

CHAPTER 5

NATURAL & CULTURAL RESOURCES



NATURAL RESOURCES

Introduction

This chapter inventories the natural and historical features of the City of Dundas, as well as elements of the environment, which could be affected by implementation of the comprehensive plan. Planning for the preservation of these features must also acknowledge and emphasize their role in improving the community, either as tools for improving public health, stimulating local economies, and more. Located along the Cannon River, the City must take special care to preserve the quality and health of this natural amenity.

Topography and Slopes

The area around Dundas has some areas of steep slopes, but topography is generally acceptable for development purposes. The main areas of concern are sections of bluffs along the Cannon River, and to the south-east of Highway 3. Topography in the City is depicted on the Steep Slopes Map on the following page.

A bluff is a slope that rises at least 25 feet above the OHWL, or the toe of the slope to the top of the slope, and the grade averages 18 percent or greater, measured over a horizontal distance of 25 feet; or a natural escarpment or cliff with a slope that rise at least 10 feet above the OHWL, or top of the slope to the top of the slope, with an average slope of 100 percent or greater.

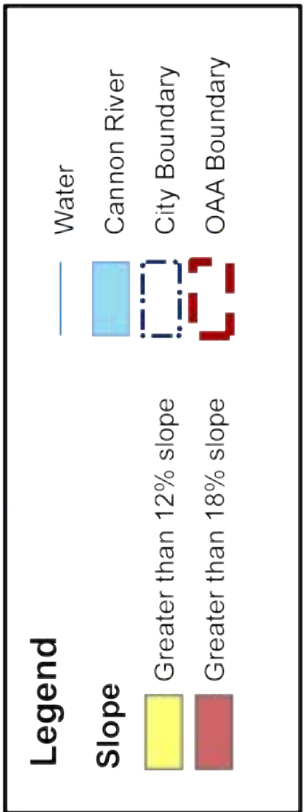
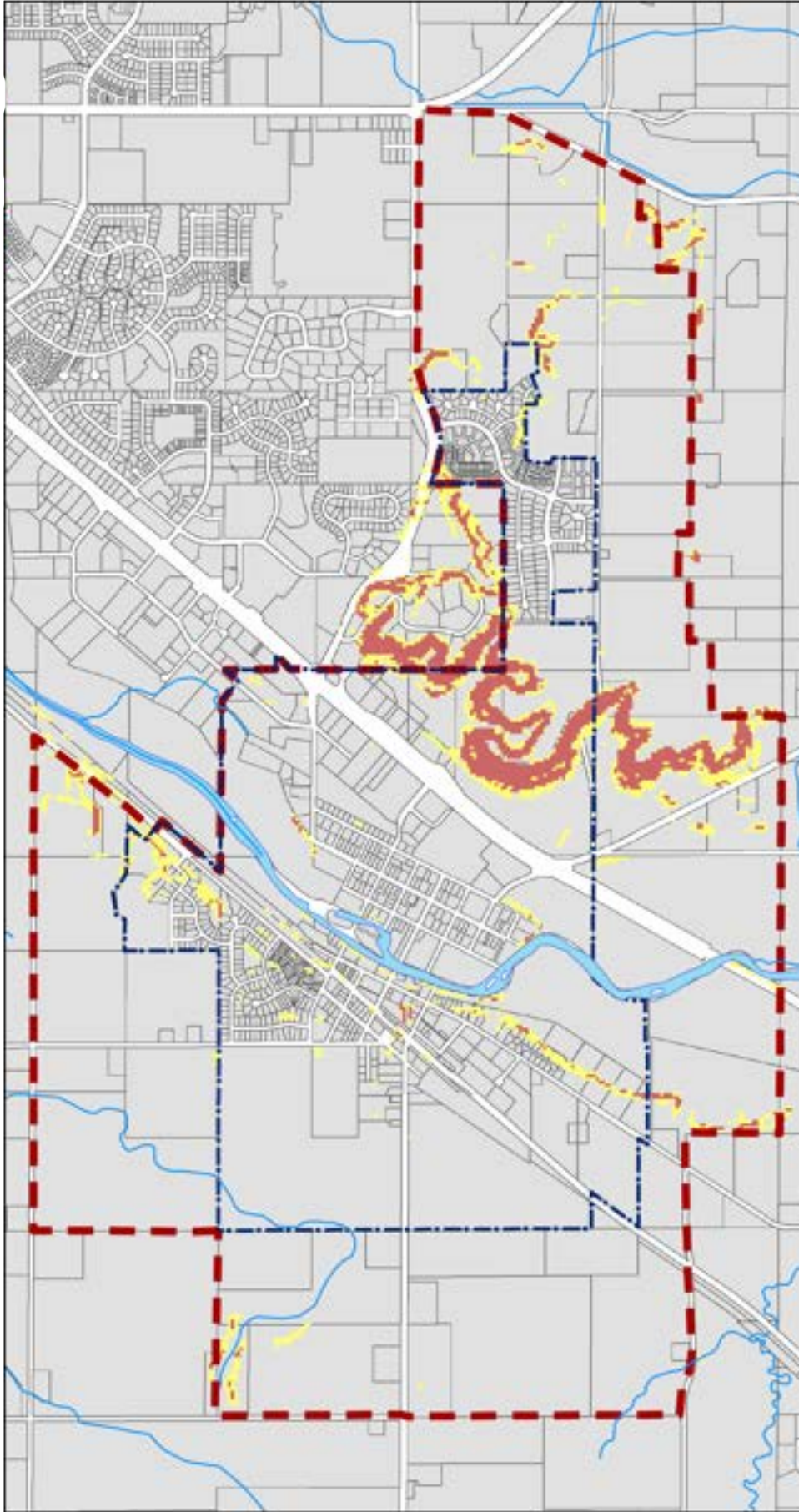
For future development projects around the River, the City shall establish a bluff impact zone, which would prohibit any development besides trails or overlooks within 40 feet of a bluff. This measure would help to prevent unnecessary runoff and impacts to the river itself. The actual bluff and bluff impact area will be verified when individual projects are submitted for review. The determination of the bluff line along the river will be verified by a registered surveyor in connection with development or redevelopment projects.

Land Cover

Dundas is largely developed at this point, but there are still areas of significant open space and other natural areas. In addition, the outskirts of the city are comprised primarily of active agricultural cropland, as can be seen on the following map.

The area with the most significant cluster of natural vegetation can be found to the east of the River and Highway 3, where a significant stock of lowland forest can be found. This wooded area contains native plant species and is considered ecologically significant. Any development which would occur in this area would have to be done so at a low intensity and with respect to native plant species.

Steep Slopes



0 0.25 0.5 1 Miles

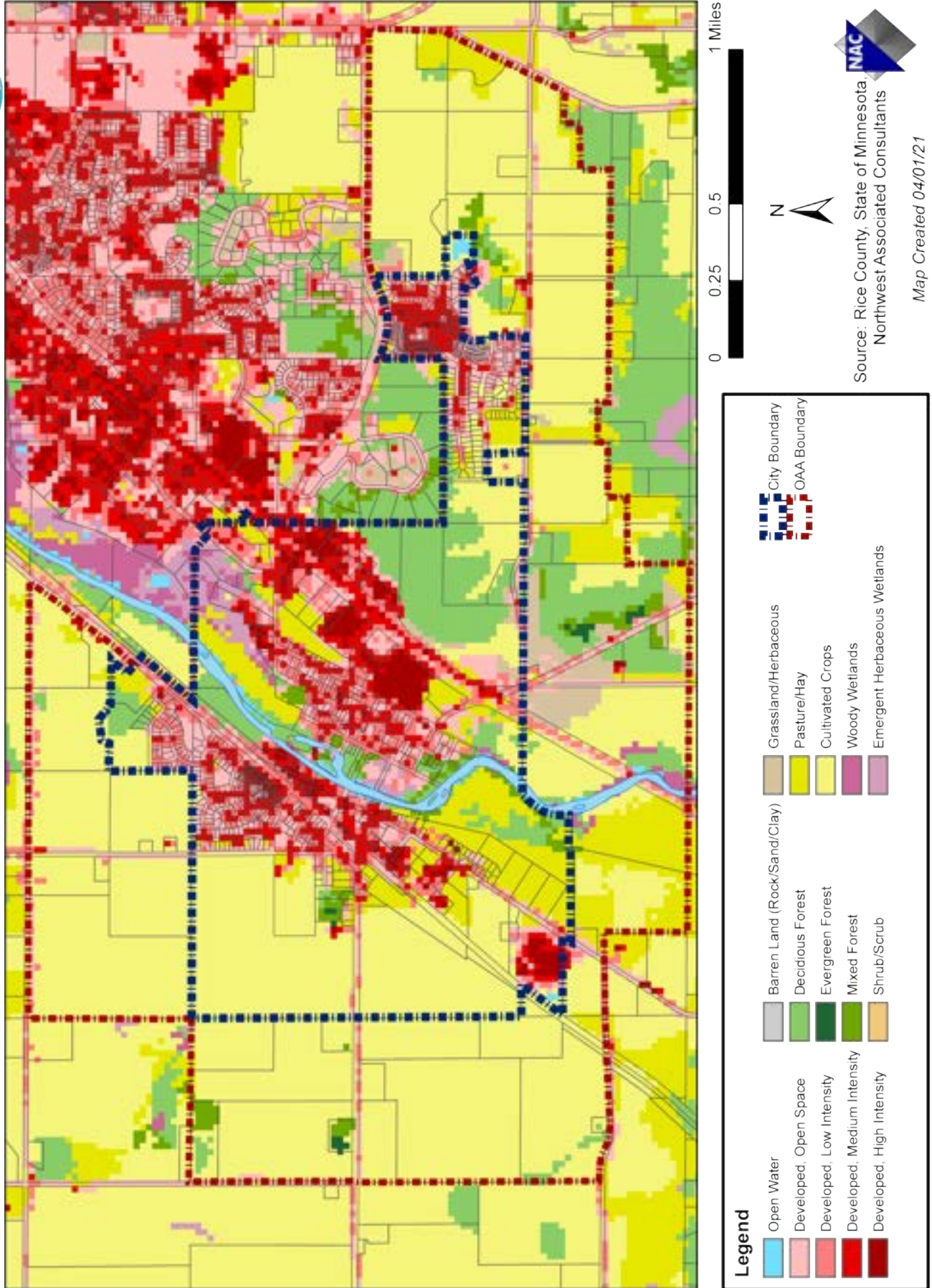


Source: Rice County, State of Minnesota, Northwest Associated Consultants



Map Created 04/01/21

Land Cover Classification



CITY OF DUNDAS

Soil

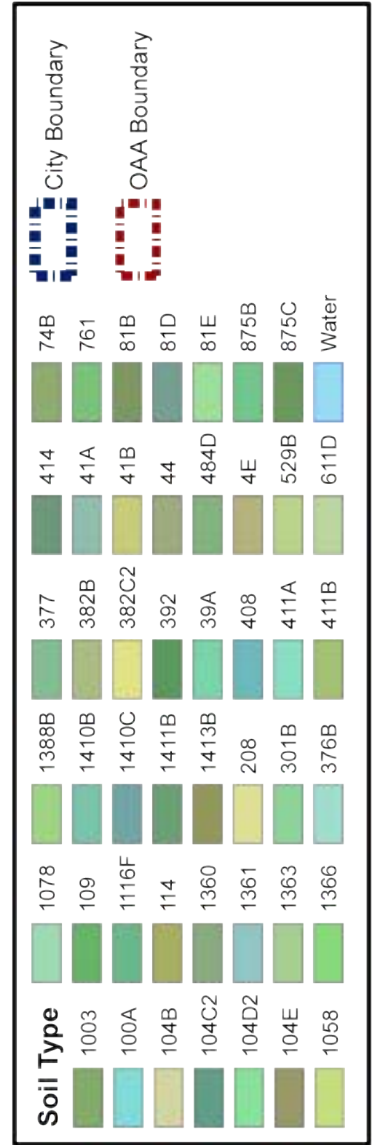
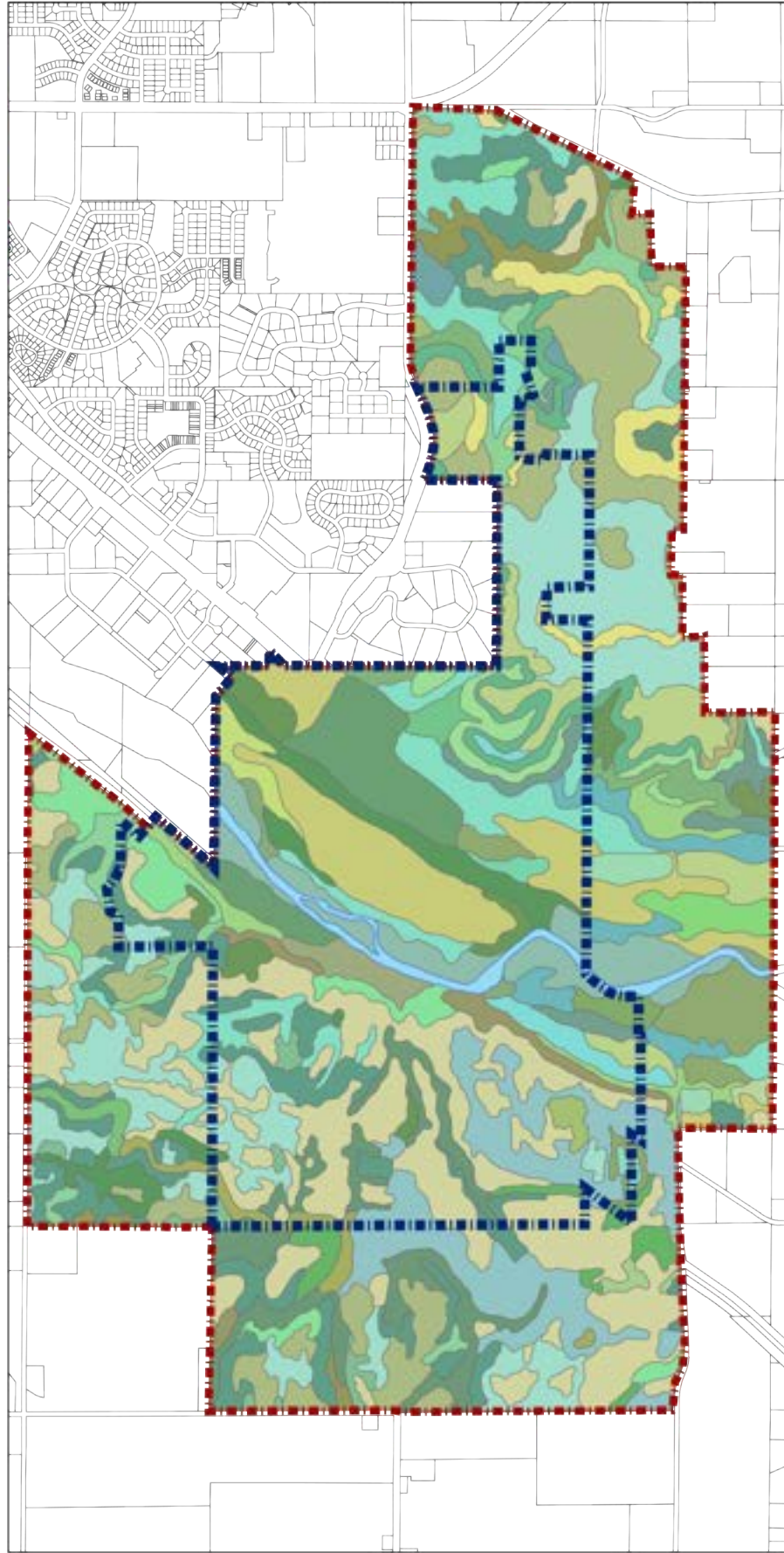
The soil in an area impacts the type of development and extent of development that can occur in the area. Factors such as drainage, frost characteristics, and shrink/swell potential may limit the development of buildings, structures, and septic systems. Dundas is composed of many different soil types that have different development capacity. The table below outlines the different soil types present, whose locations are shown on the Soil Type map.

Soil limitations were determined from analysis conducted by the USDA Soil Conservation Service. A rating system, defined as follows, and shown on the Soil Limitations map, indicated the development potential of certain sites for dwellings with basements. The limitations are slight if soil properties or site features are generally favorable for the indicated use and limitations are minor and easily overcome. Moderate limitations result if the soil properties of a site are not favorable for the proposed use and special planning, design or maintenance is needed to overcome the limitations. Severe limitations defined by unfavorable soil properties or site features are so difficult to overcome that special planning, design and maintenance are required which results in increased construction costs and on-going maintenance. Oftentimes special feasibility studies are necessary to determine if development is possible of soils classified as “severe”.

Soil Name	Shallow Excavations	Dwellings without Basements	Dwellings with Basements	Small Commercial Buildings	Local roads and streets	Lawns and landscaping
4E: Renova	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Slope
39A: Wadena	Severe: Cutbanks Cave	Slight	Slight	Slight	Slight	Moderate: Droughty
41A: Estherville	Severe: Cutbanks Cave	Slight	Slight	Slight	Slight	Moderate: Droughty
41B: Estherville	Severe: Cutbanks Cave	Slight	Slight	Moderate: Slope	Slight	Moderate: Droughty
44: Ankeny	Severe: Cutbanks Cave	Slight	Slight	Slight	Moderate: Frost Action	Slight
74B: Dickinson	Severe: Cutbanks Cave	Slight	Slight	Slight	Moderate: Frost Action	Slight
81B: Boone	Severe: Cutbanks Cave	Slight	Moderate: depth to rock	Slight	Slight	Severe: Too acid, droughty
81D: Boone	Severe: Cutbanks Cave	Moderate: Slope	Moderate: depth to rock, slope	Moderate: Slope	Moderate: Slope	Severe: Too acid, droughty
81E: Boone	Severe: Cutbanks Cave	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Too acid, droughty, slope
100A: Copaston	Severe: Depth to rock	Severe: Depth to rock	Severe: Depth to rock	Severe: Depth to rock	Severe: Depth to rock	Severe: Depth to rock
104B: Hayden	Slight	Moderate: Shrink-swell	Slight	Moderate: Shrink-swell, slope	Severe: Low strength	Slight
104C2: Hayden	Moderate: Slope	Moderate: Shrink-swell, slope	Moderate: Slope	Severe: Slope	Severe: Low strength	Moderate: Slope
104D2: Hayden	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Low strength, slope	Severe: Slope
104E: Hayden	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Low strength, slope	Severe: Slope
109: Cordova	Severe: Wetness	Severe: Wetness	Severe: Wetness	Severe: Wetness	Severe: Low strength, wetness, frost action	Severe: Wetness
114: Glencoe	Severe: Excess humas, ponding	Severe: Ponding, low strength	Severe: Ponding	Severe: Ponding, low strength	Severe: Ponding, low strength, frost action	Severe: Ponding

Soil Name	Shallow Excavations	Dwellings without Basements	Dwellings with Basements	Small Commercial Buildings	Local roads and streets	Lawns and landscaping
208: Kate	Severe: Cutbanks Cave, wetness	Severe: Wetness	Severe: Wetness	Severe: Wetness	Severe: Low strength, frost action	Moderate: Wetness
301B: Lindstrom	Slight	Slight	Slight	Moderate: Slope	Severe: Frost action	Slight
376B: Moland	Slight	Slight	Slight	Slight	Moderate: Frost action	Slight
377: Merton	Severe: Wetness	Moderate: Wetness	Severe: Wetness	Moderate: Wetness	Severe: Frost action	Slight
382B: Blooming	Slight	Moderate: Shrink-swell	Moderate: Shrink-swell	Moderate: Shrink-swell, slope	Moderate: Shrink-swell, low strength	Slight
382C2: Blooming	Moderate: Slope	Moderate: Shrink-swell, slope	Moderate: Slope, shrink-swell	Severe: Slope	Moderate: Shrink-swell, low strength, slope	Moderate: Slope
392: Biscay	Severe: Cutbanks Cave, wetness	Severe: Wetness	Severe: Wetness	Severe: Wetness	Severe: Low strength, wetness	Severe: Wetness
408: Faxon	Severe: Depth to rock, wetness	Severe: Wetness	Severe: Wetness, depth to rock	Severe: Wetness	Severe: Wetness, frost action	Severe: Wetness
411A: Waukegan	Severe: Cutbanks cave	Slight	Slight	Slight	Severe: Low strength	Slight
411B: Waukegan	Severe: Cutbanks cave	Slight	Slight	Moderate: Slope	Severe: Low strength	Slight
414: Hamel	Severe: Wetness	Severe: Wetness	Severe: Wetness	Severe: Wetness	Severe: Low strength, wetness, frost action	Severe: Wetness
484D: Eyota	Severe: Cutbanks cave, slope	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Slope
529B: Ripon	Severe: Depth to rock	Moderate: Shrink-swell, depth to rock	Severe: Depth to rock	Moderate: Shrink-swell, slope, depth to rock	Severe: Low strength, frost action	Moderate: Thin layer, area reclaim
611D: Hawick	Severe: Cutbanks cave, slope	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Slope
761: Epsom	Severe: Ponding	Severe: Flooding, ponding	Severe: Flooding, ponding	Severe: Flooding, ponding	Severe: Low strength, ponding, flooding	Severe: Ponding, flooding
875B: Hawick	Severe: Cutbanks Cave	Slight	Slight	Moderate: Slope	Slight	Moderate: Droughty
875C: Hawick	Severe: Cutbanks Cave	Moderate: Slope	Moderate: Slope	Severe: Slope	Moderate: Slope	Moderate: Droughty, slope
1058: Houghton	Severe: Excess humus, ponding	Severe: Subsides, ponding, low strength	Severe: Subsides, ponding, low strength	Severe: Subsides, ponding, low strength	Severe: Subsides, ponding, frost action	Severe: Ponding, excess humus
1116F: Brodale	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Small stones, droughty, slope
1360: Rushriver	Severe: Cutbanks cave, wetness	Severe: Flooding, wetness	Severe: Flooding, wetness	Severe: Flooding, wetness	Severe: Wetness, flooding, frost action	Severe: Wetness, flooding
1361: Le Sueur	Moderate: Wetness	Moderate: Shrink-swell	Moderate: Wetness, shrink-swell	Moderate: Shrink-swell	Severe: Low strength, frost action	Slight
1363: Dundas	Severe: Wetness	Moderate: Wetness, shrink-swell	Severe: Wetness	Moderate: Wetness, shrink-swell	Severe: Low strength, frost action	Moderate: Wetness
1366: Talcot	Severe: Cutbanks cave, wetness	Severe: Wetness	Severe: Wetness	Severe: Wetness	Severe: Low strength, frost action	Moderate: Wetness
1388B: Terril	Moderate: Wetness	Slight	Moderate: Wetness	Moderate: Slope	Severe: Low strength	Slight
1410B: Racine	Moderate: Dense layer, wetness	Moderate: Shrink-swell	Moderate: Wetness, shrink-swell	Moderate: Shrink-swell, slope	Severe: Low strength	Slight
1410C: Racine	Moderate: Dense layer, wetness, slope	Moderate: Shrink-swell, slope	Moderate: Wetness, slope, shrink-swell	Severe: Slope	Severe: Low strength	Moderate: Slope
1411B Urban Land Hayden/Esterville	Slight/Severe: Cutbanks cave	Slight/Moderate: Wetness	Slight/Severe: Wetness	Moderate: Slope/Moderate: Wetness	Slight/Severe: Low strength, frost action	Moderate: Droughty/Moderate: Wetness
1413B: Littleton	Severe: Wetness	Moderate: Wetness	Severe: Wetness	Moderate: Wetness	Severe: Low strength, frost action	Moderate: Wetness

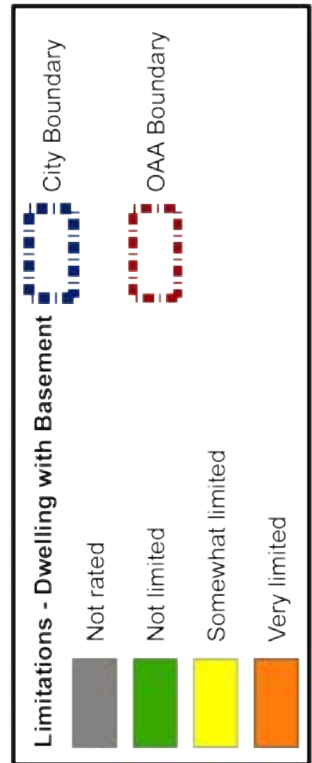
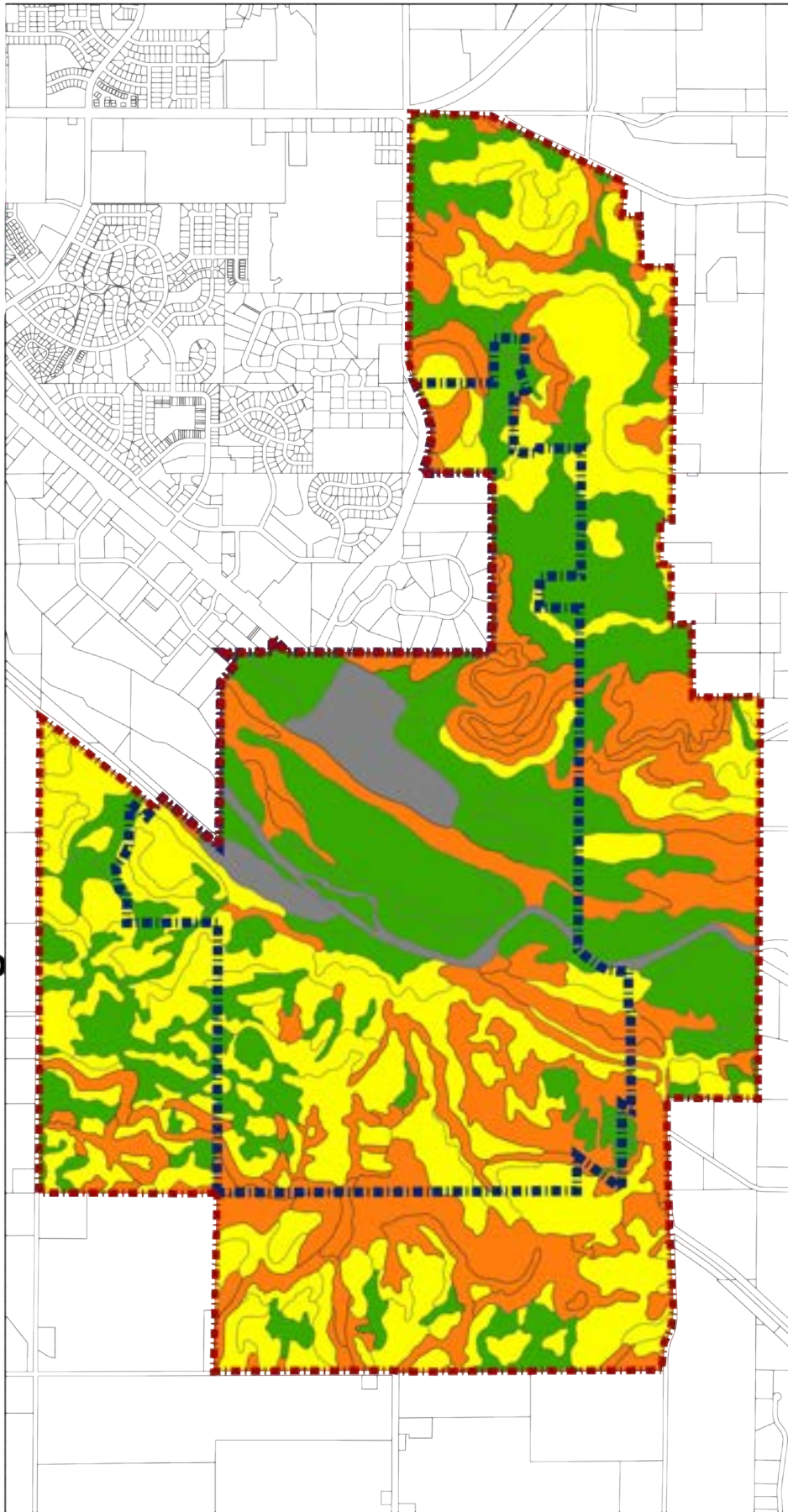
Soil Classification



Source: Rice County, MNDOT,
Northwest Associated Consultants

Map Created 04/01/21

Soil Limitation - Dwellings With Basements



Source: Rice County, MNDOT,
Northwest Associated Consultants
Map Created 04/01/21

CITY OF DUNDAS

Areas of Dundas contain soils that present severe limitations for urban development, due to high water tables, flooding potential, and poor drainage qualities. Past development in areas of poor soils have resulted in wet basements, poorly drained yards, and sewer system backups. Any development in areas exhibiting poor soils will require extensive soil corrections or construction techniques that mitigate the soil issues and provide a safe building.

For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. Dwellings are single-family houses of three stories or less. The map on the next page, Soil Limitations - Dwellings with Basements, show what soils are limited or not limited to soil corrections before development.

The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The soil properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), compressibility, slope, depth to bedrock or a cemented pan, and the amount and size of rock fragments.

The ratings on the map are categorized as not limited, somewhat limited and very limited. “Not limited” indicates that the soil has properties that are very favorable for the specified use, which is dwellings with basements in this case. Good performance and very low maintenance can be expected. “Somewhat limited” indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. “Very limited” indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected. The data on the map is from the United States Department of Agriculture’s Web Soil Survey. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Bedrock

Dundas has several different bedrock formations within the City, with the primary groups being the Prairie du Chien Group and the Decorah, Platteville, Glenwood, St. Peter Group. These groups date back to the Ordovician subdivision of the Paleozoic Era, the first being primarily sandstone, and the former shale.

Although these bedrocks exist at varying depths, almost the entirety of the City has a depth of less than 50 feet to bedrock, and along the river, there is areas of completely exposed bedrock in the form of rocky bluffs. Bedrock close to the surface has important implications on development possibilities. For example, it can significantly raise the cost of developing a residential building with a basement or sub-level. The Bedrock Map shows points of bedrock from various County Well Index (CWI) points throughout the City.

Floodplains

As a river community, it is mindful to be aware of the floodplain areas existing within the city. The floodplain is divided into 100-year and 500-year. A 100-year floodplain is an area where the probability of flooding is at least one percent a year. This floodplain includes the river channel and portions of the adjacent floodplain where a 100-year flood could occur. The 500-year floodplain is also vulnerable to flooding but is at a significantly lower risk. Typically, fill is permitted in a 500-year floodplain. In Dundas, most of the floodplain risk is located to the south of the river, due to the presence of bluffs to the north of the river.

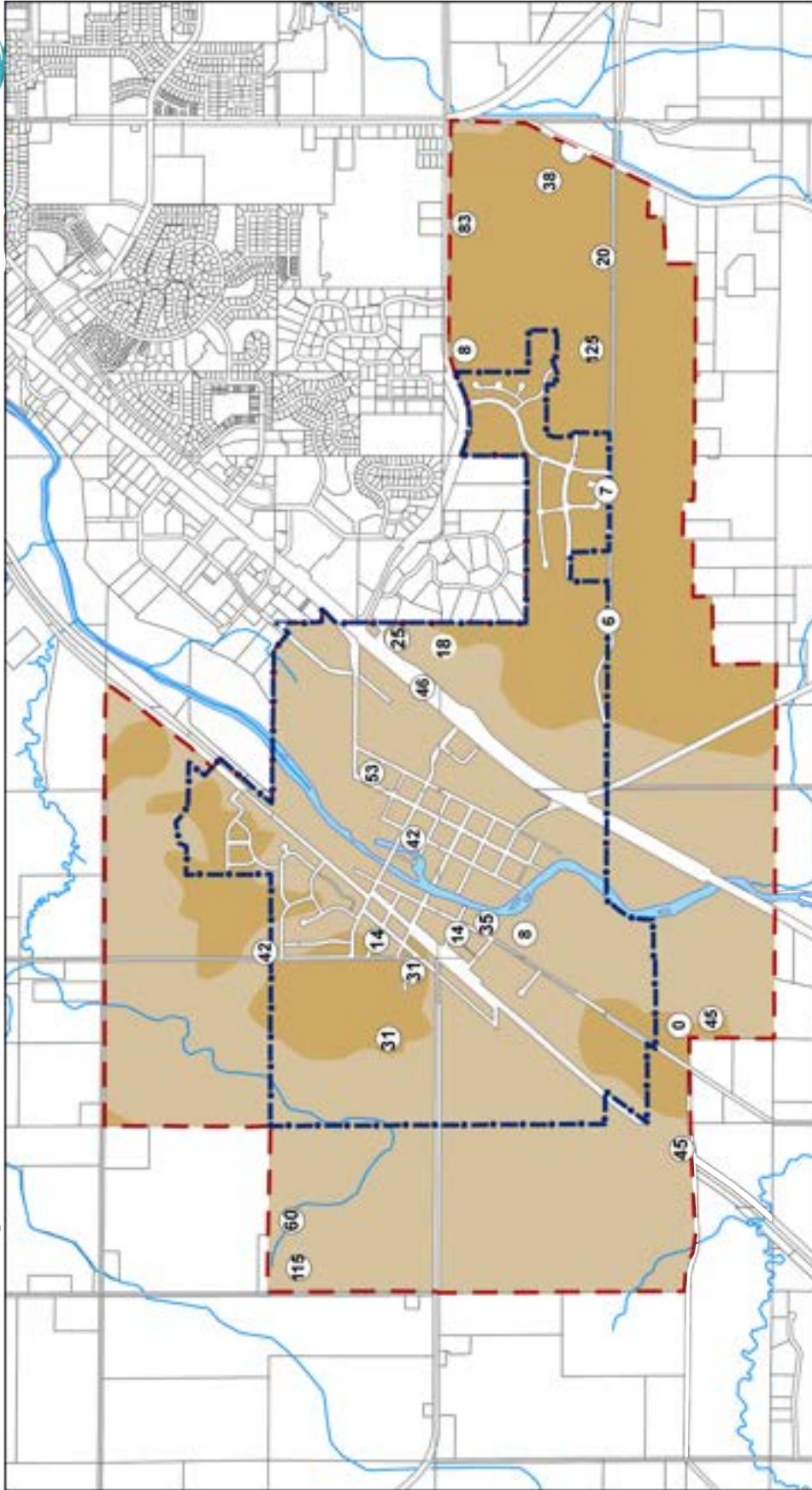
The Floodplains map is based on FEMA data and depicts the various flood zones along the Cannon River. Calculating the exact location of the floodplain will be based on FEMA insurance maps.

All lots in a designated floodplain are subject to Rice County Floodplain Management Ordinance as well as regulations provide by Dundas' own zoning code. The City has established a Floodplain Overlay District in its zoning ordinance to protect the health safety and welfare of its citizens, and in order to minimize the damage and losses incurred via flood events. Establishing such a district entitles the City to participate in the national flood insurance program. Uses that are permitted in the floodplain district include, for example, residential lawns and gardens, industrial loading and parking areas, and recreational uses. Consistent with federal regulations, conditional uses are permitted in the floodplain district only if they have a low potential for flood damage and if their construction and use does not adversely impact the capacity of the floodway.

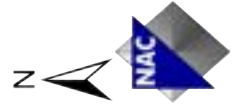
Cannon Recreational River District

Dundas straddles the Cannon River, a waterbody that has long been a central identifier of the city, from when it was the driving power for the numerous grain milling operations, to the role it plays today as a recreational and cultural amenity. Much like rivers all over the state, as much as the Cannon is an asset to the community, it is something that must also be protected and ensured against pollution, erosion, and any other harm that could be caused to it by over-development in the immediate surrounding vicinity.

Bedrock Depth and Terrain



0 0.25 0.5 1 Miles



Source: Rice County, MNDOT,
Northwest Associated Consultants
Map Updated: 07/24/2020

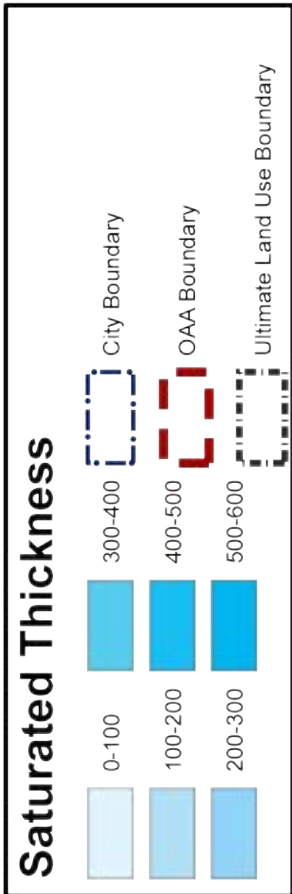
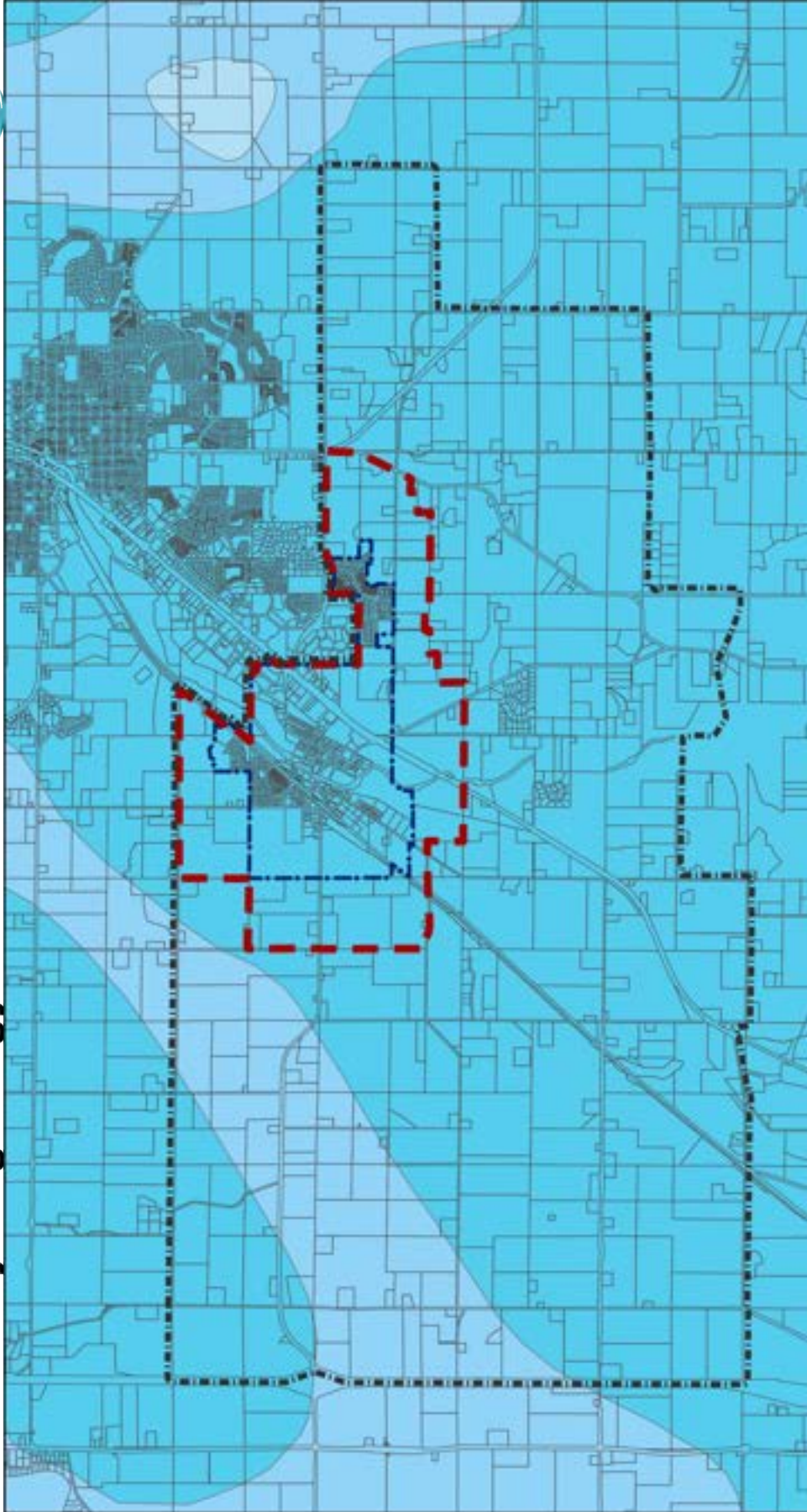
Legend

- Depth to Bedrock (Feet)
- City Boundary
- OAA Boundary
- Water

Paleozoic Bedrock Types

- Decorah, Plateville, Greenwood, St. Peter
- Prairie du Chien Group

Bedrock Hydrogeology



Source: Rice County, State of Minnesota
Northwest Associated Consultants

Map Created 04/01/21

CITY OF DUNDAS

To help prevent this type of damage, the city has established an overlay district to regulate development in the area of the river according to Minnesota Statutes, Sections 104.31-104.40, Minnesota Regulations, NV 78-84 and the Cannon River Management Plan (6 MCAR °1.2900). As an overlay this district sets standards beyond what the base zoning may require, although all standards of those underlying zoning districts must still be met. The district extends 300 feet from the OHWL of the Cannon River.

The district is further subdivided into “Natural environment Waters” and “General Environment Waters”. The DNR classifies the section of the Cannon running through Dundas as a Recreational River, which is used to describe rivers which have adjacent lands that are primarily developed, either for agricultural or more intensive land uses, and which are readily accessible for recreational use. The city has chosen to further classify the river section to better regulate and determine the intensity of surrounding land uses: with higher allowances along the “General Environment” section which has more preexisting development, while preserving lower intensities on the less sparsely developed “natural environment” sections. These subdistricts, as well as a map of the overlay can be found on the following page.

In terms of what land uses are allowed, The Cannon River Recreational River District (CRRRD) permits public recreational uses as well as any allowed uses of the underlying district. In addition, it conditionally allows private campgrounds, other private open space uses, public road and utilities, canoe rental establishments, and Sand and gravel extraction. However, it prohibits inner tube rental establishment, manufacturing of sand and gravel by-products, and any uses not otherwise mentioned. The following dimensional standard apply to all properties within the district, subdivided into the general environment and natural environment waterway sections.

	Natural Environment Waters	General Environment Waters
	S1/2 of N1/2 of Sec. 15 and Sec 11, T111N, R 20 W	N1/2 of N1/2 of Sec. 15 and Sec 10, T111N, R 20 W
(1) Lot area	80,000 square feet	20,000 square feet
(2) Water frontage and lot width at building line	200 feet	100 feet
(3) Building setback from ordinary high water mark	200 feet	75 feet
(4) Building setback from roads and highways	50 feet (federal, state or county) 20 feet (municipal or private)	
(5) Building height limitation	35 feet	35 feet
(6) Total lot area covered by impervious surface	30%	30%
(7) Sewage system setback from ordinary high water mark	150 feet	50 feet
(8) Sewage system elevation above highest ground water level or bedrock	3 feet	3 feet

For properties with sewerage areas, additional dimensional restrictions are put in place to better prevent potential river way pollution.

	Natural Environment Waters	General Environment Waters
	S1/2 of N1/2 of Sec. 15 and Sec 11, T111N, R 20 W	N1/2 of N1/2 of Sec. 15 and Sec 10, T111N, R 20 W
(9) Lot area		
Waterfront lots	40,000 square feet	15,000 square feet
Other lots	20,000 square feet	10,000 square feet
(10) Water frontage and lot width at building line	125 feet	75 feet
(11) Building setback from ordinary high water mark	150 feet	50 feet

HISTORIC PRESERVATION

Dundas' History is a key component to its character, and as such it must be preserved in such a way that it can be seen, visited and enjoyed by generations to come. The City has grown significantly since it was initially founded, however the heart of the city, the area identified in the Original Town plat, makes up the core of the current City. Most other development around the city is from 1980 or more recently, making the area of the original plat an important historic center in Rice County. The various plats in town can be seen on the map on the following page.

Historic Landmarks

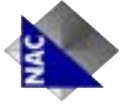
Historic Preservation can be an expensive process, and therefore it can be in Cities' interests to focus on those properties recognized nationally for their status as historic landmarks. These are the preeminent historic sites within the City and may be eligible for additional funding or grants for maintenance and restoration purposes. These properties in particular can show us something of Dundas' legacy as a milling boom town:

1. The 1870 Archibald Mill: First Hungarian roller mill in the United States built in 1870. This was the largest mill in the state at the time. The site was sold to Palon and Watson who built their own mill and operated into the 20th century, which are the ruins you see today. This milling site was placed on the National Register of Historic Places in 1976.
2. The Ault Store: was built in 1866 and was used as a store, a library and office for the Dundas Newspaper. It is the only remaining commercial building from the Dundas original business district. Added to the National Register of Historic Places in 1982.
3. The William Martin House: Built in 1869 for John's sister and her husband, Ette Archibald and William Martin, it currently serves as a private home and the Archibald Inn Bed & Breakfast. Added to the National Register of Historic Places in 1981.
4. E.T. Archibald House: Constructed between 1867-1885, the Edward T. Archibald family lived here, and it was built in the 1860s by their cousin, Lorenzo Hamblin. Added to the National Register of Historic Places in 1976.
5. Church of the Holy Cross: Began construction in 1867, land, limestone and lumber were donated by J.S. Archibald. Added to the National Register of Historic Places in 1961.

Historic Places



0 250 500 1,000 Feet



Source: Rice County, State of Minnesota,
Northwest Associated Consultants
Map Created 04/01/21

National Registry of Historic Places

- ① Archibald Mill
- ② Ault Store
- ③ William Martin House
- ④ Edward T. Archibald House
- ⑤ Church of the Holy Cross

NATURAL AND CULTURAL RESOURCE GOALS

Goal: Protection and enhancement of natural features and cultural resources within the City.

- Continue to eradicate invasive, exotic species from publicly owned areas.
- Educate citizens on removal of invasive, exotic species from private land.
- Promote the use of native species in future plantings in development plans and private residencies.
- The City will identify natural areas for future protection.
- Manage diseased trees and noxious weeds in a proper fashion on private property.
- Support restoration and connectivity of areas with existing native vegetation.
- Explore creation of an urban tree ordinance/preservation act.
- Provide support to area historical societies.
- Ensure that properties have adequate access to sunlight.

Goal: Pursue development in harmony with the natural resources.

- Enforce federal and state regulations for development on wetlands and floodplains.
- Protect riverbanks, bluffs, and other natural areas, to minimize impacts to sensitive resources and minimize site alteration.
- Collaborate with the adjacent cities and townships regarding development of land adjacent to Dundas if that development might impact the natural resources of Dundas.
- Continue to minimize stormwater runoff and mitigate its negative impacts on water quality.
- Development will protect the natural environment and landscape.
- Provide Public access to key natural resource areas in coordination with the Parks, Trails and Open Space Plan.

Goal: Promote and protect the Cannon River as a recreational and environmental amenity.

- Enforce regulations of the Cannon Recreational River Overlay District to protect the river from over-intensification of adjacent land uses.
- Update local regulations periodically to match updates to the state statute requirements.
- Include periodic maintenance such as dredging with the city's Capital Improvements Program.

Goal: Preserve the history of Dundas and its most critically important historic properties.

- Utilize grant moneys available to National Historic Register Properties to help subsidize the maintenance cost of historic properties in the City.
- Organize events such as tours which highlight the City's history and which can externally benefit other commercial activity in the city.
- Work with local and regional historic preservation groups to chronicle and record the town's continuing history.