswind runway alternative crosses the USAF MCC and the MDU pipeline, while the Runway 16 RPZ overlays the WBI pipeline.



**STANLEY MUNICIPAL AIRPORT  
 STANLEY, ND**

4545300-230576.01  
 1/9/2024

**BUILD ALTERNATIVE 2: TURF CROSSWIND RUNWAY 16/34**



**FIGURE 2-2**

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### **2.2.3 Build Alternative 3: Turf Crosswind Runway 6/24**

This alternative would add a turf crosswind runway in a 6/24 orientation running west by southwest to east by northeast and crossing Runway 10/28 near the Runway 10 end. The new runway would be 2,325 feet long and 120 feet wide, with most of the runway northeast of Runway 10/28. Build Alternative 3 is shown in **Figure 2-3**.

#### *2.2.3.1 Provide Adequate Crosswind Coverage*

This alternative would improve the Airport's 10.5-knot VMC wind coverage from 88.96 percent to 91.83 percent, an improvement of 2.87 percent.

#### *2.2.3.2 Meet FAA Airport Design Standards*

This alternative does not meet all applicable FAA airport design standards, as it intersects Runway 10/28 at a 38-degree angle at its most acute, which is outside the permitted 15-degree deviation from a right angle.

#### *2.2.3.3 Provide Adequate Runway Length*

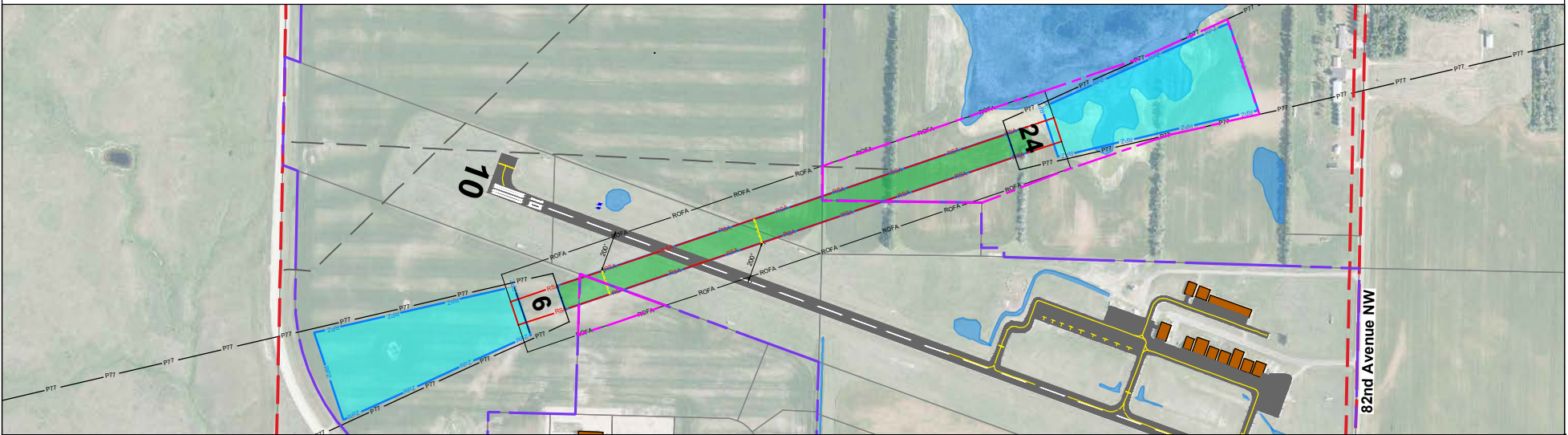
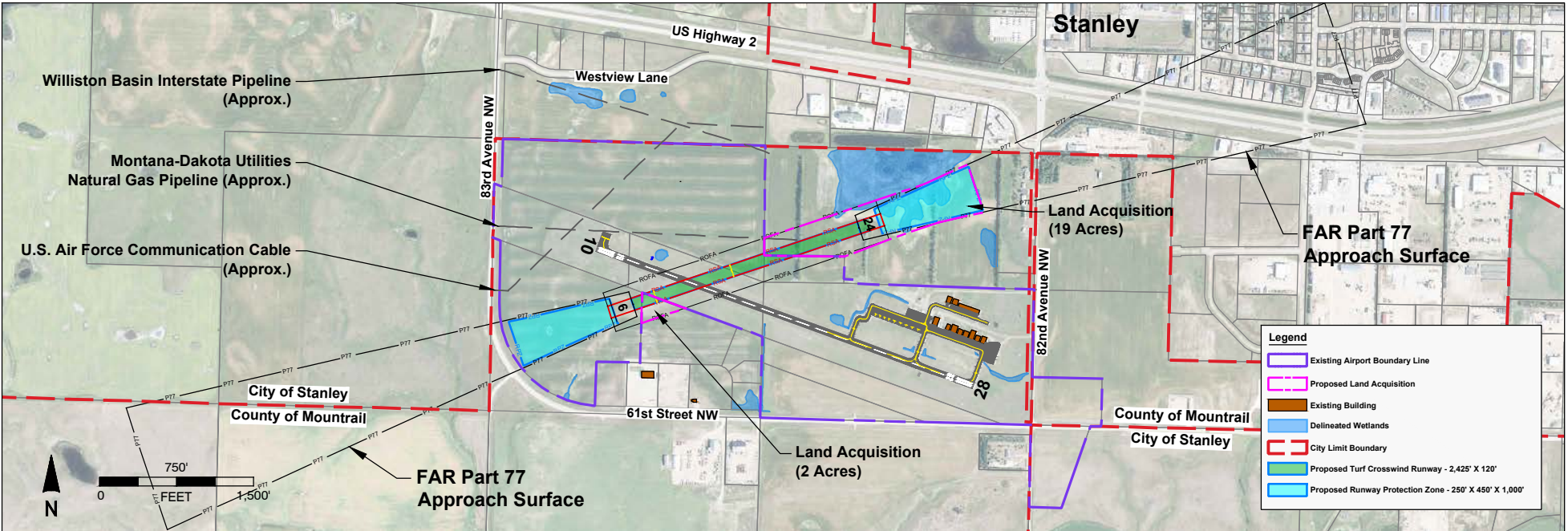
At 2,425 feet, the proposed runway would greatly exceed the manufacturer's published runway length needs for the less crosswind capable aircraft expected to regularly use the runway.

#### *2.2.3.4 Minimize Incompatible Land Use*

The Airport would need to acquire approximately 21 acres of the land that this turf crosswind runway alternative would be built upon and to meet RPZ land use control requirements.

This alternative may affect noise-sensitive land uses within the City of Stanley, as aircraft on approach or departure would fly above residential areas of the city. Although there are currently no obstacles in its runway approach and departure paths, this alternative increases the likelihood of future obstacles due to the location of its approach and departure paths above the city.

This turf crosswind runway alternative crosses the MDU pipeline, while the Runway 24 RPZ overlays the WBI pipeline. This alternative does not affect the USAF MCC.



STANLEY MUNICIPAL AIRPORT  
STANLEY, ND

4545300-230576.01  
1/9/2024

BUILD ALTERNATIVE 3: TURF CROSSWIND RUNWAY 6/24



FIGURE 2-3



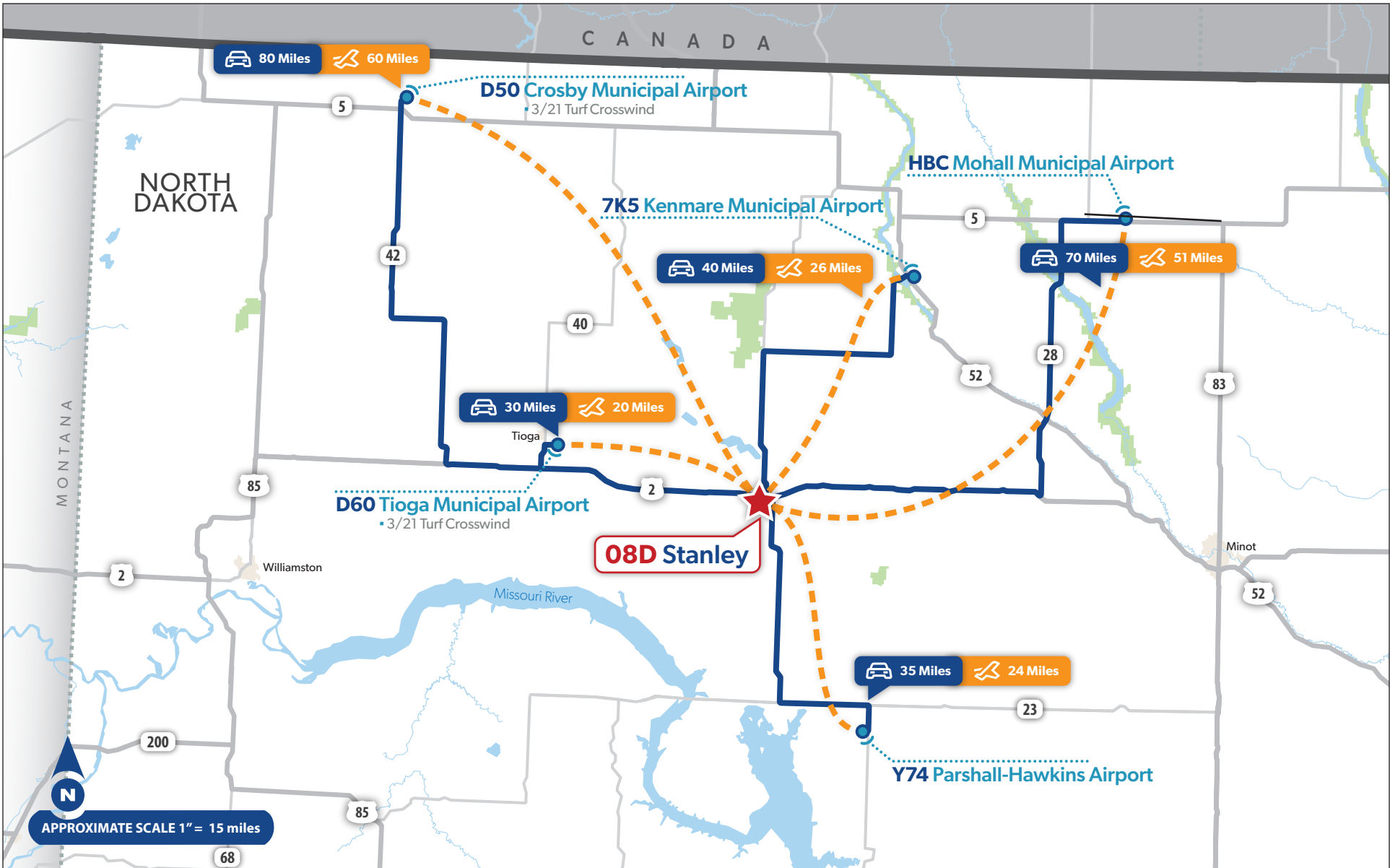
## 2.3 Alternatives Considered but Dismissed

### 2.3.1 Use of Other Airports

This alternative considers use of nearby airports in lieu of 08D for operations by less crosswind capable aircraft during periods of strong crosswinds. Comparable nearby airports are compared in **Table 2-1** and their locations relative to 08D are shown in **Figure 2-4**.

<b>Airport</b>	<b>Identifier</b>	<b>Crosswind Runway</b>	<b>Driving Distance (statute miles)</b>	<b>Flying Distance (nautical miles)</b>
Tioga Municipal Airport	D60	3/21, turf	30	20
Parshall-Hankins Airport	Y74	None	35	24
Kenmare Municipal Airport	7K5	None	40	26
Mohall Municipal Airport	HBC	None	70	51
Crosby Municipal Airport	D50	3/21, turf	80	60

As shown in Table 2-1, there are two comparable airports within 100 statute miles driving distance of 08D that have a turf crosswind runway, Tioga Municipal Airport (D60) and Crosby Municipal Airport (D50). However, FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, states that an airport should be included in the NPIAS if it is more than a 20-mile driving distance, or 30-minute drive time, from the nearest existing or proposed NPIAS airport. As shown in Table 2-1, driving distances to all comparable nearby airports are greater than 20 miles. Based on this metric, Stanley Municipal Airport serves a specific geographic area that cannot be adequately served by another existing airport. For this reason, this alternative was not considered further.



STANLEY MUNICIPAL AIRPORT  
STANLEY, MD

COMPARABLE NEARBY AIRPORTS



FIGURE 2-4

## 2.4 Selection of the Preferred Alternative

**Table 2-2** compares the turf crosswind runway alternatives based on its ability to meet the four objectives of the Purpose and Need.

<b>Alternative</b>	<b>No-Action Alternative</b>	<b>Build Alternative 1</b>	<b>Build Alternative 2</b>	<b>Build Alternative 3</b>
Provides adequate crosswind coverage	No	Yes	Yes	No
Meets FAA airport design standards	NA	Yes	No	No
Provides adequate runway length	NA	Yes	Yes	Yes
Minimizes incompatible land use	NA	Yes	Yes	No
Affected underground utilities	NA	MDU, USAF, WBI	MDU, USAF, WBI	MDU, WBI
Approximate required land acquisition	NA	17 acres	20 acres	21 acres

Build Alternatives 1 and 2 both provide VMC wind coverage greater than 95 percent, while the No-Action Alternative and Build Alternative 3 do not.

Build Alternative 1 meets applicable FAA airport design standards, while Build Alternatives 2 and 3 do not. This objective does not apply to the No-Action Alternative, as it does not provide a turf crosswind runway at the Airport.

All three build alternatives provide adequate runway length for the less crosswind capable aircraft expected to regularly use the runway. This objective does not apply to the No-Action Alternative, as it does not provide a turf crosswind runway at the Airport.

Build Alternatives 1 and 2 both minimize incompatible land uses in the runway approach and departure paths, while Build Alternative 3 does not. This objective does not apply to the No-Action Alternative, as it does not provide a turf crosswind runway at the Airport.

Based on the above, Build Alternative 1 is the only alternative that meets all four objectives of the project Purpose and Need. Therefore, Build Alternative 1 is the Preferred Alternative. Specific project components for the Preferred Alternative (Build Alternative 1) can be found in **Figure 2-5**. The No-Action Alternative and Build Alternatives 2 and 3 do not meet the Purpose and Need and are eliminated from further consideration. However, the No-Action Alternative will be carried into the environmental impact analysis for comparison with the Preferred Alternative.

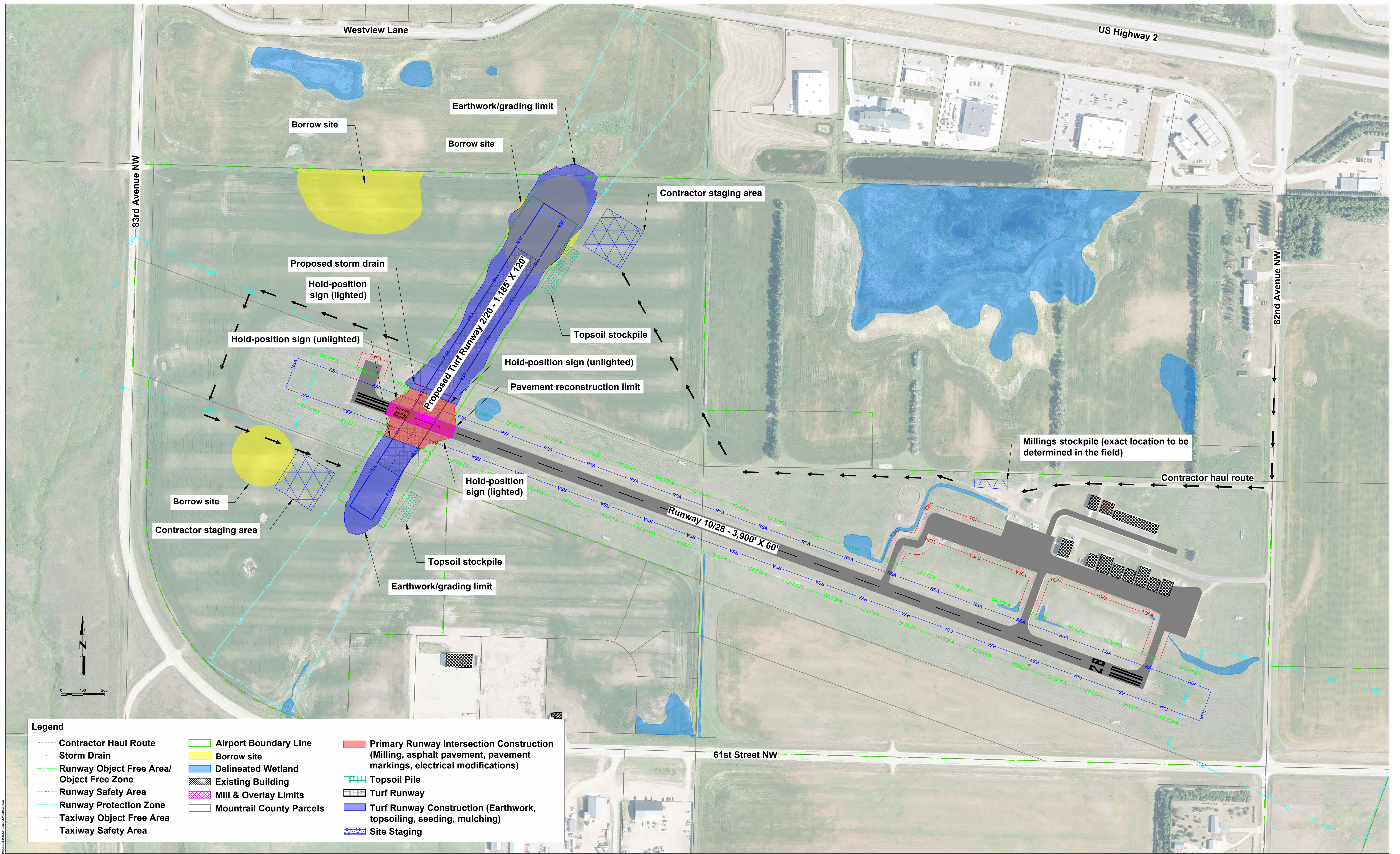


FIGURE 2-5 - PROJECT COMPONENTS