# Grand River Source Protection Area

# ASSESSMENT REPORT

## Chapter 8: Region of Waterloo

**April 1, 2025**

# CHAPTER 8: REGION OF WATERLOO SECTIONS

Chapter 8 of the Assessment Report, including each municipal well system for the Region of Waterloo, is separated into eight section documents as follows:

**CURRENT DOCUMENT:**

- **Section 8.6** – Rural Area Wellfields (Ayr, Branchton Meadows, Elmira, Foxboro Green, Heidelberg, Linwood, Maryhill, New Dundee, New Hamburg, Roseville, St. Clements, Wellesley)

**REMAINING DOCUMENTS:**

- **Section 8.1** – Water Quantity Risk Assessment
- **Section 8.2** – Waterloo Area Wellfields (Erb Street, William Street, and Waterloo North wells)
- **Section 8.3** – Kitchener Area Wellfields (Mannheim (East, West, ASR and Peaking), Greenbrook, Strange Street, Parkway, Strasburg, Pompeii, Woolner and Wilmot Centre)
- **Section 8.4** – Hidden Valley Intake
- **Section 8.5** – Cambridge Area Wellfields (Hespeler, Pinebush, Blair Road, Clemens Mill, Elgin Street, Middleton Street, Shades Mills, Fountain Street, and Willard)
- **Section 8.7** – Limitations, Data Gaps and Uncertainty
- **Section 8.8** – Summary

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# 8 REGION OF WATERLOO

## 8.6 Rural Wellfields

Each wellfield in the Rural Area (Ayr, Branchton Meadows, Elmira, Foxboro Green, Heidelberg, Linwood, Maryhill, New Dundee, New Hamburg, Roseville, St. Clements, Wellesley) is described in further detail in the subsections below.

### 8.6.1 Ayr Wellfield

The water supply for the Ayr Wellfield is obtained from production wells A1, A2 and A3, which supply water to a population of approximately 4,337 people (**Table 8—1**). The Ayr production wells are screened from approximately 43 to 51 m below ground surface within the Pre-Catfish Creek Aquifer (AFD1), which is overlain by an aquitard and aquifer sequence including the Middle Maryhill Till (ATB2) and Waterloo Moraine Sands (AFB1/AFB2) (**Table 8.1—6**). The serviced areas are presented on **Map 8.6—161.**

#### Vulnerability and Transport Pathways

The WHPAs are presented on **Map 8.6—162**. **Map 8.6—163** presents the unadjusted intrinsic vulnerability. Analysis of the attributes of each potential transport pathway in the Ayr WHPA resulted in the identification of well clusters within the WHPA-B through WHPA-D and two adjacent areas defined as aggregate resources in the WHPA-D which warranted an increase to the ISI. **Map 8.6—165** shows the adjusted intrinsic vulnerability while **Map 8.6—164** and **Map 8.6—166** show these transport pathways and area of influence for the Wellhead Protection Areas and **Map 8.6—167** shows the final vulnerability scoring.

#### Identification of Significant, Moderate and Low Drinking Water Quality Threats in the Ayr Wellhead Protection Areas

The identification of a land use activity as a significant, moderate, or low drinking water threat depends on its risk score, determined by considering the circumstances of the activity and the type and vulnerability score of any underlying protection zones, as set out in the Tables of Drinking Water Threats. Information on drinking water threats is also accessible through the Source Water Protection Information Portal. The information above can be used with the vulnerability scores shown in **Map 8.6—167** to help the public determine where certain activities are or would be significant, moderate and low drinking water threats.

**Table 8.6—51** provides a summary of the threat levels possible in the Ayr Wellfield for Chemicals, Dense Non-Aqueous Phase Liquids (DNAPLs), and Pathogens. “Yes” indicates that the threat classification level is possible for the indicated threat type under the corresponding vulnerable area / vulnerable score; “No" indicates that it is not. The colours shown for each vulnerability score correspond to those shown in **Map 8.6—167**.

**Table 8.6—1: Identification of Drinking Water Quality Threats in the Ayr Wellhead Protection Areas**

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| Chemicals | WHPA-A/B | 10 | Yes | Yes | Yes |
| Chemicals | WHPA-B | 8 | Yes | Yes | Yes |
| Chemicals | WHPA-B/C/D | 6 | No | Yes | Yes |
| Chemicals | WHPA-C/D | 2 & 4 | No | No | No |
| DNAPLs | WHPA-A/B/C | Any Score | Yes | No | No |
| DNAPLs | WHPA-D | 6 | No | Yes | Yes |
| DNAPLs | WHPA-D | 2 & 4 | No | No | No |
| Pathogens | WHPA-A/B | 10 | Yes | Yes | No |
| Pathogens | WHPA-B | 8 | No | Yes | Yes |
| Pathogens | WHPA-B | 6 | No | No | Yes |

### Threats and Issues Enumeration for the Ayr Wellfield

The percent managed land, livestock density and percent impervious surface for each protection zone in the Wellfield are shown in **Map 8.6—168, Map 8.6—169 and Map 8.6—170**, respectively.

The total number of identified significant drinking water threats in this Wellfield is 11. The number of properties in this Wellfield with identified significant drinking water threats is 8. Details surrounding the types of threats and circumstances found in the Ayr wellhead protection areas are outlined in **Table 8.6—52**.

No Significant Conditions were identified in this wellfield as per Technical Rule 126.

No drinking water Issues have been identified in this wellfield as per Technical Rule 114.

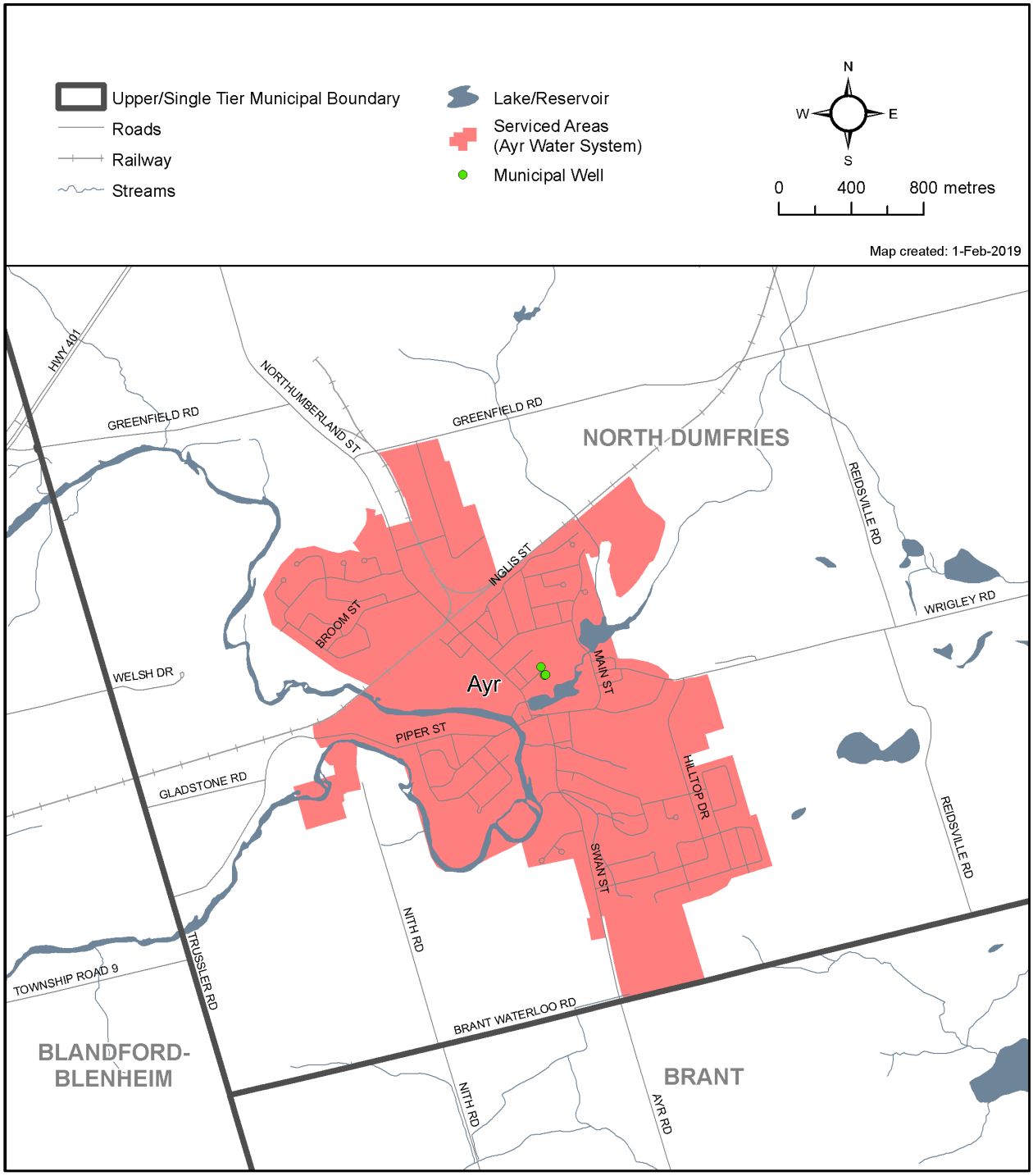
**Table 8.6—2: Significant Drinking Water Quality Threats in the Ayr Wellhead Protection Areas (current to February 2019)**

| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| 2 | Sewage system or sewage works - sanitary sewers and related wastewater collection systems | 1 | WHPA-B |
| 11 | Storage of a pesticide | 1 | WHPA-B |
| 12 | Application of road salt | 8 | WHPA-B |
| 15 | Storage and handling of fuel | 1 | WHPA-B |
| **Total Number of Significant Threat Activities** | | **11** | |
| **Total Number of Properties with Significant Threats** | | **8** | |

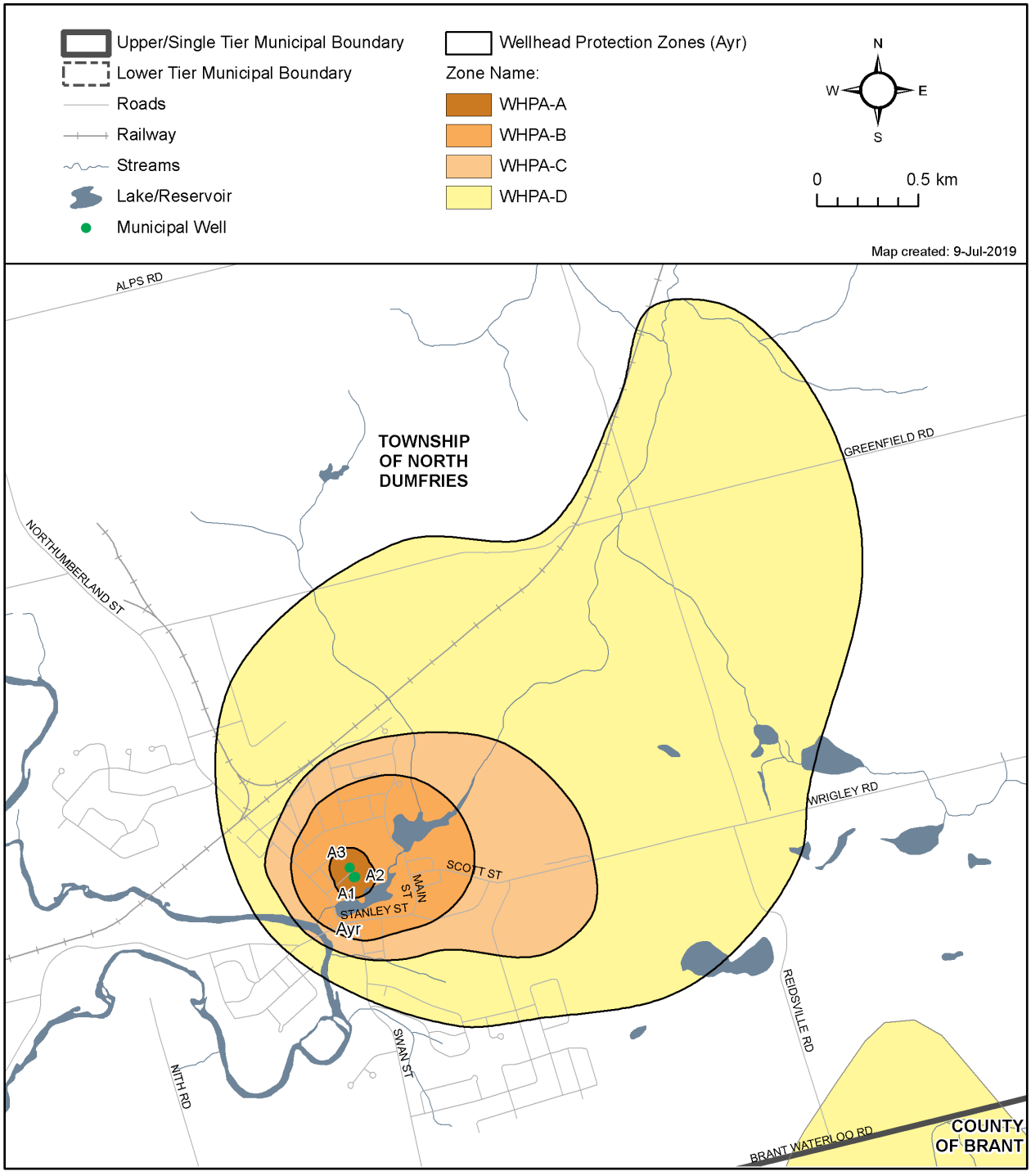
[1] Prescribed Drinking Water Quality Threat Number refers to the prescribed drinking water threat listed in O. Reg. 287/07 s.1.1 (1)

[2] Where applicable, waste, sewage, and livestock threat numbers are reported by sub-threat; fuel and DNAPL by Prescribed Drinking Water Threat category.

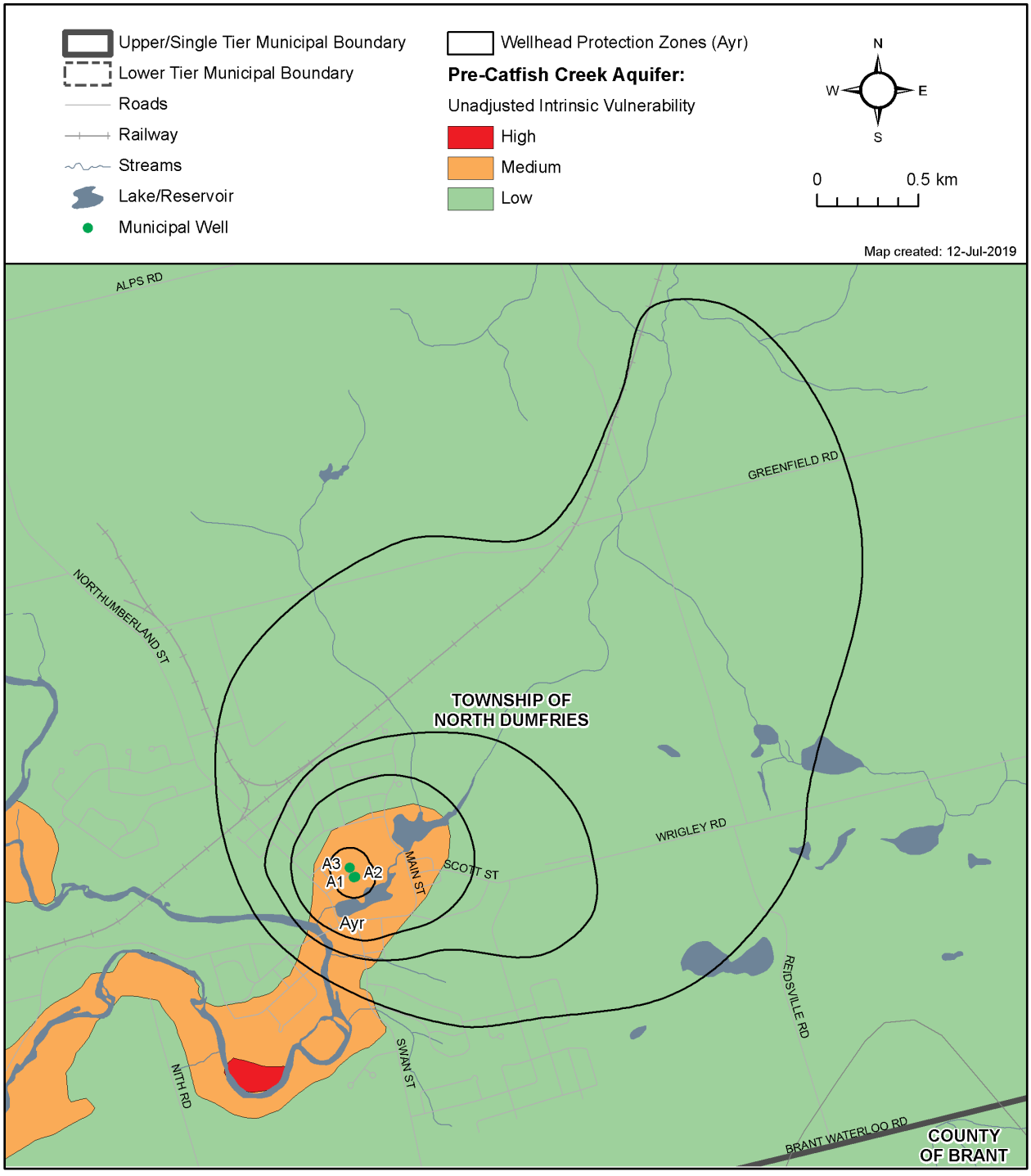
## Map 8.6—1: Ayr Well Supply Serviced Areas



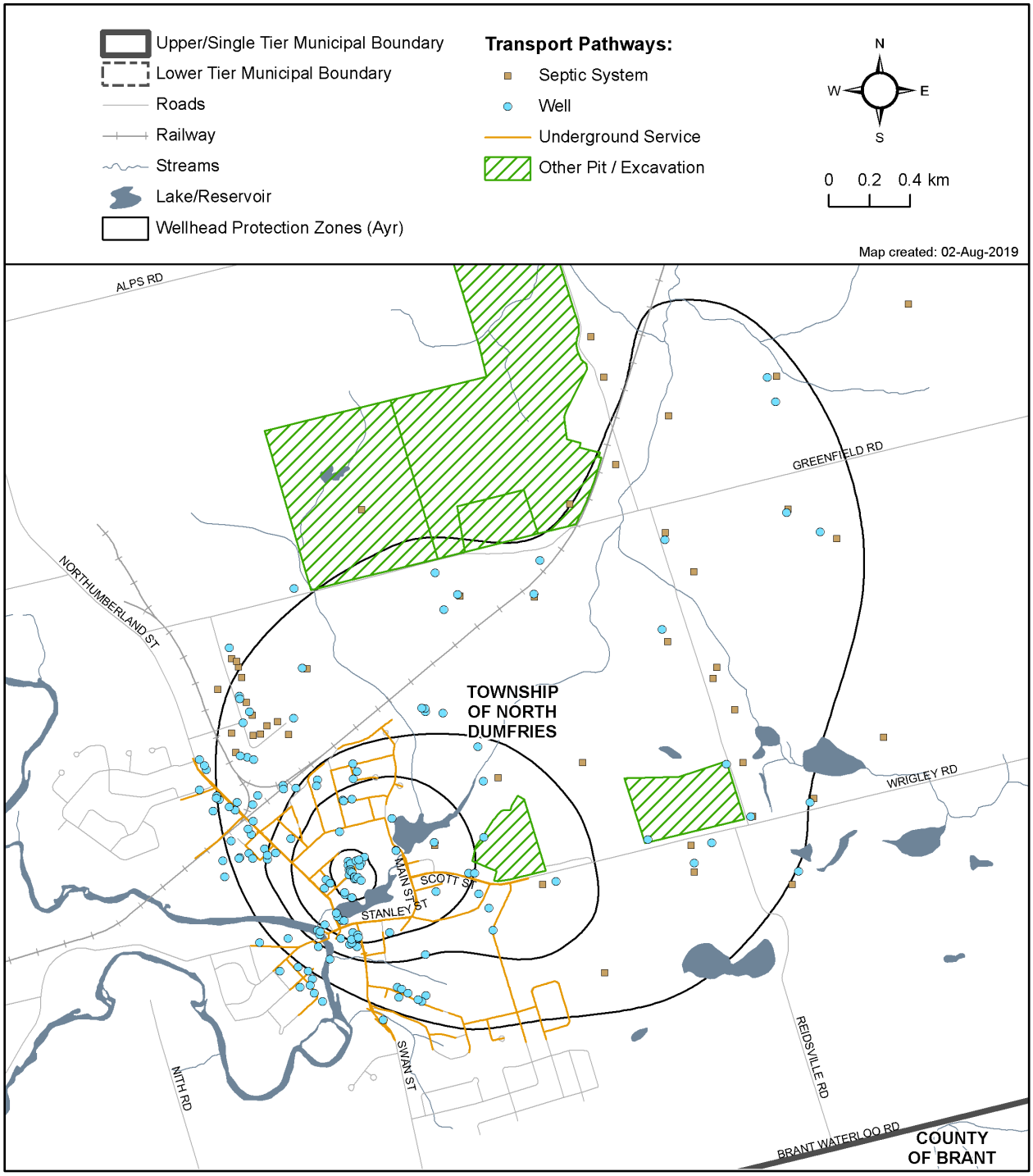
## Map 8.6—2: Ayr Well Supply Wellhead Protection Area



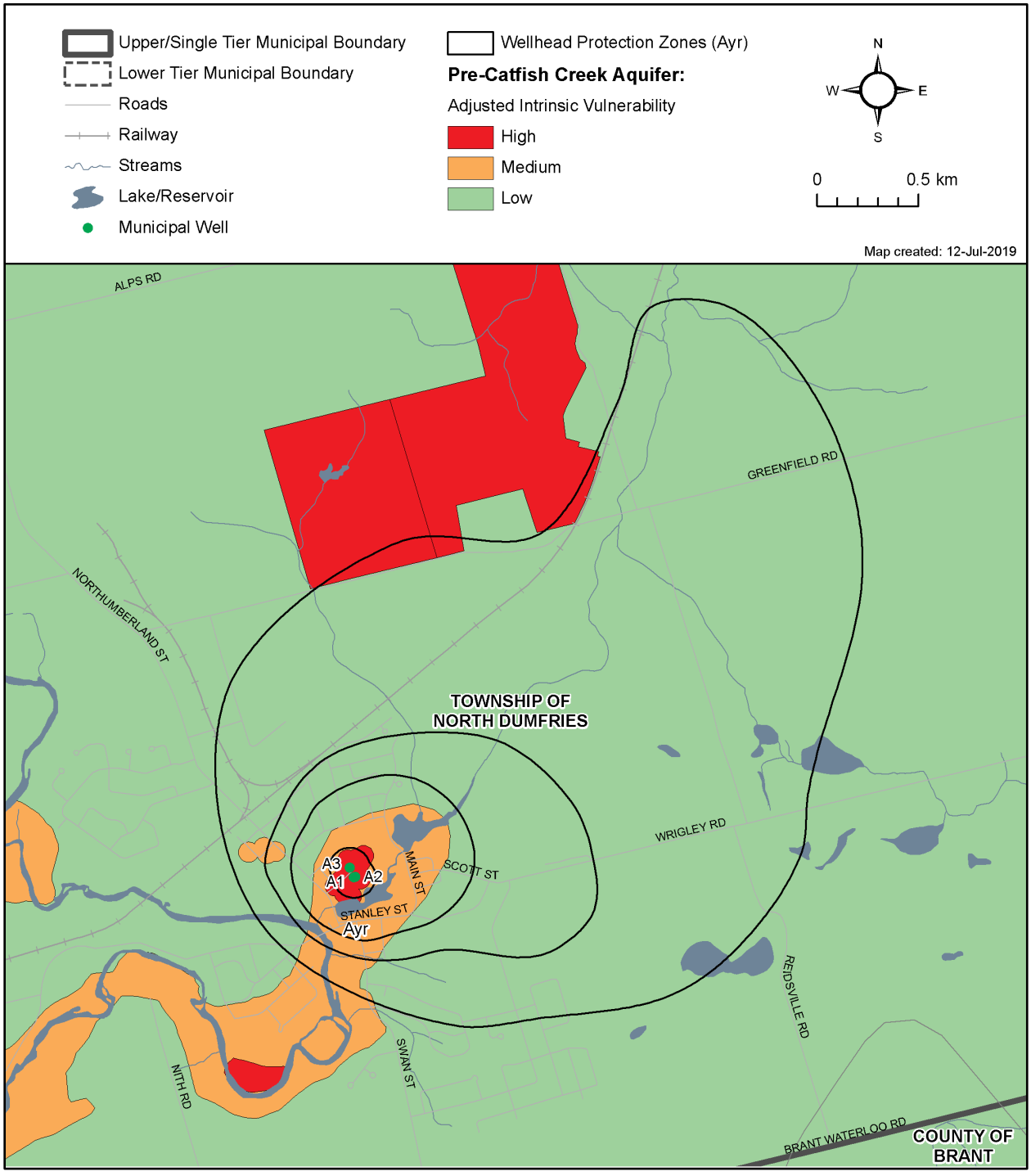
## Map 8.6—3: Ayr Well Supply Unadjusted Intrinsic Vulnerability



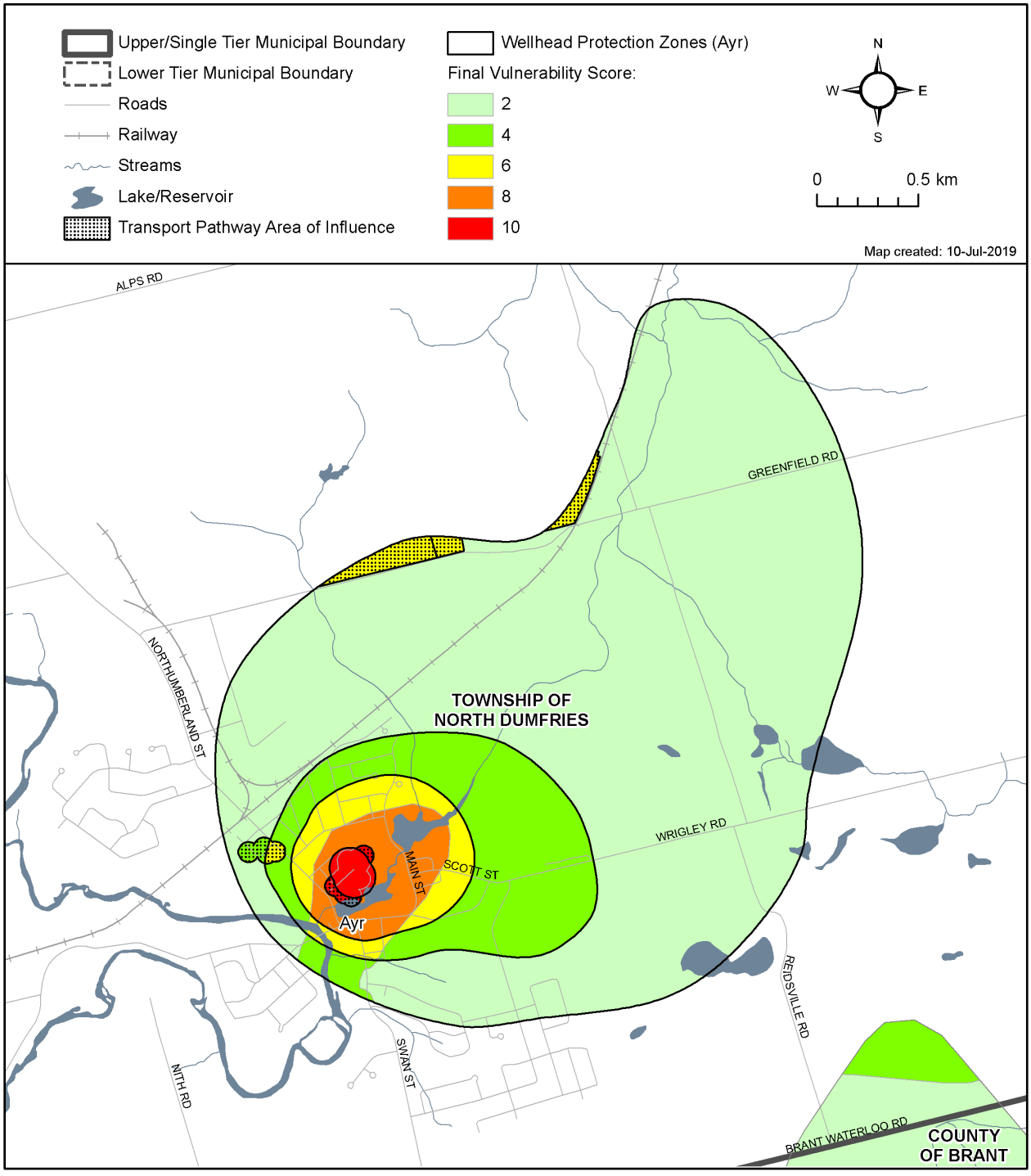
## Map 8.6—4: Ayr Well Supply Transport Pathways



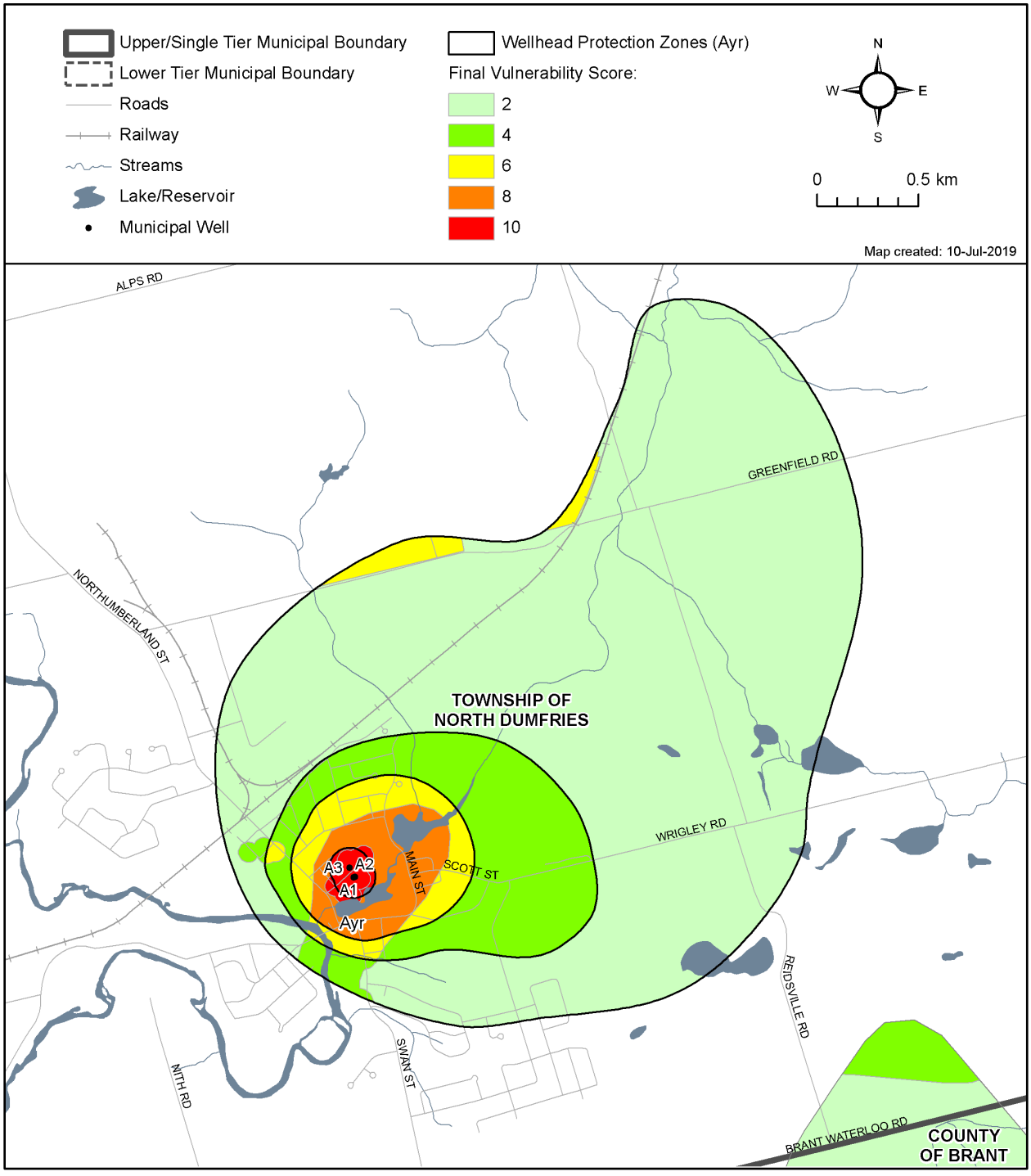
## Map 8.6—5: Ayr Well Supply Adjusted Intrinsic Vulnerability



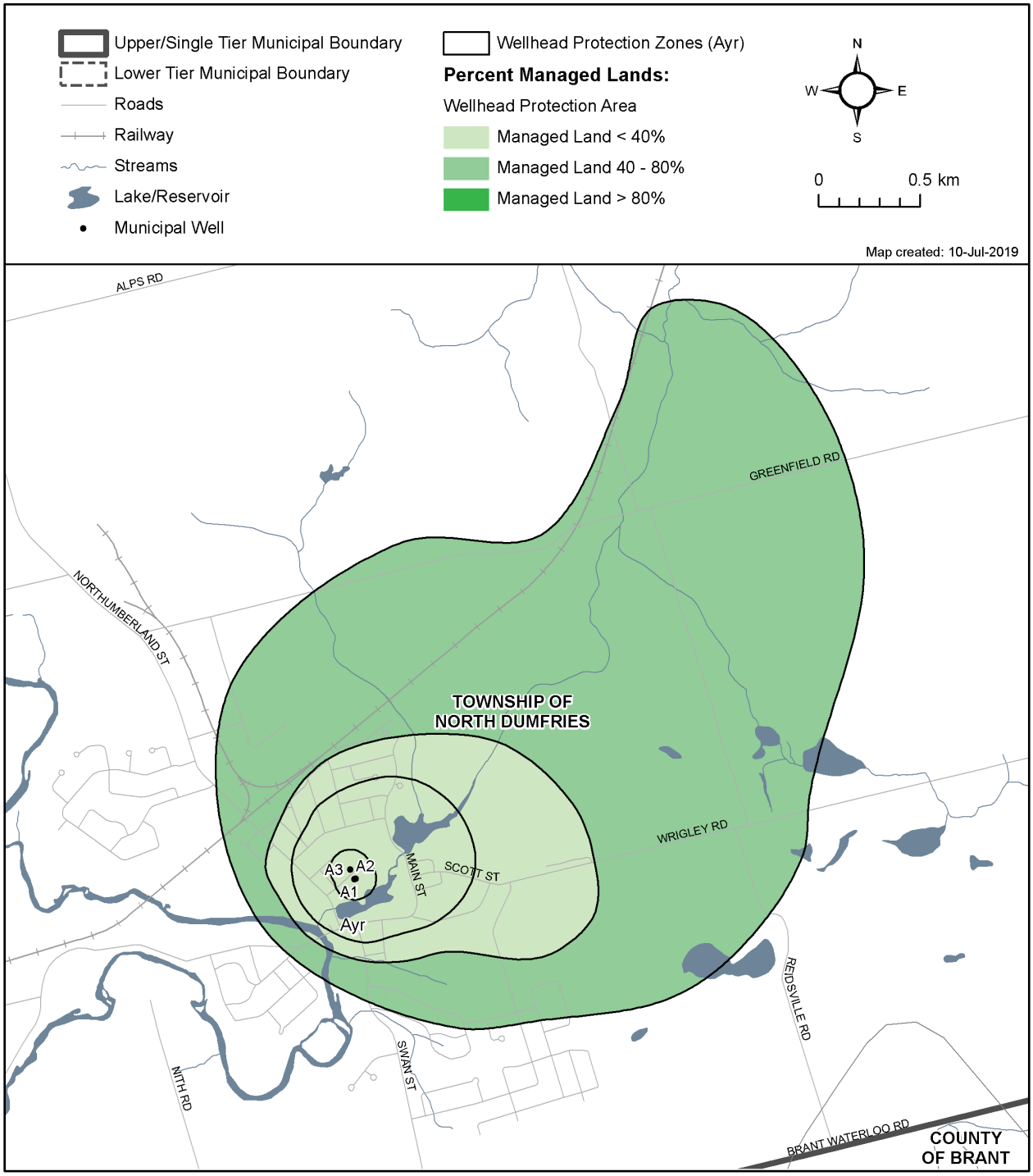
## Map 8.6—6: Ayr Well Supply Transport Pathways Area of Influence



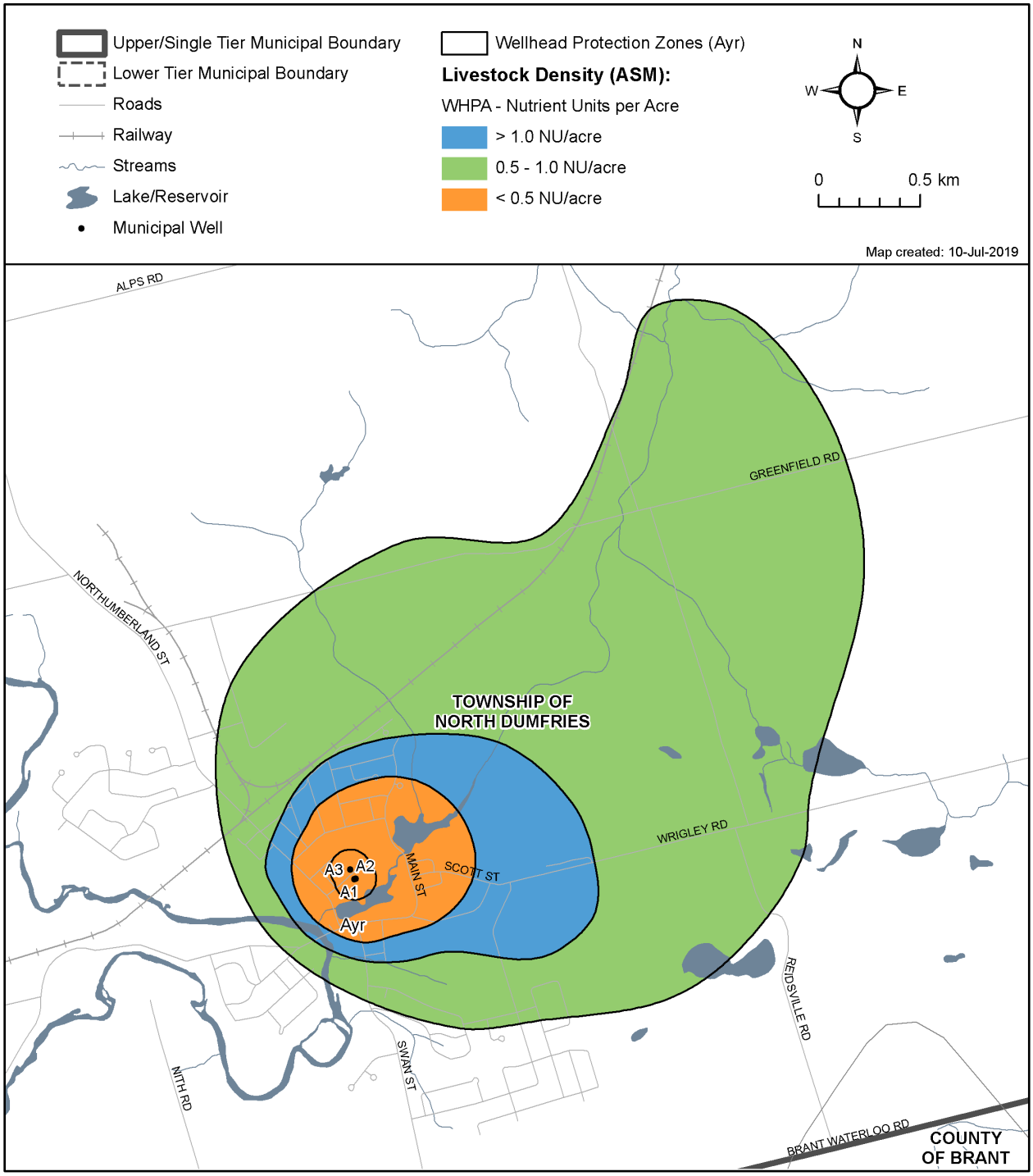
## Map 8.6—7: Ayr Well Supply Wellhead Protection Area Final Vulnerability



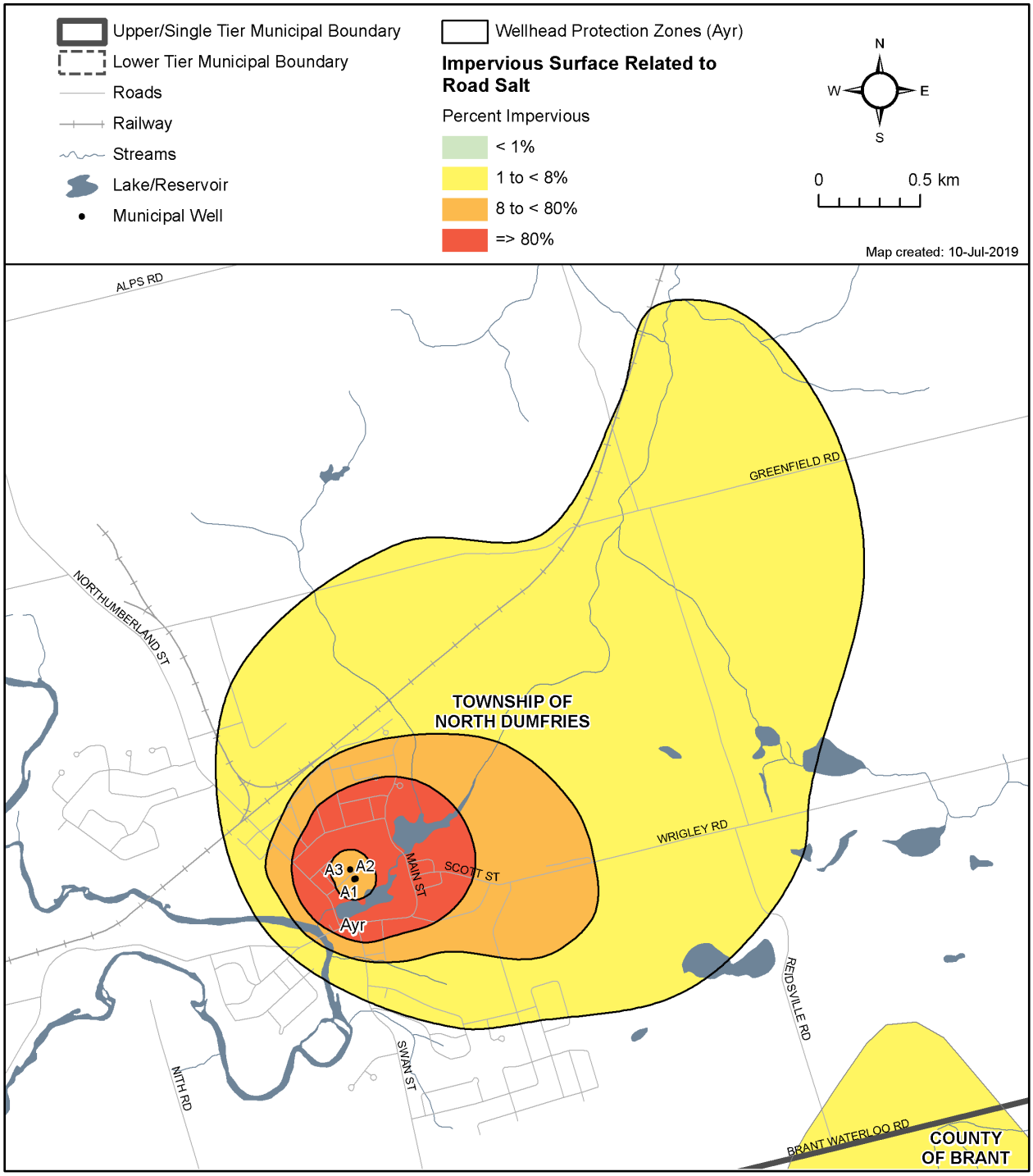
## Map 8.6—8: Ayr Well Supply Percent Managed Lands



## Map 8.6—9: Ayr Well Supply Livestock Density



## Map 8.6—10: Ayr Well Supply Percent Impervious Surfaces



### 8.6.2 Branchton Meadows Wellfield

The water supply for the Branchton Meadows Wellfield is obtained from production wells BM1 BM2 and BM3. This Wellfield supplies water to a population of approximately 121 people (**Table 8—1**). The serviced areas are presented on **Map 8.6—171**. BM1 and BM2 wells are open hole within a dense sand and gravel conglomerate unit approximately 29 m to 34 m BGS. BM3 was completed slightly deeper as open hole from 39 to 47 m BGS in the Guelph Formation bedrock aquifer (**Table 8.1—6**). Near the wells, a vertically extensive surficial aquitard overlies the dense sand and gravel conglomerate. It is of note that pumping was simulated from BM3 only for the delineation of the WHPAs. Analysis of the particle tracks during modelling indicated water was drawn from the lower overburden indicating a hydraulic connection between the lower overburden and the bedrock.

#### Vulnerability and Transport Pathways

The WHPAs are presented on **Map 8.6—172.** The unadjusted intrinsic vulnerability is shown on **Map 8.6—173** and adjusted intrinsic vulnerability on **Map 8.6—175**. **Map 8.6—177** presents the final protection areas and vulnerability scoring for the Branchton Meadows WHPA. Several septic systems are located adjacent to the wells within WHPA-A and WHPA-D zones that warranted an increase to the ISI at this Wellfield. Transport pathways and area of influence are shown on **Map 8.6—174** and **Map 8.6—176.**

#### Identification of Significant, Moderate and Low Drinking Water Threats in the Branchton Meadows Wellhead Protection Areas

The identification of a land use activity as a significant, moderate, or low drinking water threat depends on its risk score, determined by considering the circumstances of the activity and the type and vulnerability score of any underlying protection zones, as set out in the Tables of Drinking Water Threats. Information on drinking water threats is also accessible through the Source Water Protection Information Portal. The information above can be used with the vulnerability scores shown in **Map 8.6—177** to help the public determine where certain activities are or would be significant, moderate and low drinking water threats.

**Table 8.6—53** provides a summary of the threat levels possible in the Branchton Meadows Wellfield for Chemicals, Dense Non-Aqueous Phase Liquids (DNAPLs), and Pathogens. “Yes” indicates that the threat classification level is possible for the indicated threat type under the corresponding vulnerable area / vulnerable score; “No" indicates that it is not. The colours shown for each vulnerability score correspond to those shown in **Map 8.6—177.**

**Table 8.6—3: Identification of Drinking Water Quality Threats in the Branchton Meadows Wellhead Protection Areas**

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| Chemicals | WHPA-A | 10 | Yes | Yes | Yes |
| Chemicals | WHPA-B | 8 | Yes | Yes | Yes |
| Chemicals | WHPA-B/C | 6 | No | Yes | Yes |

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| Chemicals | WHPA-C/D | 2 & 4 | No | No | No |
| DNAPLs | WHPA-A/B/C | Any Score | Yes | No | No |
| DNAPLs | WHPA-D | 2 & 4 | No | No | No |
| Pathogens | WHPA-A | 10 | Yes | Yes | No |
| Pathogens | WHPA-B | 8 | No | Yes | Yes |
| Pathogens | WHPA-B | 6 | No | No | Yes |
| Pathogens | WHPA-C/D | Any Score | No | No | No |

**Threats and Issues Enumeration in the Branchton Meadows Wellfield**

The percent managed land, livestock density, and percent impervious surface for each protection zone in this wellfield are shown in **Map 8.6—178, Map 8.6—179 and Map 8.6—180**, respectively.

The Branchton Meadows production wells (BM1 and BM2) showed increasing chloride concentrations since at least 1992 when Region monitoring began. Since the summer of 2009, chloride concentrations have stabilized at approximately 150 mg/L (**Figure 8.6—27**) compared to the ODW-AO limit of 250 mg/L. Well BM3 has not yet been put into production so no chloride trend information is available; the chloride concentration in two samples from the initial pumping test was 82 and 63 mg/L. Sodium concentrations are also currently elevated (approximately 90 mg/L) with an increasing trend but are not predicted to exceed the ODW-AO of 200 mg/L withing 10 years and as such are not classified as an Issue.

Monitoring well nest ND-BM-OW1-02-S & -D (approximately 90 m NE of BM1/BM2) has piezometers screened at the water table (within silt till) and within the upper bedrock aquifer. This well is sampled twice yearly (spring and fall). Shallow groundwater from the shallow piezometer has variable chloride concentrations over time, with concentrations between approximately 150 mg/L and 500 mg/L (**Figure 8.6—28**). The higher concentrations occur during spring sampling events. Chloride concentrations in the deeper piezometer have shown a steadily increasing trend (regardless of season) and now are approximately 40 mg/L. The apparent stabilization of chloride trends seen at BM1 and BM2 are not evident at this monitoring well nest.

An assessment of chloride and sodium sources was completed recently (Stantec, 2015) with the following conclusions:

- The main sources of salt loadings to the wellfield are water softener and road salt. Current (2013/2014) concentrations of sodium and chloride at the wellfield average 84.0 mg/L and 155.8 mg/L, respectively, 75% of which is estimated to be from water softener salt and 22% of which is estimated to be from road salt.

- The capture zones simulated with the regional groundwater flow model extended to the northwest of the production wells, based on a strong regional horizontal hydraulic gradient, away from potential salt sources. Preliminary mass balance calculations showed that only 35% of the observed salt loadings at the production wells could be sourced from these areas. Flow at the wellfield might be more

influenced by the subtle local horizontal hydraulic gradient, a thicker local sand unit observed at the production wells, and local salt sources. Therefore the numerical model capture zones were not used in the Stantec (2015) assessment.

- Reductions in road salt and water softener use since the early 2000's are expected to cause a 56% decline in sodium and chloride concentrations at the production wells in the next 7 to 13 years. A further 20% reduction in road and/or water softener salt use could result in an additional 2% to 8% drop in concentrations.

- Salt loadings to the groundwater system have steadily decreased since the early 2000's. Road salt use by the Township of North Dumfries has declined 63% due to changes in road salt management practices, and water softener use is estimated at 57% less presumably as residents upgrade to more modern and efficient water softeners with time.

The observed stabilization of chloride concentrations in the production well may be from recent reductions in local salt discharges (Stantec, 2015) but may also have been influenced by declining production volumes at the wellfield, which have declined since 2009.

While the recent trend to stabilization in chloride concentrations at the Branchton wells is encouraging, the overall trend (since 1993) is still increasing and recent values of 150 ug/L are greater than one-half of the drinking water objective; therefore, the chloride *Issue* designation will remain for this wellfield.

The *Issue contributing area* is delineated as the 25 year time-of-travel for the Branchton Meadows wells shown in **Map 8.6—181**. In the meantime, the Region has added groundwater monitoring locations in this wellfield to better define the well capture zones and potential salt sources.

The total number of identified significant drinking water threats in this wellfield is 9. The number of properties in this wellfield with identified significant drinking water threats is 7. Details surrounding the types of threats and circumstances found in the Branchton Meadows wellhead protection areas are outlined in **Table 8.6—54**.

No Significant Conditions were identified in this wellfield as per Technical Rule 126.

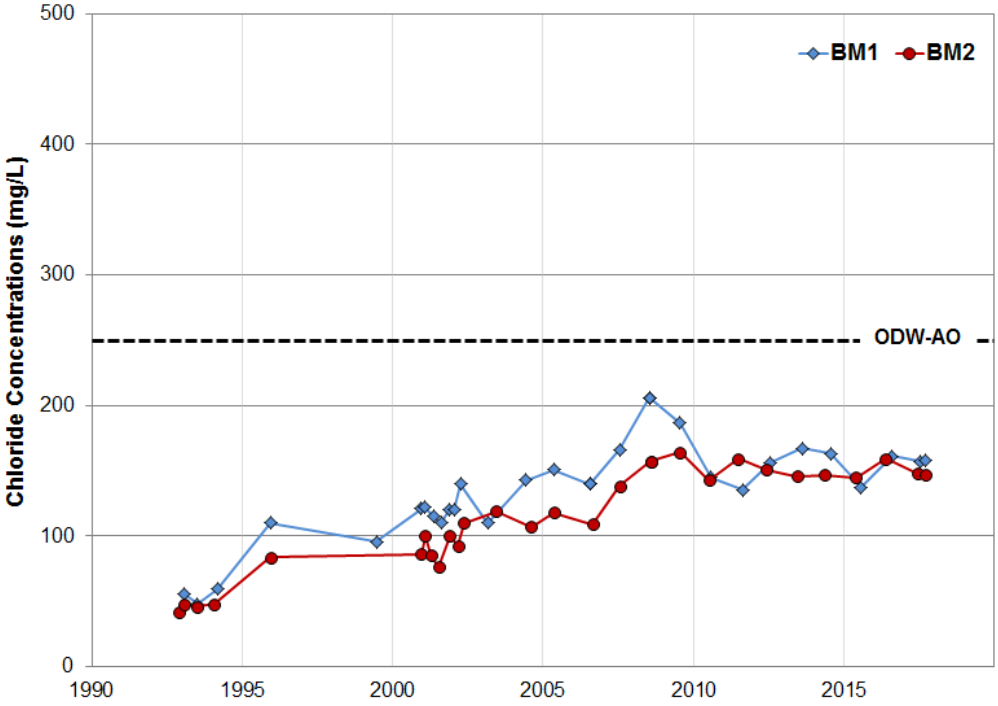



**Figure 8.6—1: Chloride Trends in the Raw Water at the Branchton Meadows Supply Wells, North Dumfries**

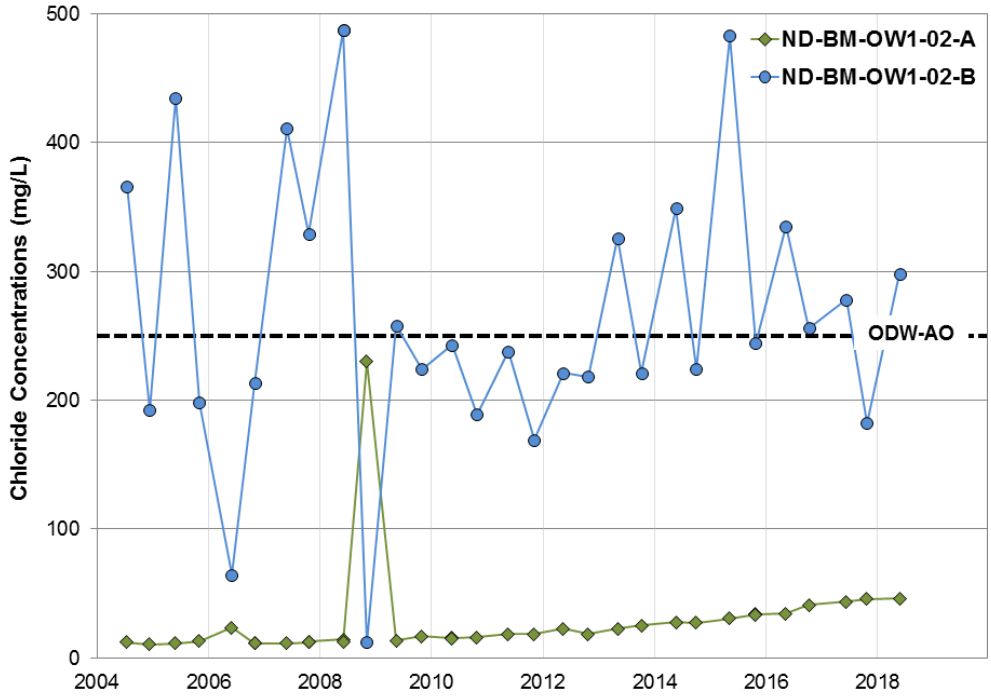



**Figure 8.6—2: Chloride Trends in the Raw Water at Monitoring Well Nest ND-BM-OW1-02, Branchton Meadows, North Dumfries**

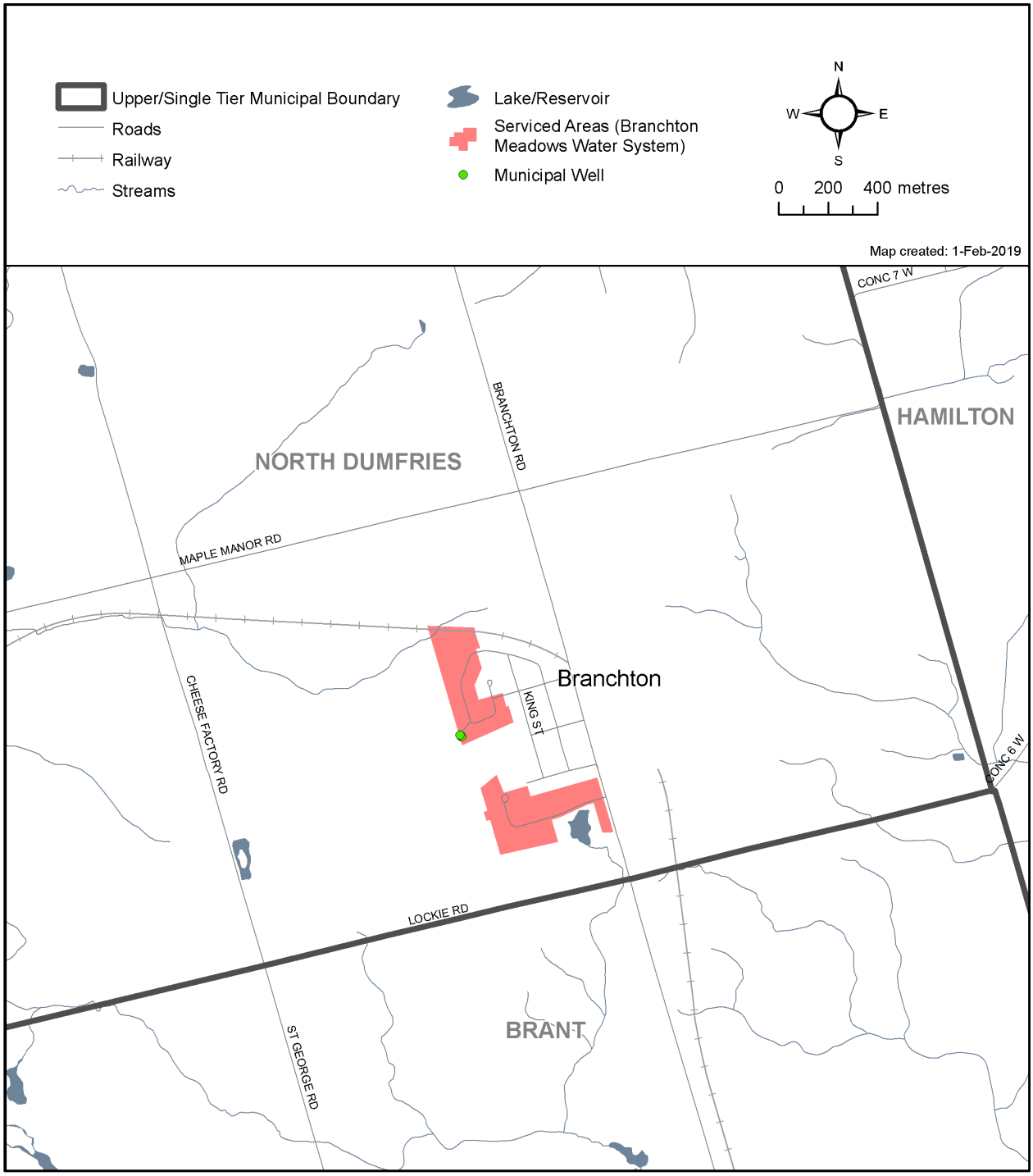
**Table 8.6—4: Significant Drinking Water Quality Threats in the Branchton Meadows Wellhead Protection Areas (current to February 2019)**

| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| 2 | Sewage system or sewage works - onsite sewage systems | 6 | WHPA-A |
| | Sewage system or sewage works - onsite sewage systems holding tanks | 1 | WHPA-A |
| 12 | Application of road salt | 1 | ICA |
| 15 | Storage and handling of fuel | 1 | WHPA-A |
| **Total Number of Significant Threat Activities** | | **9** | |
| **Total Number of Properties with Significant Threats** | | **7** | |

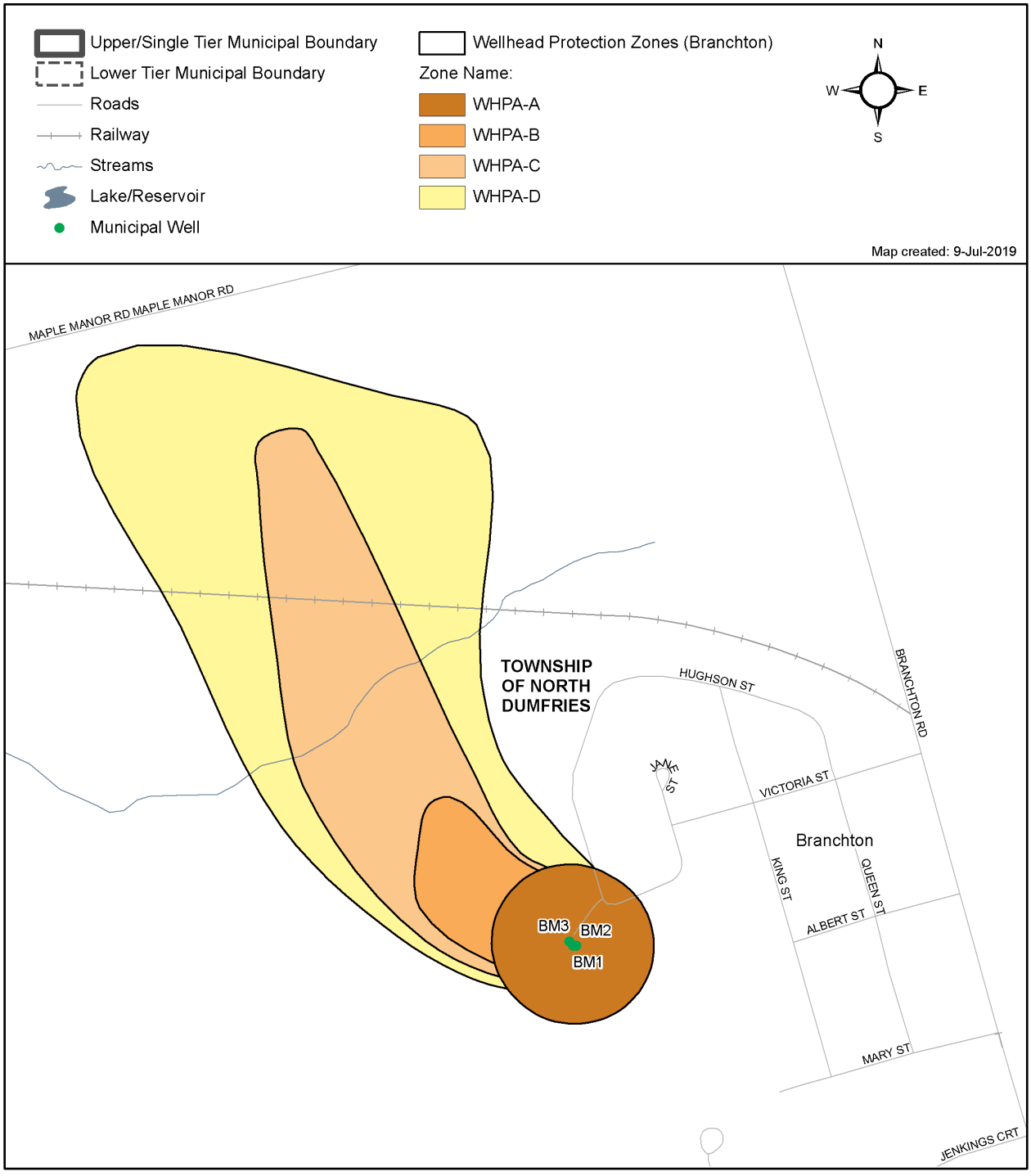
[1] Prescribed Drinking Water Quality Threat Number refers to the prescribed drinking water threat listed in O. Reg. 287/07 s.1.1 (1)

[2] Where applicable, waste, sewage, and livestock threat numbers are reported by sub-threat; fuel and DNAPL by Prescribed Drinking Water Threat category.

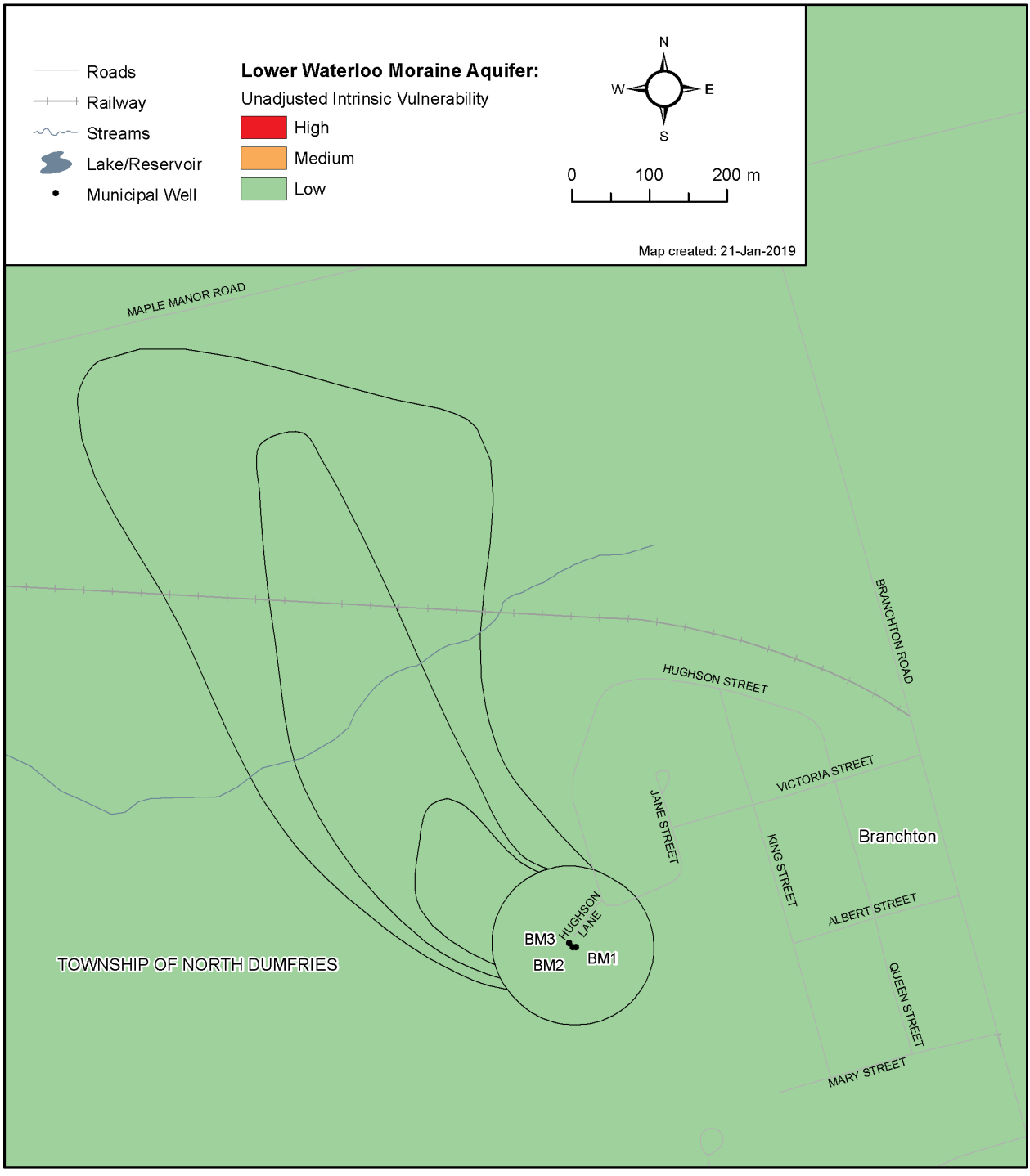
## Map 8.6—11: Branchton Meadows Well Supply Serviced Areas



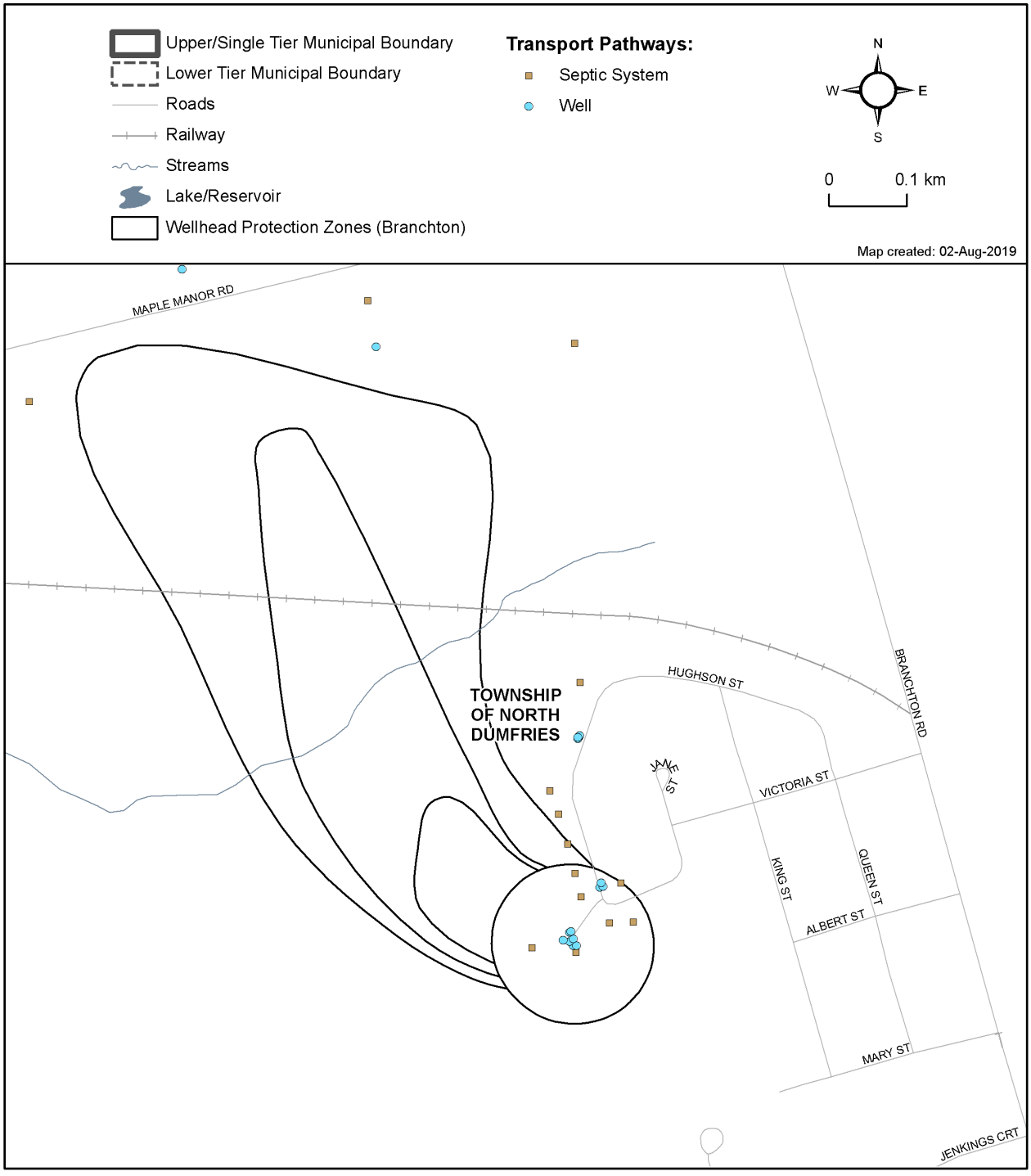
## Map 8.6—12: Branchton Meadows Well Supply Wellhead Protection Area



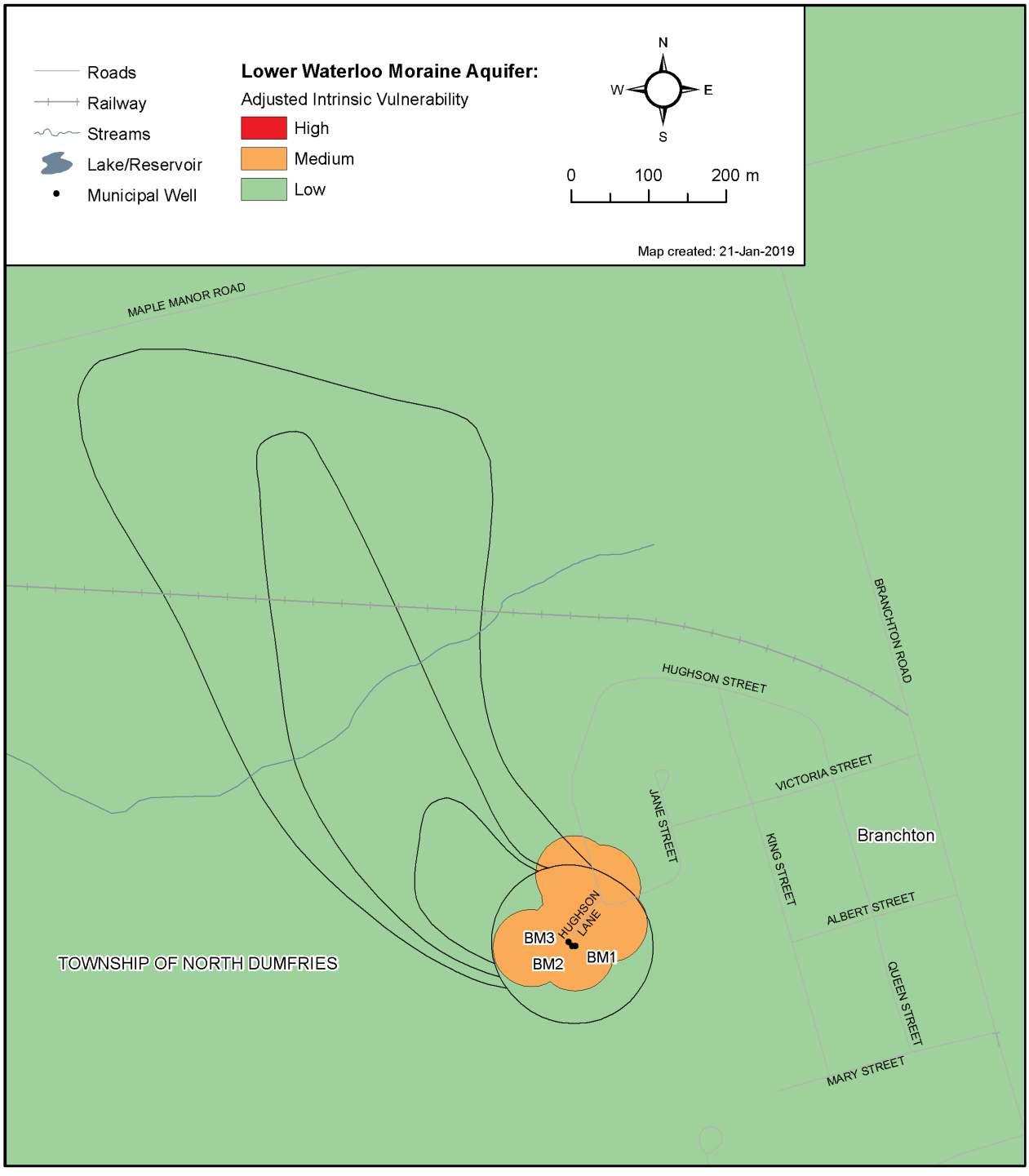
## Map 8.6—13: Branchton Meadows Well Supply Wellhead Protection Area Unadjusted Intrinsic Vulnerability



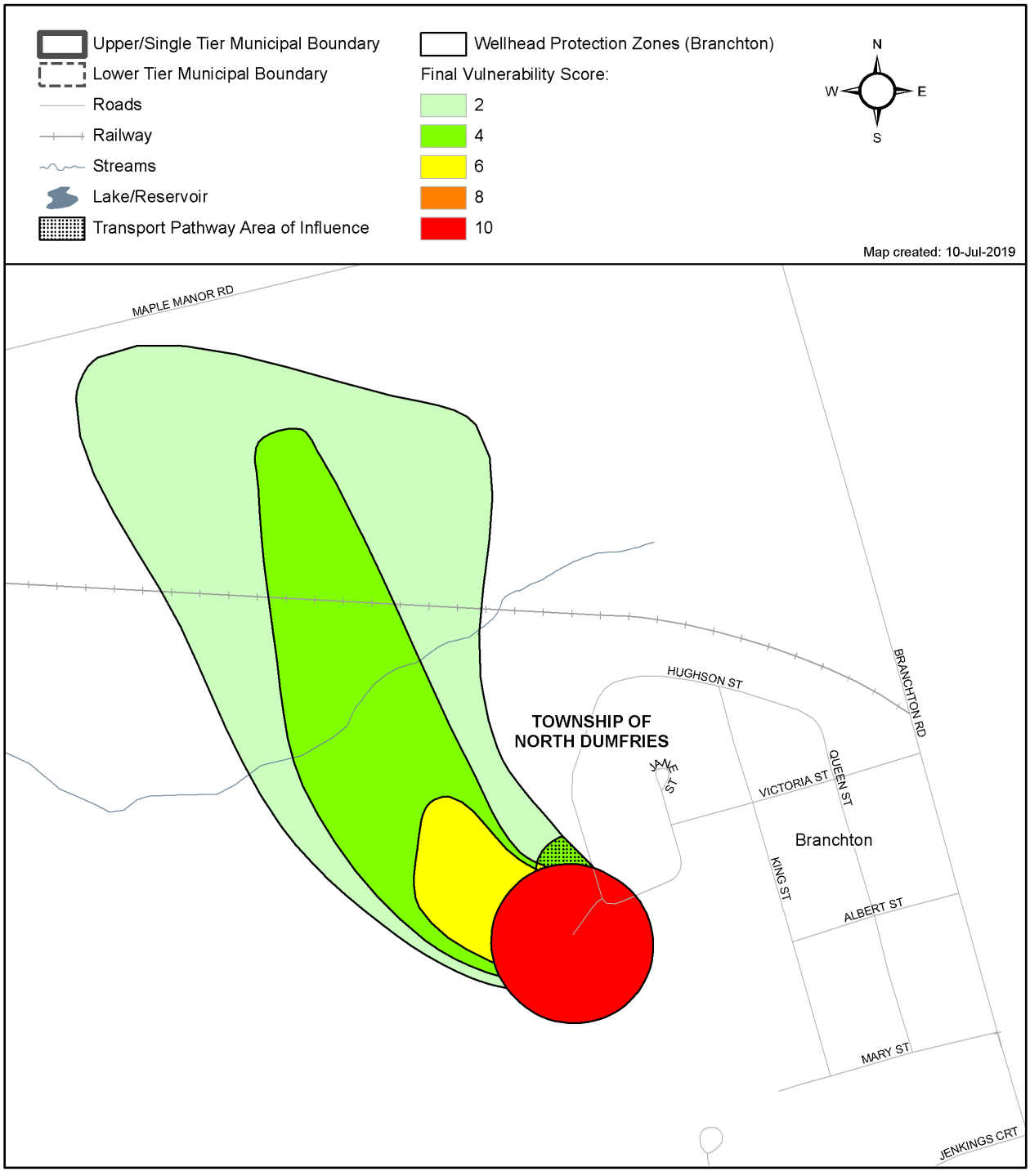
## Map 8.6—14: Branchton Meadows Well Supply Transport Pathways



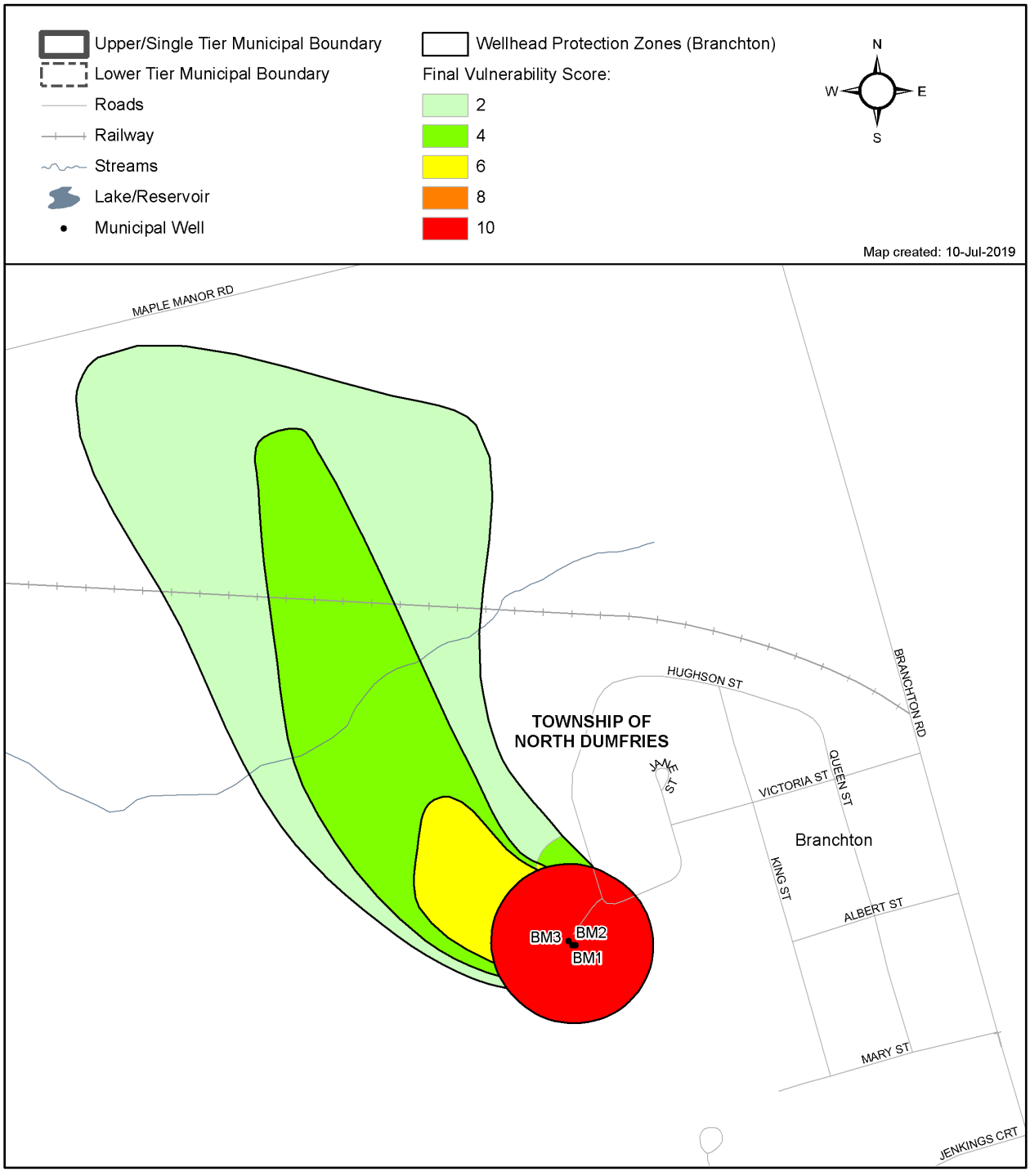
## Map 8.6—15: Branchton Meadows Well Supply Wellhead Protection Area Adjusted Intrinsic Vulnerability



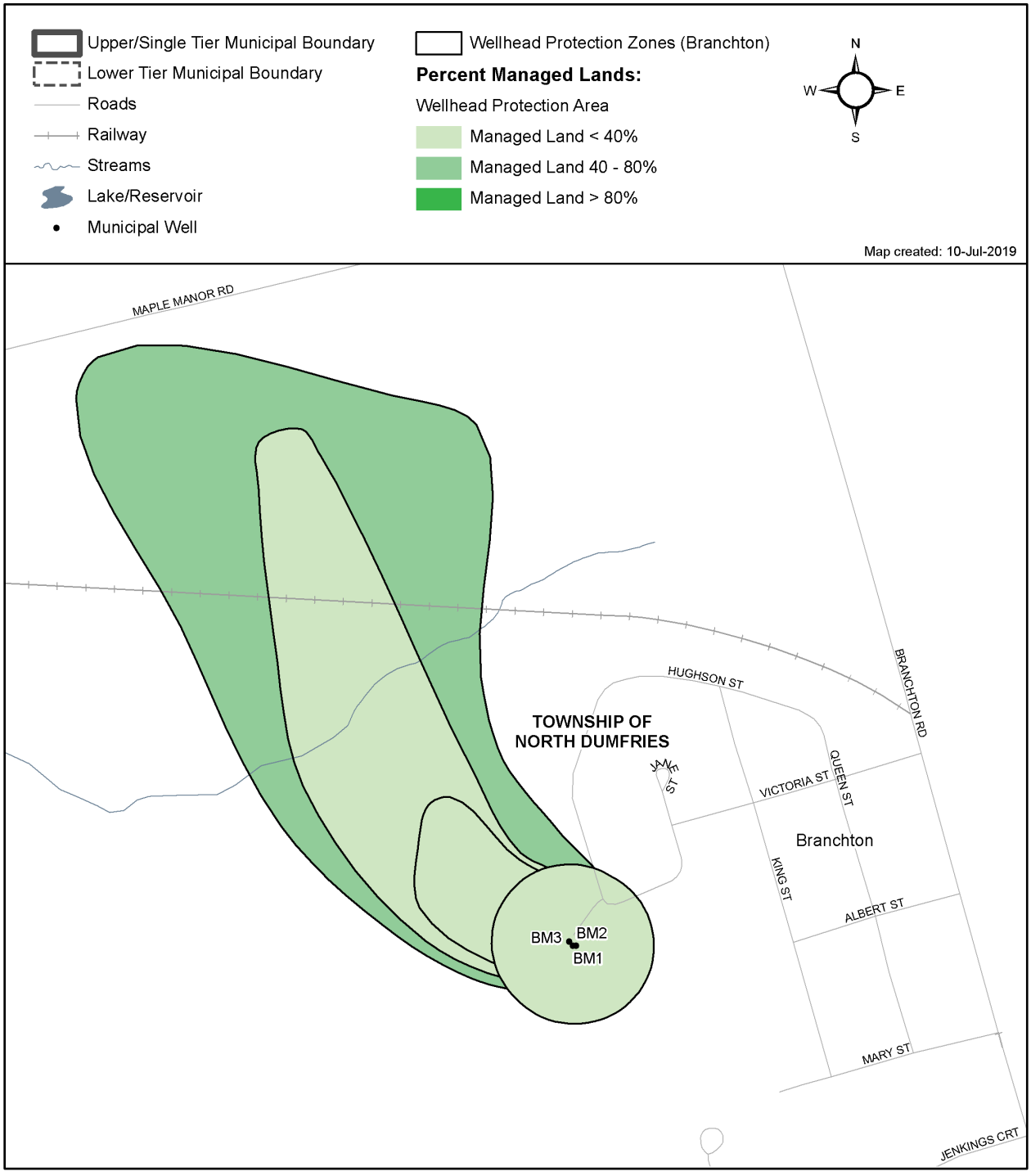
## Map 8.6—16: Branchton Meadows Well Supply Wellhead Protection Area Transport Pathways Area of Influence



## Map 8.6—17: Branchton Meadows Well Supply Wellhead Protection Area Final Vulnerability

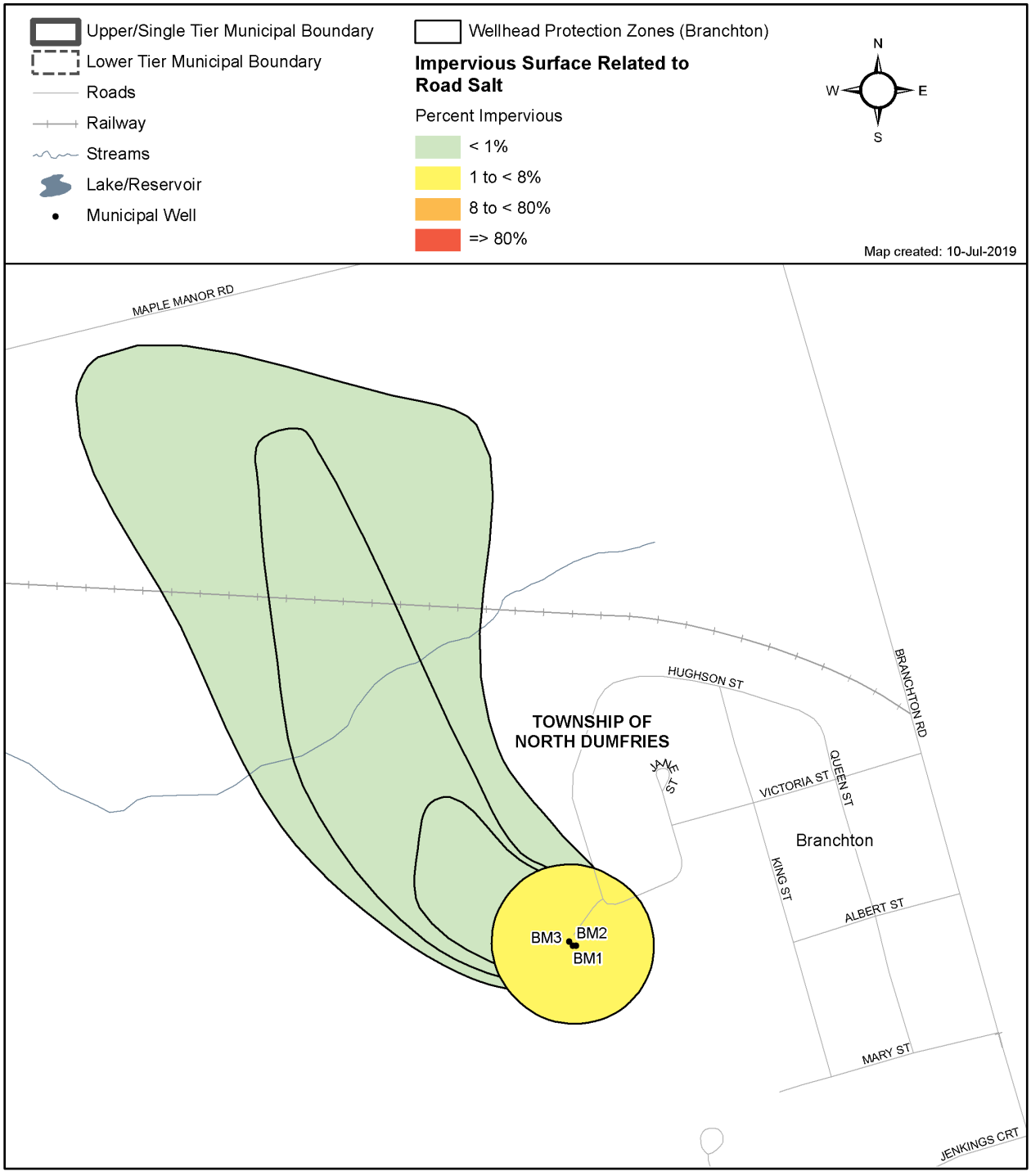


## Map 8.6—18: Branchton Meadows Well Supply Percent Managed Lands

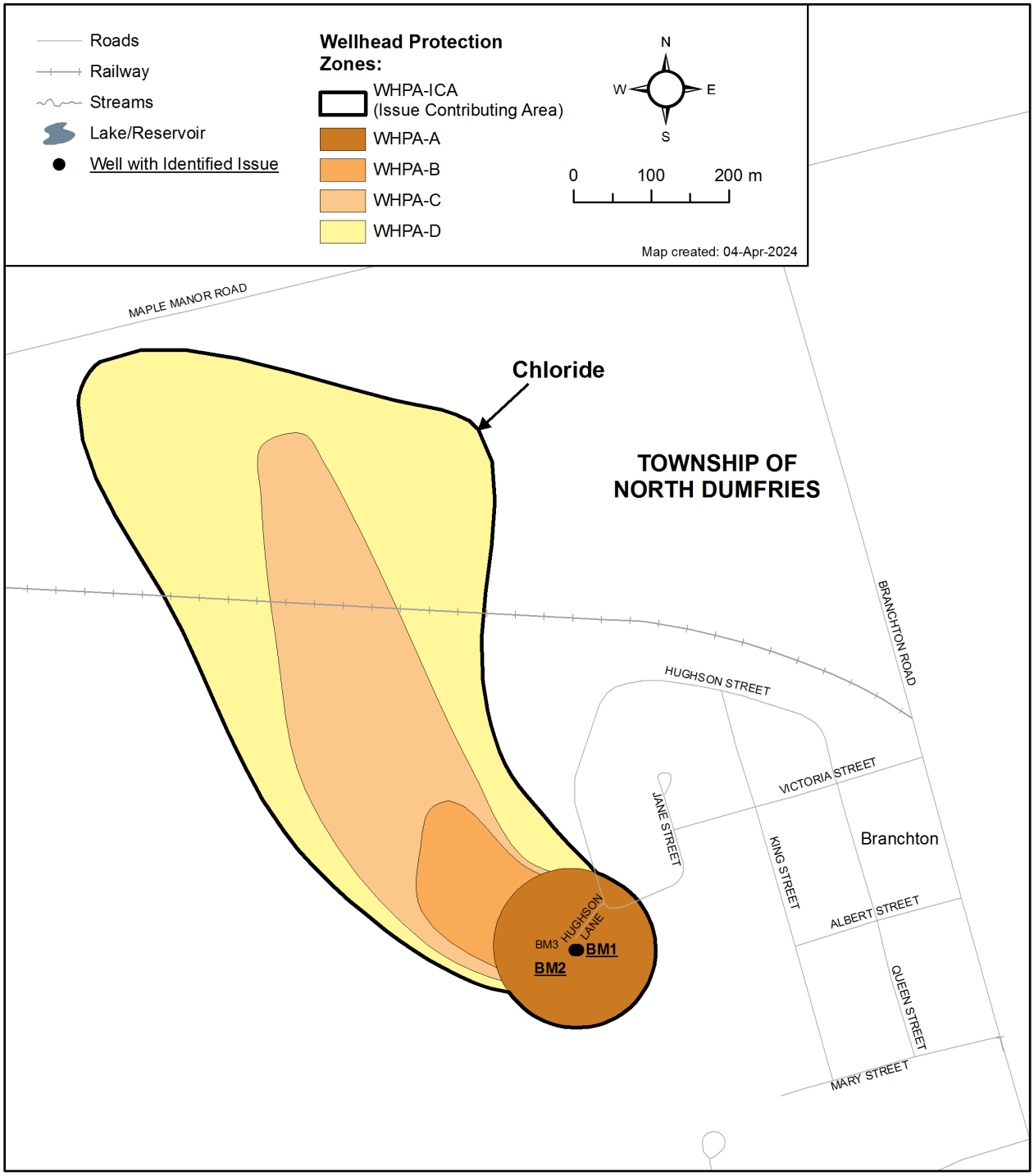


## Map 8.6—19: Branchton Meadows Well Supply Livestock Density

## Map 8.6—20: Branchton Meadows Well Supply Percent Impervious Surfaces



## Map 8.6—21: Branchton Meadows Well Supply Issue Contributing Area



### 8.6.3 Elmira Wellfield

The water supply for the Elmira Wellfield is obtained from production well E10 and is part of the IUS. The serviced areas are presented on **Map 8.6—182.** The production well is completed with a screened interval of approximately 45 to 53 m below ground surface within the Pre-Catfish Creek Aquifer (AFD1), which overlies bedrock (**Table 8.1—6**).

#### Vulnerability and Transport Pathways

The WHPA for Elmira is presented on **Map 8.6—183.** The unadjusted intrinsic vulnerability is shown on **Map 8.6—184** and the adjusted intrinsic vulnerability is shown on **Map 8.6—186.** Analysis of the attributes of each potential transport pathway (**Map 8.6—185**) in the Elmira WHPA resulted in the identification of well and septic system clusters situated in the WHPA-A through WHPA-D that warranted increases to the ISI. **Map 8.6—187** shows the area of influence for these transport pathways, while **Map 8.6—188** shows the final vulnerability scoring.

#### Identification of Significant, Moderate and Low Drinking Water Quality Threats in the Elmira Wellhead Protection Areas

The identification of a land use activity as a significant, moderate, or low drinking water threat depends on its risk score, determined by considering the circumstances of the activity and the type and vulnerability score of any underlying protection zones, as set out in the Tables of Drinking Water Threats. Information on drinking water threats is also accessible through the Source Water Protection Information Portal. The information above can be used with the vulnerability scores shown in **Map 8.6—188** to help the public determine where certain activities are or would be significant, moderate and low drinking water threats.

**Table 8.6—55** provides a summary of the threat levels possible in the Elmira Wellfield for Chemicals, Dense Non-Aqueous Phase Liquids (DNAPLs), and Pathogens. “Yes” indicates that the threat classification level is possible for the indicated threat type under the corresponding vulnerable area / vulnerable score; “No" indicates that it is not. The colours shown for each vulnerability score correspond to those shown in **Map 8.6—188**.

**Table 8.6—5: Identification of Drinking Water Quality Threats in the Elmira Wellhead Protection Areas**

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| Chemicals | WHPA-A/B | 10 | Yes | Yes | Yes |
| Chemicals | WHPA-B/C | 8 | Yes | Yes | Yes |
| Chemicals | WHPA-B/C/D | 6 | No | Yes | Yes |
| Chemicals | WHPA-C/D | 2 & 4 | No | No | No |
| DNAPLs | WHPA-A/B/C | Any Score | Yes | No | No |
| DNAPLs | WHPA-D | 6 | No | Yes | Yes |
| DNAPLs | WHPA-D | 2 & 4 | No | No | No |
| Pathogens | WHPA-A/B | 10 | Yes | Yes | No |

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| Pathogens | WHPA-B | 8 | No | Yes | Yes |
| Pathogens | WHPA-B | 6 | No | No | Yes |

### Threats and Issues Enumeration for the Elmira Wellfield

The percent managed land, livestock density, and percent impervious surface for each protection zone in the Wellfield are shown in **Map 8.6—189, Map 8.6—190 and Map 8.6—191**, respectively.

The total number of identified significant drinking water threats in this wellfield is 31. The number of properties in this Wellfield with identified significant drinking water threats is 7. Details surrounding the types of threats and circumstances found in the Elmira wellhead protection areas are outlined in **Table 8.6—56**.

The total number of Conditions identified in the wellfield as per Technical Rule 126 is 1 of which 0 are ranked as significant.

No drinking water Issues have been identified in this wellfield as per Technical Rule 114.

**Table 8.6—6: Significant Drinking Water Quality Threats in the Elmira Wellhead Protection Areas (current to February 2019)**

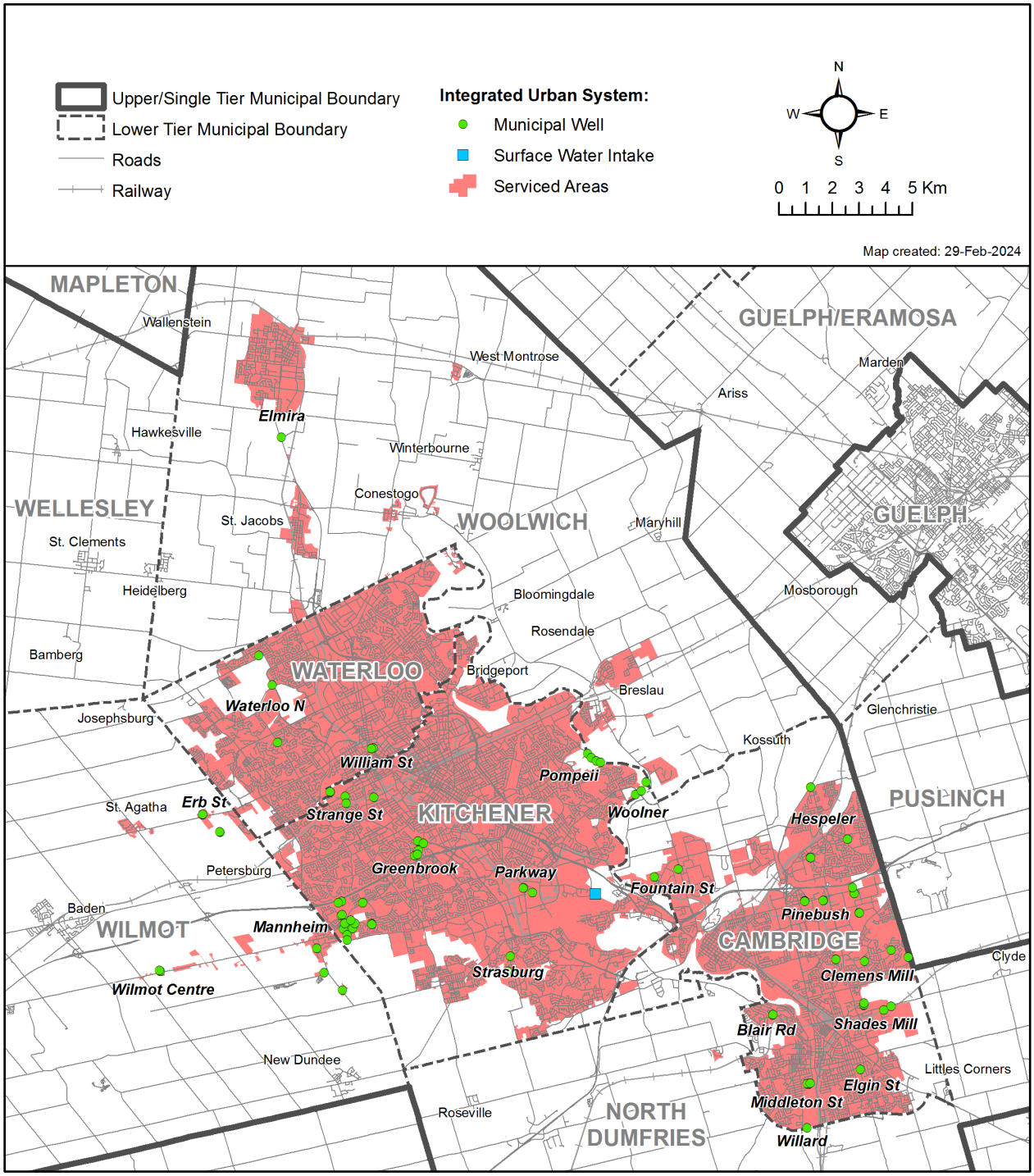
| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| 2 | Sewage system or sewage works - onsite sewage systems holding tanks | 2 | WHPA-A<br>WHPA-B |
| 3 | Application of agricultural source material (ASM) to land | 5 | WHPA-A<br>WHPA-B |
| 4 | Storage of agricultural source material (ASM) | 3 | WHPA-A<br>WHPA-B |
| 8 | Application of commercial fertilizer to land | 5 | WHPA-A<br>WHPA-B |
| 9 | Storage of commercial fertilizer | 3 | WHPA-A<br>WHPA-B |
| 10 | Application of pesticide to land | 4 | WHPA-A<br>WHPA-B |
| 11 | Storage of a pesticide | 2 | WHPA-A<br>WHPA-B |
| 12 | Application of road salt | 2 | WHPA-A |
| 21 | Management or handling of agricultural source material - agricultural source material (ASM) generation (grazing and pasturing) | 2 | WHPA-A<br>WHPA-B |
| | Management or handling of agricultural source material - agricultural source | 3 | WHPA-A<br>WHPA-B |

| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| | material (ASM) generation (yards or confinement) | | |
| **Total Number of Significant Threat Activities** | | **31** | |
| **Total Number of Properties with Significant Threats** | | **7** | |

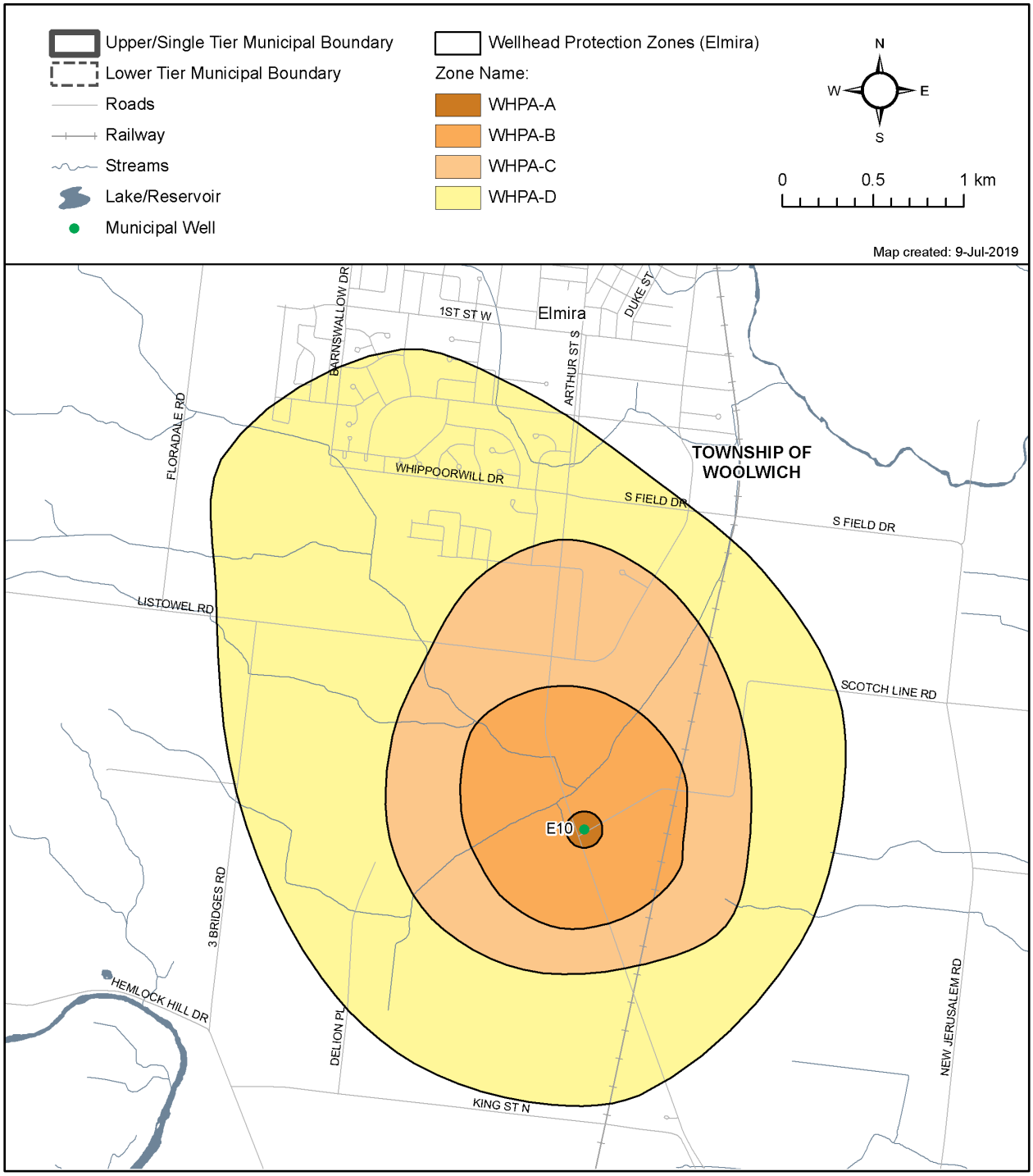
[1] Prescribed Drinking Water Quality Threat Number refers to the prescribed drinking water threat listed in O. Reg. 287/07 s.1.1 (1)

[2] Where applicable, waste, sewage, and livestock threat numbers are reported by sub-threat; fuel and DNAPL by Prescribed Drinking Water Threat category.

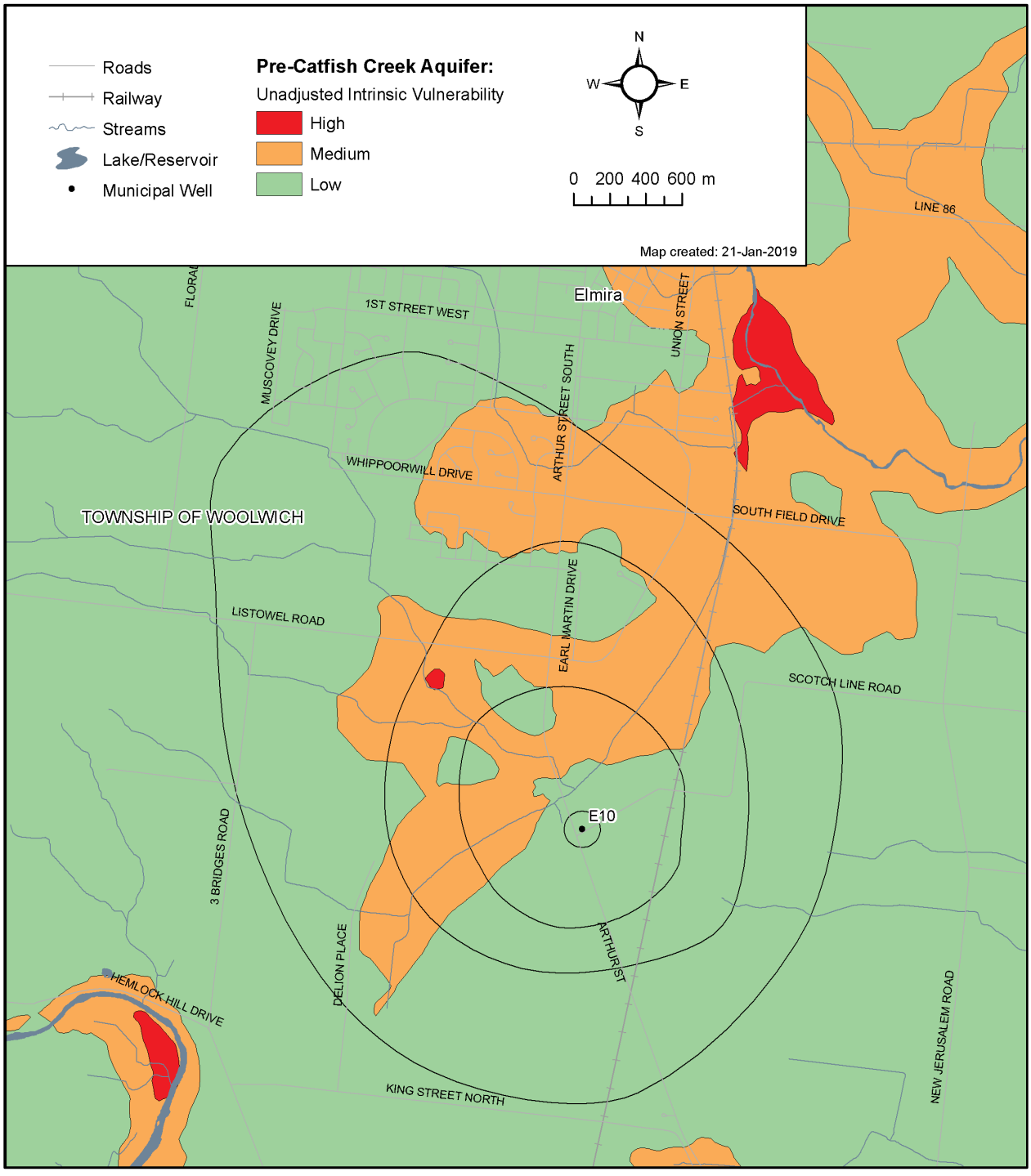
## Map 8.6—22: Integrated Urban System Serviced Areas



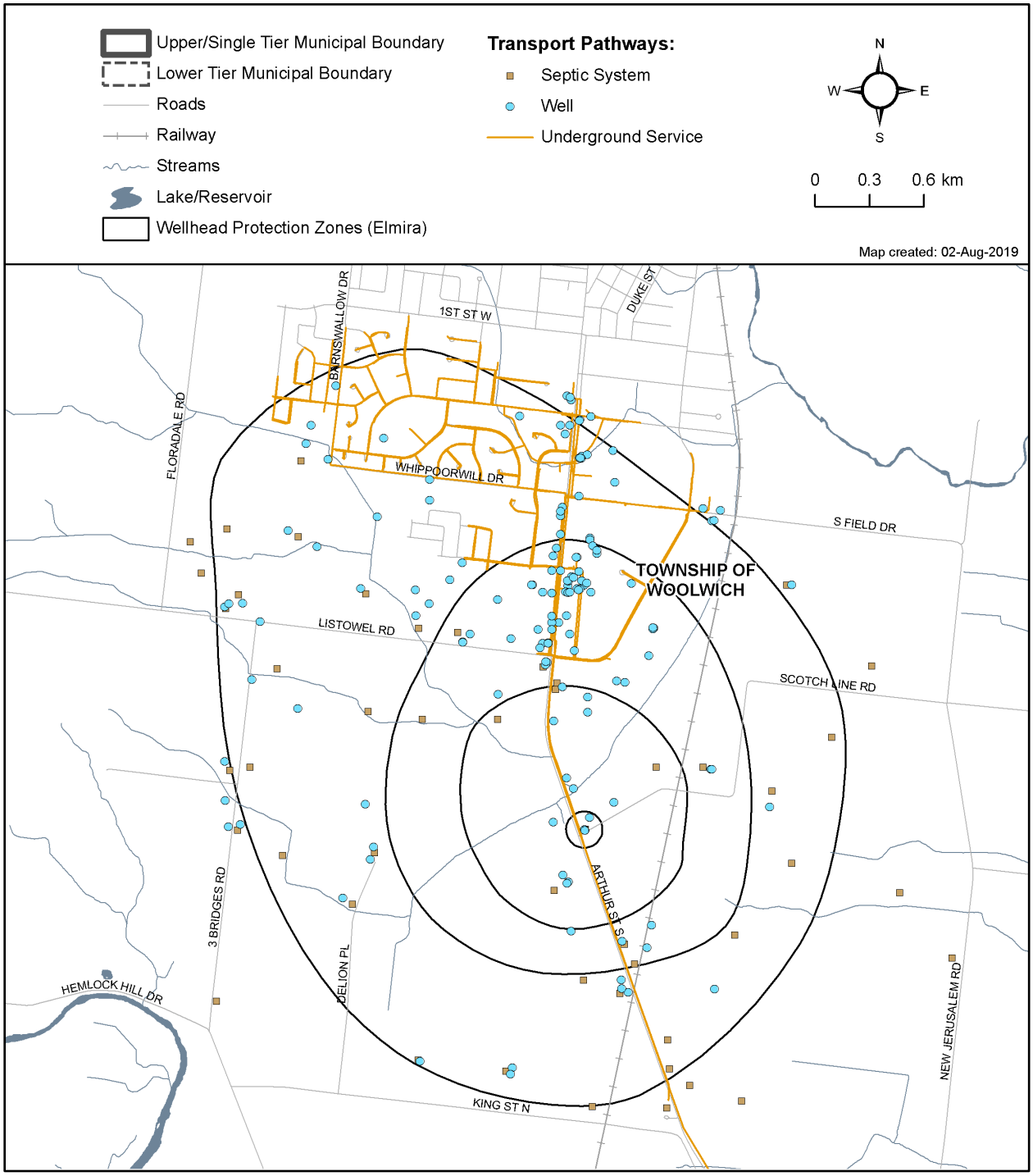
## Map 8.6—23: Elmira Well Supply Wellhead Protection Area



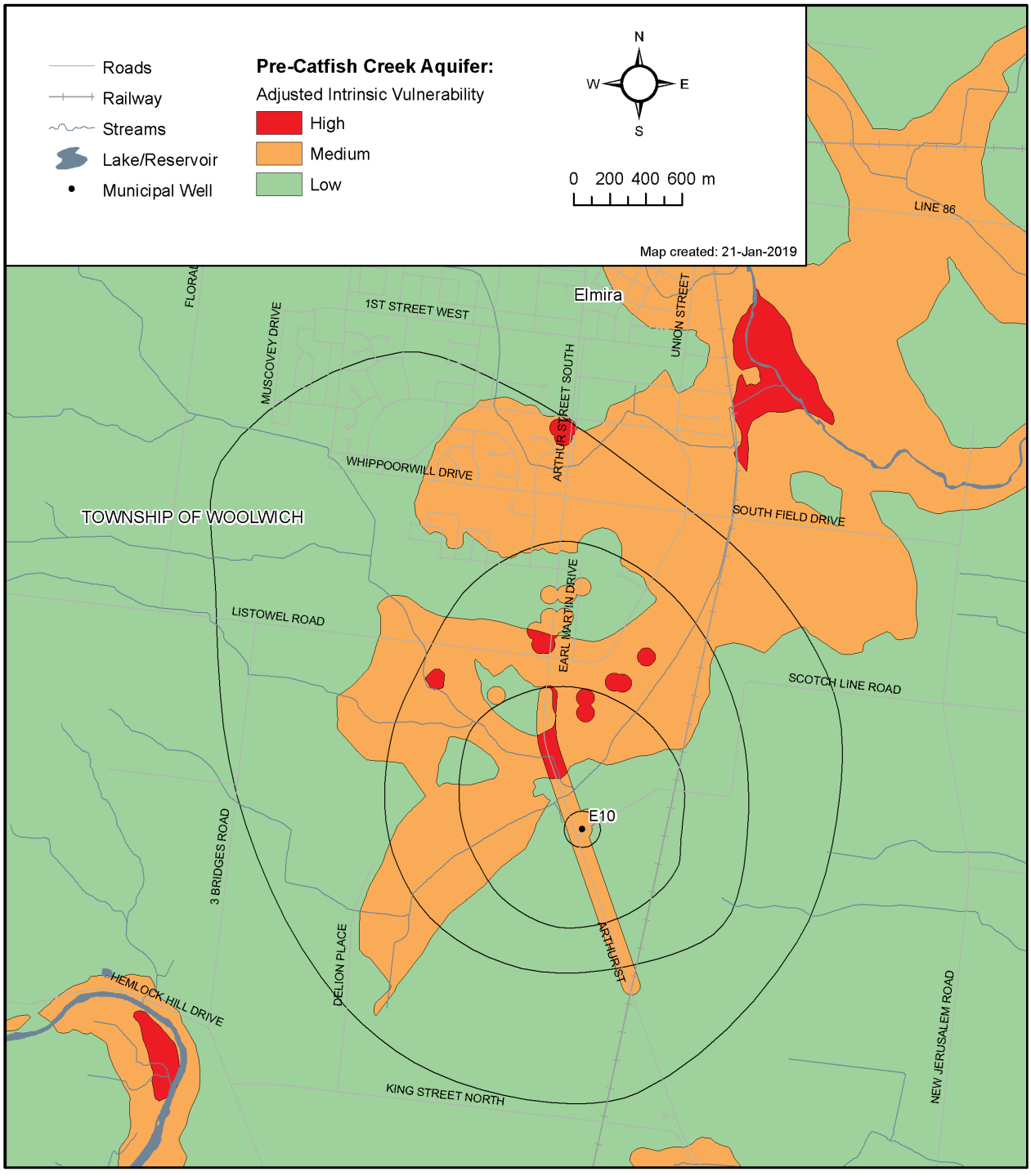
## Map 8.6—24: Elmira Well Supply Wellhead Protection Area Unadjusted Intrinsic Vulnerability



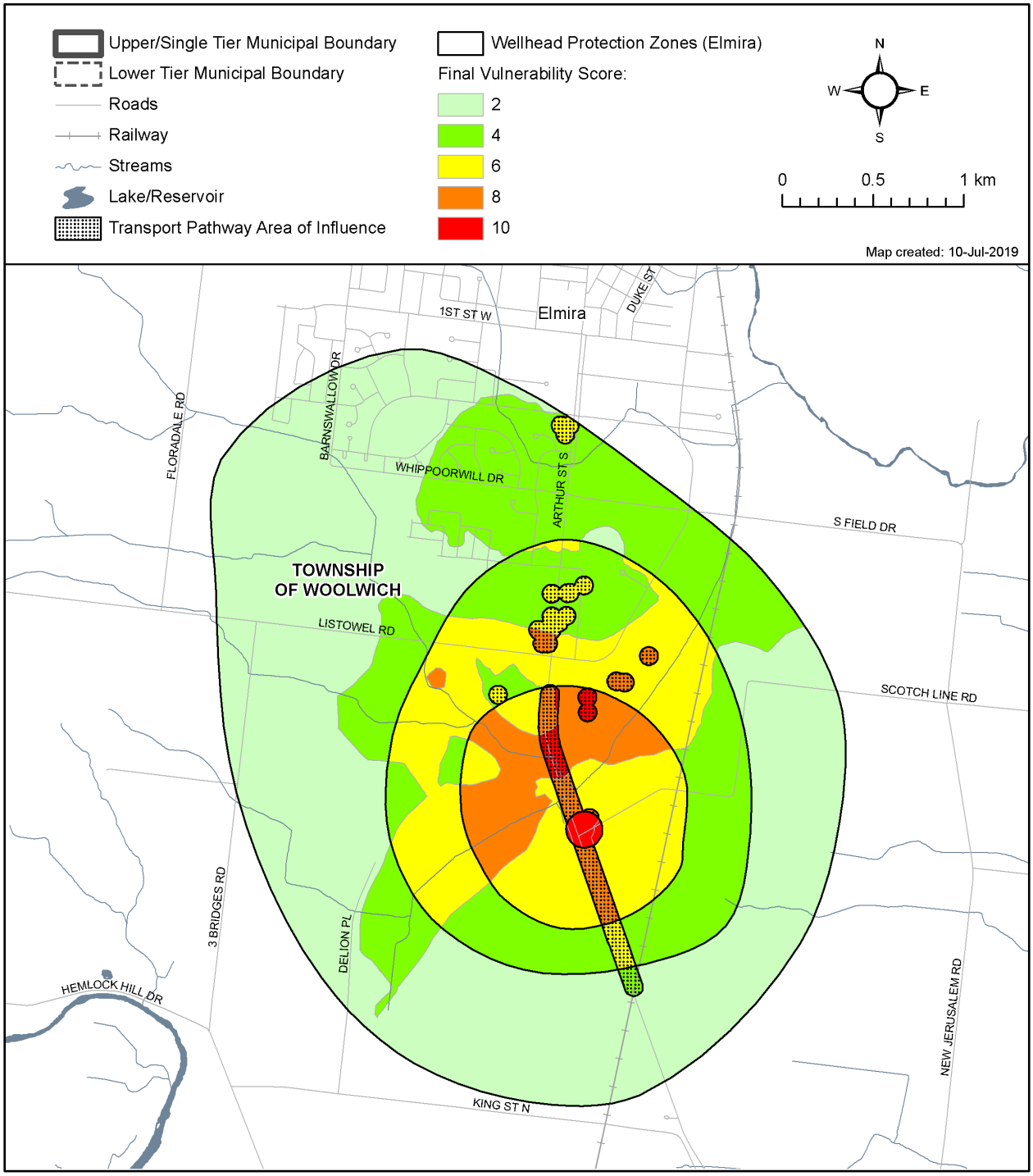
## Map 8.6—25: Elmira Well Supply Transport Pathways



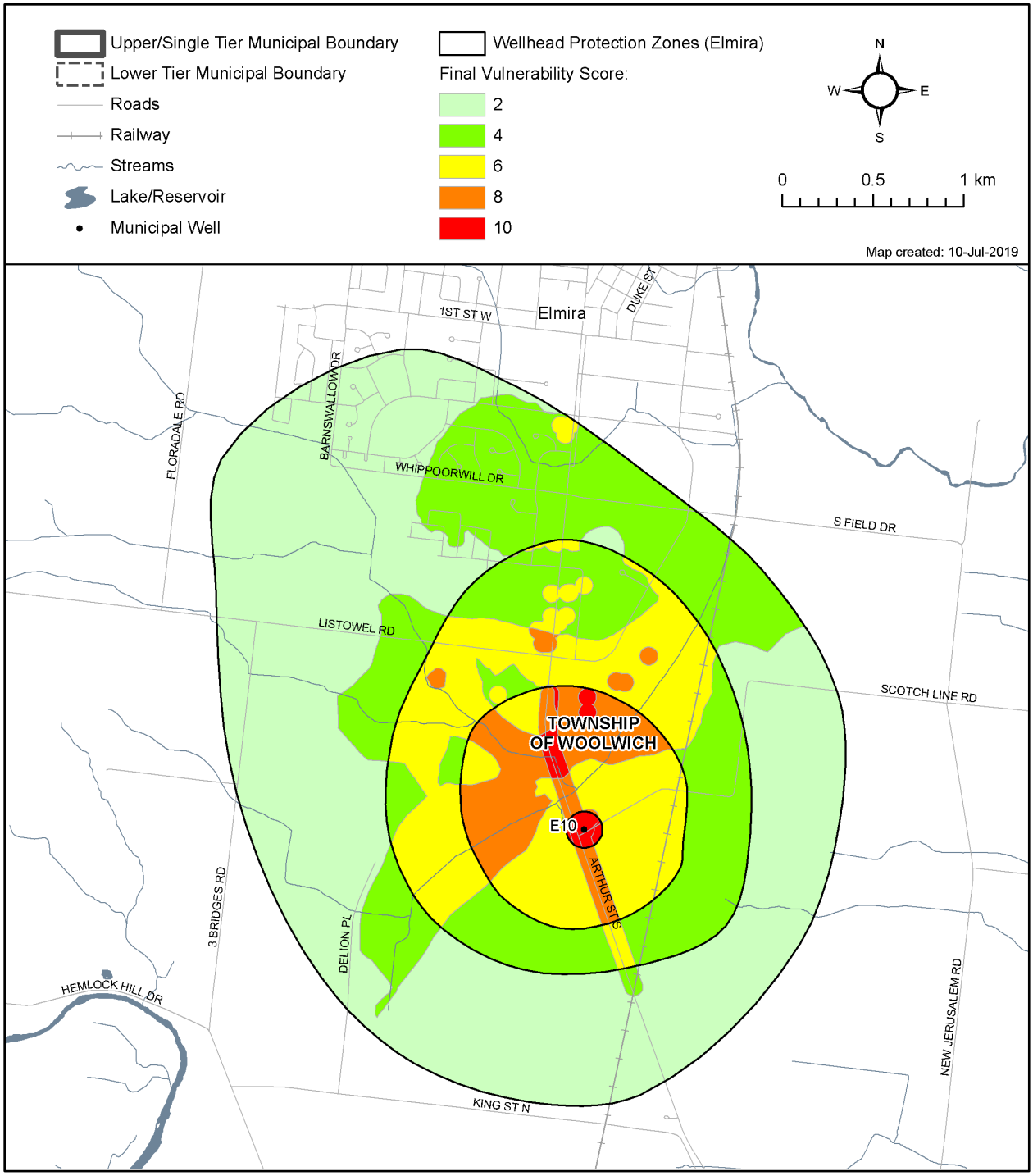
## Map 8.6—26: Elmira Well Supply Wellhead Protection Area Adjusted Intrinsic Vulnerability



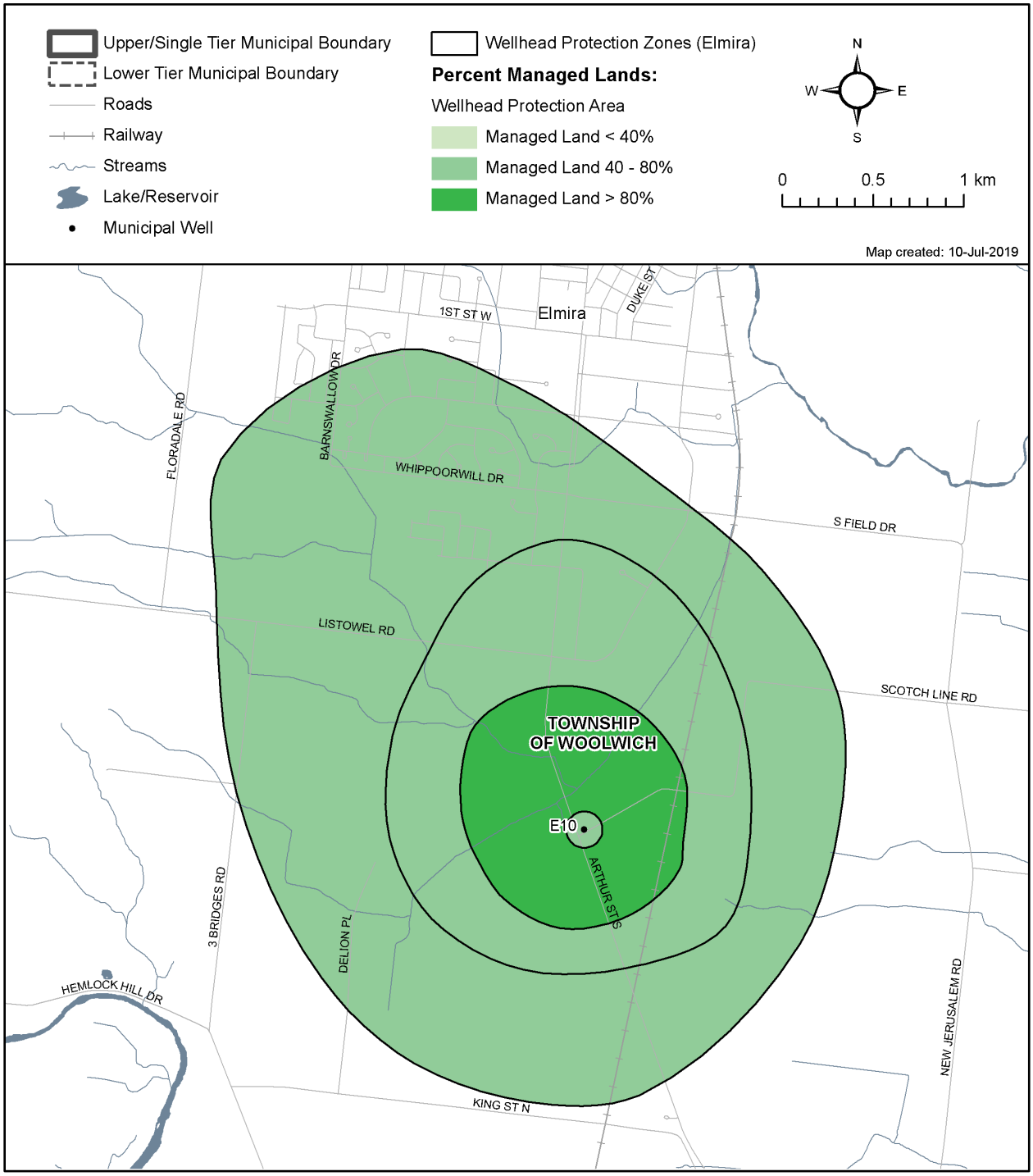
## Map 8.6—27: Elmira Well Supply Transport Pathways Area of Influence



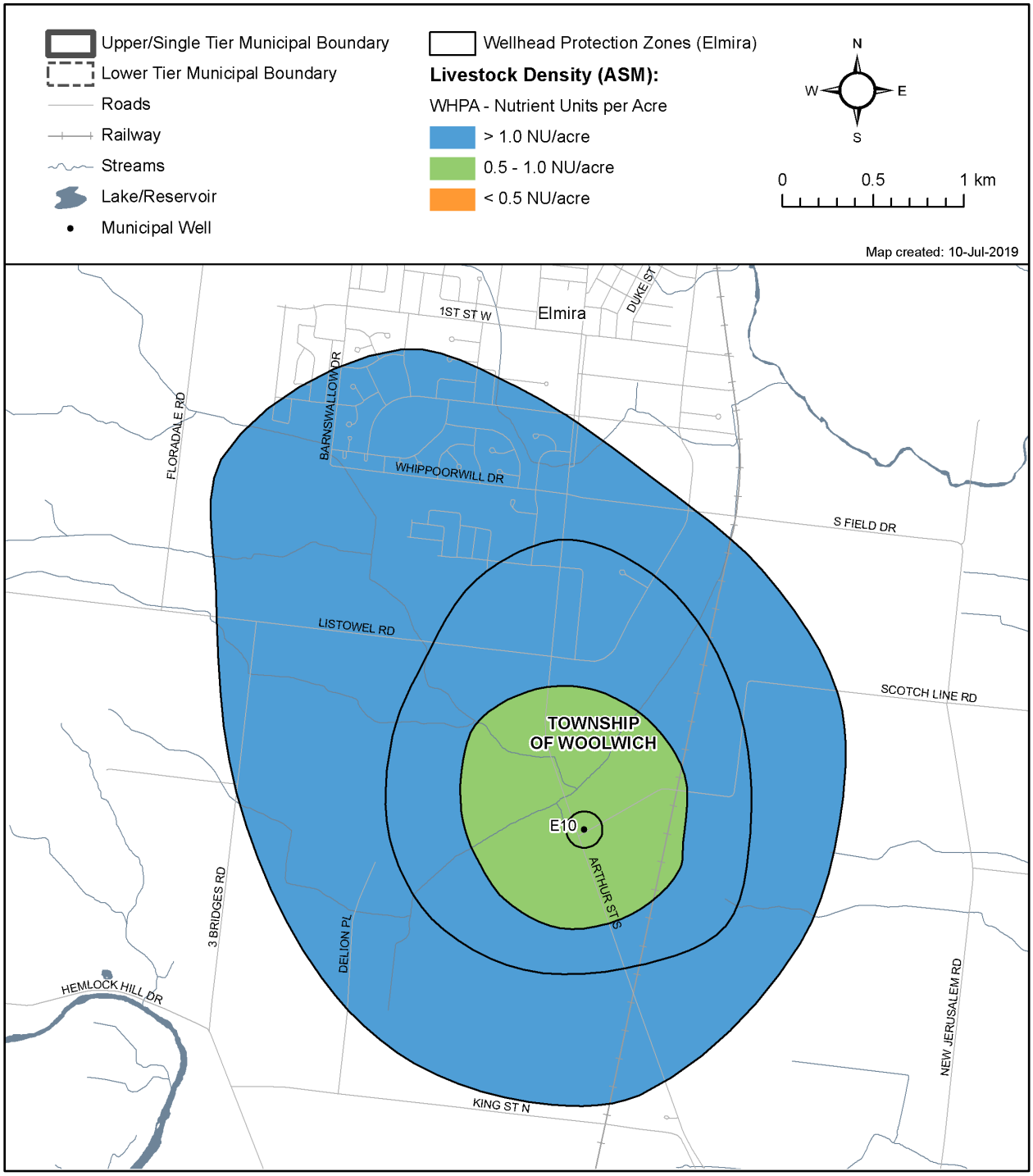
## Map 8.6—28: Elmira Well Supply Wellhead Protection Area Final Vulnerability



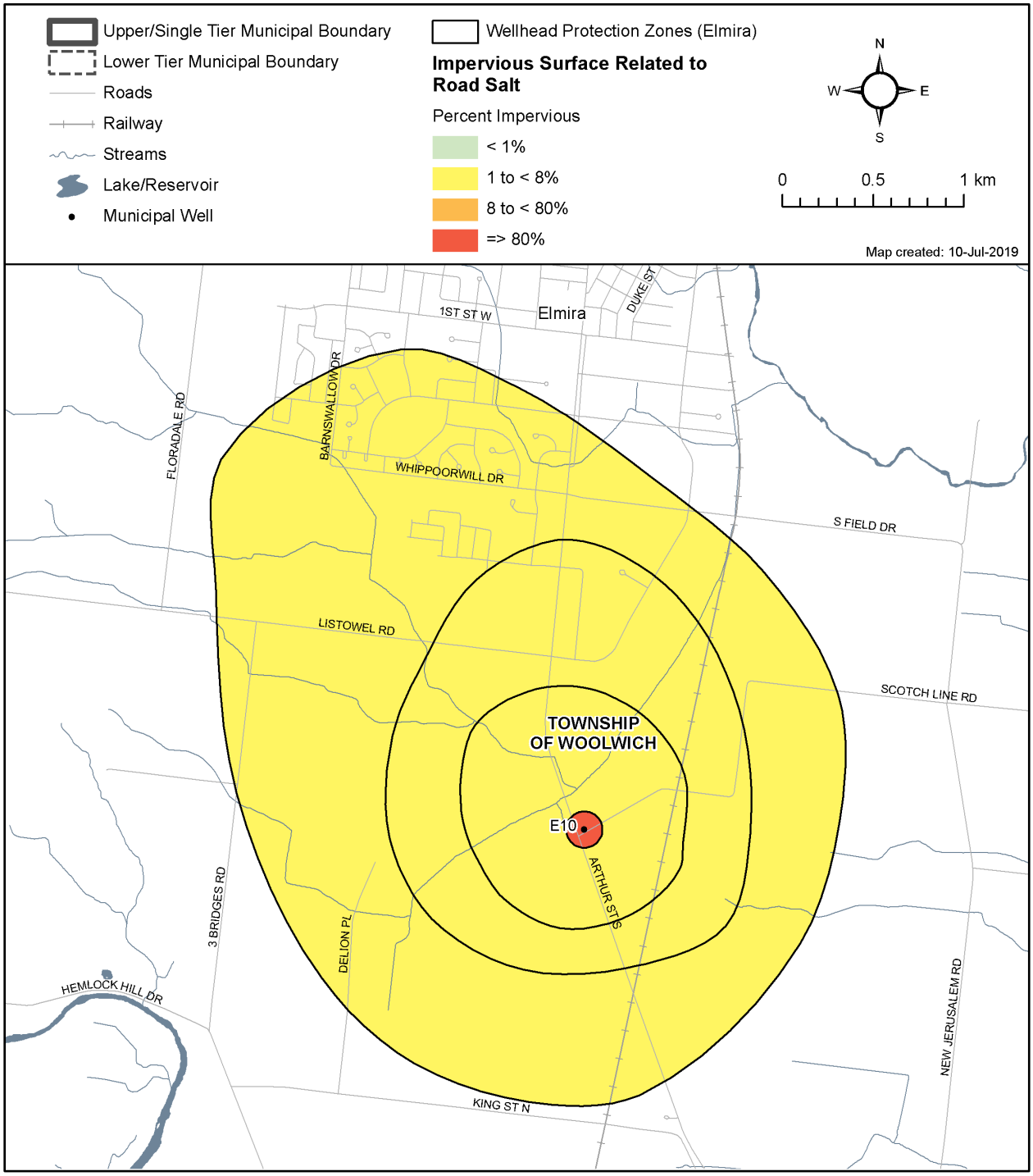
## Map 8.6—29: Elmira Well Supply Percent Managed Lands



## Map 8.6—30: Elmira Well Supply Livestock Density



## Map 8.6—31: Elmira Well Supply Percent Impervious Surfaces



### 8.6.4 Foxboro Green Wellfield

The water supply for the Foxboro Green Wellfield is obtained from production wells FG1, FG2A, and FG4, which supply water to a population of approximately 410 people **(Table 8—1).** The serviced areas are presented on **Map 8.6—192**. All of the production wells are open hole at depths ranging from 47 m BGS to 67 m BGS within the Salina bedrock aquifer. The bedrock is overlain by units consistent with the Pre-Catfish Creek Aquifer (AFD1), Catfish Creek (ATC1), the Maryhill Tills (ATB1 & ATB2) and the Waterloo Moraine Sands present near ground surface (**Table 8.1—6**).

#### Vulnerability and Transport Pathways

The WHPAs are presented on **Map 8.6—193.** The unadjusted intrinsic vulnerability is shown on **Map 8.6—194,** and adjusted intrinsic vulnerability on **Map 8.6—196**. No increases to the ISI were warranted for the potential transport pathways outside of the WHPA-A in the Foxboro Green Wellfield. **Map 8.6—195** shows these transport pathways. **Map 8.6—197** presents the final protection areas and vulnerability scoring for the Foxboro Green WHPA.

#### Identification of Significant, Moderate and Low Drinking Water Quality Threats in the Foxboro Green Wellhead Protection Areas

The identification of a land use activity as a significant, moderate, or low drinking water threat depends on its risk score, determined by considering the circumstances of the activity and the type and vulnerability score of any underlying protection zones, as set out in the Tables of Drinking Water Threats. Information on drinking water threats is also accessible through the Source Water Protection Information Portal. The information above can be used with the vulnerability scores shown in **Map 8.6—197** to help the public determine where certain activities are or would be significant, moderate and low drinking water threats.

**Table 8.6—57** provides a summary of the threat levels possible in the Foxboro Green Wellfield for Chemicals, Dense Non-Aqueous Phase Liquids (DNAPLs), and Pathogens. “Yes” indicates that the threat classification level is possible for the indicated threat type under the corresponding vulnerable area / vulnerable score; “No" indicates that it is not. The colours shown for each vulnerability score correspond to those shown in **Map 8.6—197**.

**Table 8.6—7: Identification of Drinking Water Quality Threats in the Foxboro Green Wellhead Protection Areas**

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | | Moderate Threats | Low Threats |
|---|---|---|---|---|---|---|
| Chemicals | WHPA-A | 10 | Yes | | Yes | Yes |
| Chemicals | WHPA-B | 6 | No | | Yes | Yes |
| DNAPLs | WHPA-A/B/C | Any Score | Yes | | No | No |
| DNAPLs | WHPA-D | 2 | No | | No | No |
| Pathogens | WHPA-A | 10 | Yes | | Yes | No |
| Pathogens | WHPA-B | 6 | No | | No | Yes |

### Threats and Issues Enumeration for the Foxboro Green Wellfield

The percent managed land, livestock density, and percent impervious values for each protection zone in this wellfield are shown in **Map 8.6—198, Map 8.6—199 and Map 8.6—200**, respectively.

The total number of identified significant drinking water threats in this wellfield is 1. The number of properties in this Wellfield with identified significant drinking water threats is 1. Details surrounding the types of threats and circumstances found in the Foxboro Green WHPAs are outlined in **Table 8.6—58**.

No Significant Conditions were identified in this wellfield as per Technical Rule 126.

No drinking water Issues have been identified in this wellfield as per Technical Rule 114.

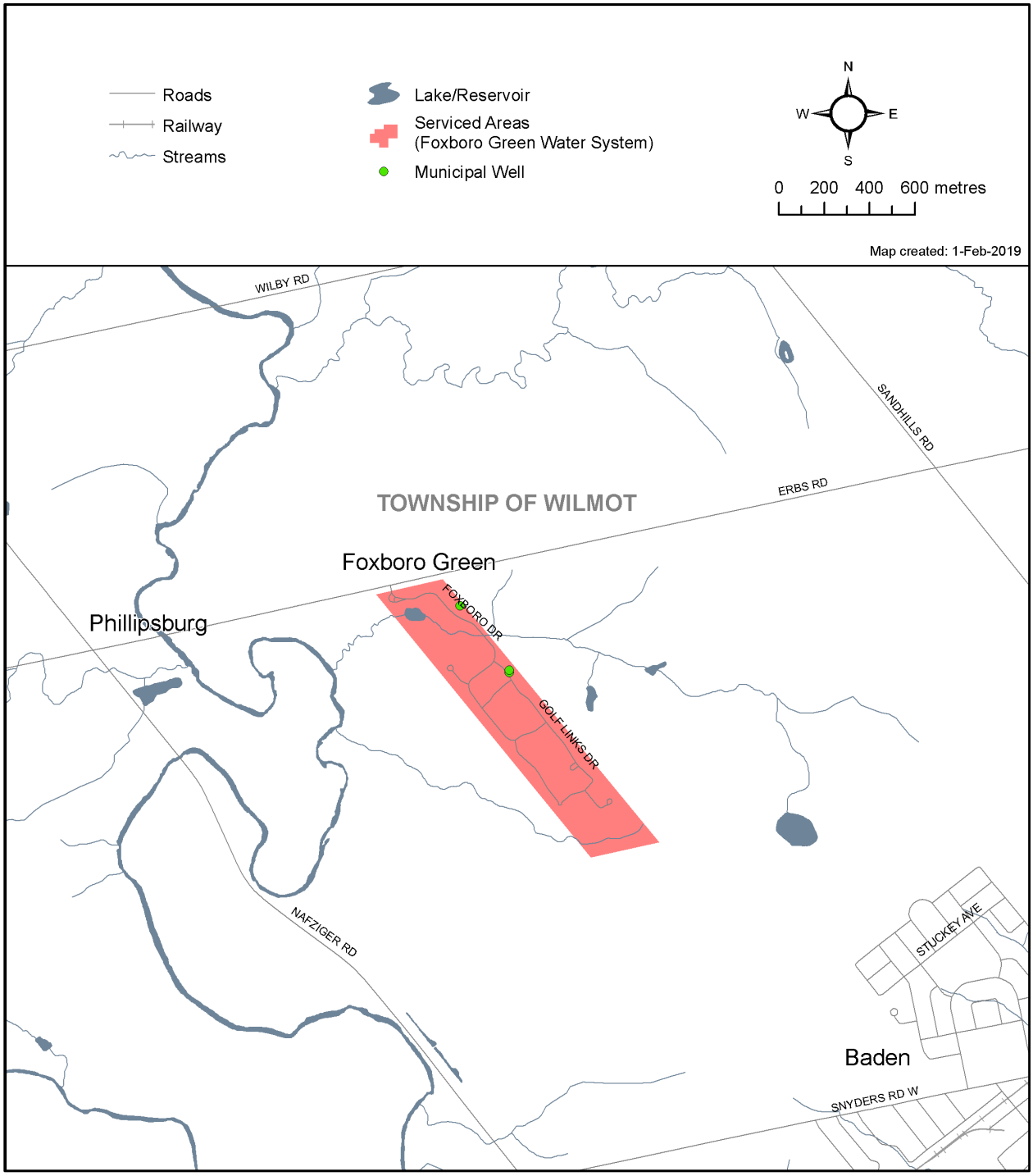
**Table 8.6—8: Significant Drinking Water Quality Threats in the Foxboro Green Wellhead Protection Areas (current to February 2019)**

| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| 2 | Sewage system or sewage works - sanitary sewers and related wastewater collection systems | 1 | WHPA-A |
| **Total Number of Significant Threat Activities** | | **1** | |
| **Total Number of Properties with Significant Threats** | | **1** | |

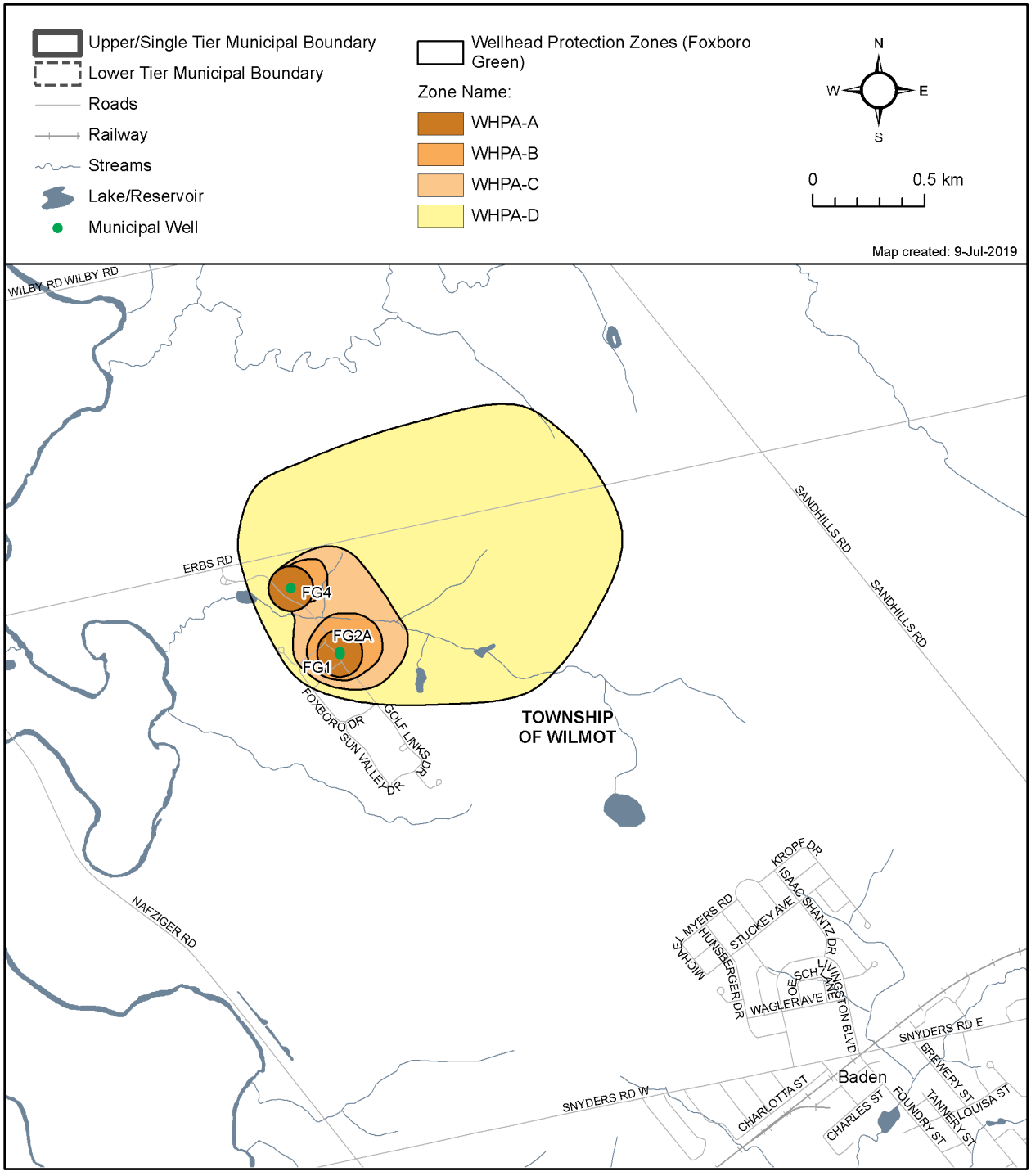
[1] Prescribed Drinking Water Quality Threat Number refers to the prescribed drinking water threat listed in O. Reg. 287/07 s.1.1 (1)

[2] Where applicable, waste, sewage, and livestock threat numbers are reported by sub-threat; fuel and DNAPL by Prescribed Drinking Water Threat category.

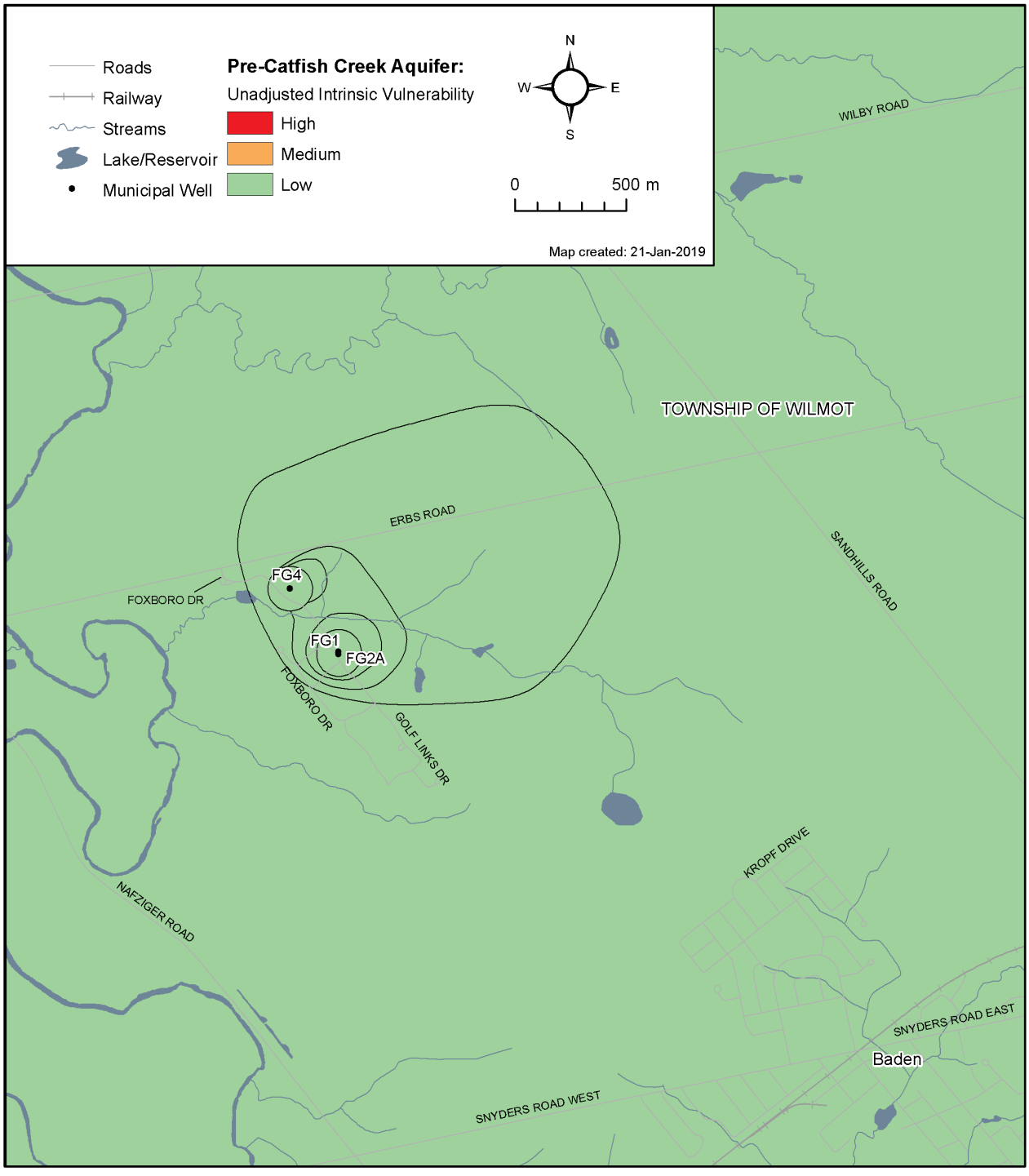
## Map 8.6—32: Foxboro Green Well Supply Serviced Areas



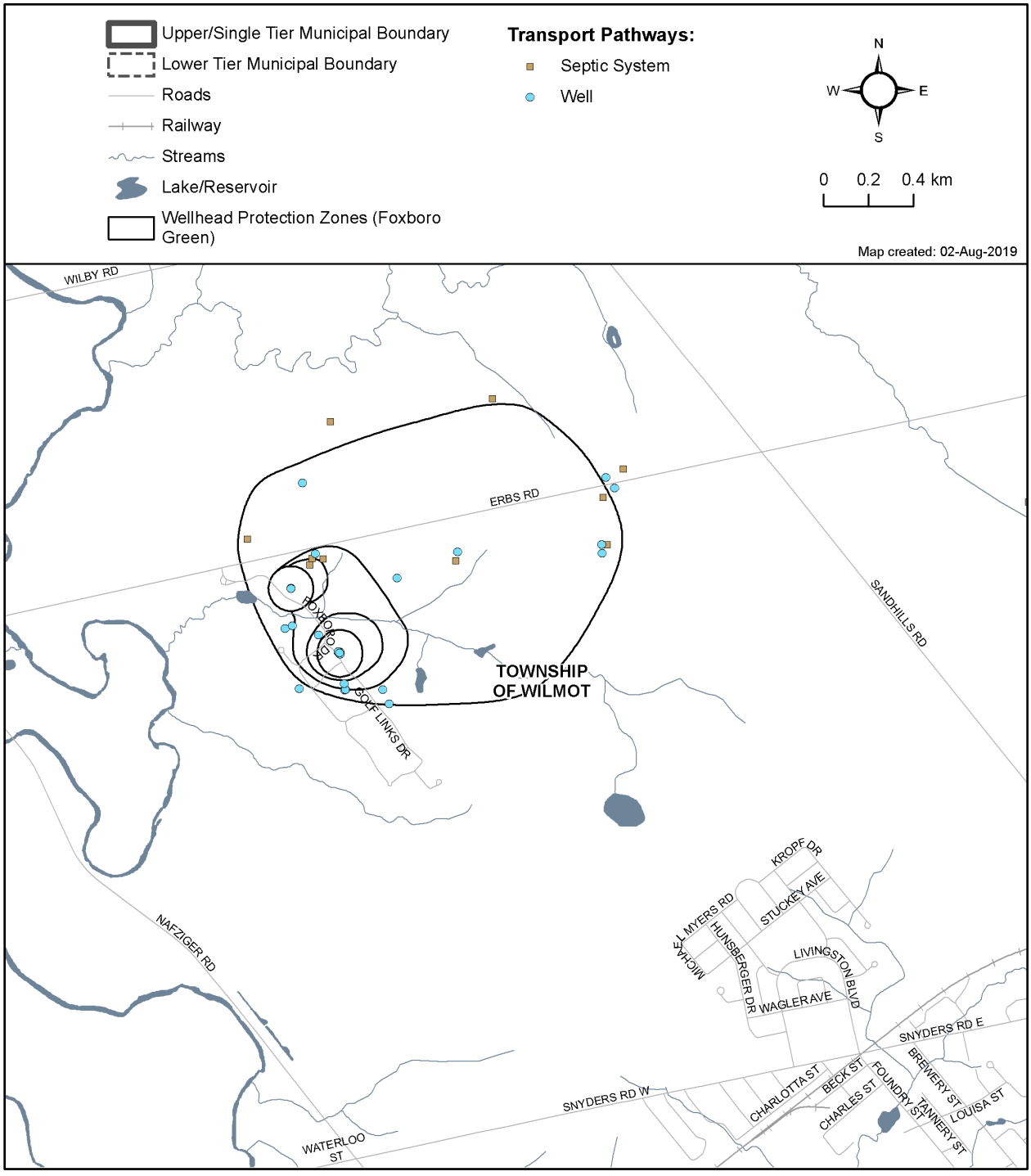
## Map 8.6—33: Foxboro Green Well Supply Wellhead Protection Areas



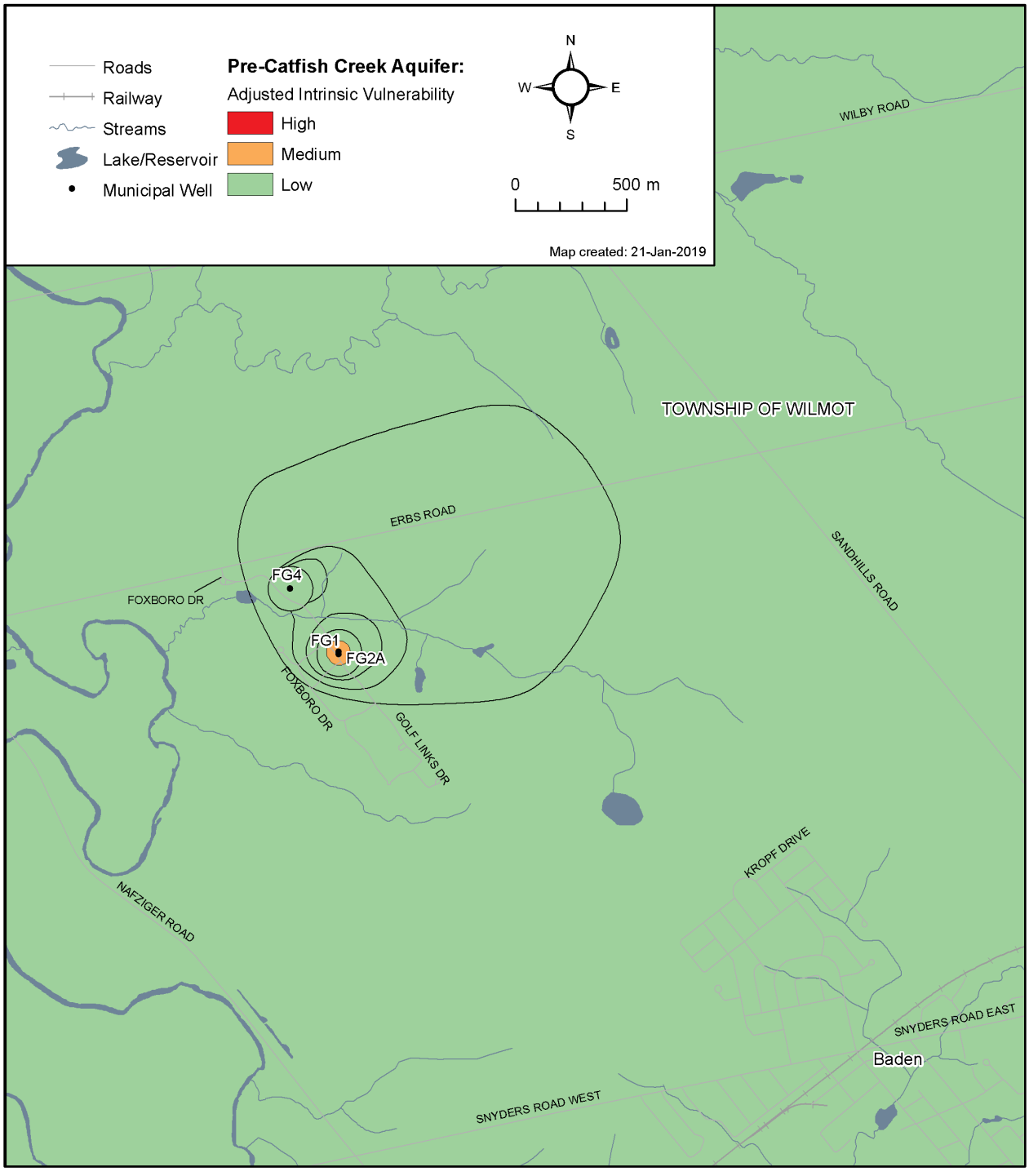
## Map 8.6—34: Foxboro Green Well Supply Wellhead Protection Area Unadjusted Intrinsic Vulnerability



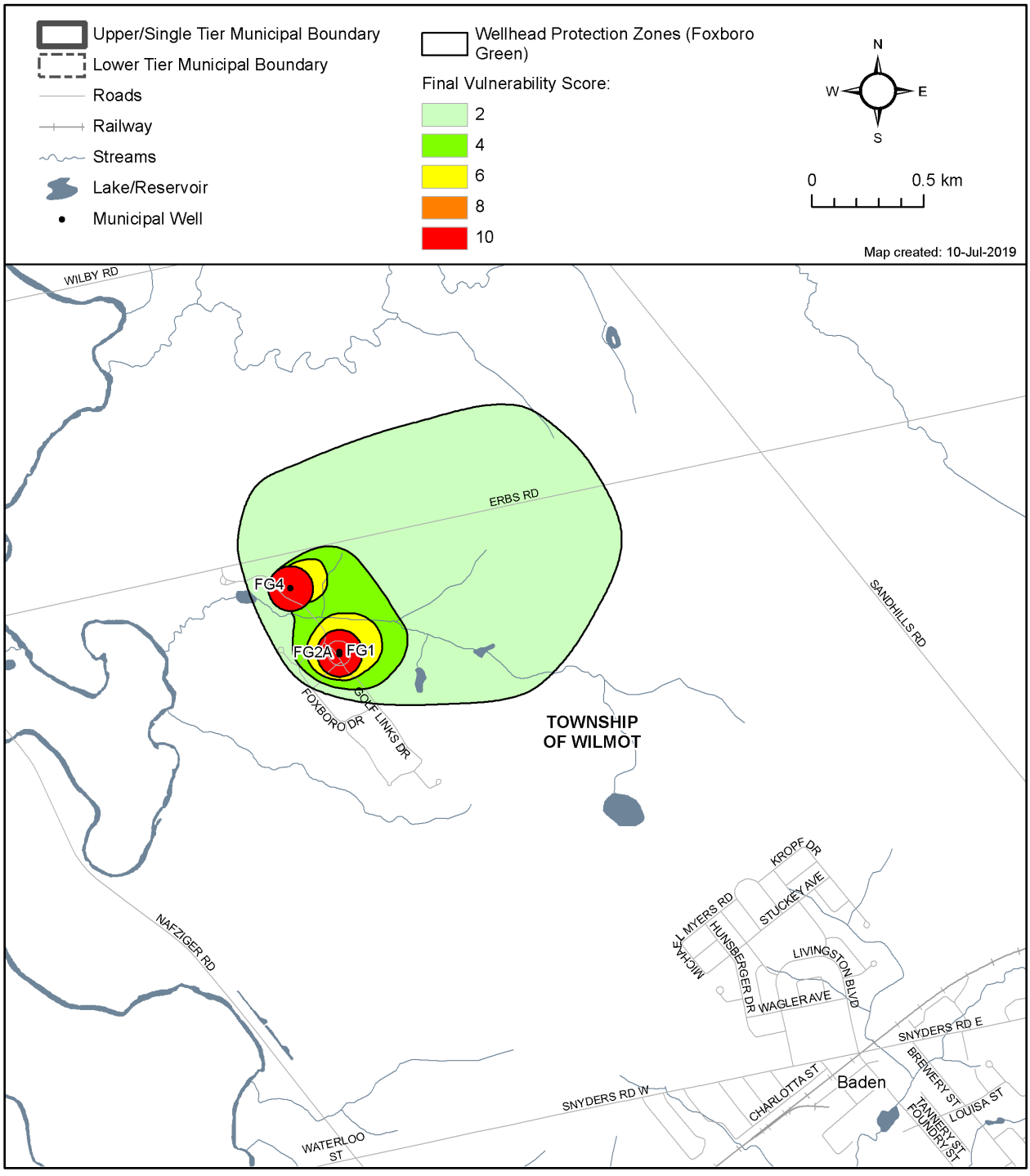
## Map 8.6—35: Foxboro Green Well Supply Transport Pathways



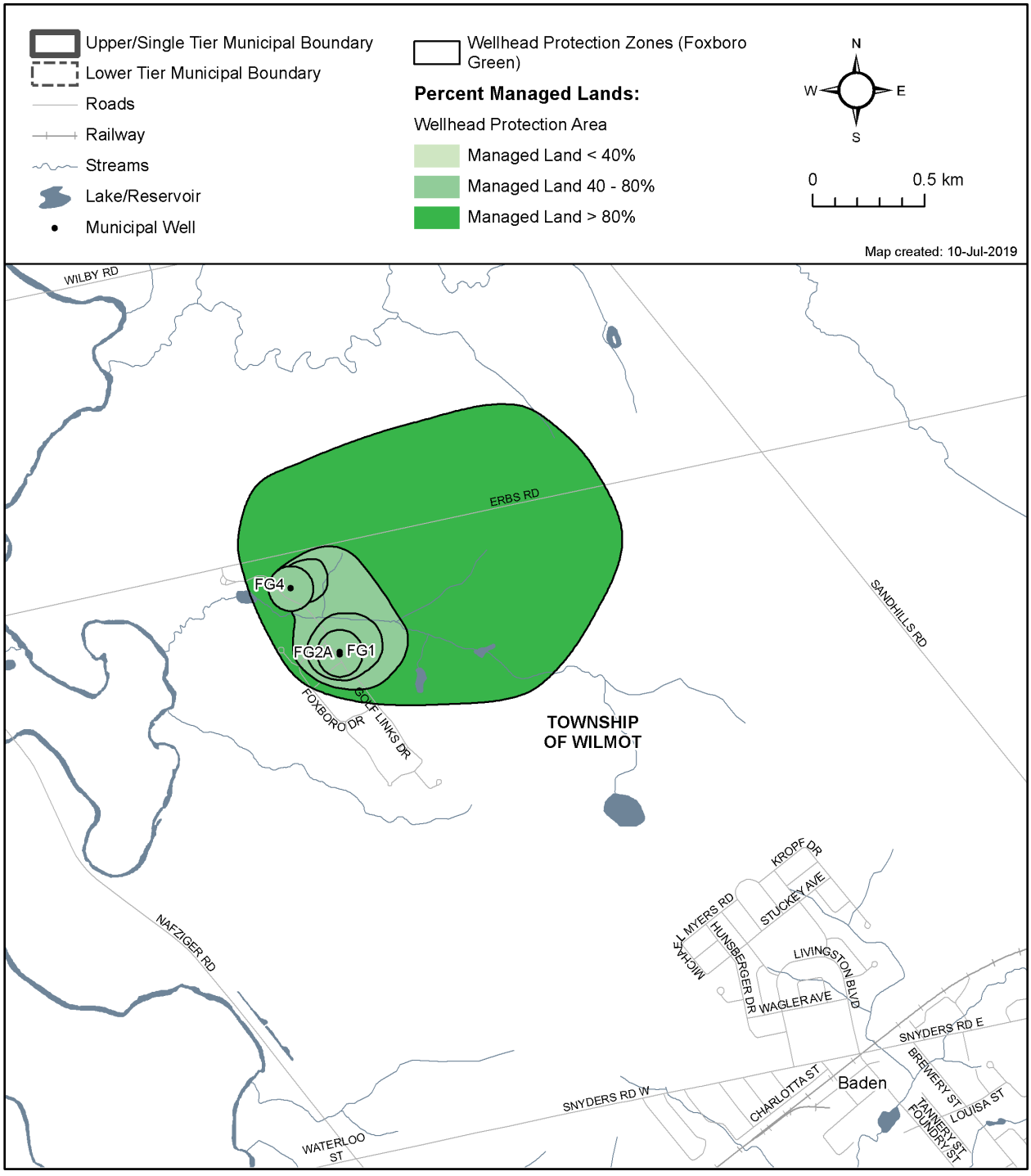
## Map 8.6—36: Foxboro Green Well Supply Wellhead Protection Area Adjusted Intrinsic Vulnerability



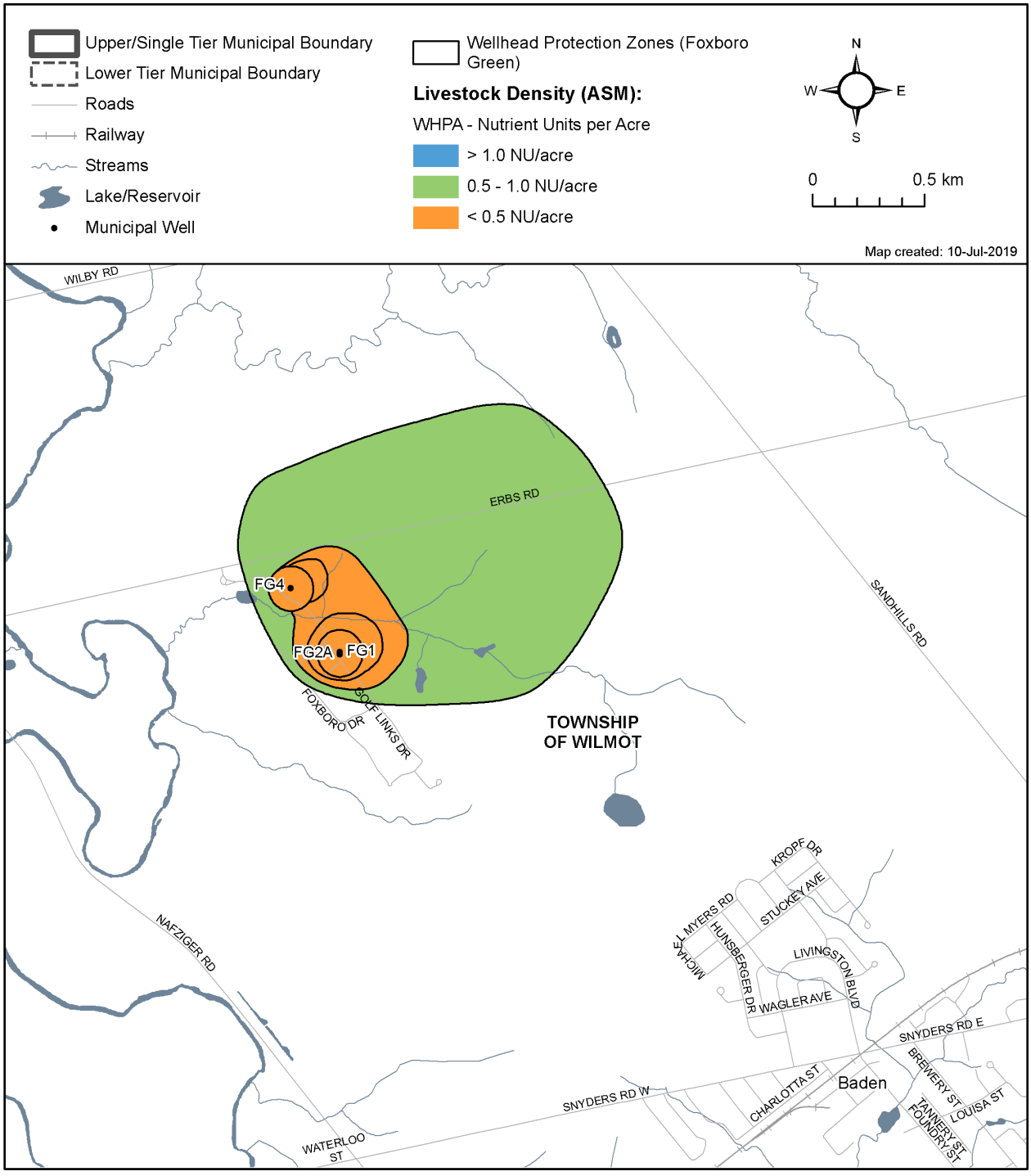
## Map 8.6—37: Foxboro Green Well Supply Wellhead Protection Area Final Vulnerability



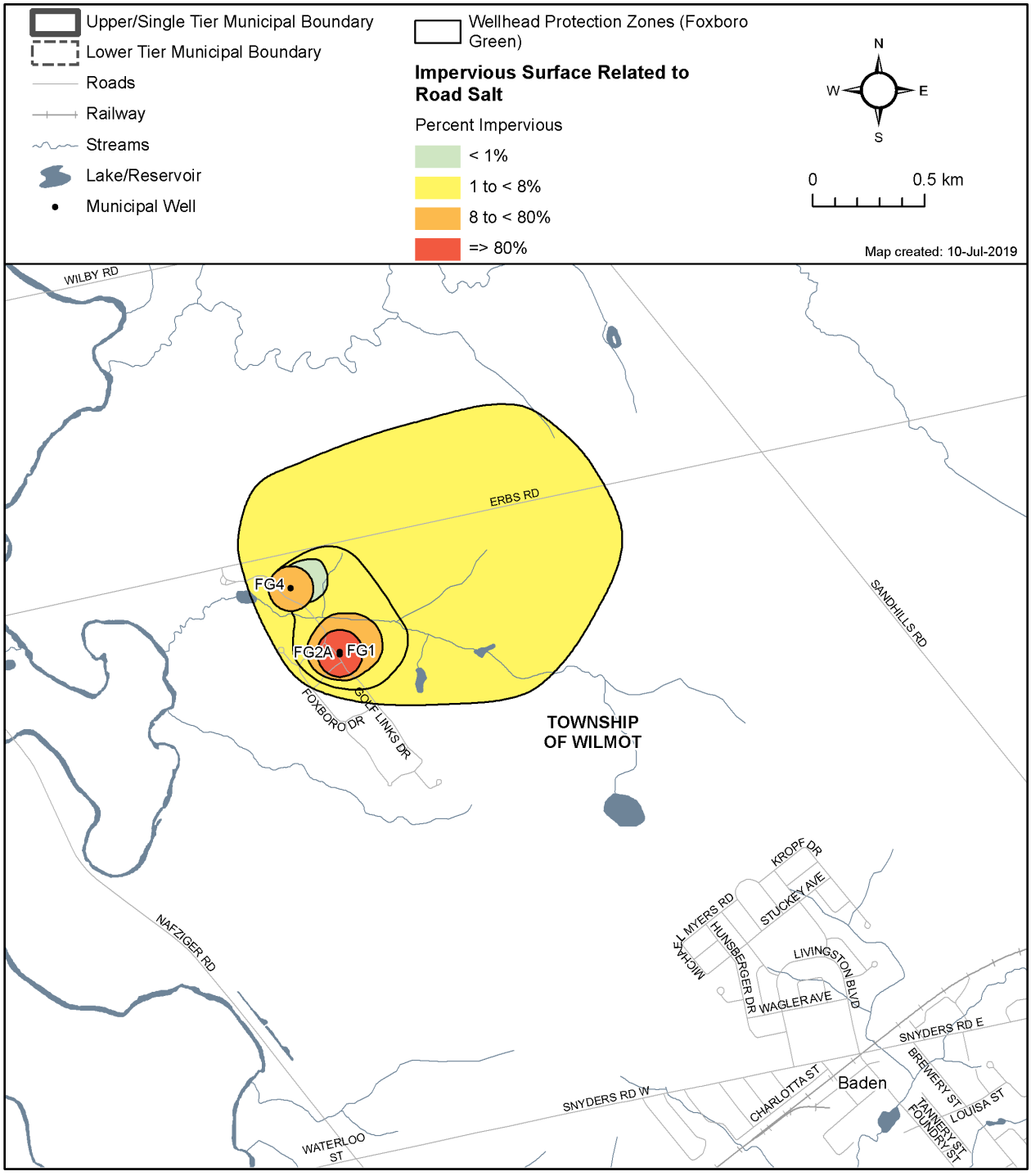
## Map 8.6—38: Foxboro Green Well Supply Percent Managed Lands



## Map 8.6—39: Foxboro Green Well Supply Livestock Density



## Map 8.6—40: Foxboro Green Well Supply Percent Impervious Surfaces



### 8.6.5 Heidelberg Wellfield

The water supply for the Heidelberg Wellfield is obtained from production wells HD1 and HD2, which supply approximately 1013 people with water **(Table 8—1)**. The serviced areas are presented on **Map 8.6—201.** All of the production wells are screened at depths ranging from approximately 54 m to 60 m below ground surface within the Pre-Catfish Creek Aquifer (AFD1), which is overlain by stratigraphic units consistent with the Catfish Creek (ATC1) and Maryhill Tills (ATB2) and the Waterloo Moraine Sands (AFB1/AFB2) near ground surface (**Table 8.1—6**).

#### Vulnerability and Transport Pathways

The WHPA for the Heidelberg Wellfield is shown in **Map 8.6—202.** The unadjusted intrinsic vulnerability is shown in **Map 8.6—203** and the adjusted instrinsic vulnerability on **Map 8.6—205**. **Map 8.6—207** presents the final protection areas and vulnerability scoring for the Heidelberg WHPA. Analysis of the potential transport pathways in the Heidelberg WHPAs identified several clusters of septic systems and wells in WHPA-A and WHPA-B that warranted increases to the ISI. **Map 8.6—204** and **Map 8.6—206** show the transport pathways and areas of influence.

#### Identification of Significant, Moderate and Low Drinking Water Quality Threats in the Heidelberg Wellhead Protection Areas

The identification of a land use activity as a significant, moderate, or low drinking water threat depends on its risk score, determined by considering the circumstances of the activity and the type and vulnerability score of any underlying protection zones, as set out in the Tables of Drinking Water Threats. Information on drinking water threats is also accessible through the Source Water Protection Information Portal. The information above can be used with the vulnerability scores shown in **Map 8.6—207** to help the public determine where certain activities are or would be significant, moderate and low drinking water threats.

**Table 8.6—59** provides a summary of the threat levels possible in the Heidelberg Wellfield for Chemicals, Dense Non-Aqueous Phase Liquids (DNAPLs), and Pathogens. “Yes” indicates that the threat classification level is possible for the indicated threat type under the corresponding vulnerable area / vulnerable score; “No" indicates that it is not. The colours shown for each vulnerability score correspond to those shown in **Map 8.6—207.**

**Table 8.6—9: Identification Drinking Water Quality Threats in the Heidelberg Wellhead Protection Areas**

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| Chemicals | WHPA-A | 10 | Yes | Yes | Yes |
| Chemicals | WHPA-B | 8 | Yes | Yes | Yes |
| Chemicals | WHPA-B | 6 | No | Yes | Yes |
| Chemicals | WHPA-C/D | 2 & 4 | No | No | No |
| DNAPLs | WHPA-A/B/C | Any Score | Yes | No | No |
| DNAPLs | WHPA-D | 2 | No | No | No |
| Pathogens | WHPA-A | 10 | Yes | Yes | No |
| Pathogens | WHPA-B | 8 | No | Yes | Yes |
| Pathogens | WHPA-B | 6 | No | No | Yes |
| Pathogens | WHPA-C/D | Any Score | No | No | No |

### Threats and Issues Enumeration for the Heidelberg Wellfield

The percent managed land, livestock density, and percent impervious surface values for each protection zone in this Wellfield are shown in **Map 8.6—208, Map 8.6—209 and Map 8.6—210**, respectively.

The total number of identified significant drinking water threats in this wellfield is 22. The number of properties in this Wellfield with identified significant drinking water threats is 14. Details surrounding the types of threats and circumstances found in the Heidelberg wellhead protection areas are outlined in **Table 8.6—60.**

No Significant Conditions were identified in this wellfield as per Technical Rule 126.

No drinking water Issues have been identified in this wellfield as per Technical Rule 114.

**Table 8.6—10: Significant Drinking Water Quality Threats in the Heidelberg Wellhead Protection Areas (current to February 2019)**

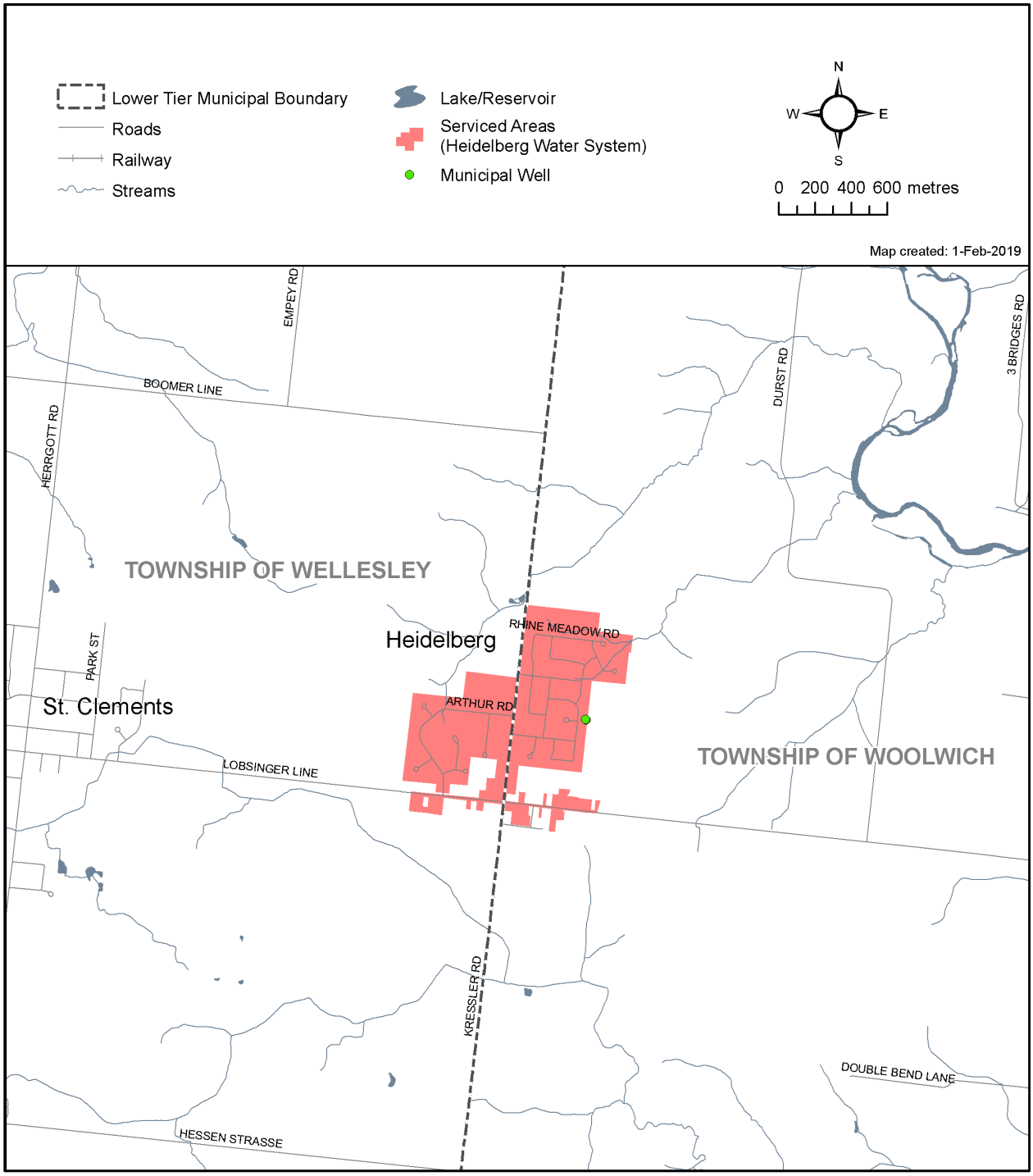
| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| 2 | Sewage system or sewage works - onsite sewage systems | 8 | WHPA-A |
| | Sewage system or sewage works - onsite sewage systems holding tanks | 6 | WHPA-A |
| 3 | Application of agricultural source material (ASM) to land | 1 | WHPA-A |
| 4 | Storage of agricultural source material (ASM) | 1 | WHPA-A |
| 8 | Application of commercial fertilizer to land | 1 | WHPA-A |
| 10 | Application of pesticide to land | 1 | WHPA-A |
| 12 | Application of road salt | 1 | WHPA-A |
| 15 | Storage and handling of fuel | 1 | WHPA-A |

| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| 21 | Management or handling of agricultural source material - agricultural source material (ASM) generation (grazing and pasturing) | 1 | WHPA-A |
| | Management or handling of agricultural source material - agricultural source material (ASM) generation (yards or confinement) | 1 | WHPA-A |
| **Total Number of Significant Threat Activities** | | **22** | |
| **Total Number of Properties with Significant Threats** | | **14** | |

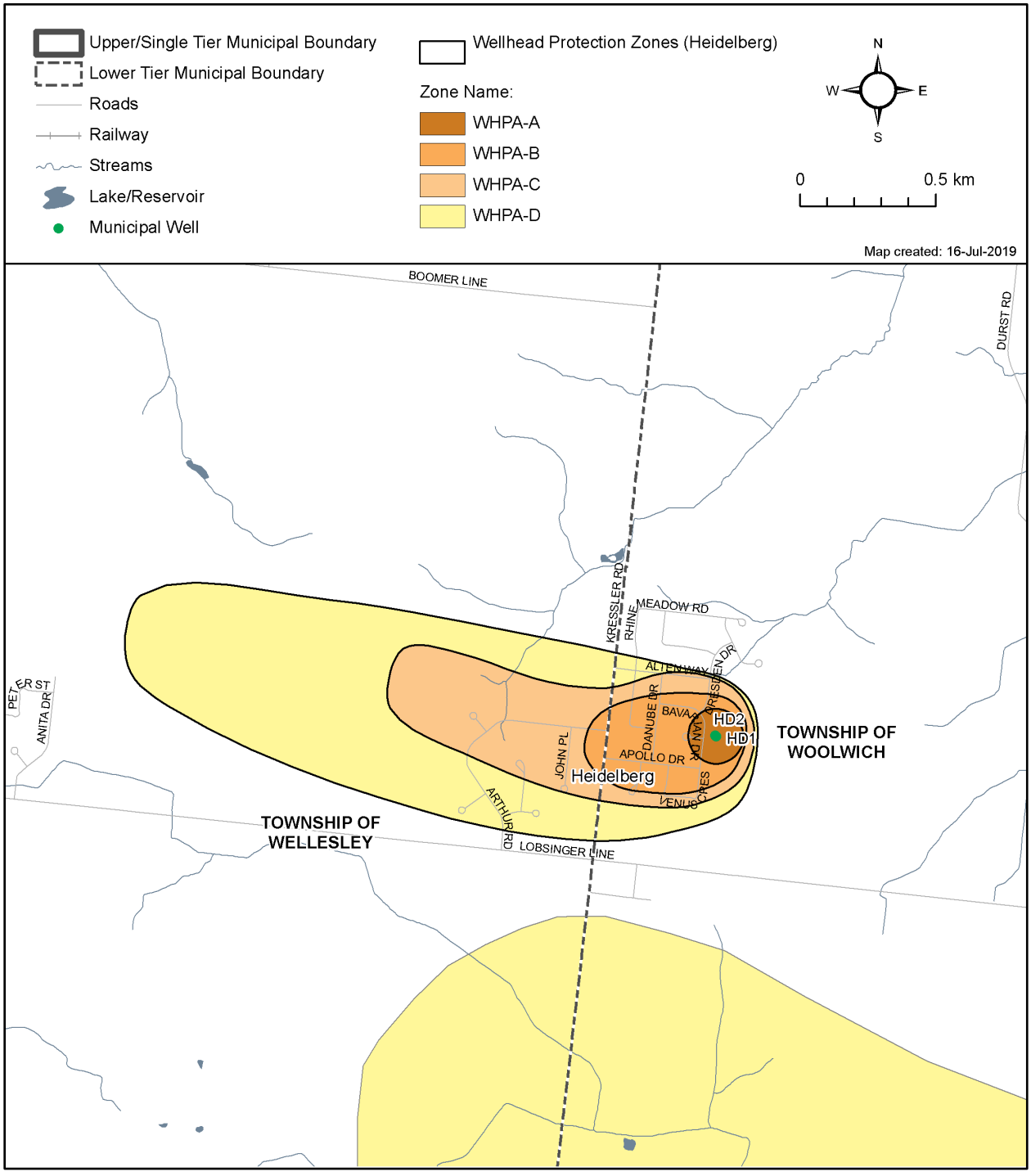
[1] Prescribed Drinking Water Quality Threat Number refers to the prescribed drinking water threat listed in O. Reg. 287/07 s.1.1 (1)

[2] Where applicable, waste, sewage, and livestock threat numbers are reported by sub-threat; fuel and DNAPL by Prescribed Drinking Water Threat category.

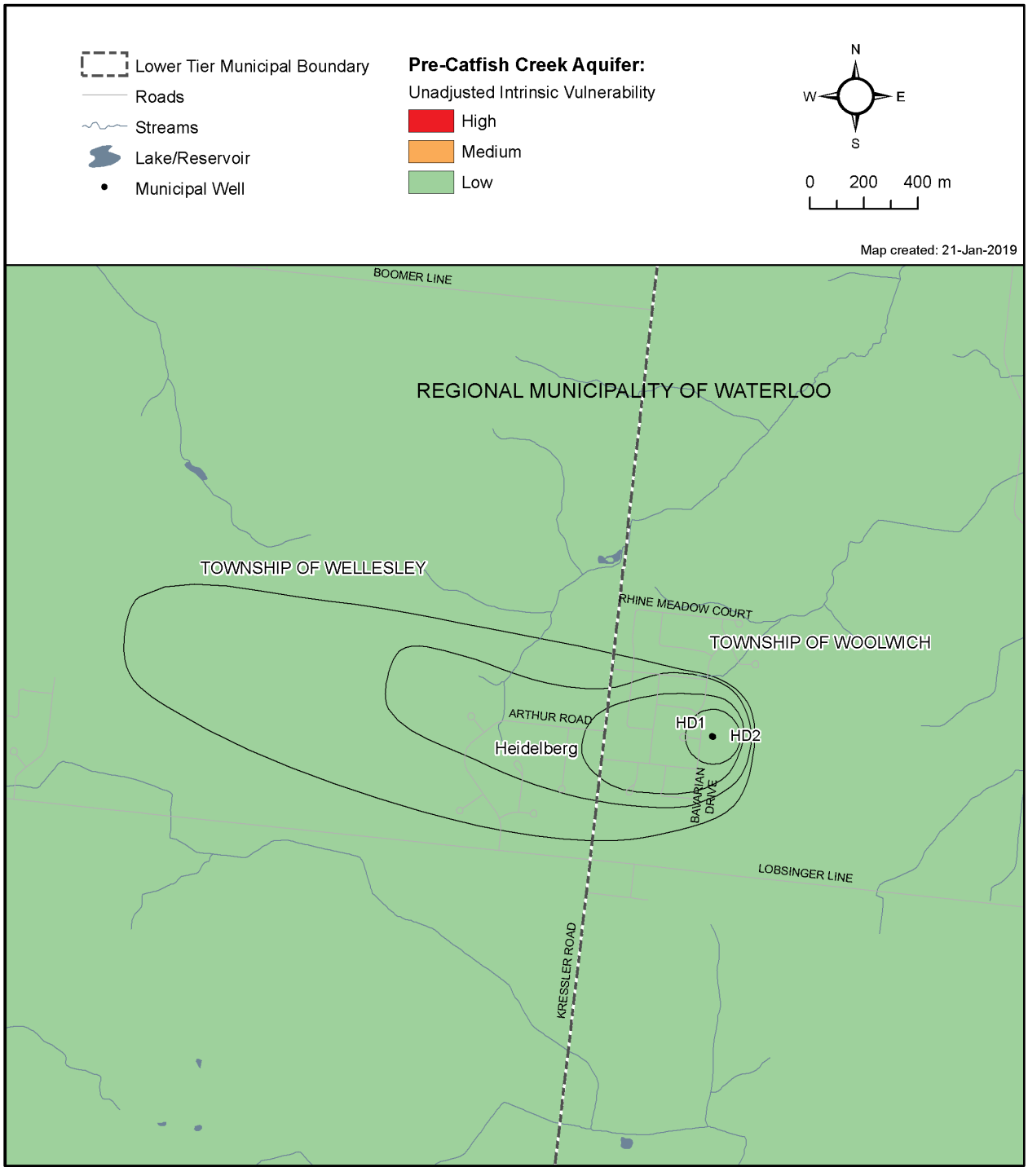
## Map 8.6—41: Heidelberg Well Supply Serviced Areas



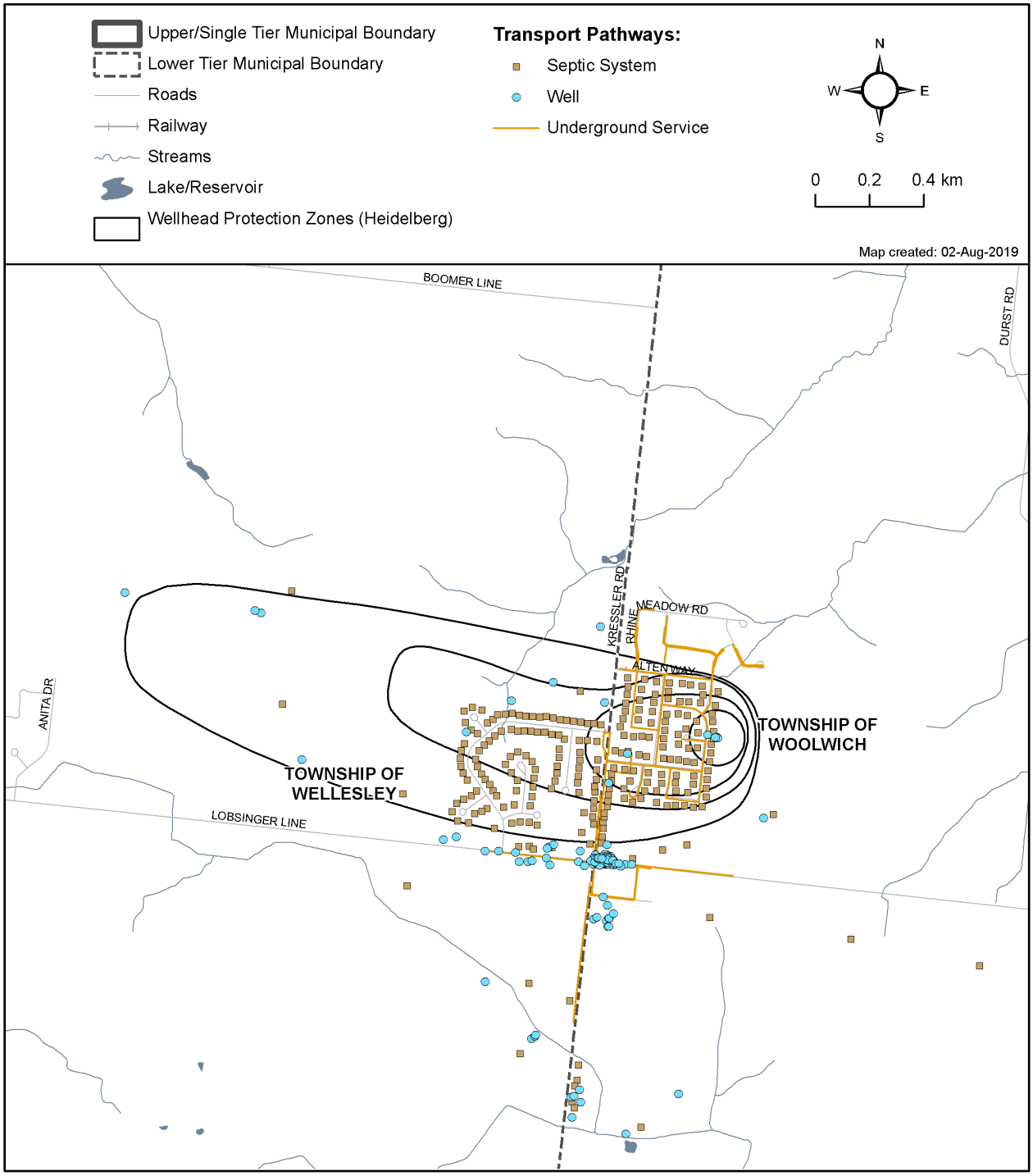
## Map 8.6—42: Heidelberg Well Supply Wellhead Protection Area



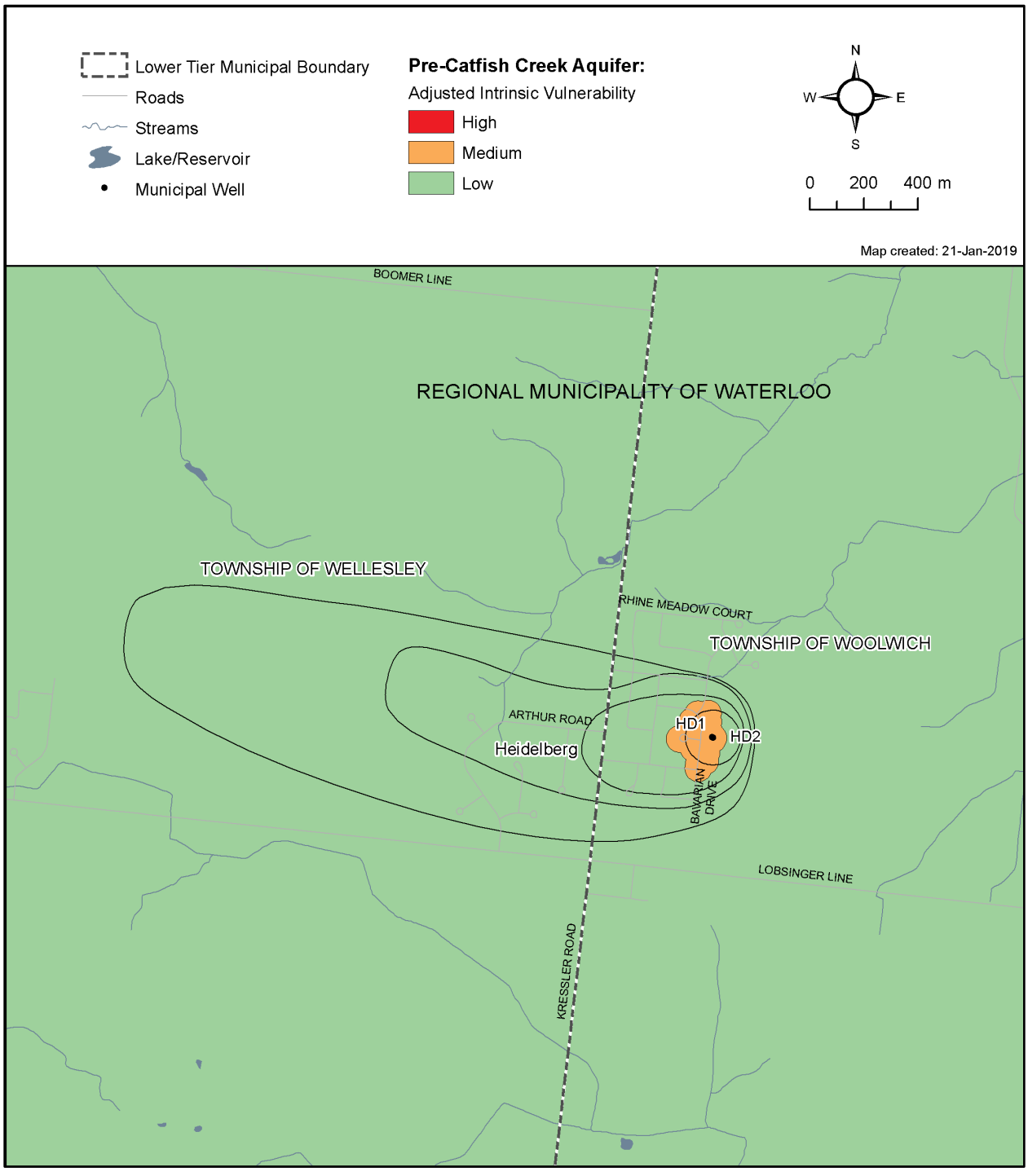
## Map 8.6—43: Heidelberg Well Supply Wellhead Protection Area Unadjusted Intrinsic Vulnerability



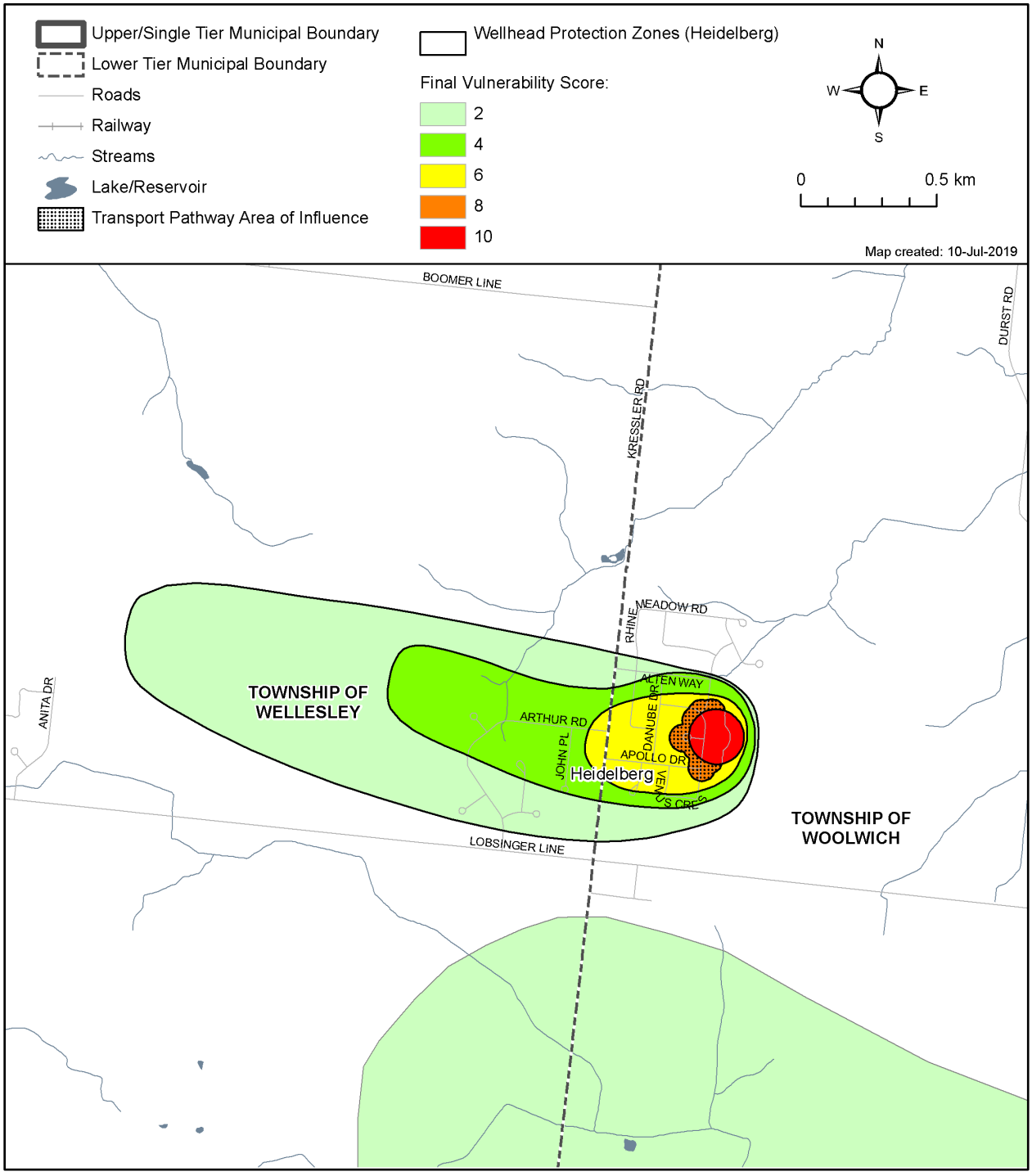
## Map 8.6—44: Heidelberg Well Supply Transport Pathways



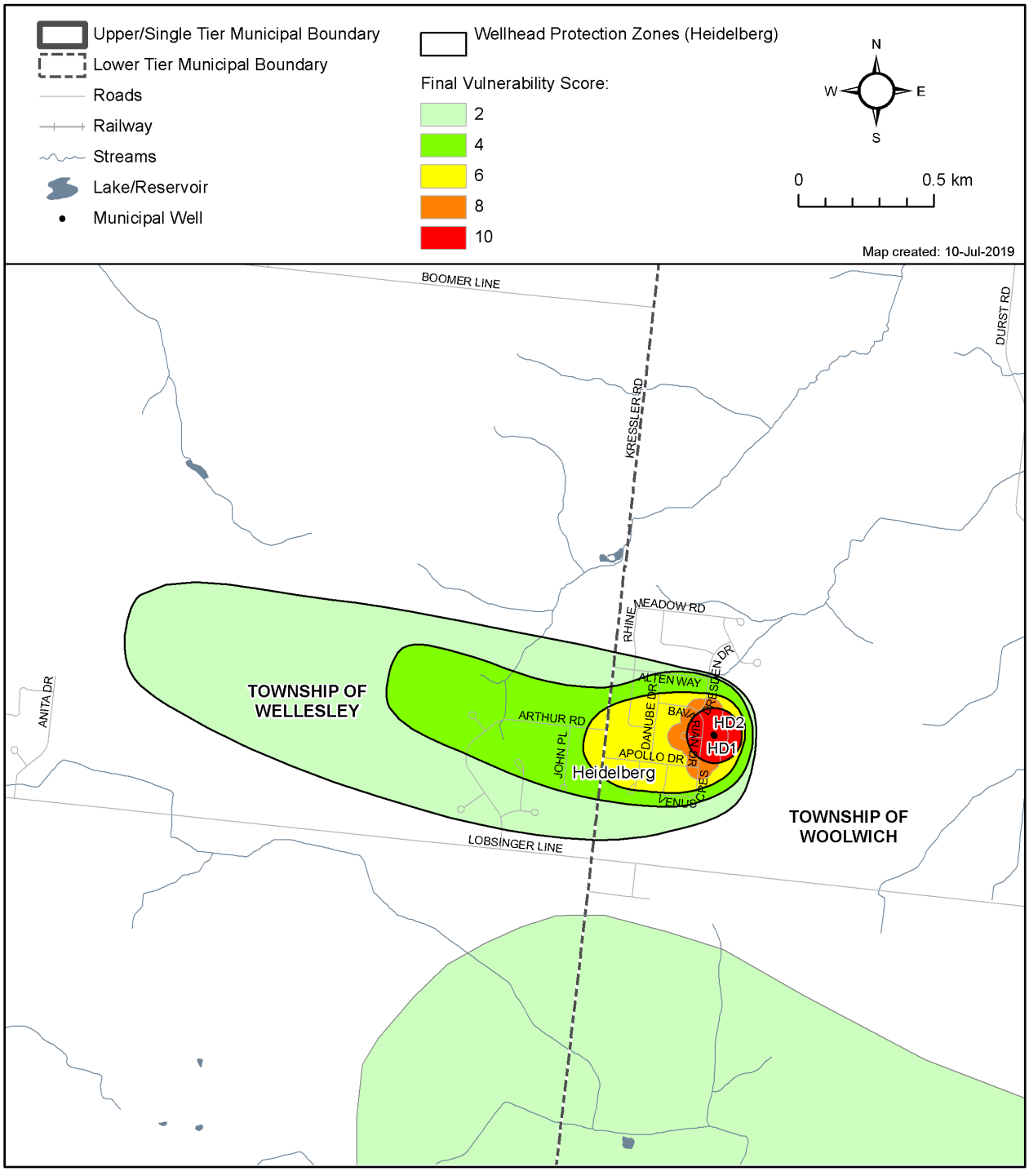
## Map 8.6—45: Heidelberg Well Supply Wellhead Protection Area Adjusted Intrinsic Vulnerability



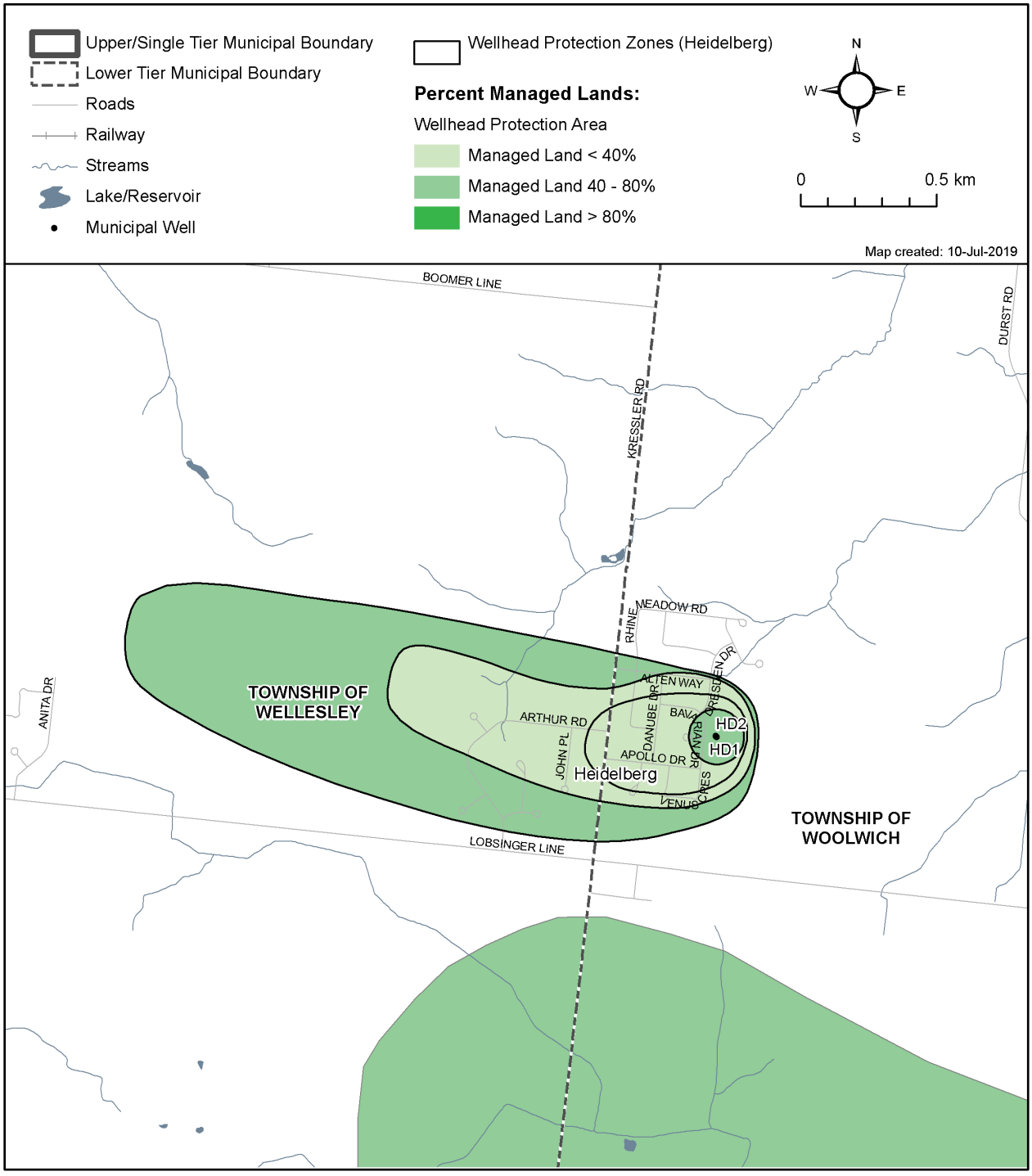
## Map 8.6—46: Heidelberg Well Supply Area of Influence



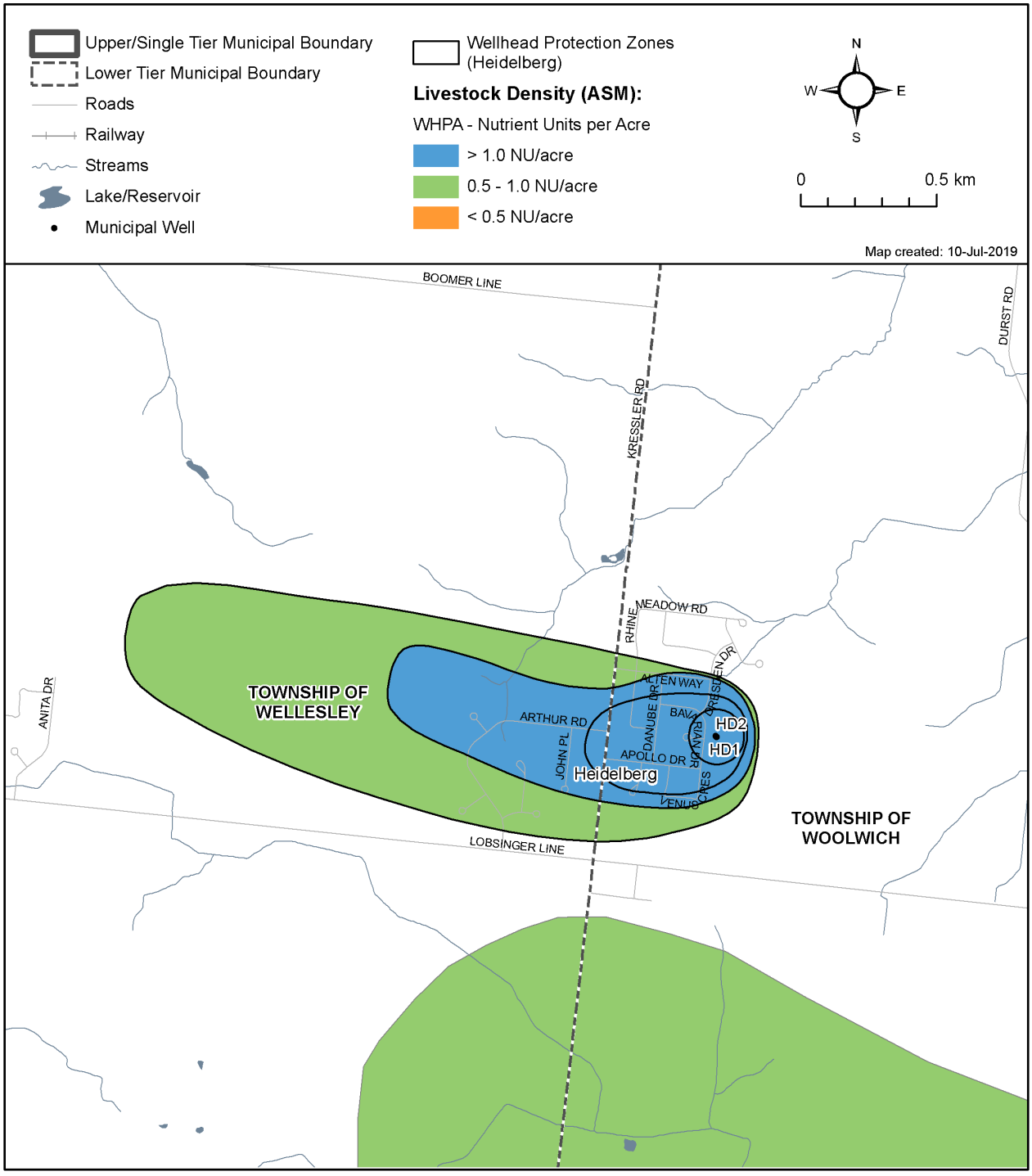
## Map 8.6—47: Heidelberg Well Supply Wellhead Protection Area Final Vulnerability



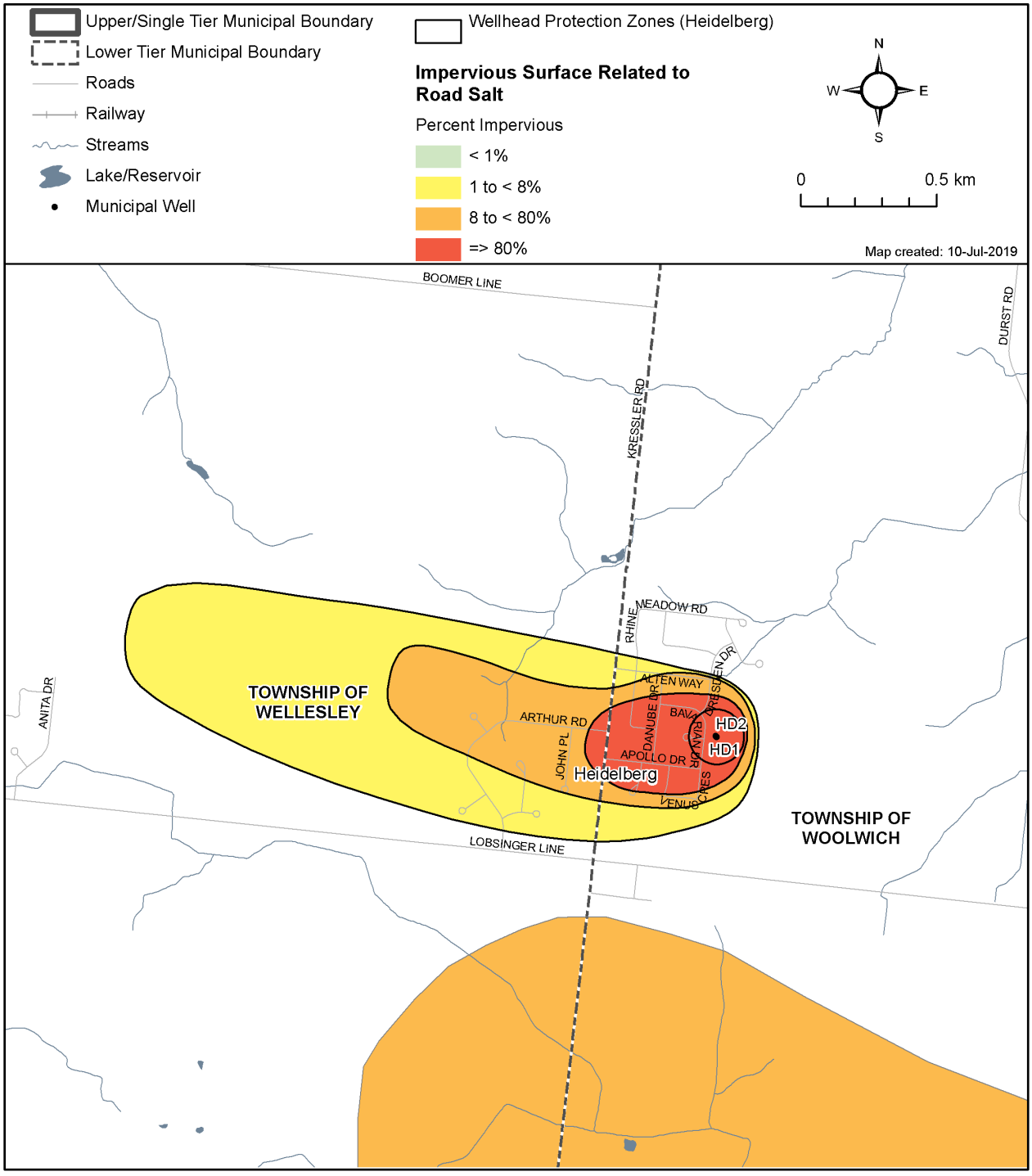
## Map 8.6—48: Heidelberg Well Supply Percent Managed Lands



## Map 8.6—49: Heidelberg Well Supply Livestock Density



## Map 8.6—50: Heidelberg Well Supply Percent Impervious Surfaces



### 8.6.6 Linwood Wellfield

The water supply for the Linwood Wellfield is obtained from production wells L1A and L2, which distribute water to approximately 781 people **(Table 8—1)**. The serviced areas are presented on **Map 8.6—211**. These production wells are open hole within bedrock of the Bois Blanc/Salina formations at depths ranging from 64 m to 80 m below ground surface **(Table 8.1—6)**.

#### Vulnerability and Transport Pathways

The WHPAs are presented on **Map 8.6—212**. The unadjusted intrinsic vulnerability is shown on **Map 8.6—213.** Analysis of the potential transport pathways in the Linwood WHPA noted several clusters of septic systems and wells within the WHPA-A through WHPA-C zones that warranted increases to the ISI. **Map 8.6—214** and **Map 8.6—216** shows the transport pathways and areas of influence. Adjusted intrinsic vulnerability is shown on **Map 8.6—215;** final vulnerability of the Linwood WHPAs is shown on **Map 8.6—217**.

#### Identification of Significant, Moderate and Low Drinking Water Quality Threats in the Linwood Wellhead Protection Areas

The identification of a land use activity as a significant, moderate, or low drinking water threat depends on its risk score, determined by considering the circumstances of the activity and the type and vulnerability score of any underlying protection zones, as set out in the Tables of Drinking Water Threats. Information on drinking water threats is also accessible through the Source Water Protection Information Portal. The information above can be used with the vulnerability scores shown in **Map 8.6—217** to help the public determine where certain activities are or would be significant, moderate and low drinking water threats.

**Table 8.6—61** provides a summary of the threat levels possible in the Linwood Wellfield for Chemicals, Dense Non-Aqueous Phase Liquids (DNAPLs), and Pathogens. “Yes” indicates that the threat classification level is possible for the indicated threat type under the corresponding vulnerable area / vulnerable score; “No" indicates that it is not. The colours shown for each vulnerability score correspond to those shown in **Map 8.6—217**.

**Table 8.6—11: Identification of Drinking Water Quality Threats in the Linwood Wellhead Protection Areas**

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| Chemicals | WHPA-A | 10 | Yes | Yes | Yes |
| Chemicals | WHPA-B | 8 | Yes | Yes | Yes |
| Chemicals | WHPA-B/C | 6 | No | Yes | Yes |
| Chemicals | WHPA-C/D | 2 & 4 | No | No | No |
| DNAPLs | WHPA-A/B/C | Any Score | Yes | No | No |
| DNAPLs | WHPA-D | 2 | No | No | No |
| Pathogens | WHPA-A | 10 | Yes | Yes | No |
| Pathogens | WHPA-B | 8 | No | Yes | Yes |
| Pathogens | WHPA-B | 6 | No | No | Yes |

### Threats and Issues Enumeration for the Linwood Wellfield

The percent managed land, livestock density, and percent impervious surface values for each protection zone in this Wellfield are shown in **Map 8.6—218, Map 8.6—219** and **Map 8.6—220**, respectively.

The total number of identified significant drinking water threats in this Wellfield is 23. The number of properties in this Wellfield with identified significant drinking water threats is 15. Details surrounding the types of threats and circumstances found in the Linwood wellhead protection areas are outlined in **Table 8.6—62**.

No Significant Conditions were identified in this wellfield as per Technical Rule 126.

No drinking water Issues have been identified in this wellfield as per Technical Rule 114.

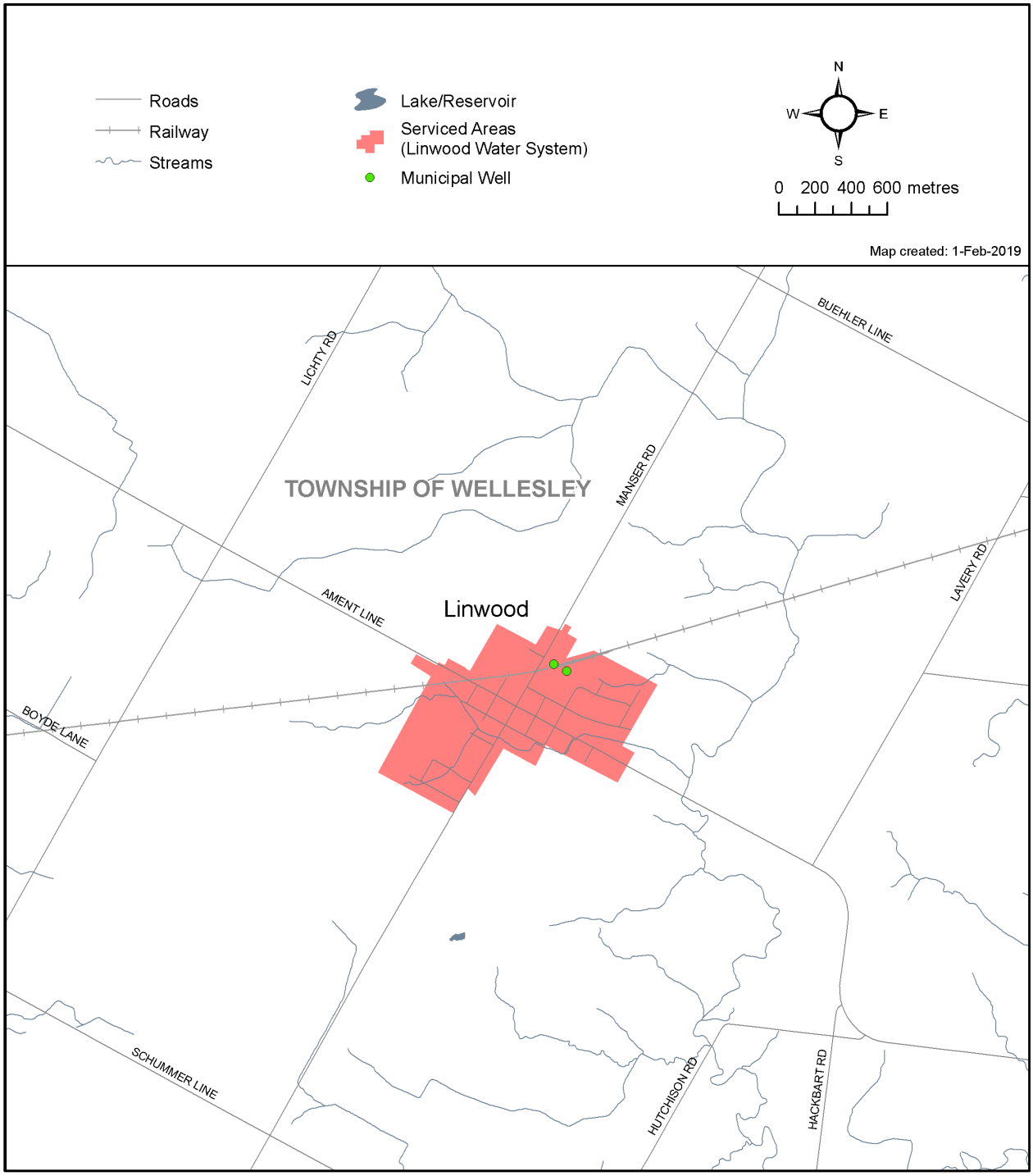
**Table 8.6—12: Significant Drinking Water Quality Threats in the Linwood Wellhead Protection Areas (current to February 2019)**

| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| 2 | Sewage system or sewage works - onsite sewage systems | 5 | WHPA-A |
| | Sewage system or sewage works - onsite sewage systems holding tanks | 9 | WHPA-A |
| 12 | Application of road salt | 4 | WHPA-A |
| 16 | Storage and handling of a dense non aqueous phase liquid (DNAPL) | 1 | WHPA-A<br>WHPA-B |
| 21 | Management or handling of agricultural source material - agricultural source material (ASM) generation (grazing and pasturing) | 2 | WHPA-A |
| | Management or handling of agricultural source material - agricultural source material (ASM) generation (yards or confinement) | 2 | WHPA-A |
| **Total Number of Significant Threat Activities** | | **27** | |
| **Total Number of Properties with Significant Threats** | | **15** | |

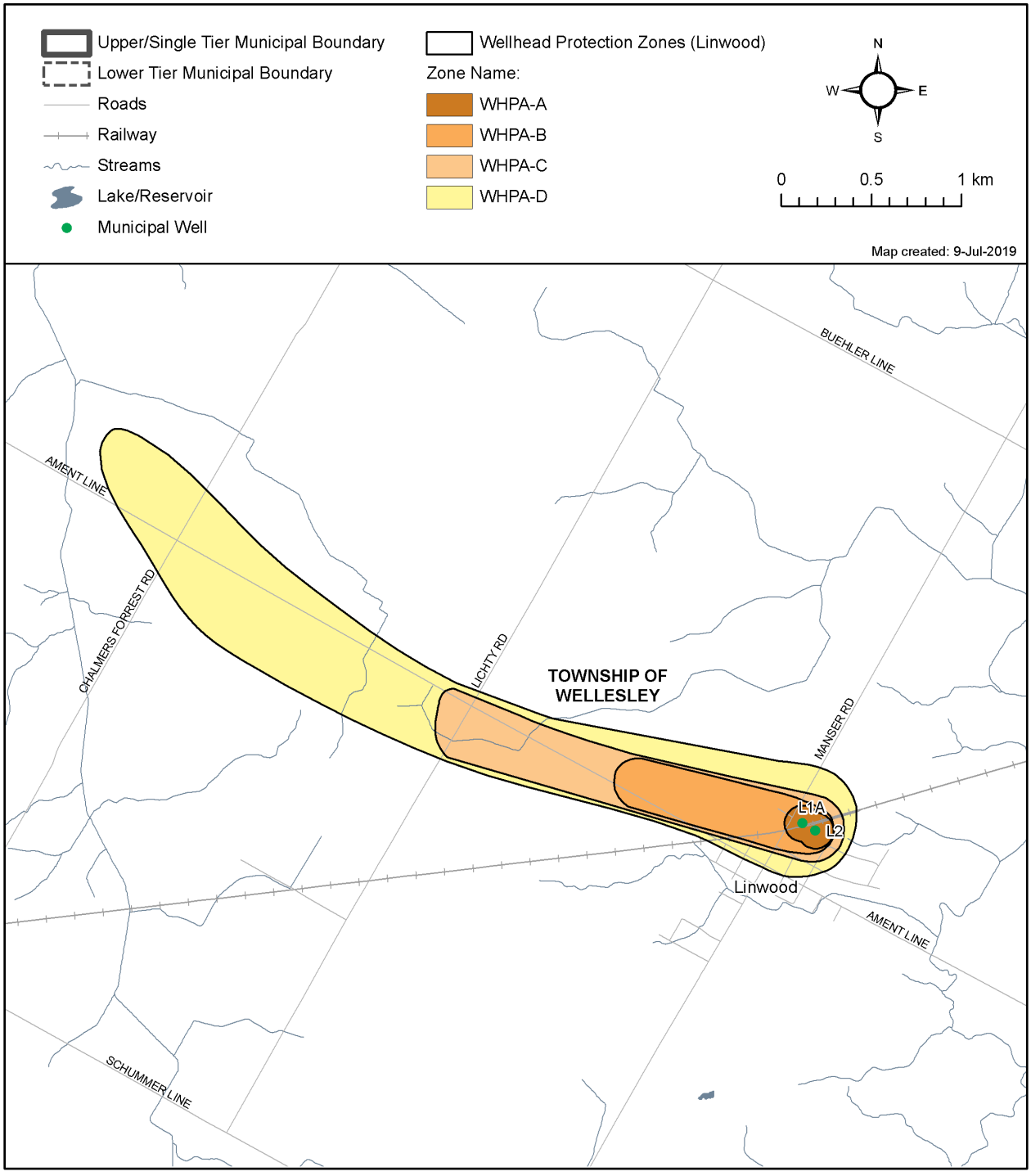
[1] Prescribed Drinking Water Quality Threat Number refers to the prescribed drinking water threat listed in O. Reg. 287/07 s.1.1 (1)

[2] Where applicable, waste, sewage, and livestock threat numbers are reported by sub-threat; fuel and DNAPL by Prescribed Drinking Water Threat category.

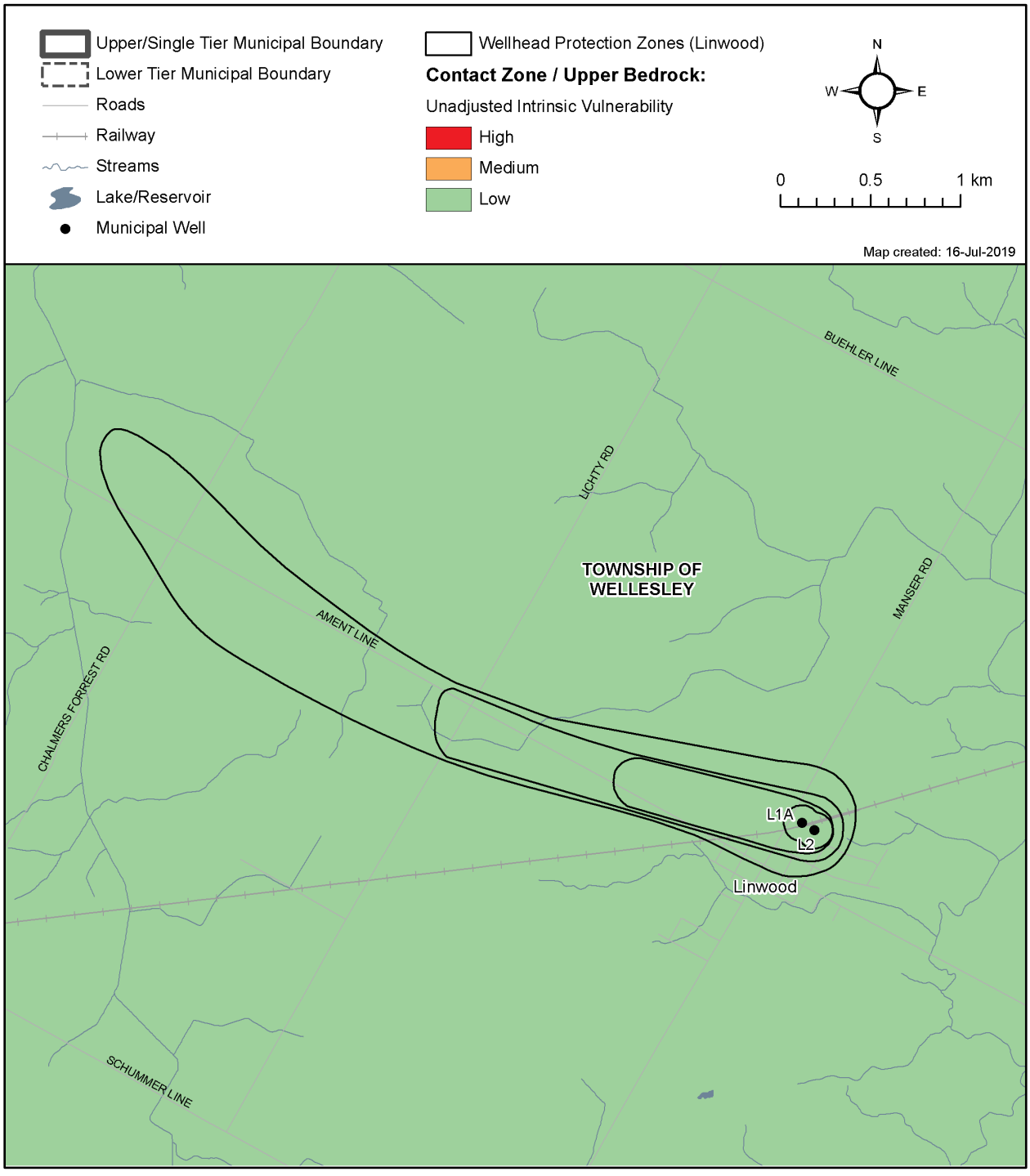
## Map 8.6—51: Linwood Well Supply Serviced Area



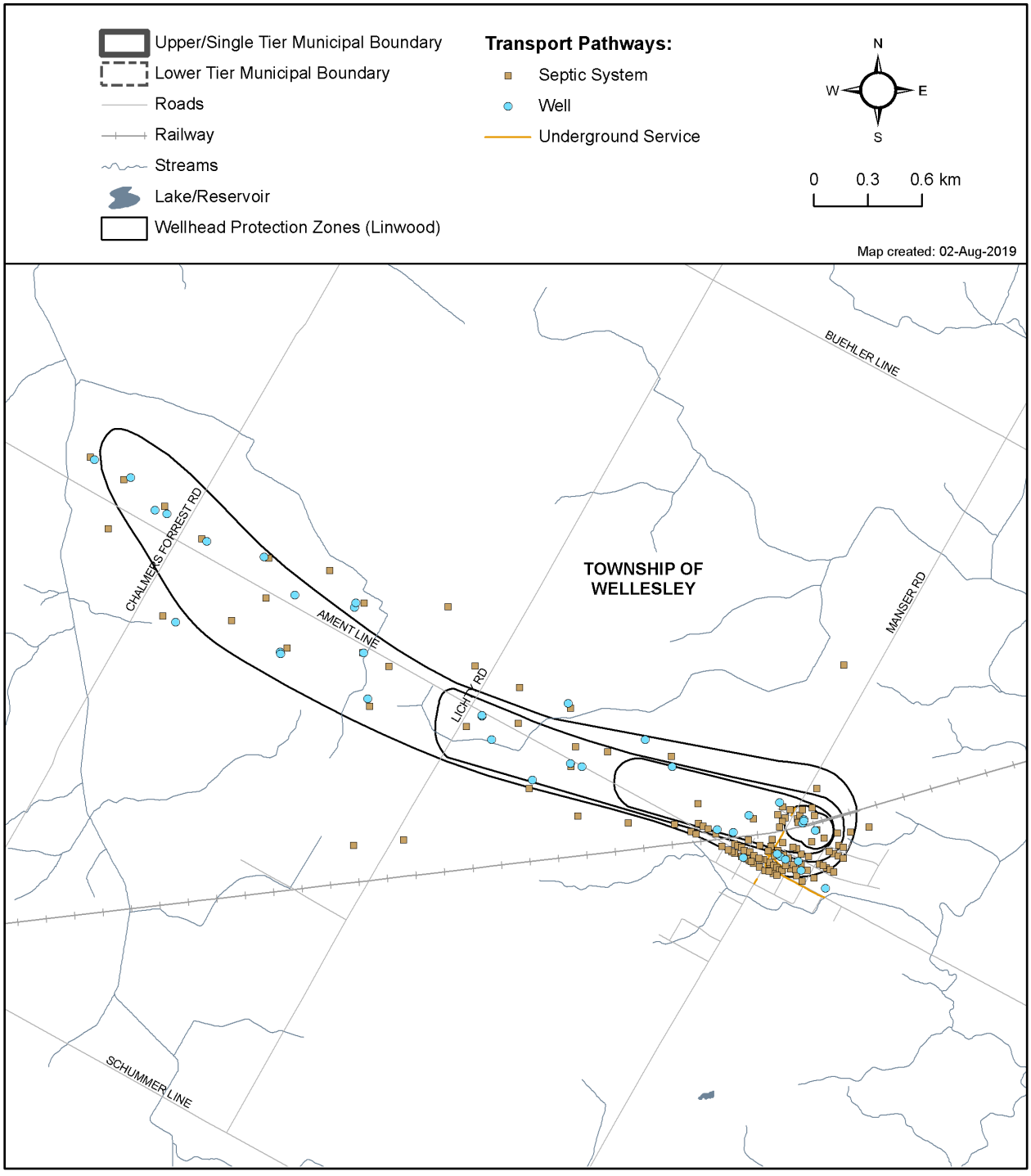
## Map 8.6—52: Linwood Well Supply Wellhead Protection Area



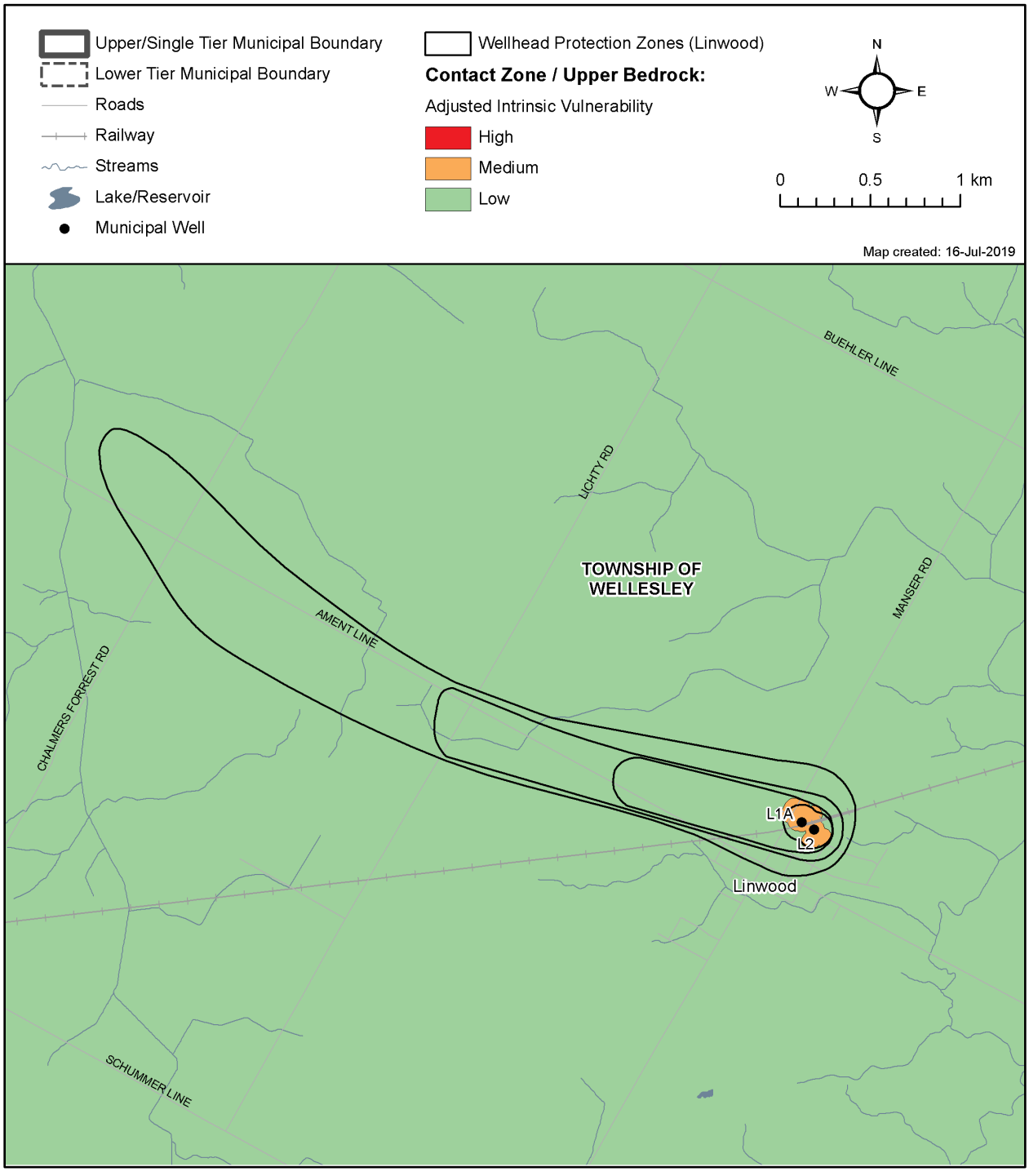
## Map 8.6—53: Linwood Well Supply Wellhead Protection Area Unadjusted Intrinsic Vulnerability



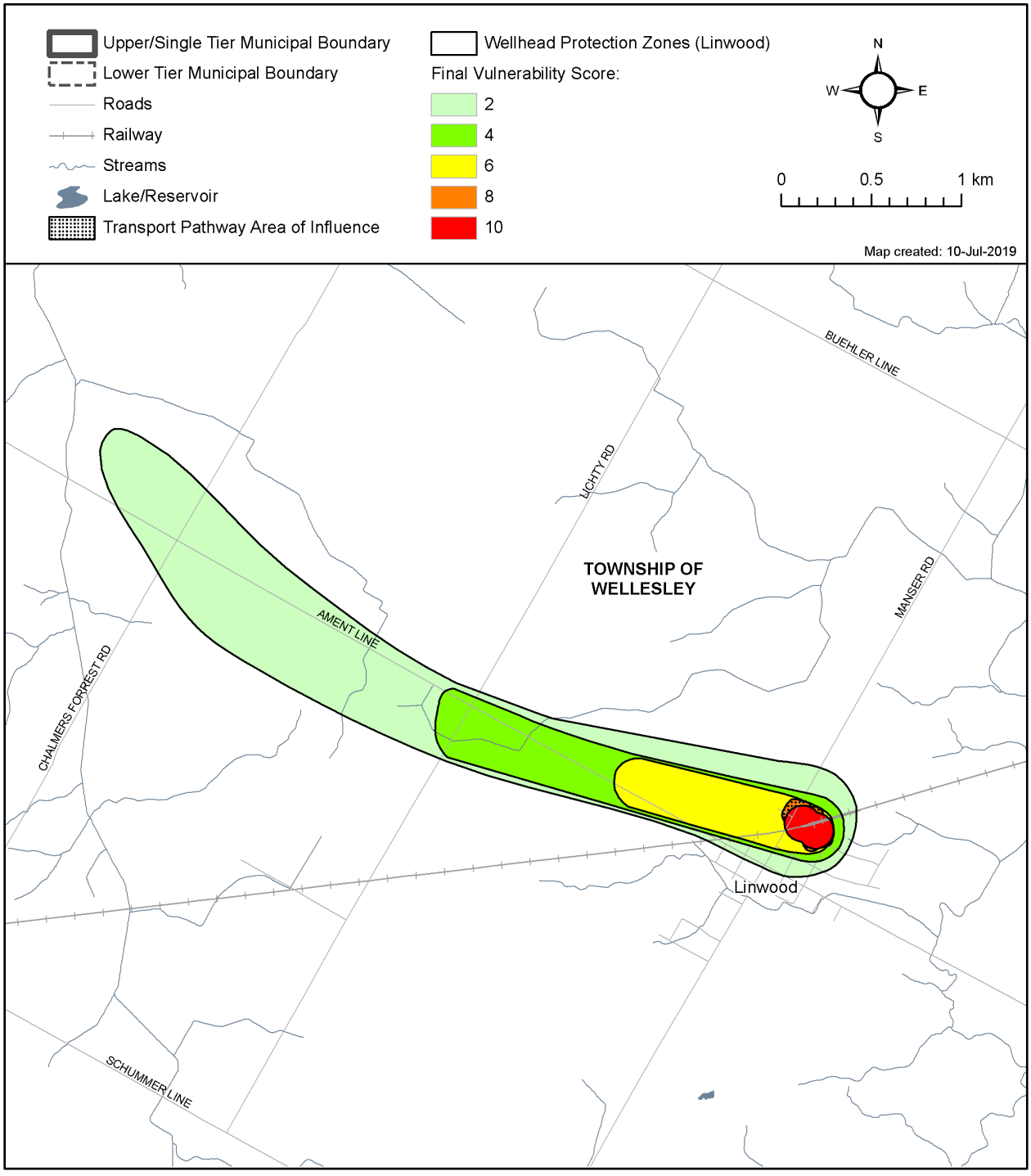
## Map 8.6—54: Linwood Well Supply Transport Pathways



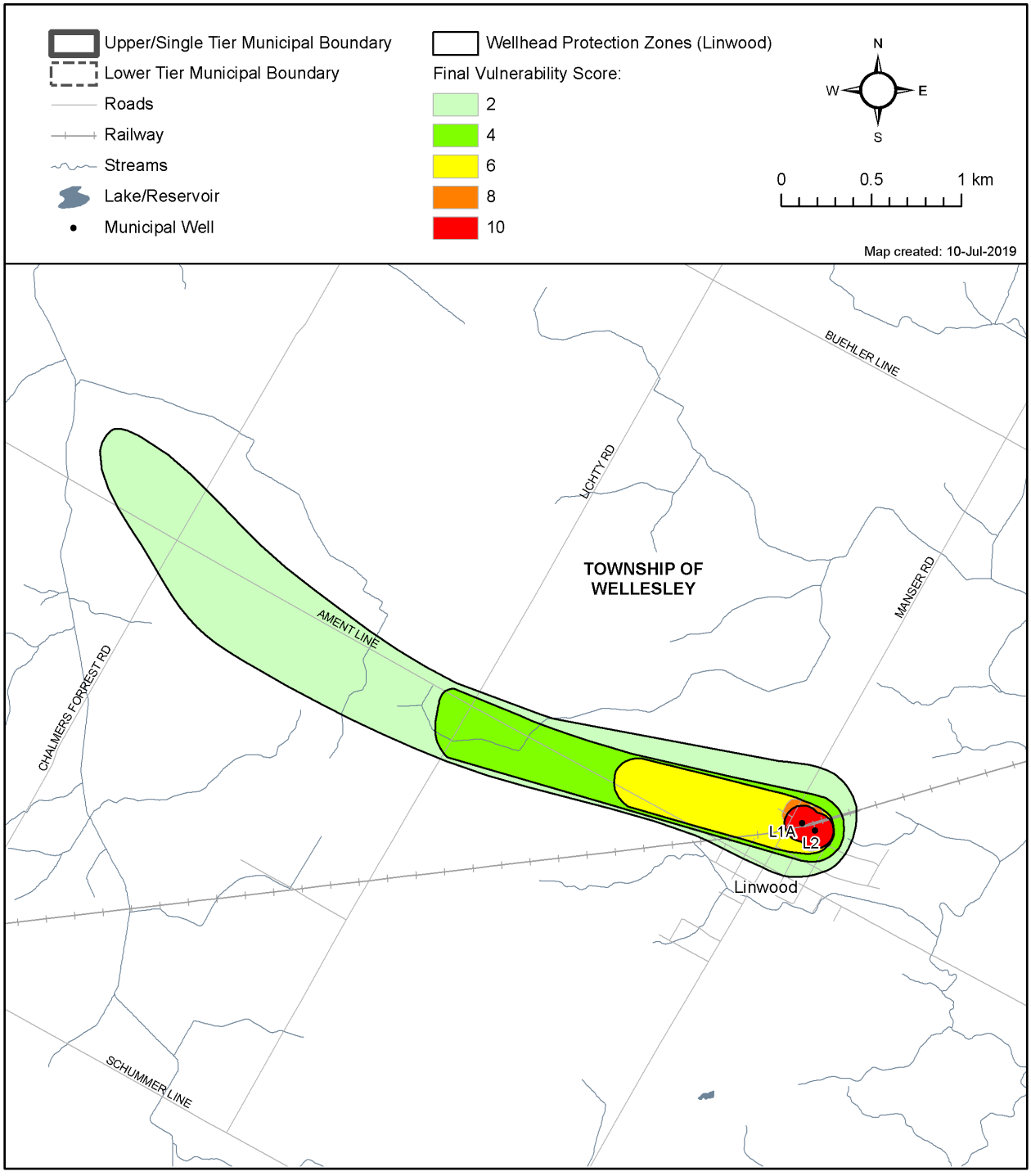
## Map 8.6—55: Linwood Well Supply Wellhead Protection Area Adjusted Intrinsic Vulnerability



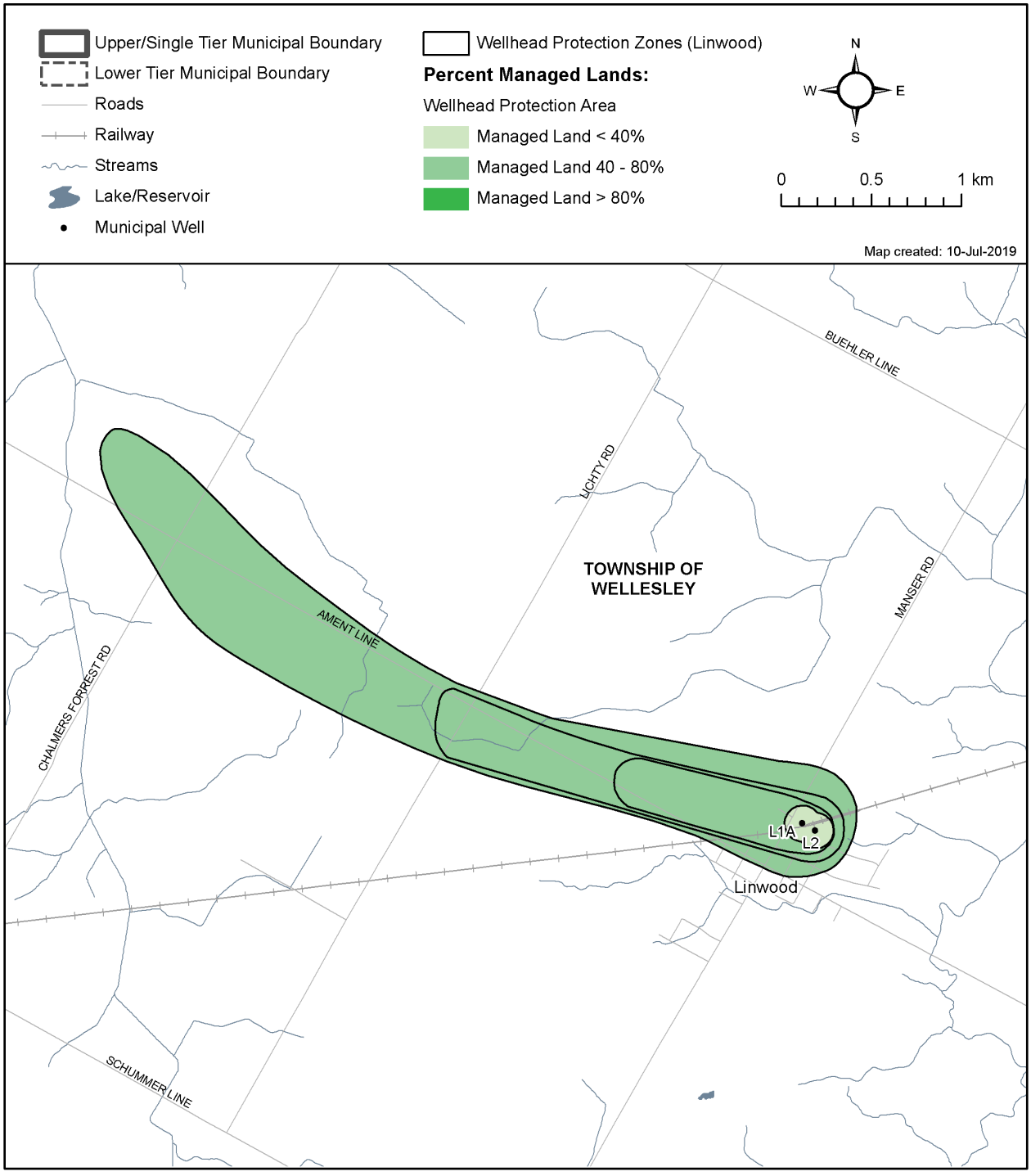
## Map 8.6—56: Linwood Well Supply Area of Influence



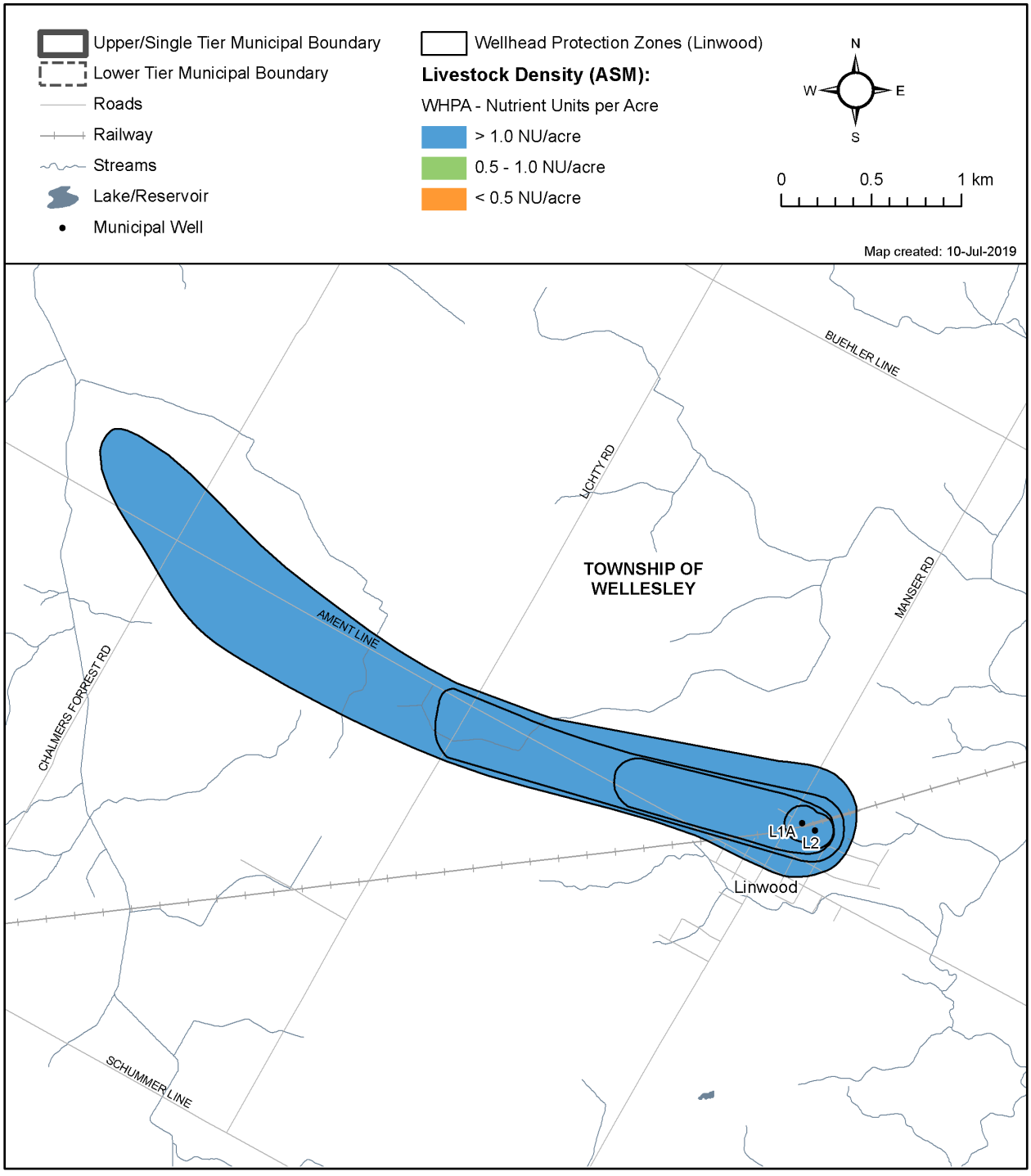
## Map 8.6—57: Linwood Well Supply Wellhead Protection Area Final Vulnerability



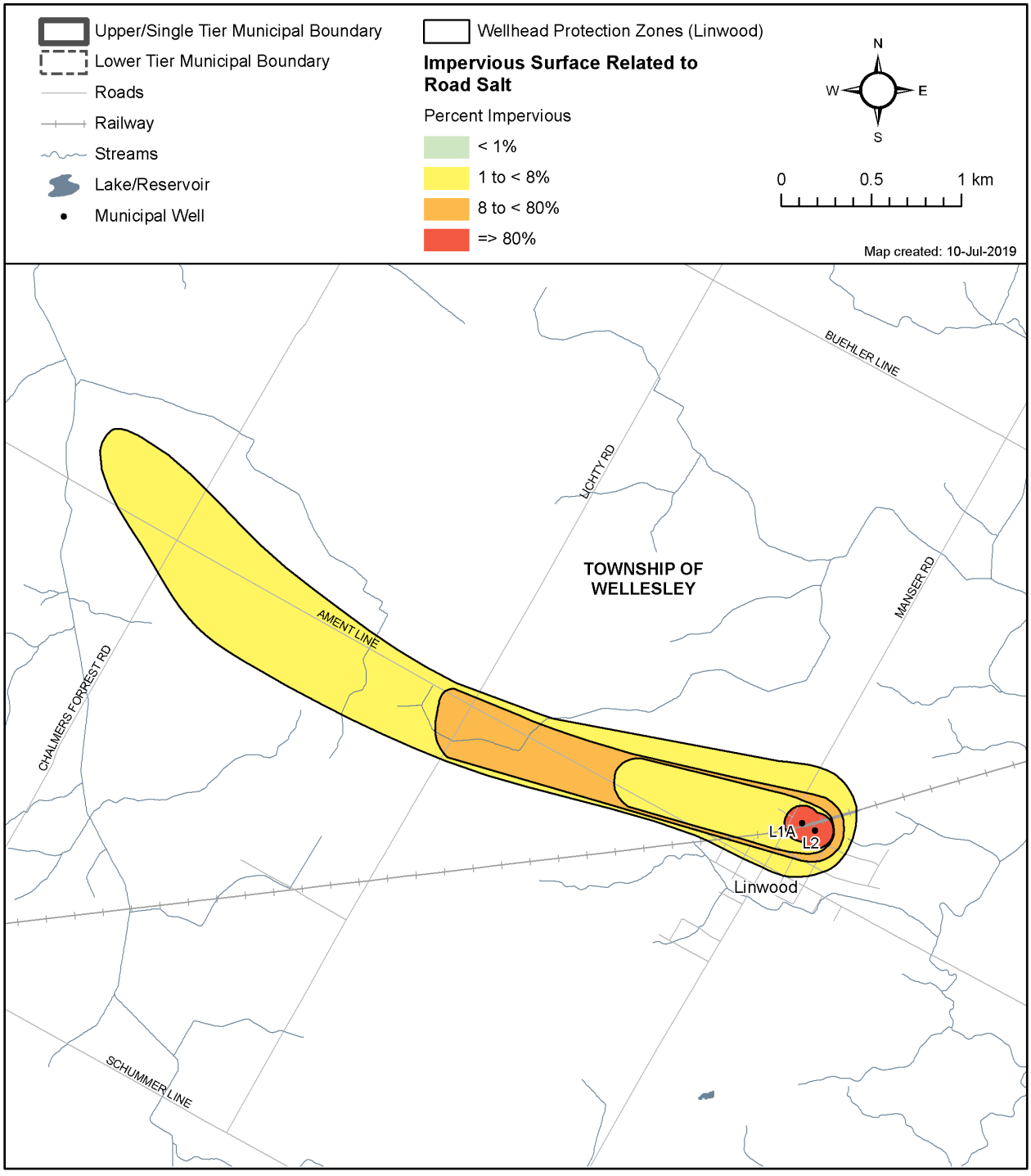
## Map 8.6—58: Linwood Well Supply Percent Managed Lands



## Map 8.6—59: Linwood Well Supply Livestock Density



## Map 8.6—60: Linwood Well Supply Percent Impervious Surfaces



### 8.6.7 Maryhill Wellfield

The water supply for the Maryhill Wellfield is obtained from production wells MH1, MH2, MH4A and MH5 (replacement well for MH3). There are two separate distribution systems that cover only a portion of the settlement area. MH1 and MH2 (Maryhill) distribute water to approximately 141 people, while MH4A and MH5 (Maryhill Heights) distribute to approximately 143 people **(Table 8—1).** The serviced areas are presented on **Map 8.6—221.** All of the production wells are screened within sand and gravel in the Pre-Catfish Creek Aquifer (AFD1) at depths ranging from 18 m to 33 m below ground surface **(Table 8.1—6)**.

#### Vulnerability and Transport Pathways

The WHPAs are presented on **Map 8.6—222.** The unadjusted intrinsic vulnerability is shown on **Map 8.6—223** and the adjusted intrinsic vulnerability on **Map 8.6—225**. **Map 8.6—227** presents the final protection areas and vulnerability scoring for the Maryhill WHPA. Analysis of the potential transport pathways in the WHPAs for the Maryhill wells located several clusters of septic systems and wells in WHPA-A through WHPA-D that warranted increases to the ISI. **Map 8.6—224** and **Map 8.6—226** show the transport pathways and areas of influence.

#### Identification of Significant, Moderate and Low Drinking Water Quality Threats in the Maryhill Wellhead Protection Areas

The identification of a land use activity as a significant, moderate, or low drinking water threat depends on its risk score, determined by considering the circumstances of the activity and the type and vulnerability score of any underlying protection zones, as set out in the Tables of Drinking Water Threats. Information on drinking water threats is also accessible through the Source Water Protection Information Portal. The information above can be used with the vulnerability scores shown in **Map 8.6—227** to help the public determine where certain activities are or would be significant, moderate and low drinking water threats.

**Table 8.6—63** provides a summary of the threat levels possible in the Maryhill Wellfield for Chemicals, Dense Non-Aqueous Phase Liquids (DNAPLs), and Pathogens. “Yes” indicates that the threat classification level is possible for the indicated threat type under the corresponding vulnerable area / vulnerable score; “No" indicates that it is not. The colours shown for each vulnerability score correspond to those shown in **Map 8.6—227.**

**Table 8.6—13: Identification of Drinking Water Quality Threats in the Maryhill Wellhead Protection Areas**

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| Chemicals | WHPA-A/B | 10 | Yes | Yes | Yes |
| Chemicals | WHPA-B/C | 8 | Yes | Yes | Yes |
| Chemicals | WHPA-B/C/D | 6 | No | Yes | Yes |
| Chemicals | WHPA-C/D | 2 & 4 | No | No | No |
| DNAPLs | WHPA-A/B/C | Any Score | Yes | No | No |
| DNAPLs | WHPA-D | 6 | No | Yes | Yes |

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| DNAPLs | WHPA-D | 2 & 4 | No | No | No |
| Pathogens | WHPA-A/B | 10 | Yes | Yes | No |
| Pathogens | WHPA-B | 8 | No | Yes | Yes |
| Pathogens | WHPA-B | 6 | No | No | Yes |

### Threats and Issues Enumeration for the Maryhill Wellfield

The percent managed land, livestock density, and percent impervious surface values for each protection zone in the wellfield are shown in **Map 8.6—228, Map 8.6—229 and Map 8.6—230**, respectively.

The total number of identified significant drinking water threats in this wellfield is 38. The number of properties in this wellfield with identified significant drinking water threats is 25. Details surrounding the types of threats and circumstances found in the Maryhill wellhead protection areas are outlined in **Table 8.6—64**.

No Significant Conditions were identified in this wellfield as per Technical Rule 126.

No drinking water Issues have been identified in this wellfield as per Technical Rule 114.

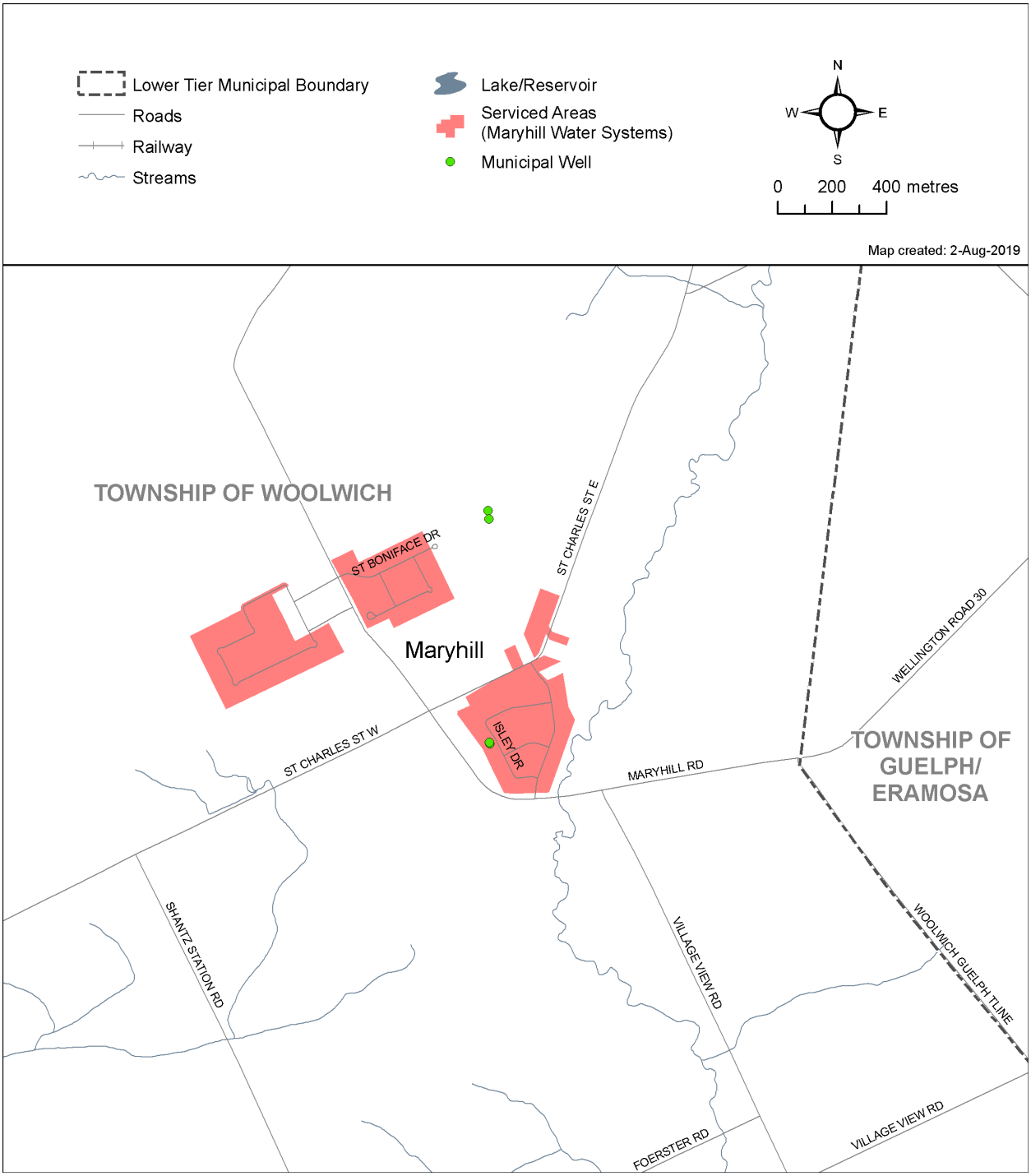
**Table 8.6—14: Significant Drinking Water Quality Threats in the Maryhill Wellhead Protection Areas (current to February 2019)**

| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| 2 | Sewage system or sewage works - onsite sewage systems | 13 | WHPA-A WHPA-B |
| | Sewage system or sewage works - onsite sewage systems holding tanks | 12 | WHPA-A WHPA-B |
| 3 | Application of agricultural source material (ASM) to land | 3 | WHPA-A |
| 8 | Application of commercial fertilizer to land | 3 | WHPA-A |
| 10 | Application of pesticide to land | 2 | WHPA-A |
| 12 | Application of road salt | 3 | WHPA-A |
| 21 | Management or handling of agricultural source material - agricultural source material (ASM) generation (grazing and pasturing) | 1 | WHPA-A |
| | Management or handling of agricultural source material - agricultural source material (ASM) generation (yards or confinement) | 1 | WHPA-A |
| **Total Number of Significant Threat Activities** | | **38** | |
| **Total Number of Properties with Significant Threats** | | **25** | |

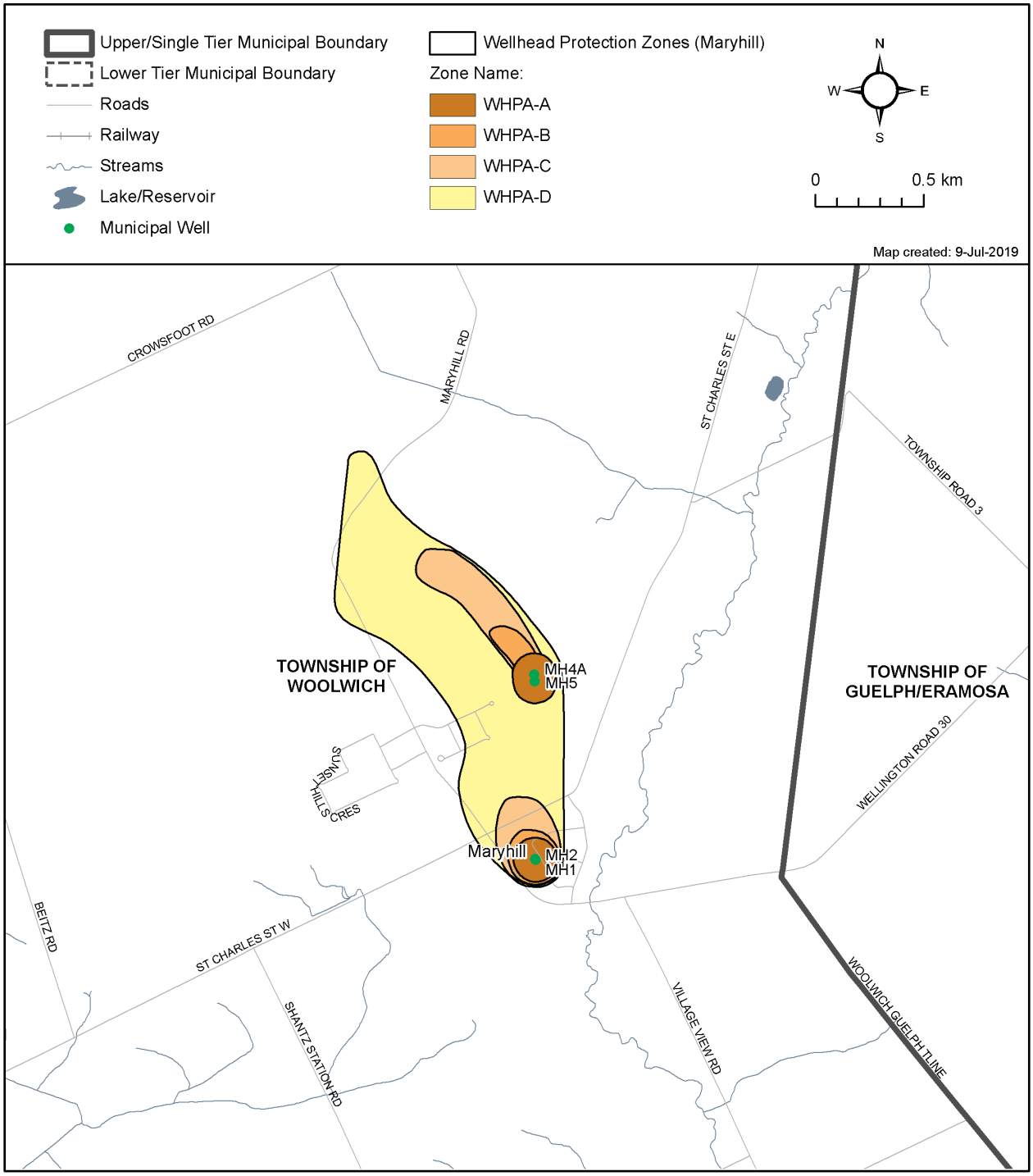
[1] Prescribed Drinking Water Quality Threat Number refers to the prescribed drinking water threat listed in O. Reg. 287/07 s.1.1 (1)

[2] Where applicable, waste, sewage, and livestock threat numbers are reported by sub-threat; fuel and DNAPL by Prescribed Drinking Water Threat category.

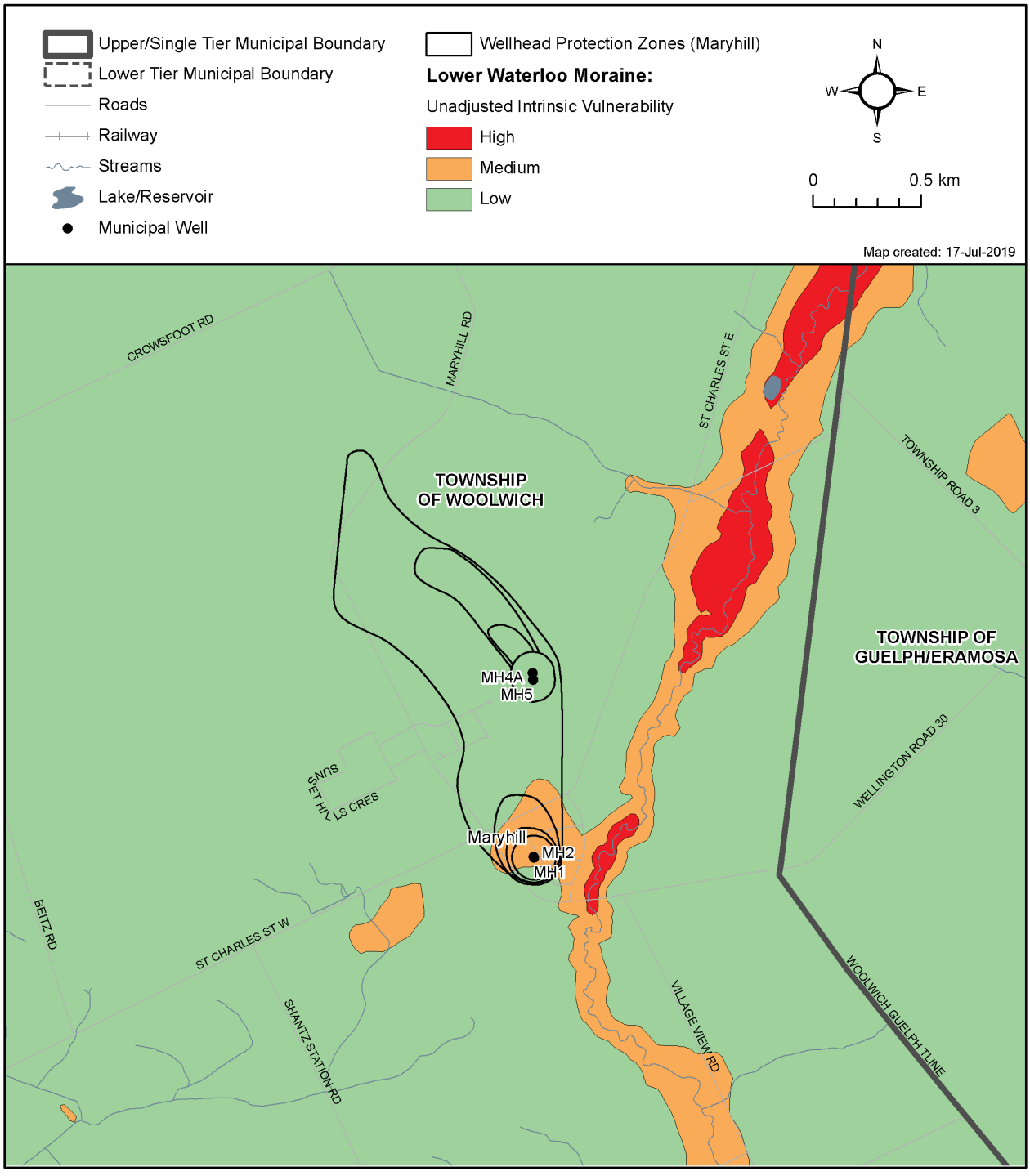
## Map 8.6—61: Maryhill Well Supply Serviced Areas



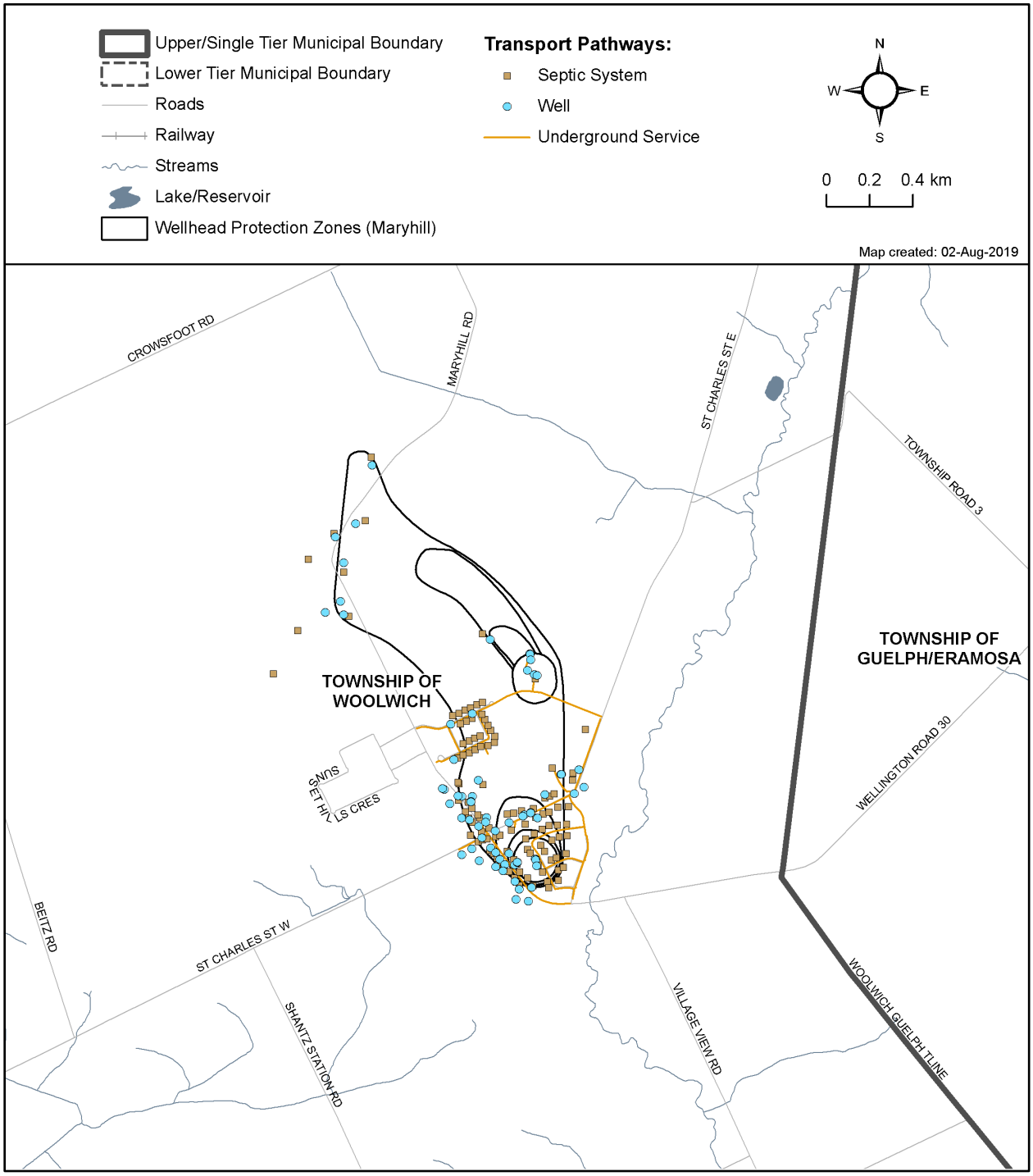
## Map 8.6—62: Maryhill Well Supply Wellhead Protection Areas



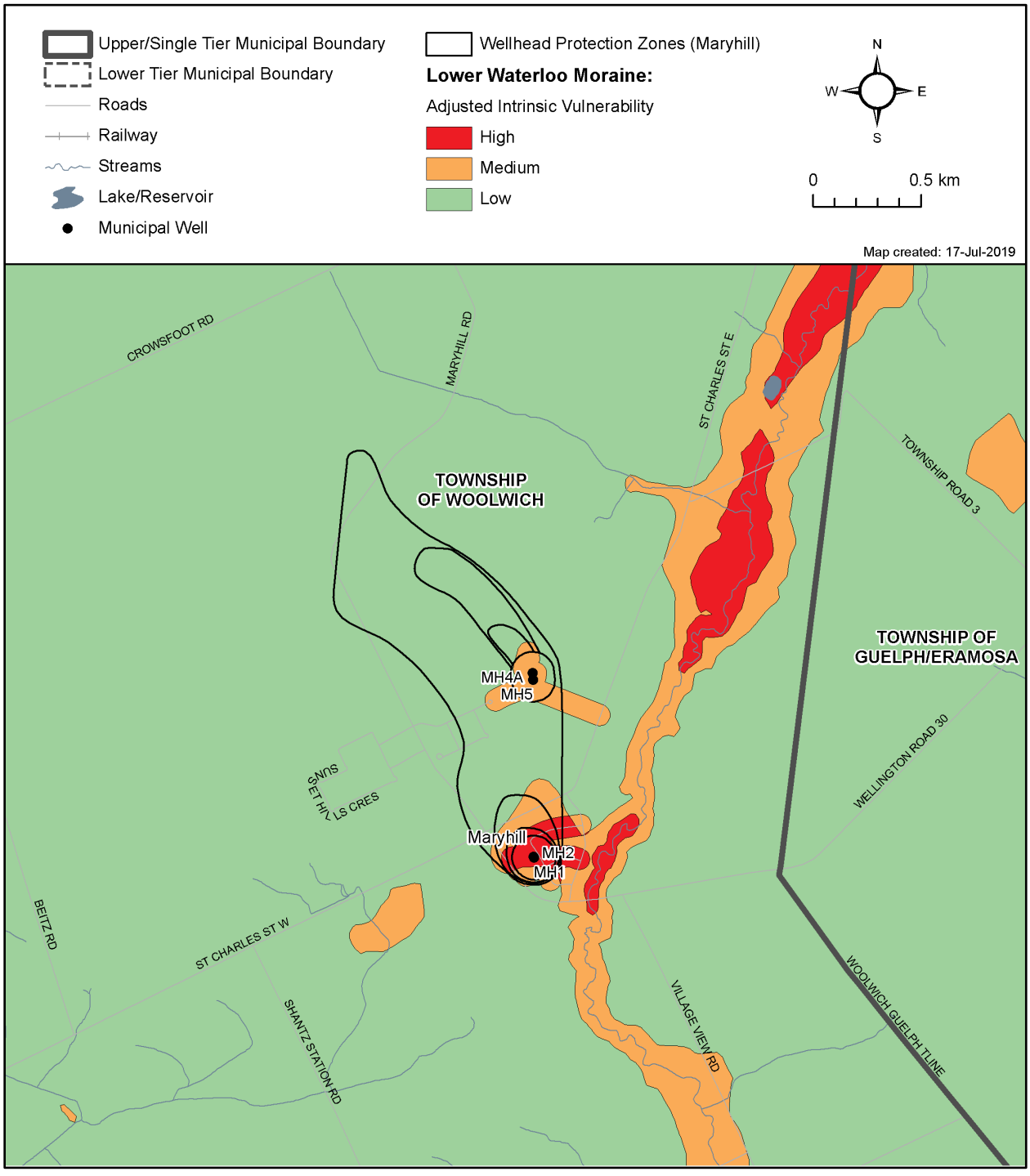
## Map 8.6—63: Maryhill Well Supply Wellhead Protection Area Unadjusted Intrinsic Vulnerability



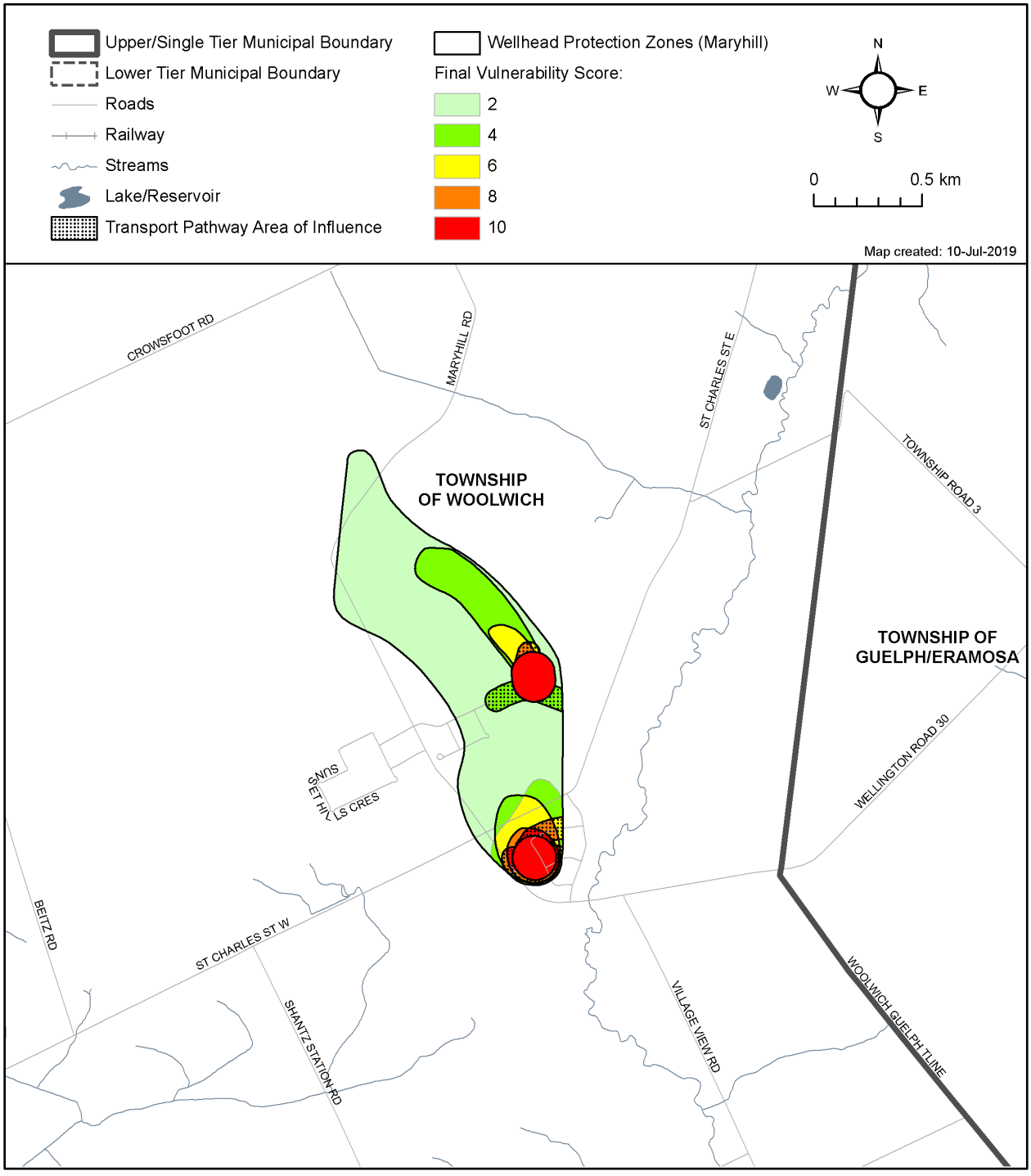
## Map 8.6—64: Maryhill Well Supply Transport Pathways



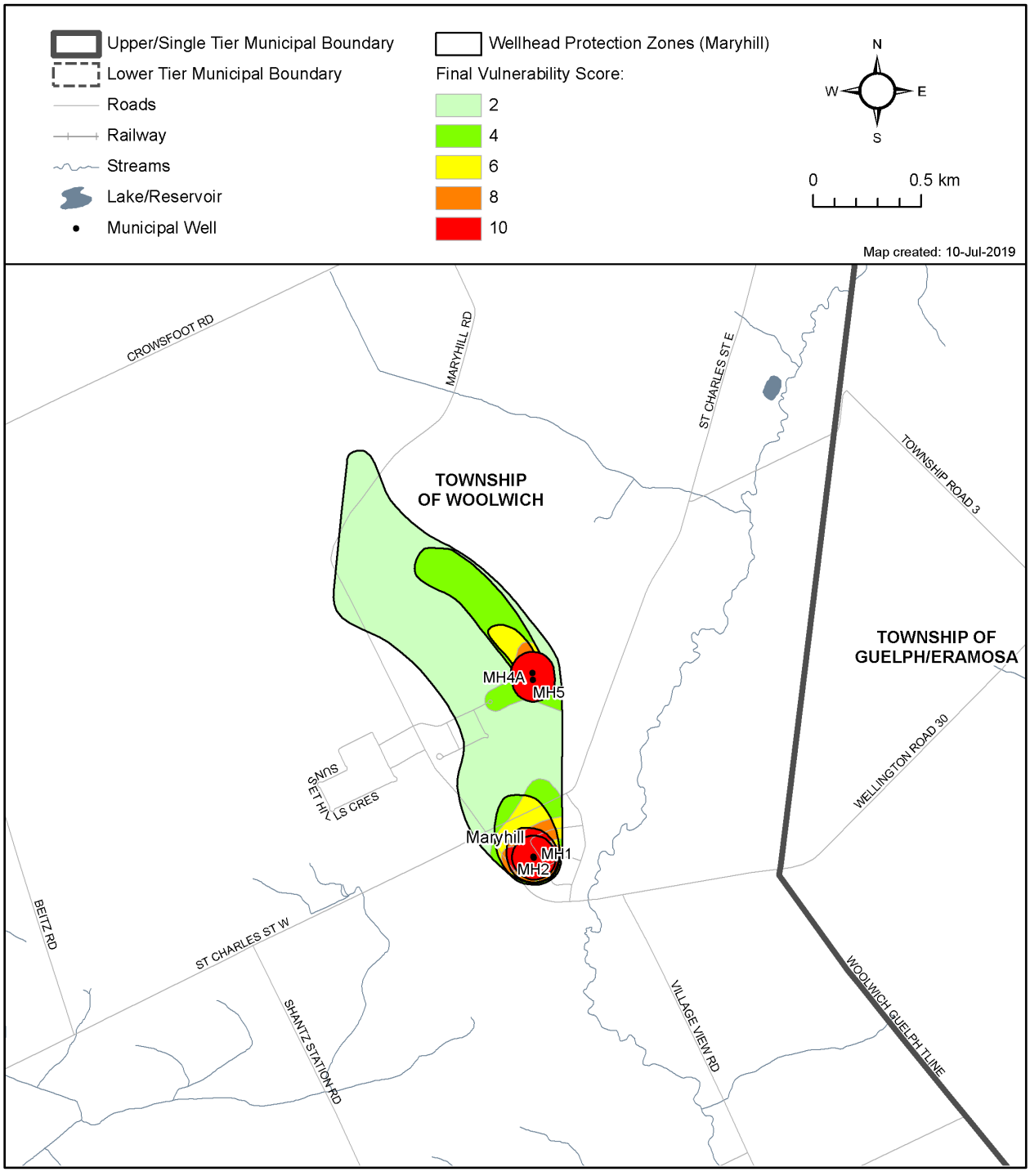
## Map 8.6—65: Maryhill Well Supply Wellhead Protection Area Adjusted Intrinsic Vulnerability



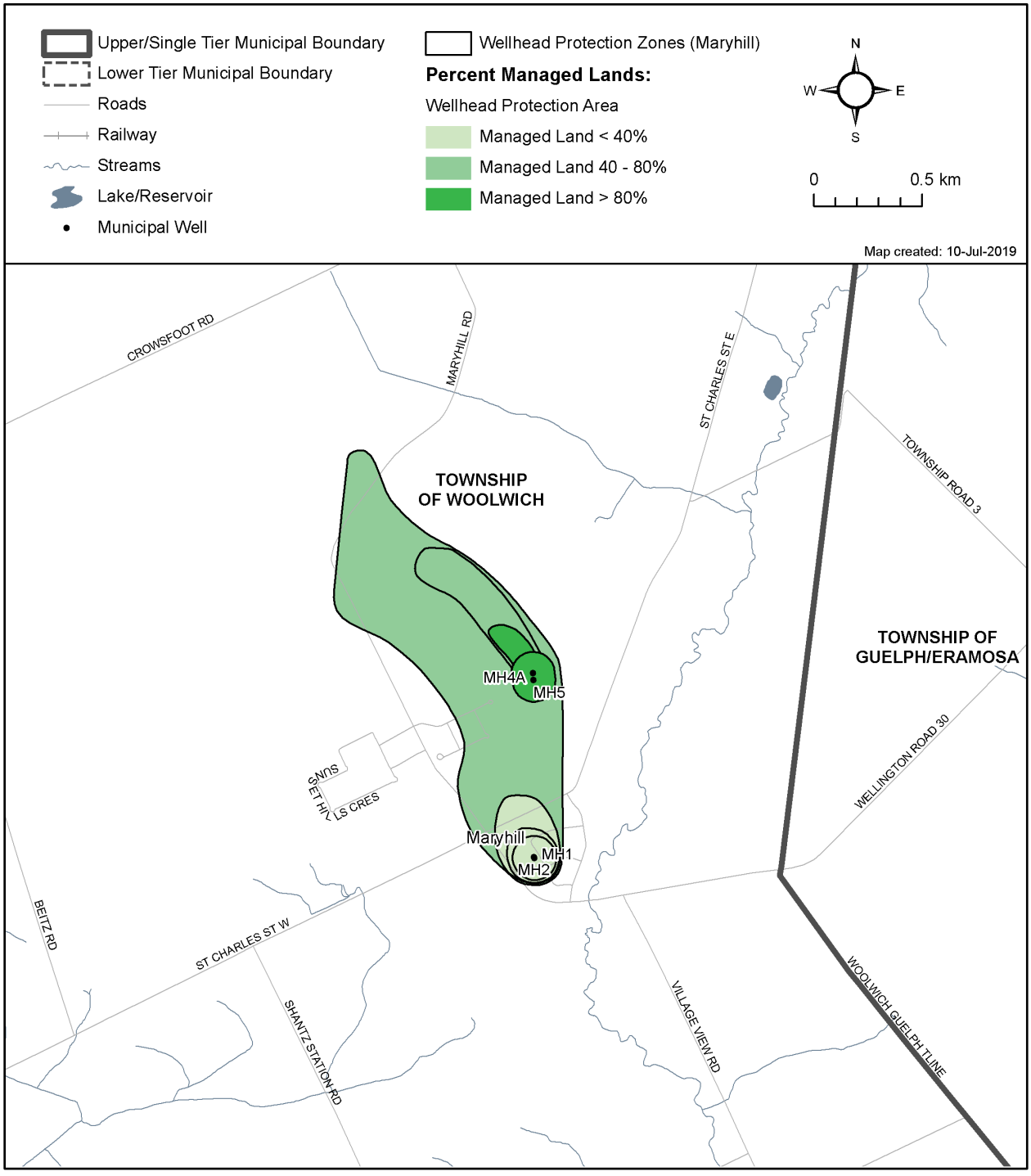
## Map 8.6—66: Maryhill Well Supply Area of Influence



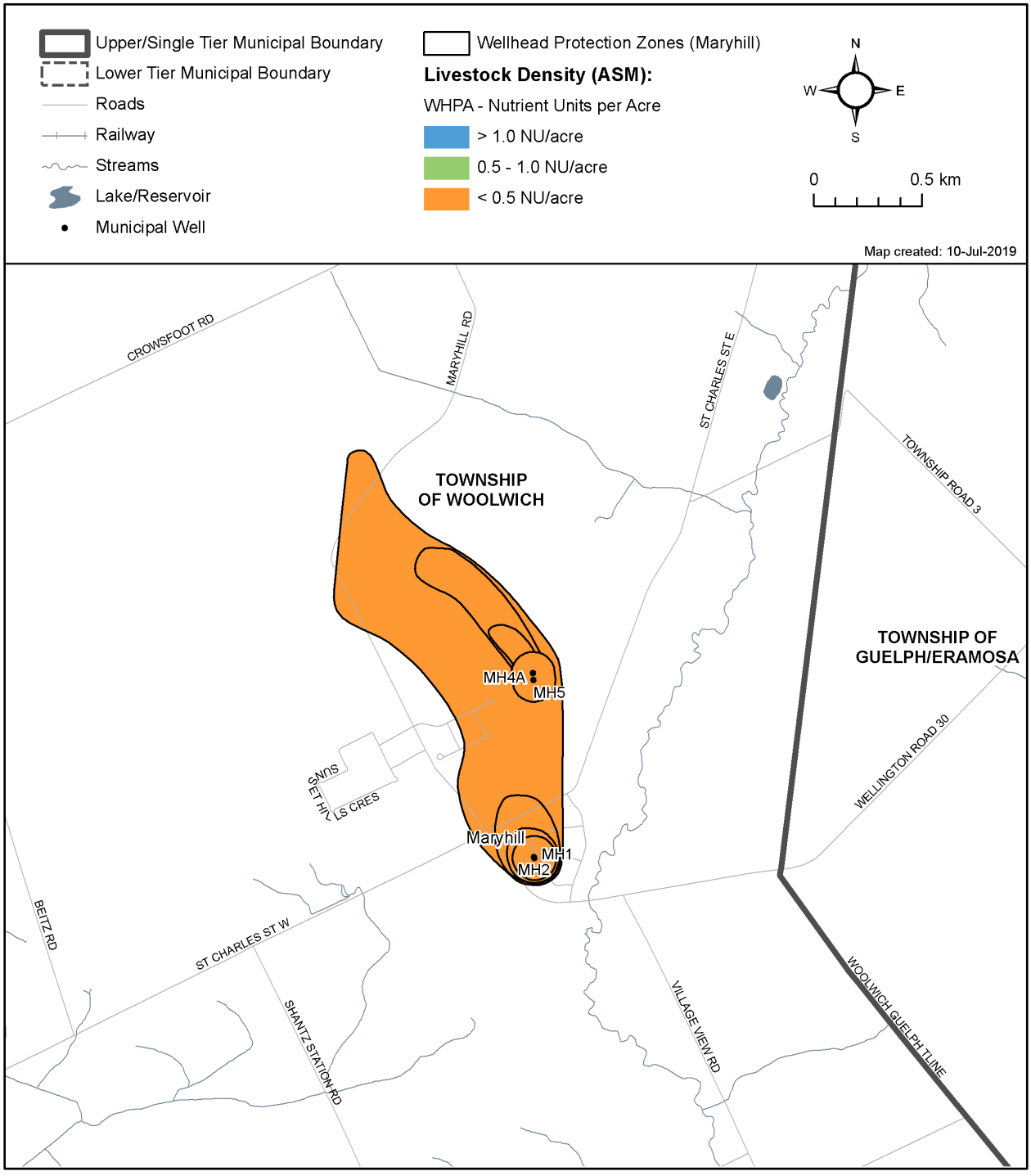
## Map 8.6—67: Maryhill Well Supply Wellhead Protection Area Final Vulnerability Scoring



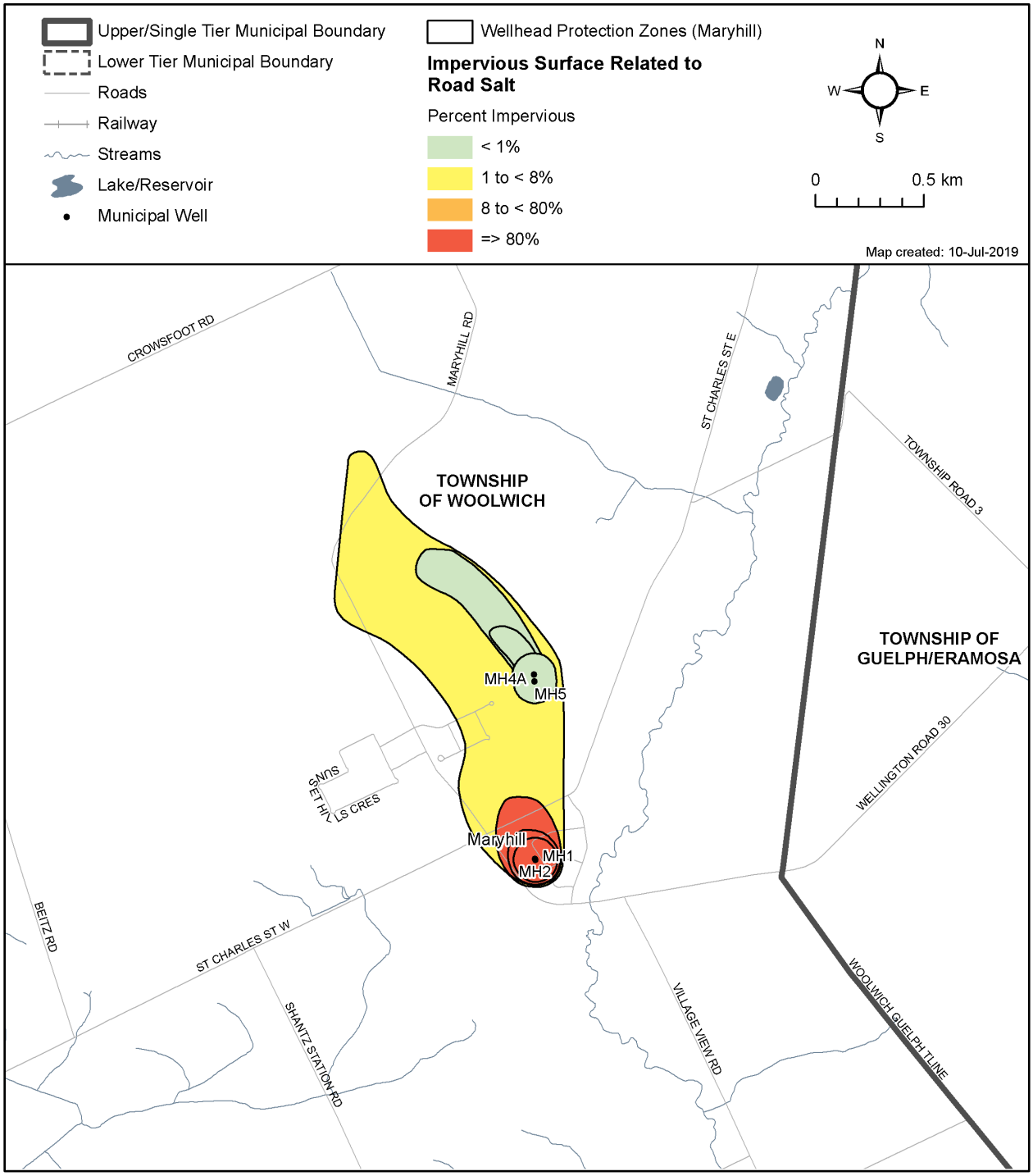
## Map 8.6—68: Maryhill Well Supply Percent Managed Lands



## Map 8.6—69: Maryhill Well Supply Livestock Density



## Map 8.6—70: Maryhill Well Supply Percent Impervious Surfaces



### 8.6.8 New Dundee Wellfield

The water supply for the New Dundee Wellfield is obtained from Production Wells ND4 and ND5, which distribute water to approximately 1,049 people **(Table 8—1)**. The serviced areas are presented on **Map 8.6—231**. The production wells are screened at depths ranging from 14 m BGS to 16 m BGS within the Middle Waterloo Moraine Sands (AFB2). AFB2 is between the Maryhill Till (ATB2) aquitard and the overlying Upper Waterloo Moraine Sands (AFB1) **(Table 8.1—6)**. Since the Upper Maryhill Till (ATB1) is not present in this area, AFB2 and AFB1 act as a single aquifer in the area resulting in the use of AFB1 for the vulnerability scoring at this Wellfield.

#### Vulnerability and Transport Pathways

The WHPAs are presented on **Map 8.6—232.** The unadjusted intrinsic vulnerability is shown on **Map 8.6—233** and the adjusted intrinsic vulnerability is on **Map 8.6—235**. Since the Upper Maryhill Till (ATB1) is not present in this area, AFB2 and AFB1 act as a single aquifer in the area resulting in the use of AFB1 for the vulnerability scoring at this Wellfield. **Map 8.6—234** and **Map 8.6—236** show the transport pathways and areas of influence. Final vulnerability scoring is presented on **Map 8.6—237**.

#### Identification of Significant, Moderate and Low Drinking Water Quality Threats in the New Dundee Wellhead Protection Areas

The identification of a land use activity as a significant, moderate, or low drinking water threat depends on its risk score, determined by considering the circumstances of the activity and the type and vulnerability score of any underlying protection zones, as set out in the Tables of Drinking Water Threats. Information on drinking water threats is also accessible through the Source Water Protection Information Portal. The information above can be used with the vulnerability scores shown in **Map 8.6—237** to help the public determine where certain activities are or would be significant, moderate and low drinking water threats.

**Table 8.6—65** provides a summary of the threat levels possible in the New Dundee Wellfield for Chemicals, Dense Non-Aqueous Phase Liquids (DNAPLs), and Pathogens. “Yes” indicates that the threat classification level is possible for the indicated threat type under the corresponding vulnerable area / vulnerable score; “No" indicates that it is not. The colours shown for each vulnerability score correspond to those shown in **Map 8.6—237**.

**Table 8.6—15: Identification of Drinking Water Quality Threats in the New Dundee Wellhead Protection Areas**

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| Chemicals | WHPA-A/B | 10 | Yes | Yes | Yes |
| Chemicals | WHPA-B/C | 8 | Yes | Yes | Yes |
| Chemicals | WHPA-C/D | 6 | No | Yes | Yes |
| Chemicals | WHPA-C/D | 4 | No | No | No |
| DNAPLs | WHPA-A/B/C | Any Score | Yes | No | No |
| DNAPLs | WHPA-D | 6 | No | Yes | Yes |

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| DNAPLs | WHPA-D | 4 | No | No | No |
| Pathogens | WHPA-A/B | 10 | Yes | Yes | No |
| Pathogens | WHPA-B | 8 | No | Yes | Yes |
| Pathogens | WHPA-C/D | Any Score | No | No | No |

### Threats and Issues Enumeration for the New Dundee Wellfield

The percent managed land, livestock density, and percent impervious surface values for each protection zone in the wellfield are shown in **Map 8.6—238, Map 8.6—239 and Map 8.6—240**, respectively.

The total number of identified significant drinking water threats in this wellfield is 46. The number of properties in this wellfield with identified significant drinking water threats is 26. Details surrounding the types of threats and circumstances found in the New Dundee wellhead protection areas are outlined in **Table 8.6—66**.

No Significant Conditions were identified in this wellfield as per Technical Rule 126.

No drinking water Issues have been identified in this wellfield as per Technical Rule 114.

**Table 8.6—16: Significant Drinking Water Quality Threats in the New Dundee Wellhead Protection Areas (current to February 2019)**

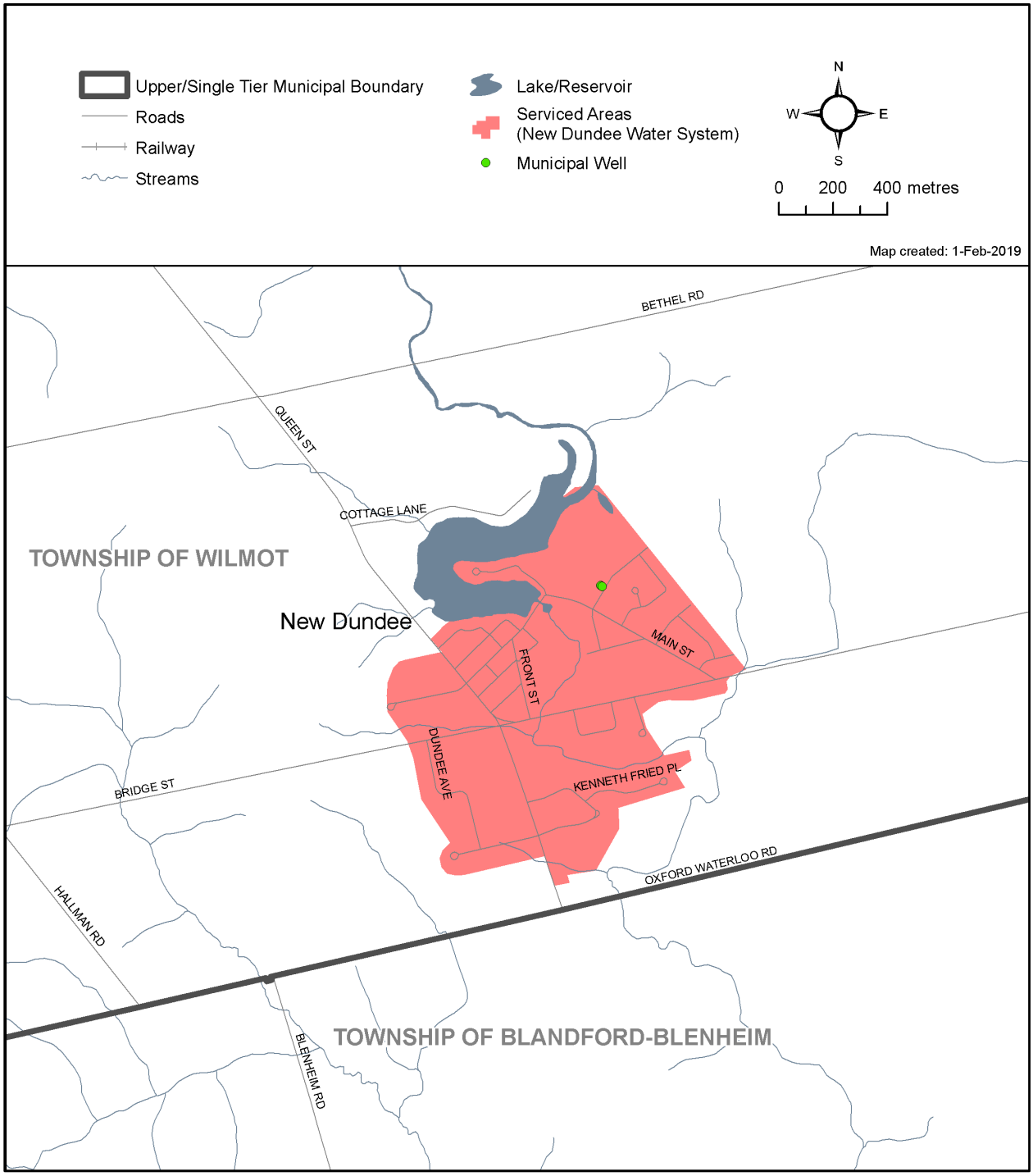
| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| 2 | Sewage system or sewage works - onsite sewage systems | 18 | WHPA-A<br>WHPA-B |
| | Sewage system or sewage works - onsite sewage systems holding tanks | 10 | WHPA-A<br>WHPA-B |
| 3 | Application of agricultural source material (ASM) to land | 2 | WHPA-A<br>WHPA-B |
| 4 | Storage of agricultural source material (ASM) | 2 | WHPA-A<br>WHPA-B |
| 8 | Application of commercial fertilizer to land | 2 | WHPA-A<br>WHPA-B |
| 9 | Storage of commercial fertilizer | 1 | WHPA-B |
| 10 | Application of pesticide to land | 2 | WHPA-A<br>WHPA-B |
| 11 | Storage of a pesticide | 1 | WHPA-B |
| 15 | Storage and handling of fuel | 4 | WHPA-A<br>WHPA-B |
| 21 | Management or handling of agricultural source material - agricultural source material (ASM) generation (grazing and pasturing) | 2 | WHPA-A<br>WHPA-B |

| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| | Management or handling of agricultural source material - agricultural source material (ASM) generation (yards or confinement) | 2 | WHPA-A<br>WHPA-B |
| **Total Number of Significant Threat Activities** | | **43** | |
| **Total Number of Properties with Significant Threats** | | **26** | |

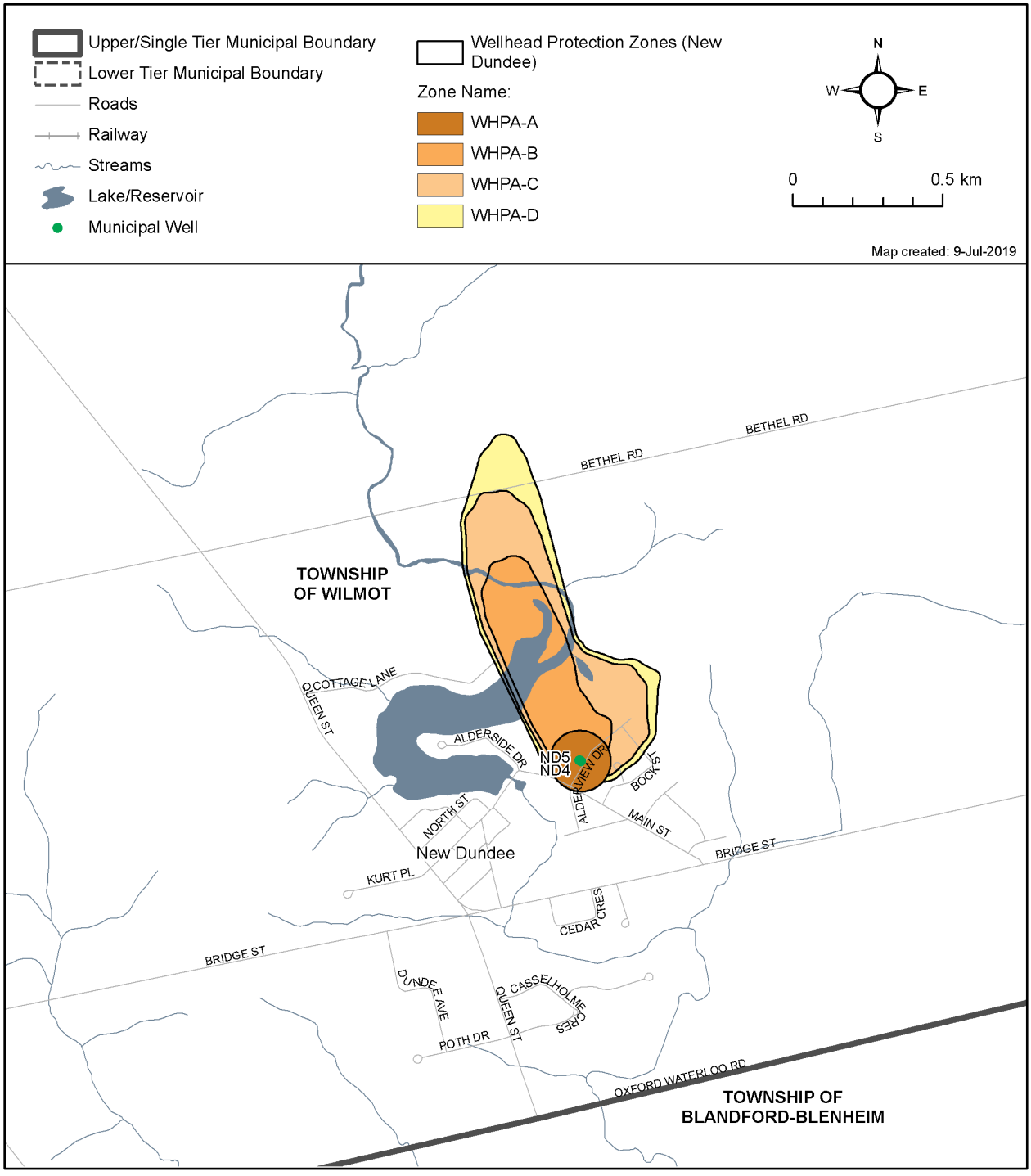
[1] Prescribed Drinking Water Quality Threat Number refers to the prescribed drinking water threat listed in O. Reg. 287/07 s.1.1 (1)

[2] Where applicable, waste, sewage, and livestock threat numbers are reported by sub-threat; fuel and DNAPL by Prescribed Drinking Water Threat category.

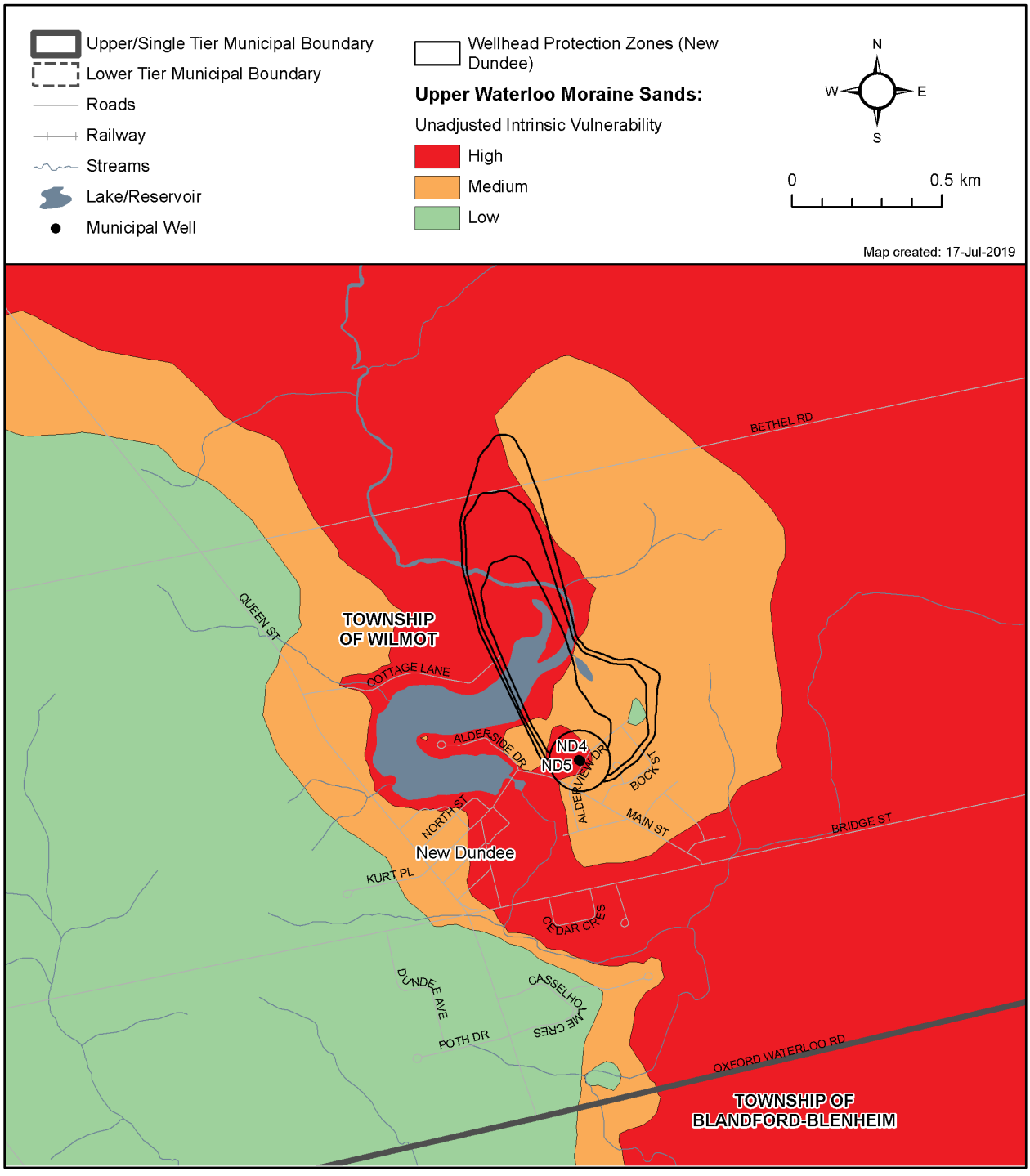
## Map 8.6—71: New Dundee Well Supply Serviced Areas



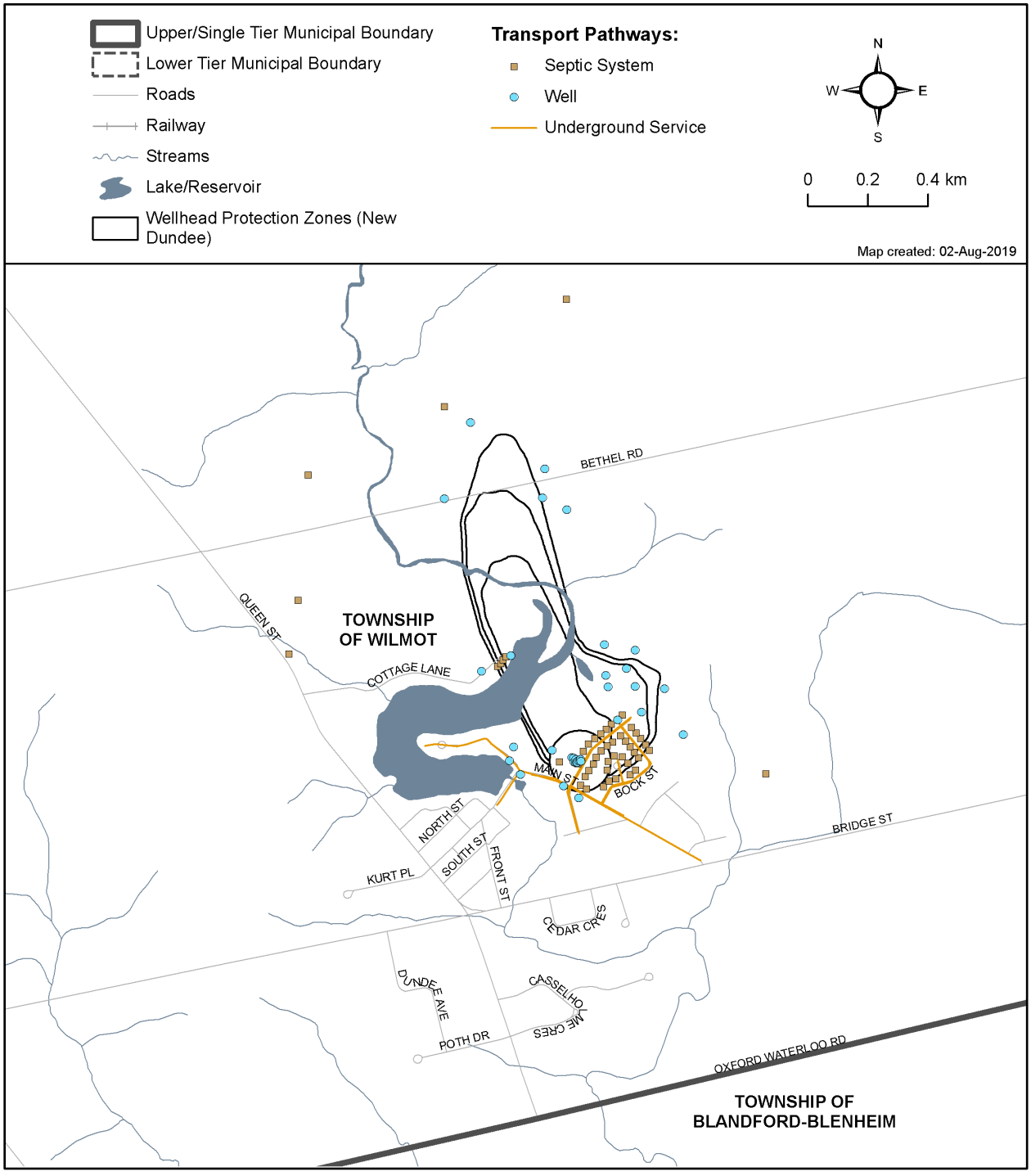
## Map 8.6—72: New Dundee Well Supply Wellhead Protection Area



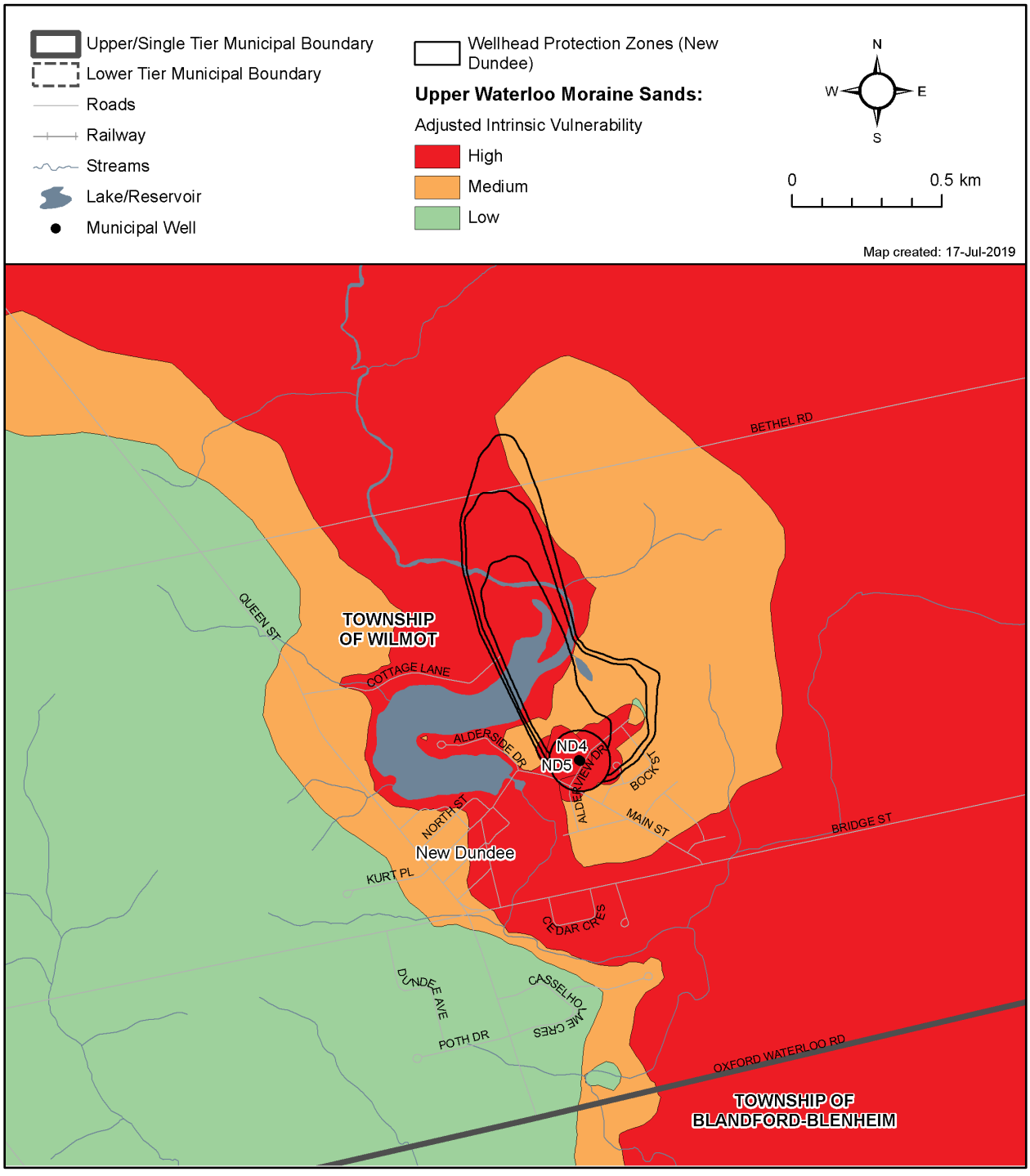
## Map 8.6—73: New Dundee Well Supply Wellhead Protection Area Unadjusted Intrinsic Vulnerability



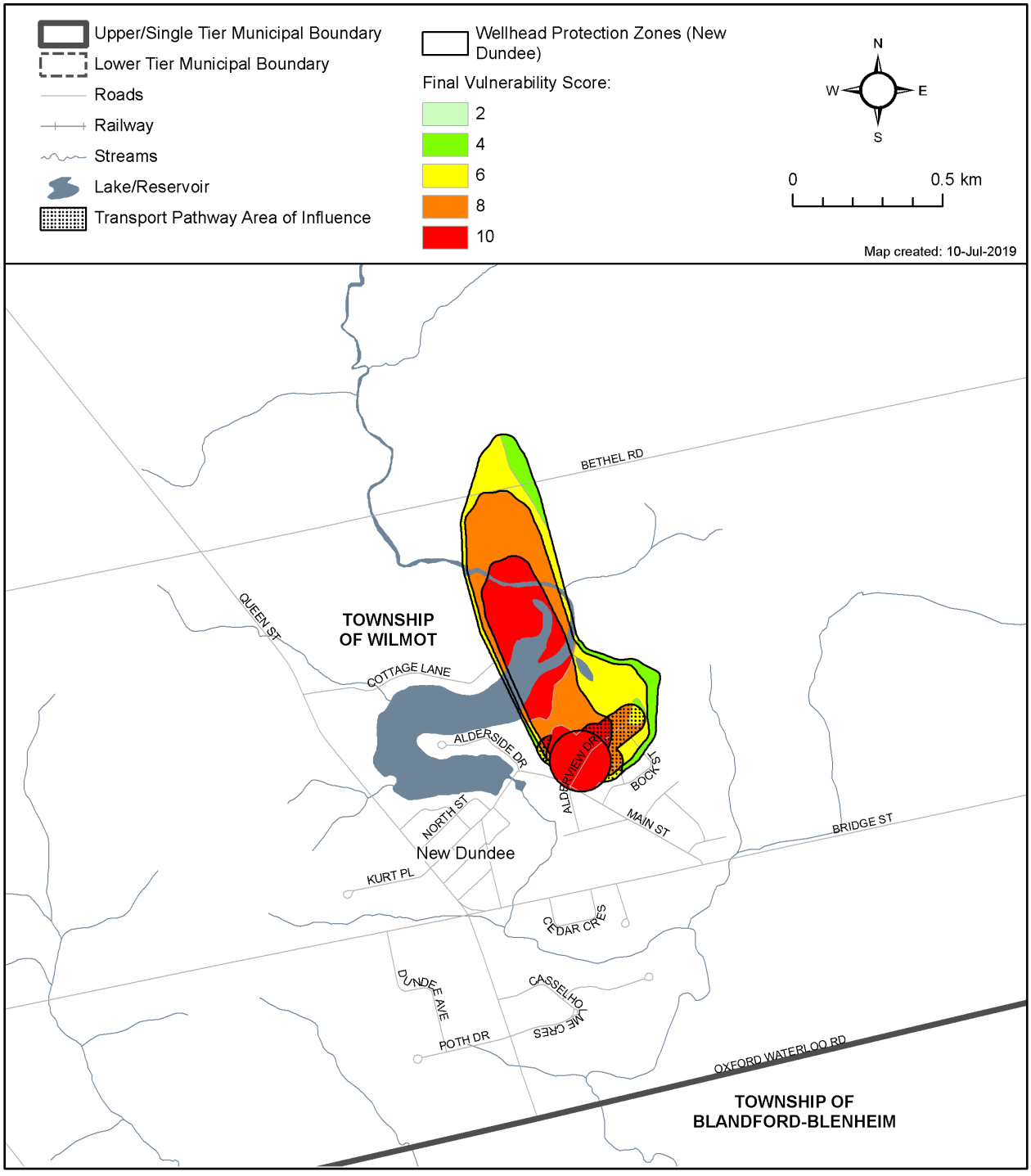
## Map 8.6—74: New Dundee Well Supply Transport Pathways



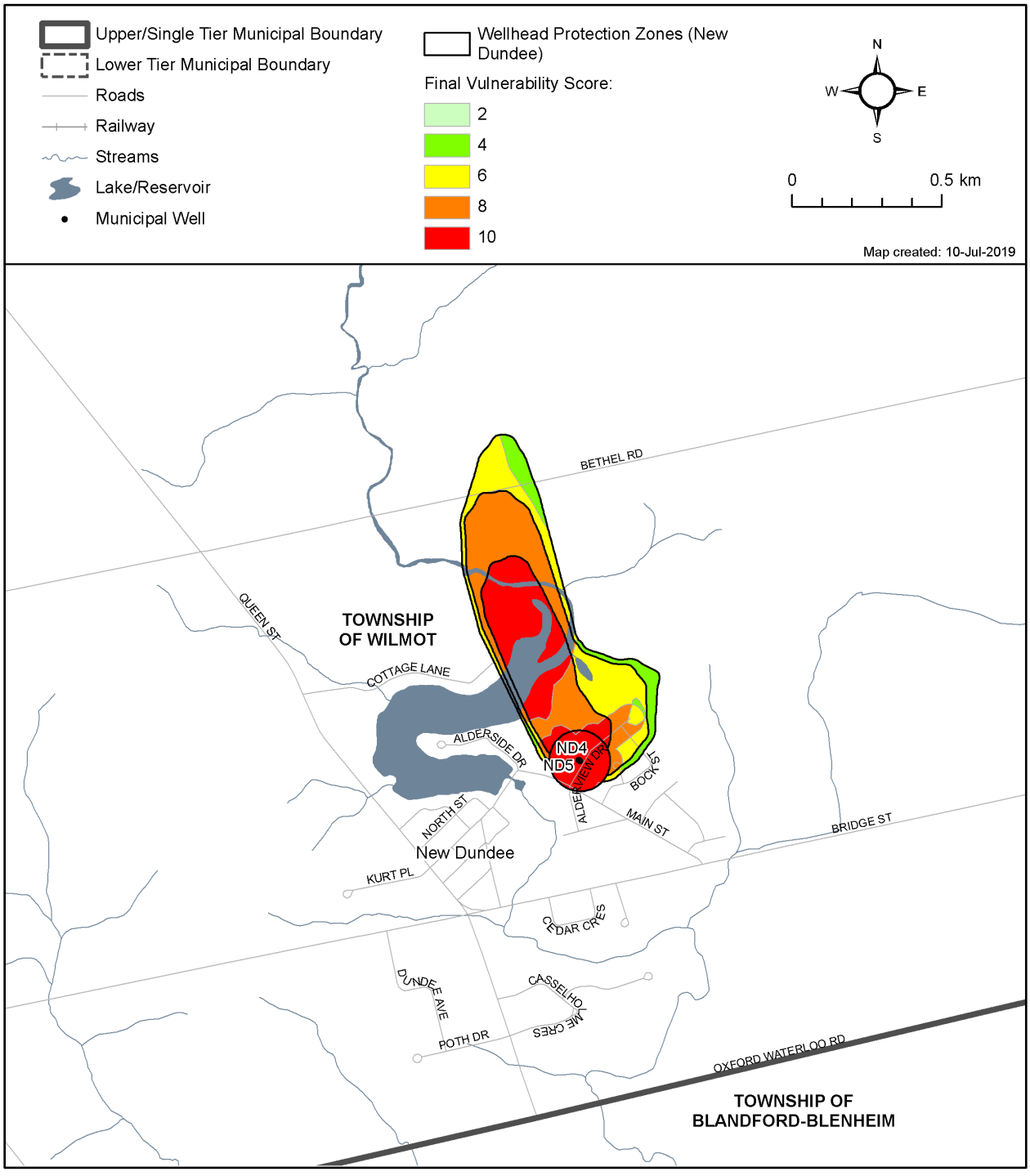
## Map 8.6—75: New Dundee Well Supply Wellhead Protection Area Adjusted Intrinsic Vulnerability



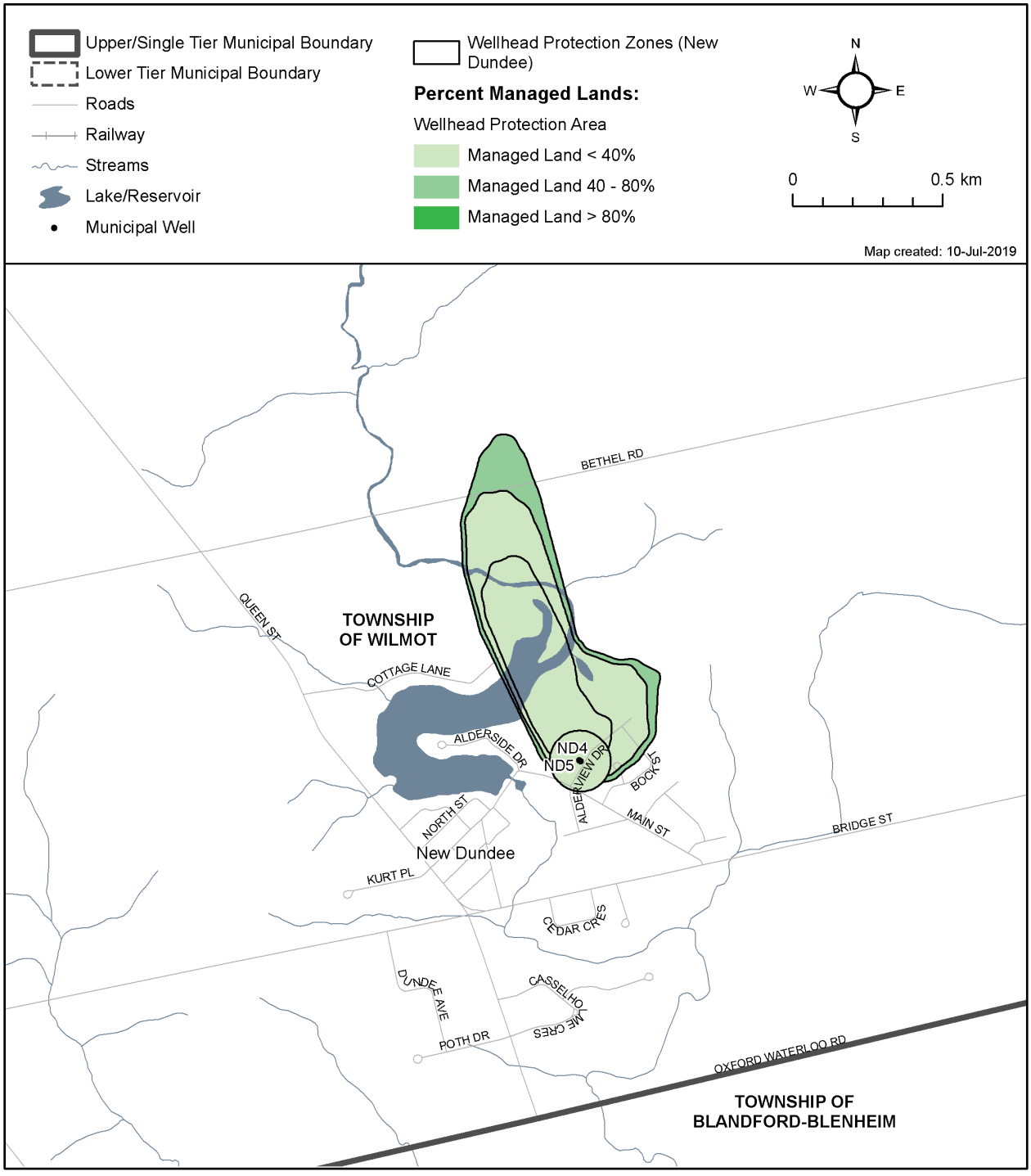
## Map 8.6—76: New Dundee Well Supply Area of Influence



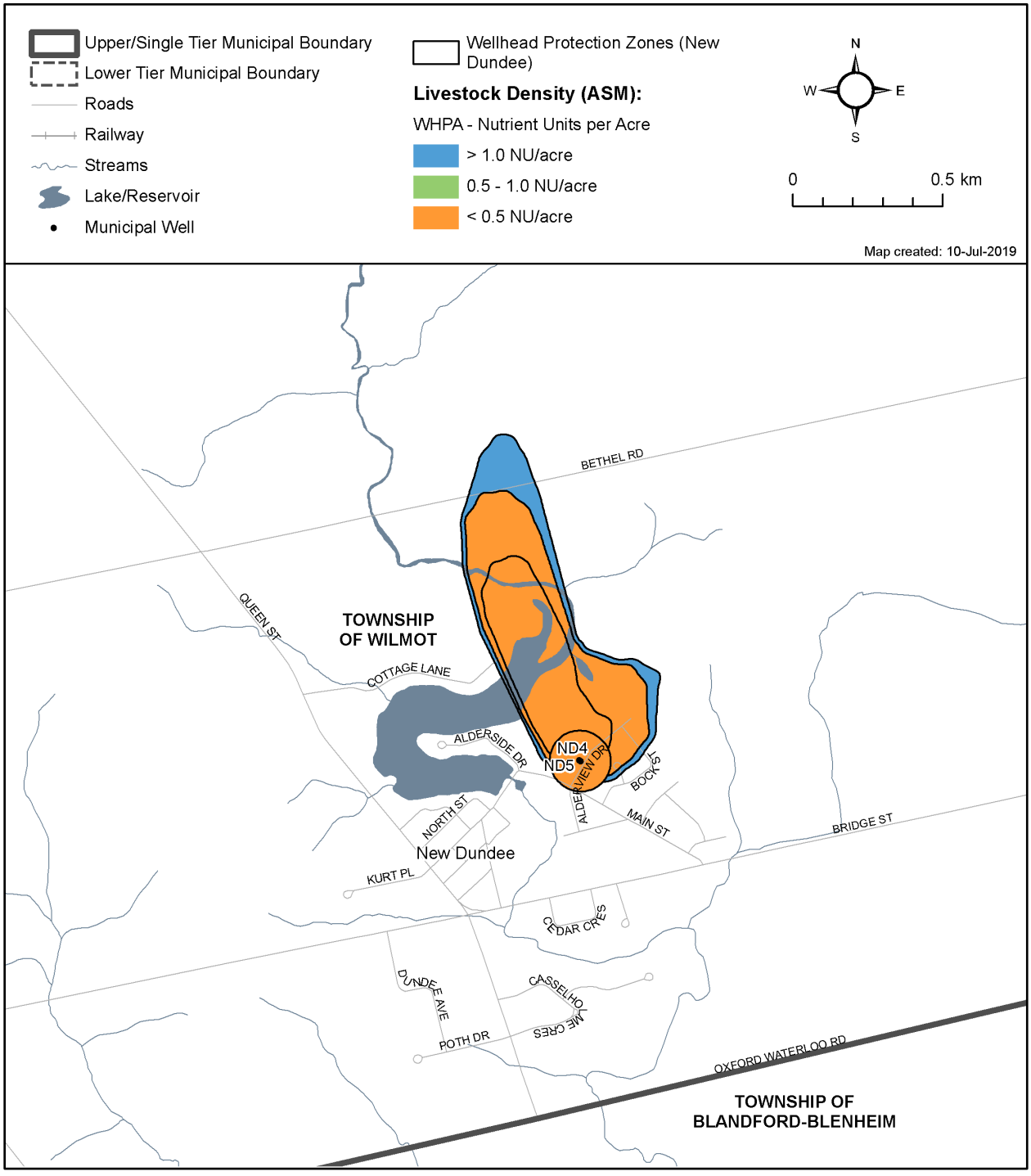
## Map 8.6—77: New Dundee Well Supply Wellhead Protection Area Final Vulnerability



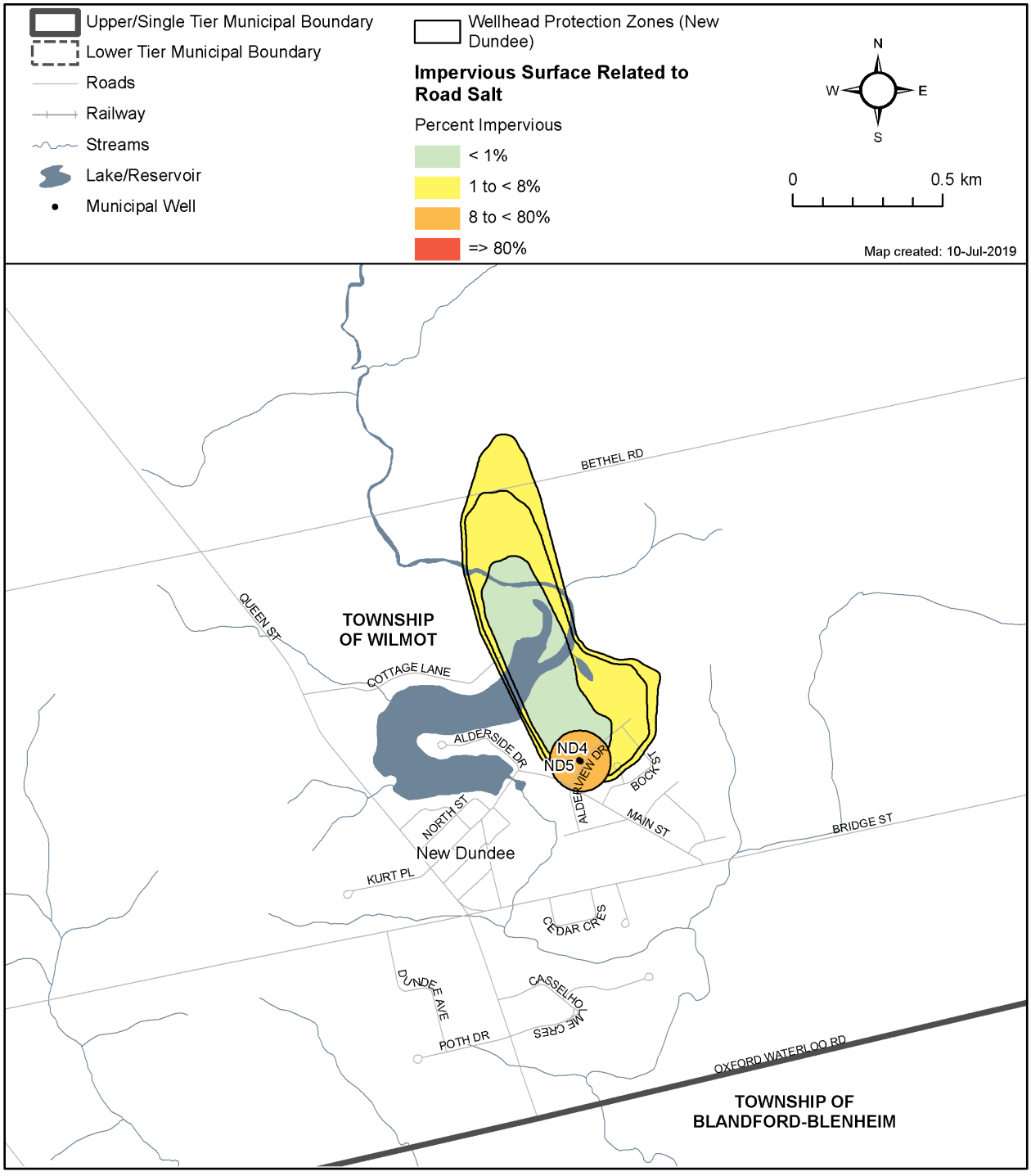
## Map 8.6—78: New Dundee Well Supply Percent Managed Lands



## Map 8.6—79: New Dundee Well Supply Livestock Density



## Map 8.6—80: New Dundee Well Percent Impervious Surfaces



### 8.6.9 New Hamburg Wellfield

The water supply for the New Hamburg Wellfield is obtained from well NH3, which distributes water to approximately 13,974 people. Additionally, well NH4 was recently constructed on the same property as the existing water supply system to provide operational redundancy. Pumping from this well will not result in additional water taking from the water supply system property. The serviced areas are presented on **Map 8.6—241**. This production well is open hole from approximately 57 to 76 m BGS within the bedrock of Salina Formation. Overlying material corresponds to Catfish Creek Till (ATC1) and pre-Catfish Creek (AFD1) aquifer deposits. A portion of WHPA-B through WHPA-D extends into the Township of Perth East (**Table 8.1—6**).

#### Vulnerability and Transport Pathways

The WHPAs are presented on **Map 8.6—242**. The unadjusted intrinsic vulnerability is shown on **Map 8.6—243** and the adjusted intrinsic vulnerability on **Map 8.6—245**. **Map 8.6—247** presents the final protection areas and vulnerability scoring for the New Hamburg WHPA. Analysis of the potential transport pathways within the WHPA areas noted several clusters of septic systems and wells within the WHPA-B zone that warranted increases to the ISI. **Map 8.6—244** and **Map 8.6—246** show the transport pathways and areas of influence.

#### Identification of Significant, Moderate and Low Drinking Water Quality Threats in the New Hamburg Wellhead Protection Areas

The identification of a land use activity as a significant, moderate, or low drinking water threat depends on its risk score, determined by considering the circumstances of the activity and the type and vulnerability score of any underlying protection zones, as set out in the Tables of Drinking Water Threats. Information on drinking water threats is also accessible through the Source Water Protection Information Portal. The information above can be used with the vulnerability scores shown in **Map 8.6—247** to help the public determine where certain activities are or would be significant, moderate and low drinking water threats.

**Table 8.6—67** provides a summary of the threat levels possible in the New Hamburg Wellfield for Chemicals, Dense Non-Aqueous Phase Liquids (DNAPLs), and Pathogens. “Yes” indicates that the threat classification level is possible for the indicated threat type under the corresponding vulnerable area / vulnerable score; “No" indicates that it is not. The colours shown for each vulnerability score correspond to those shown in **Map 8.6—247**.

**Table 8.6—17: Identification of Drinking Water Quality Threats in the New Hamburg Wellhead Protection Areas**

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| Chemicals | WHPA-A | 10 | Yes | Yes | Yes |
| Chemicals | WHPA-B | 8 | Yes | Yes | Yes |
| Chemicals | WHPA-B | 6 | No | Yes | Yes |
| Chemicals | WHPA-C/D | 2 & 4 | No | No | No |

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| DNAPLs | WHPA-A/B/C | Any Score | Yes | No | No |
| DNAPLs | WHPA-D | 2 | No | No | No |
| Pathogens | WHPA-A | 10 | Yes | Yes | No |
| Pathogens | WHPA-B | 8 | No | Yes | Yes |
| Pathogens | WHPA-B | 6 | No | No | Yes |
| Pathogens | WHPA-C/D | Any Score | No | No | No |

### Threats and Issues Enumeration for the New Hamburg Wellfield

The percent managed land, livestock density, and percent impervious surface values for each protection zone in this Wellfield are shown in **Map 8.6—248, Map 8.6—249, and Map 8.6—250,** respectively**.**

The total number of identified significant drinking water threats in this wellfield is 15. The number of properties in this wellfield with identified significant drinking water threats is 8. Details surrounding the types of threats and circumstances found in the New Hamburg wellhead protection areas are outlined in **Table 8.6—68**.

No Significant Conditions were identified in this wellfield as per Technical Rule 126.

No drinking water Issues have been identified in this wellfield as per Technical Rule 114.

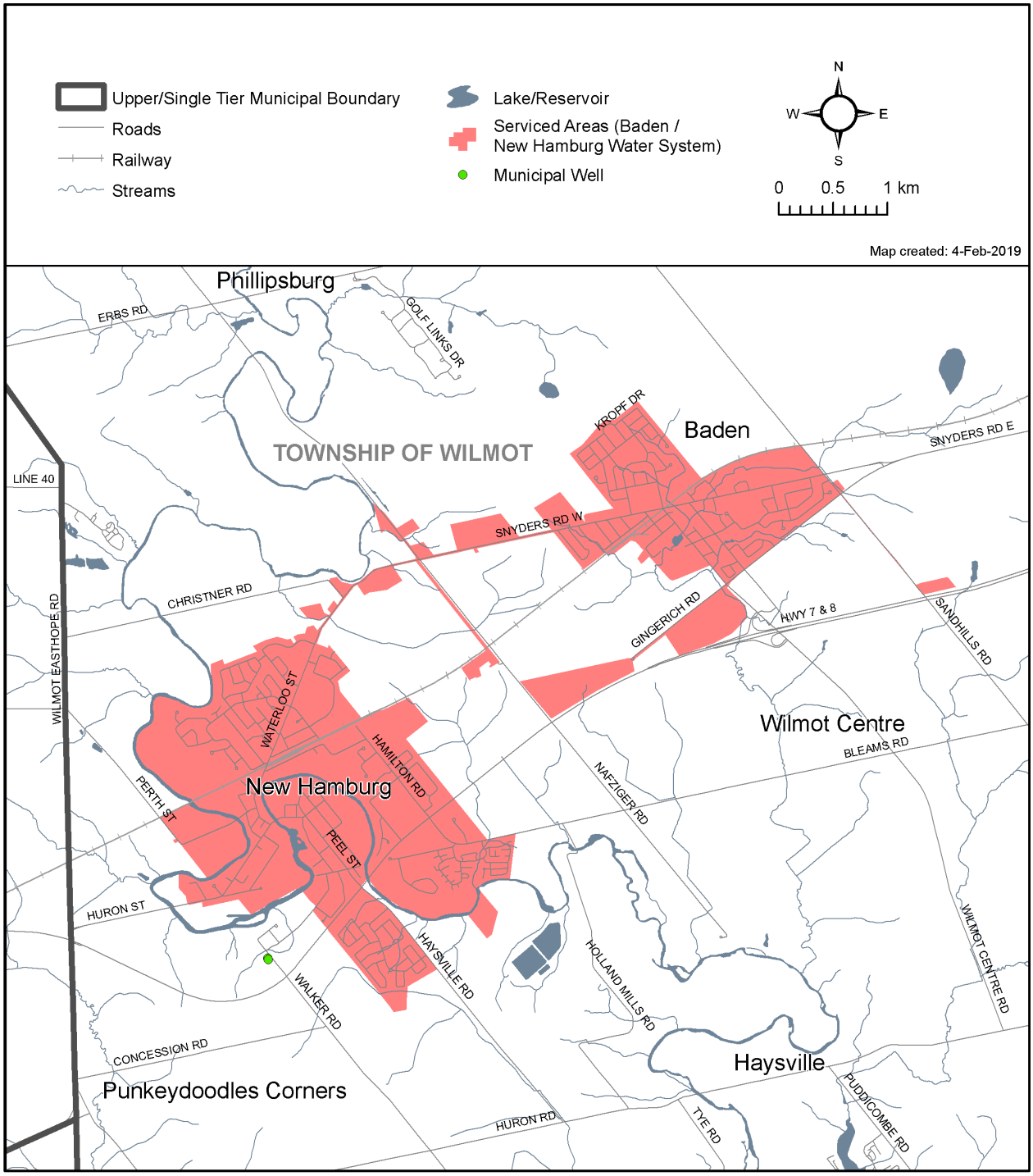
**Table 8.6—18: Significant Drinking Water Quality Threats in the New Hamburg Wellhead Protection Areas (current to February 2019)**

| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| 2 | Sewage system or sewage works - onsite sewage systems | 5 | WHPA-A |
| | Sewage system or sewage works - onsite sewage systems holding tanks | 2 | WHPA-A |
| 3 | Application of agricultural source material (ASM) to land | 1 | WHPA-A |
| 4 | Storage of agricultural source material (ASM) | 1 | WHPA-A |
| 8 | Application of commercial fertilizer to land | 2 | WHPA-A |
| 9 | Storage of commercial fertilizer | 1 | WHPA-A |
| 10 | Application of pesticide to land | 1 | WHPA-A |
| 11 | Storage of a pesticide | 1 | WHPA-A |
| 12 | Application of road salt | 1 | WHPA-A |
| **Total Number of Significant Threat Activities** | | **15** | |
| **Total Number of Properties with Significant Threats** | | **8** | |

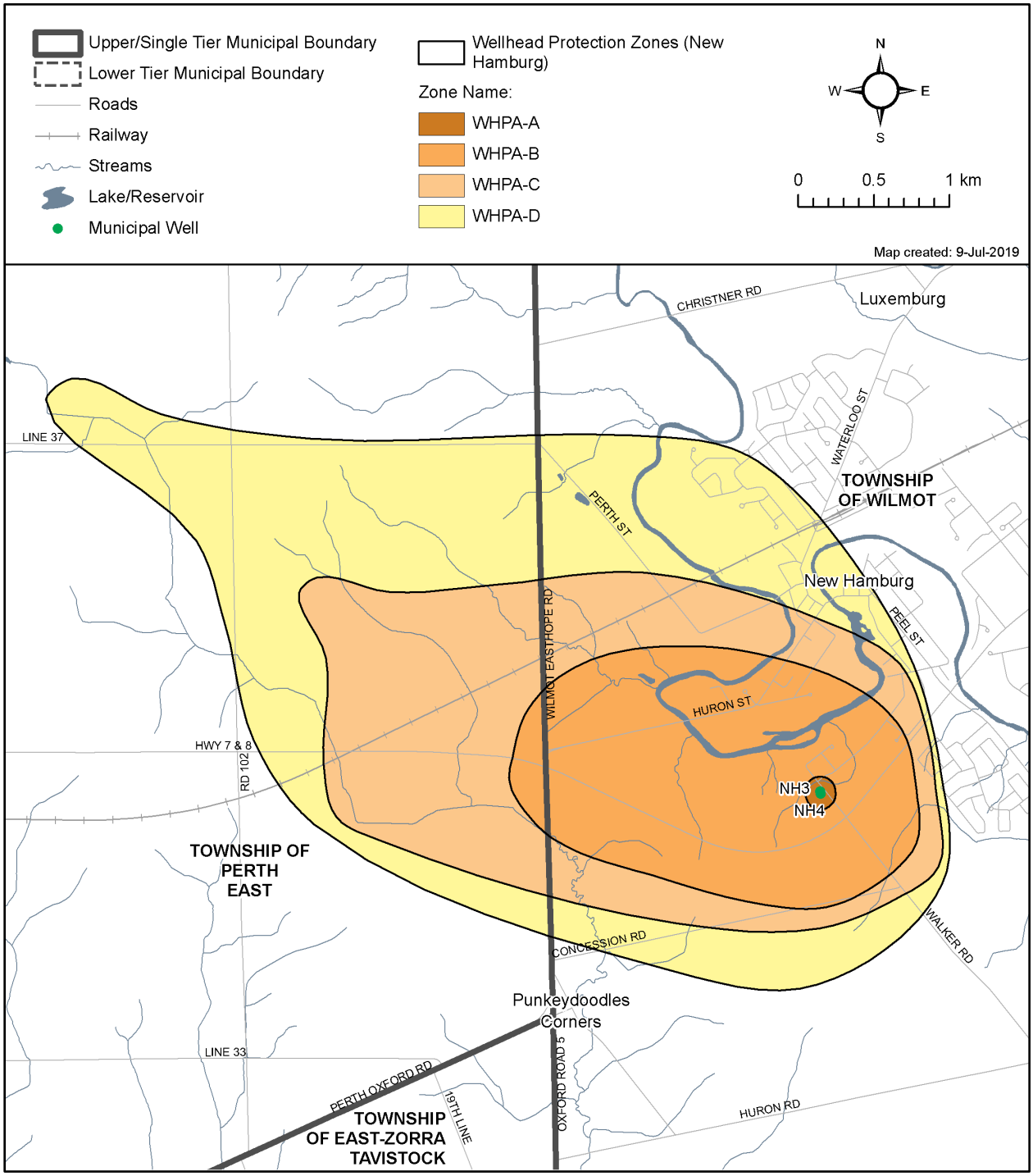
[1] Prescribed Drinking Water Quality Threat Number refers to the prescribed drinking water threat listed in O. Reg. 287/07 s.1.1 (1)

[2] Where applicable, waste, sewage, and livestock threat numbers are reported by sub-threat; fuel and DNAPL by Prescribed Drinking Water Threat category.

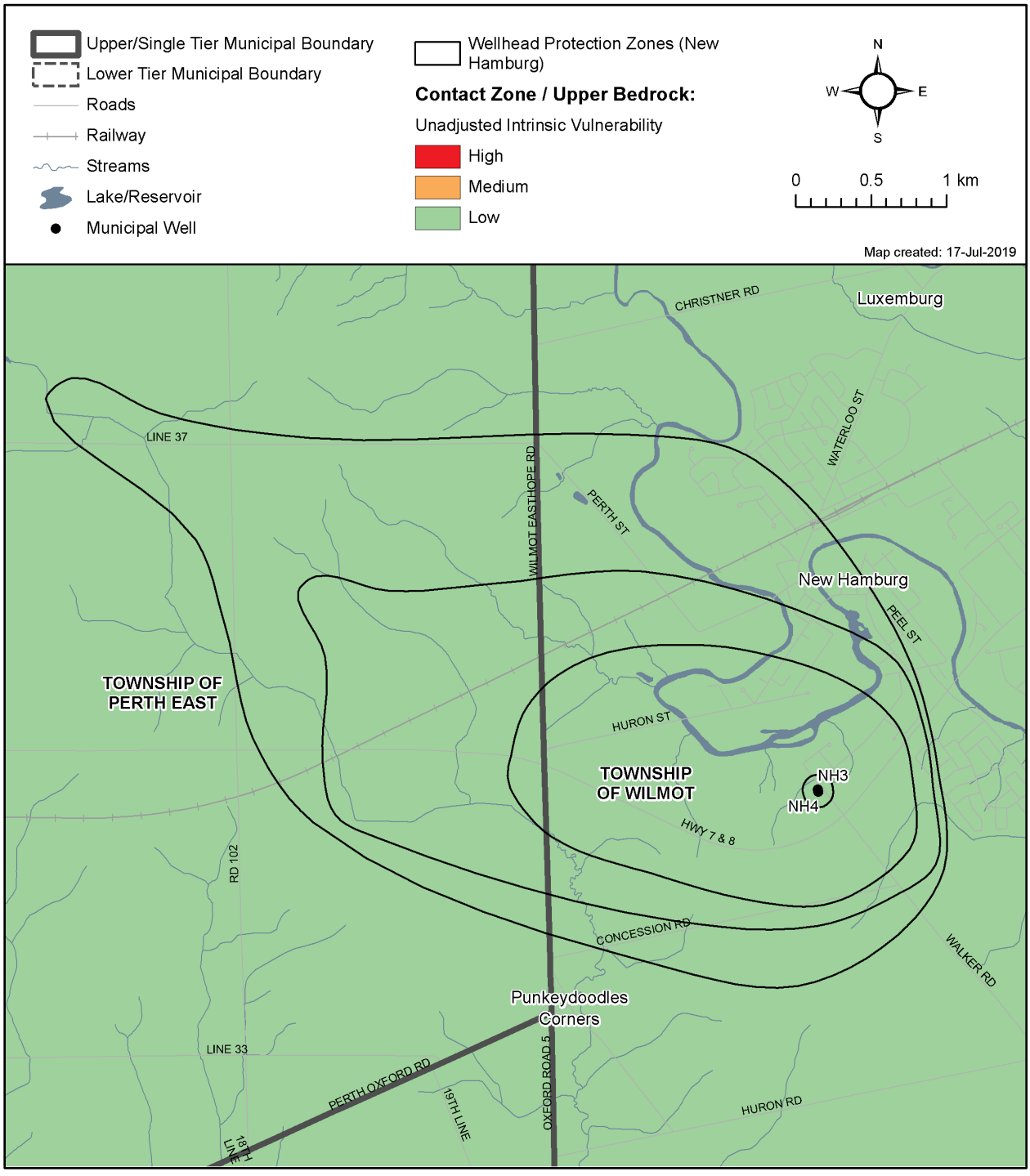
## Map 8.6—81: New Hamburg Well Supply Serviced Areas



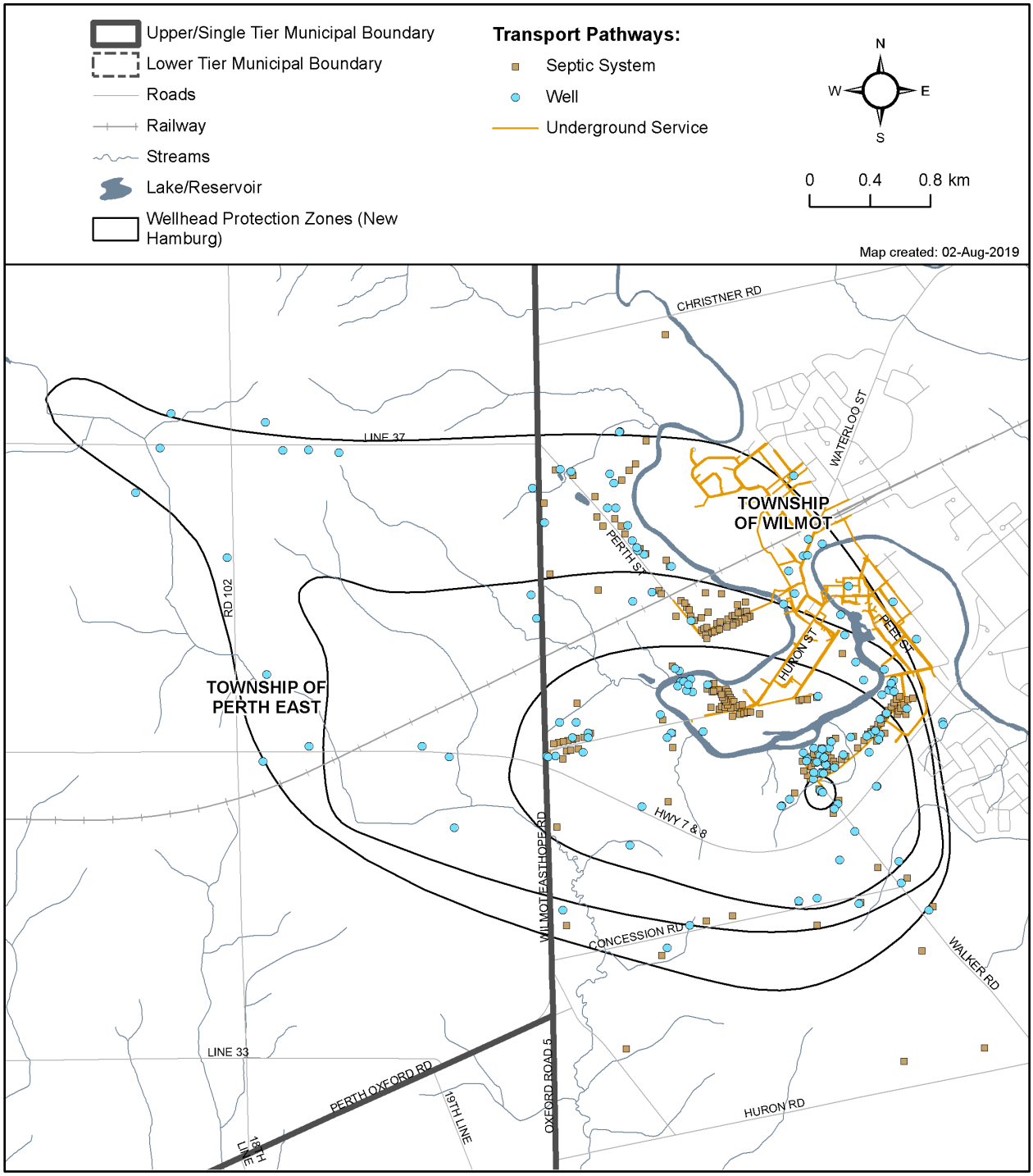
## Map 8.6—82: New Hamburg Well Supply Wellhead Protection Areas



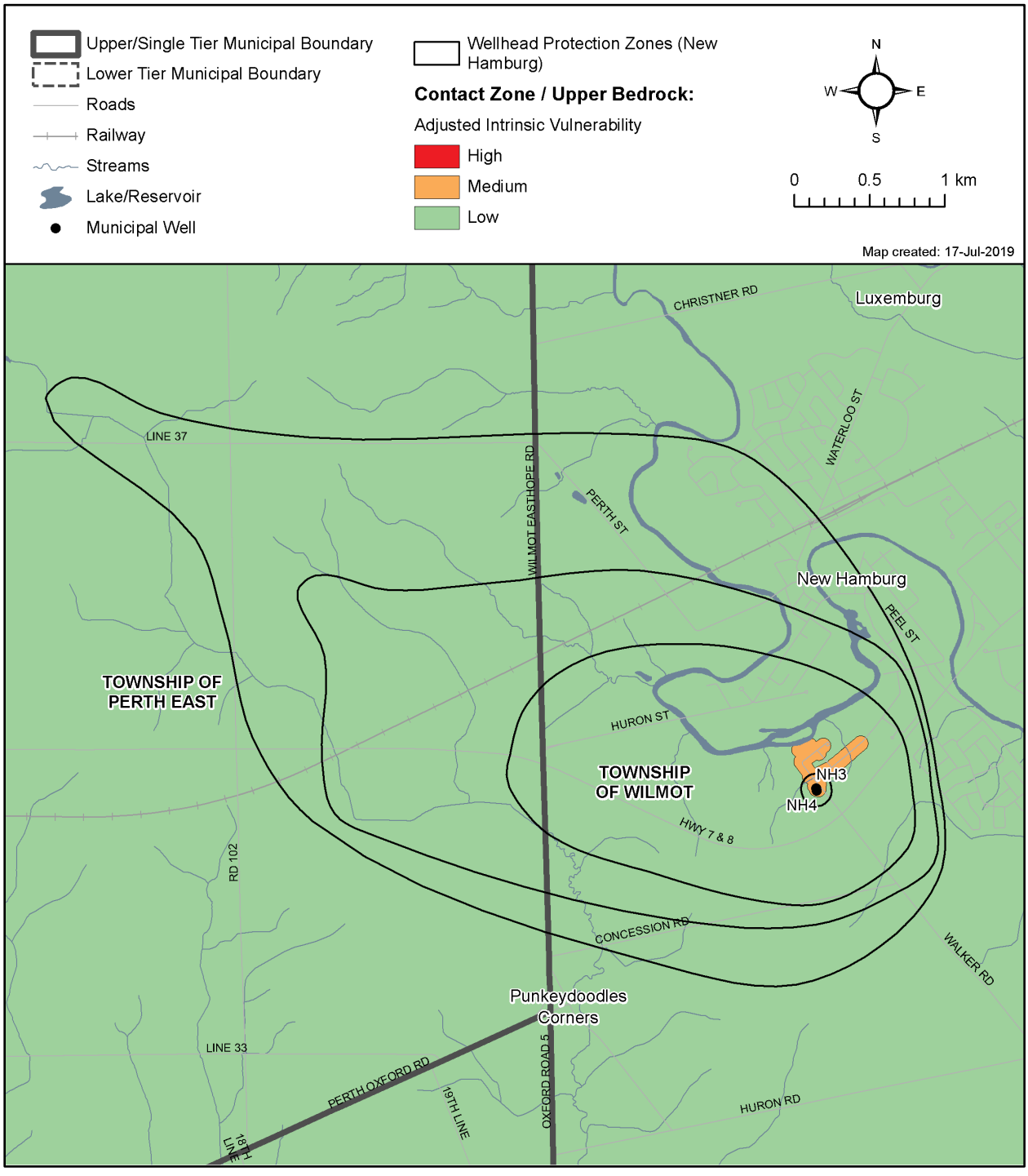
## Map 8.6—83: New Hamburg Well Supply Wellhead Protection Area Unadjusted Intrinsic Vulnerability



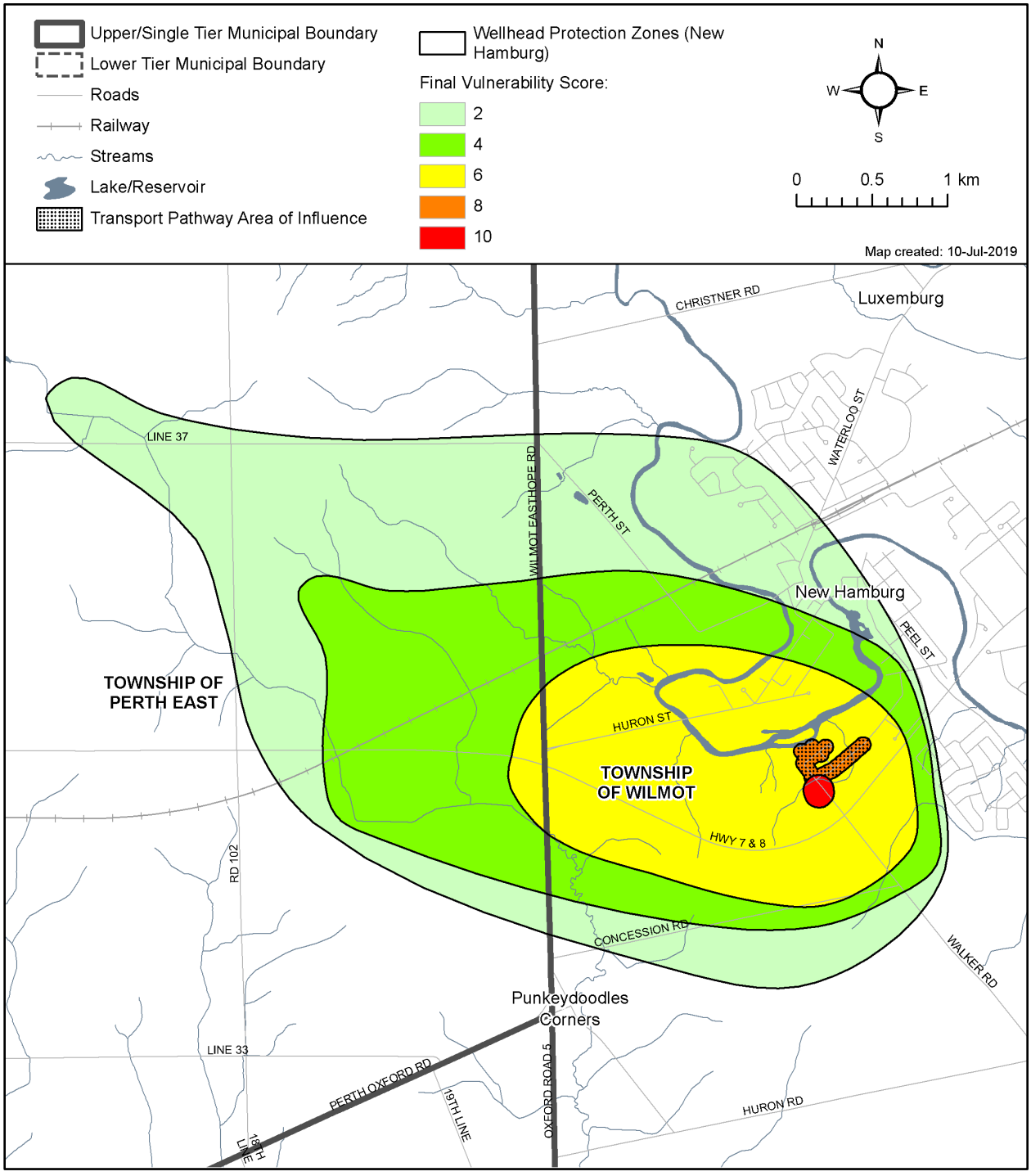
## Map 8.6—84: New Hamburg Well Supply Transport Pathways



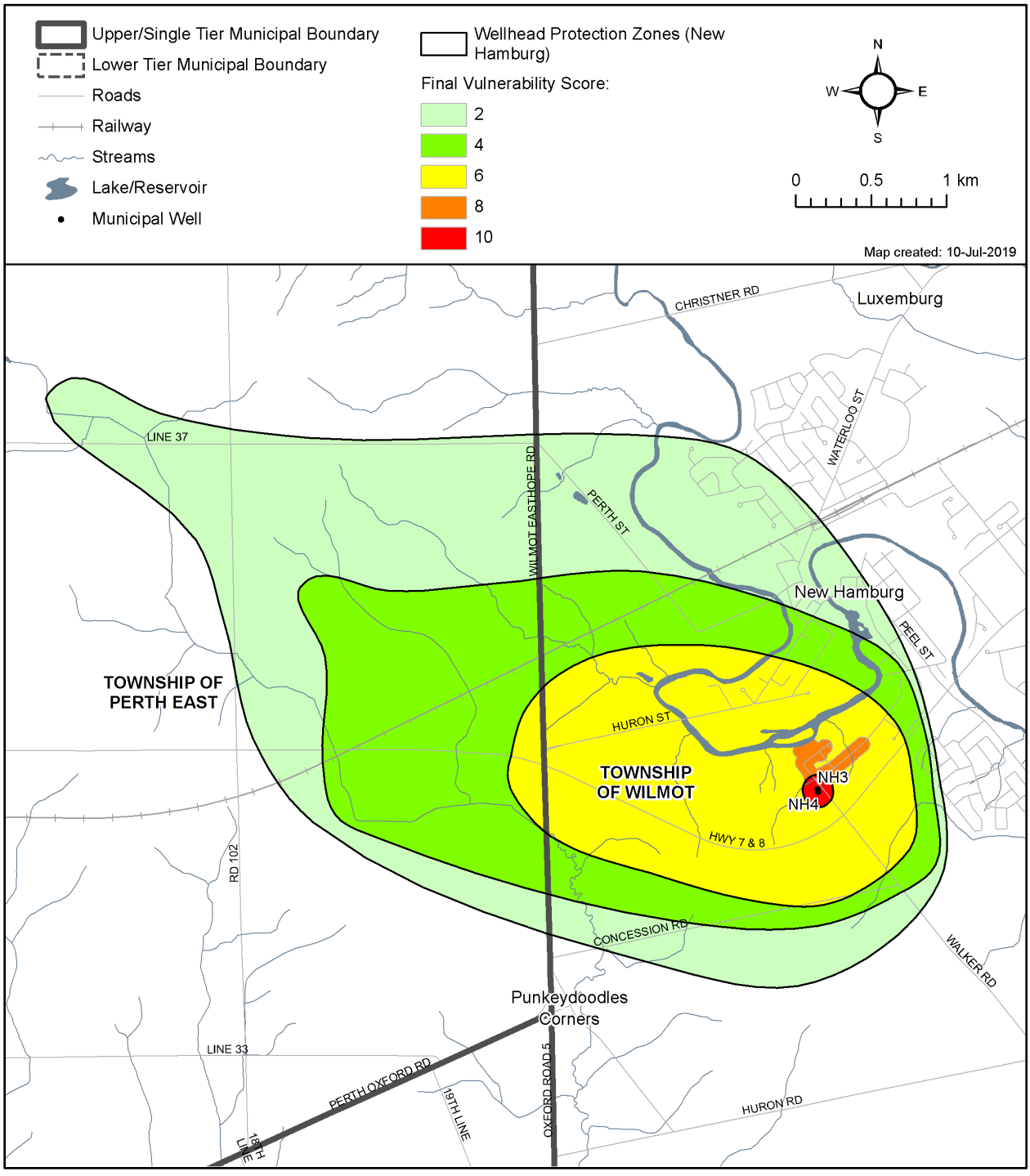
## Map 8.6—85: New Hamburg Well Supply Wellhead Protection Area Adjusted Intrinsic Vulnerability



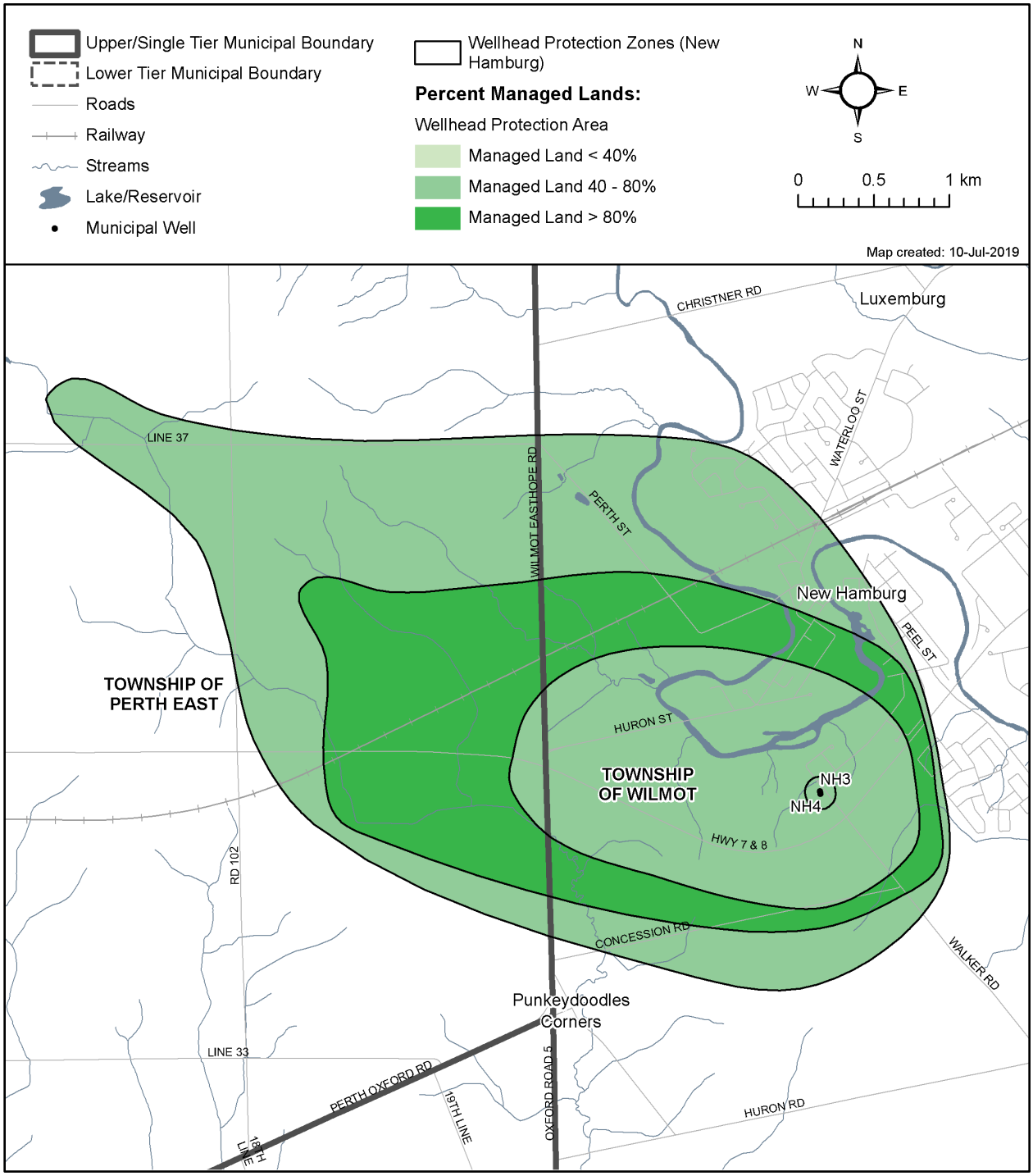
## Map 8.6—86: New Hamburg Well Supply Area of Influence



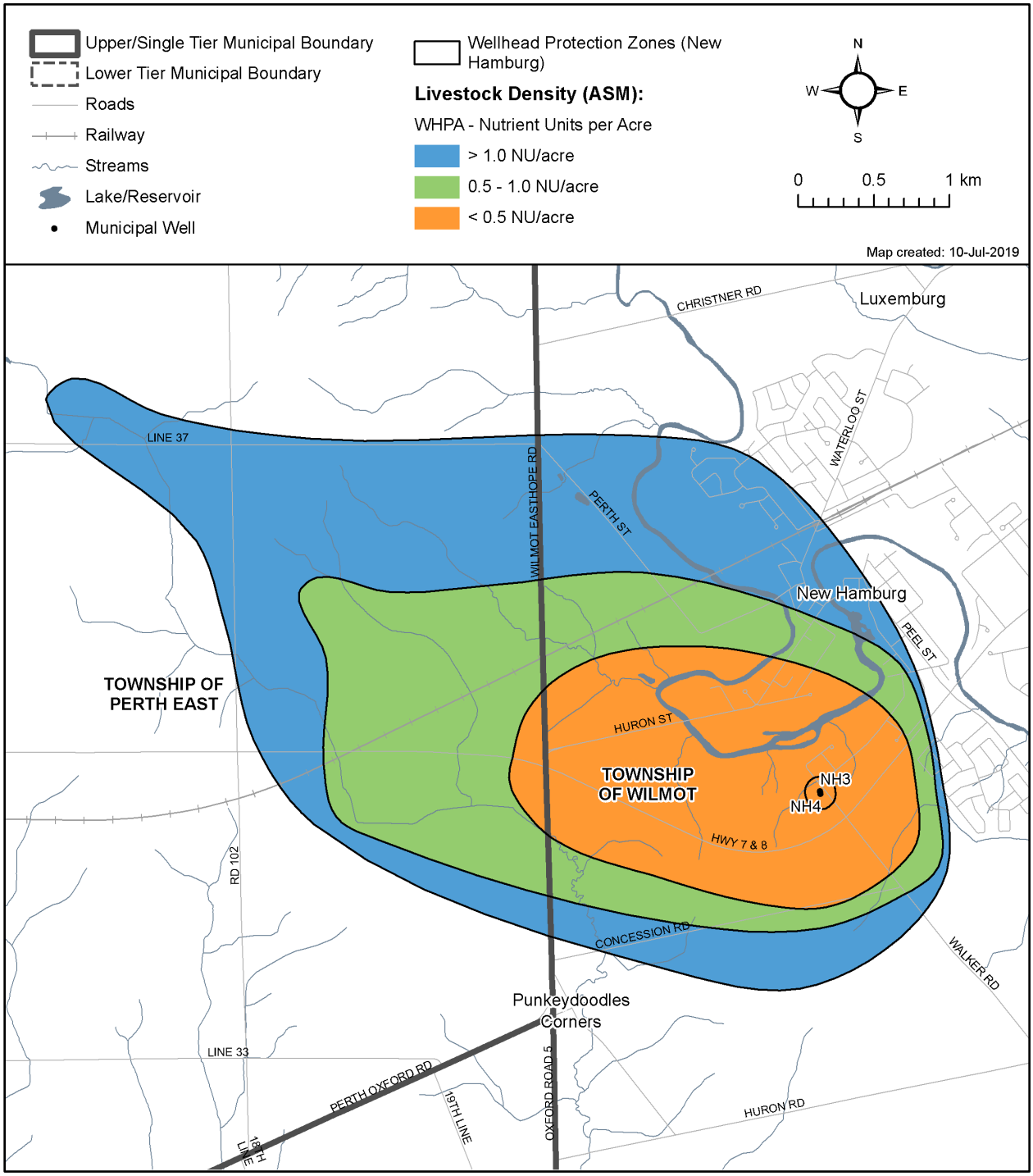
## Map 8.6—87: New Hamburg Well Supply Wellhead Protection Area Final Vulnerability



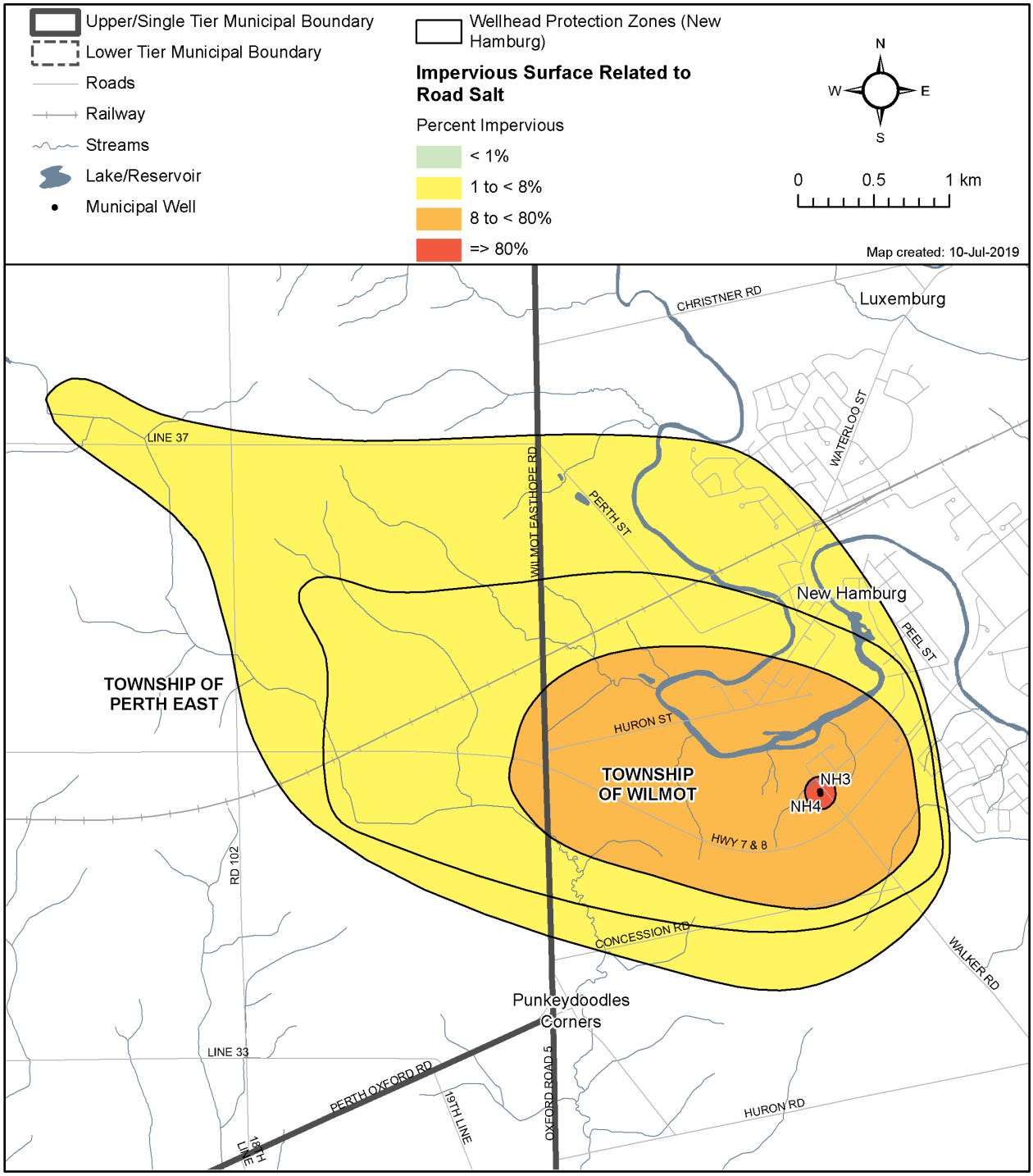
## Map 8.6—88: New Hamburg Well Supply Percent Managed Lands



## Map 8.6—89: New Hamburg Well Supply Livestock Density



## Map 8.6—90: New Hamburg Well Supply Percent Impervious Surfaces



### 8.6.10 Roseville Wellfield

The water supply for the Roseville Wellfield is obtained from production wells R5 and R6, which distribute water to a population of approximately 290 people (**Table 8—1**). The serviced areas are presented on **Map 8.6—251.** These production wells have screen depths ranging from 48 to 52 m below ground surface within the Lower Waterloo Moraine or Catfish Creek Till Outwash Aquifer (AFB3), and are overlain by the Catfish Creek (ATC1) and Maryhill Till (ATB2) units, with the Waterloo Moraine Sands (AFB1/AFB2) identified near ground surface (**Table 8.1—6**).

#### Vulnerability and Transport Pathways

The WHPAs are presented on **Map 8.6—252.** The unadjusted intrinsic vulnerability is shown on **Map 8.6—253** and the adjusted intrinsic vulnerability is on **Map 8.6—255.** Analysis of the potential transport pathways within the WHPA areas noted several clusters of septic systems and wells within the WHPA-A through WHPA-D zones that warranted increases to the ISI. **Map 8.6—254** and **Map 8.6—256** show the transport pathway and areas of influence. **Map 8.6—257** presents the final protection areas and vulnerability scoring for the Roseville WHPA.

#### Identification of Significant, Moderate and Low Drinking Water Quality Threats in the Roseville Wellhead Protection Areas

The identification of a land use activity as a significant, moderate, or low drinking water threat depends on its risk score, determined by considering the circumstances of the activity and the type and vulnerability score of any underlying protection zones, as set out in the Tables of Drinking Water Threats. Information on drinking water threats is also accessible through the Source Water Protection Information Portal. The information above can be used with the vulnerability scores shown in **Map 8.6—257** to help the public determine where certain activities are or would be significant, moderate and low drinking water threats.

**Table 8.6—69** provides a summary of the threat levels possible in the Roseville Wellfield for Chemicals, Dense Non-Aqueous Phase Liquids (DNAPLs), and Pathogens. “Yes” indicates that the threat classification level is possible for the indicated threat type under the corresponding vulnerable area / vulnerable score; “No" indicates that it is not. The colours shown for each vulnerability score correspond to those shown in **Map 8.6—257.**

**Table 8.6—19: Identification of Drinking Water Quality Threats in the Roseville Wellhead Protection Areas**

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| Chemicals | WHPA-A | 10 | Yes | Yes | Yes |
| Chemicals | WHPA-B | 8 | Yes | Yes | Yes |
| Chemicals | WHPA-B/C | 6 | No | Yes | Yes |
| Chemicals | WHPA-C/D | 2 & 4 | No | No | No |
| DNAPLs | WHPA-A/B/C | Any Score | Yes | No | No |
| DNAPLs | WHPA-D | 2 & 4 | No | No | No |
| Pathogens | WHPA-A | 10 | Yes | Yes | No |

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| Pathogens | WHPA-B | 8 | No | Yes | Yes |
| Pathogens | WHPA-B | 6 | No | No | Yes |

### Threats and Issues Enumeration of the Roseville Wellfield

The percent managed land, livestock density, and percent impervious surface values for each protection zone in the wellfield are shown in **Map 8.6—258, Map 8.6—259** and **Map 8.6—260**, respectively.

The total number of identified significant drinking water threats in this wellfield is 24. The number of properties in this Wellfield with identified significant drinking water threats is 22 Details surrounding the types of threats and circumstances found in the Roseville wellhead protection areas are outlined in **Table 8.6—70**.

No Significant Conditions were identified in this wellfield as per Technical Rule 126.

No drinking water Issues have been identified in this wellfield as per Technical Rule 114.

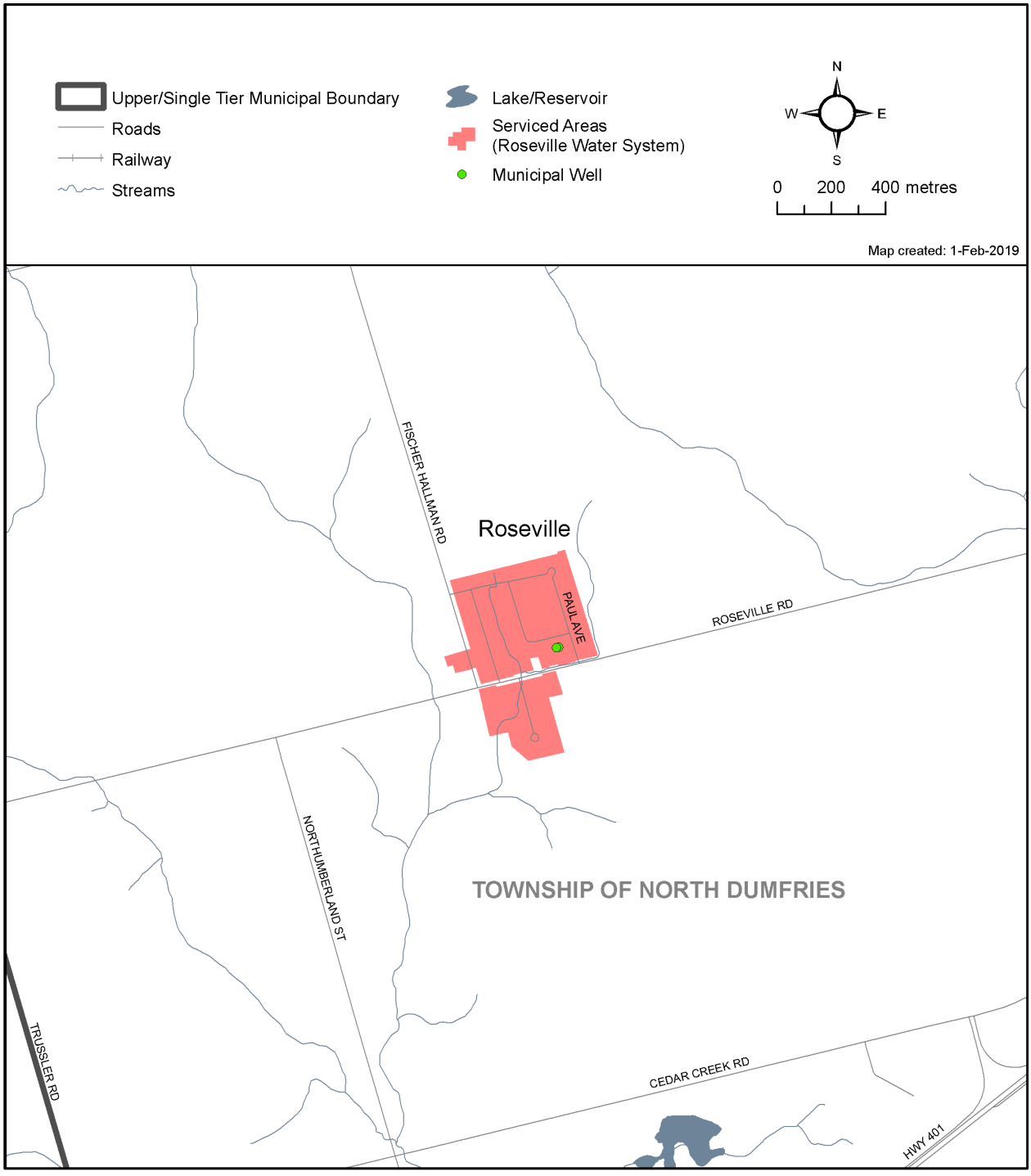
**Table 8.6—20: Significant Drinking Water Quality Threats in the Roseville Wellhead Protection Areas (current to February 2019)**

| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| 2 | Sewage system or sewage works - onsite sewage systems | 11 | WHPA-A |
| | Sewage system or sewage works - onsite sewage systems holding tanks | 12 | WHPA-A |
| 12 | Application of road salt | 1 | WHPA-A |
| **Total Number of Significant Threat Activities** | | **24** | |
| **Total Number of Properties with Significant Threats** | | **22** | |

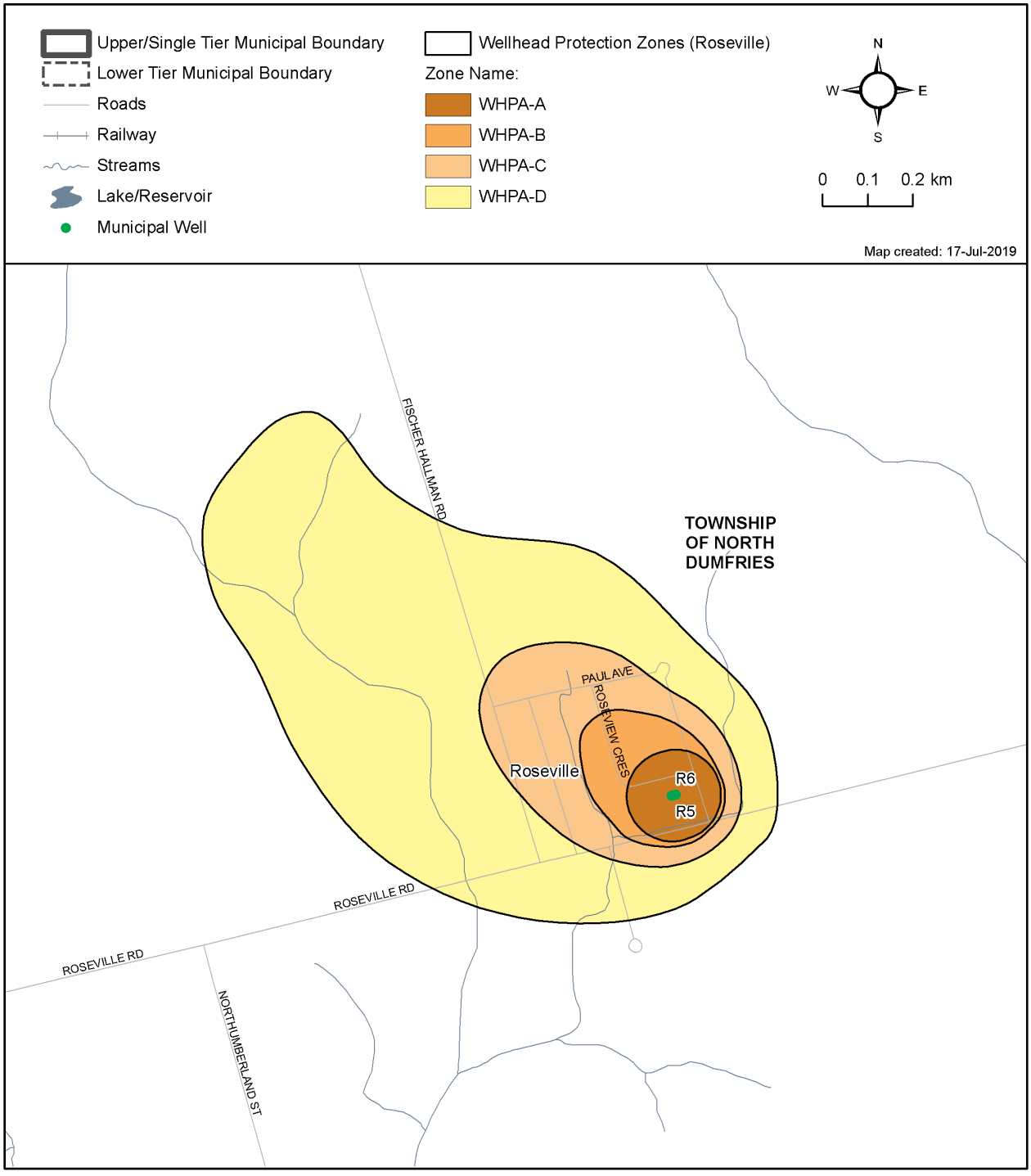
[1] Prescribed Drinking Water Quality Threat Number refers to the prescribed drinking water threat listed in O. Reg. 287/07 s.1.1 (1)

[2] Where applicable, waste, sewage, and livestock threat numbers are reported by sub-threat; fuel and DNAPL by Prescribed Drinking Water Threat category.

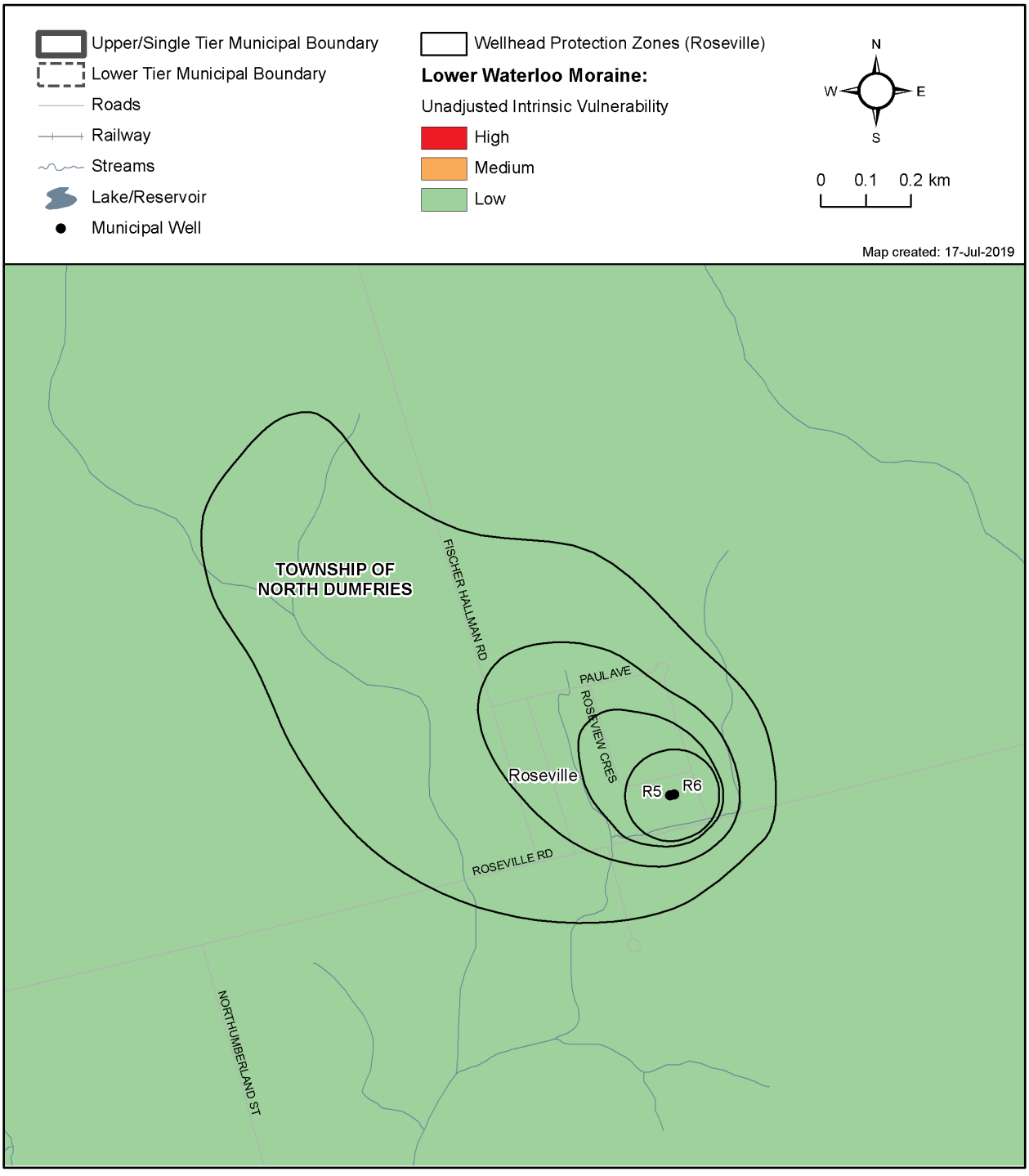
## Map 8.6—91: Roseville Well Supply Serviced Areas



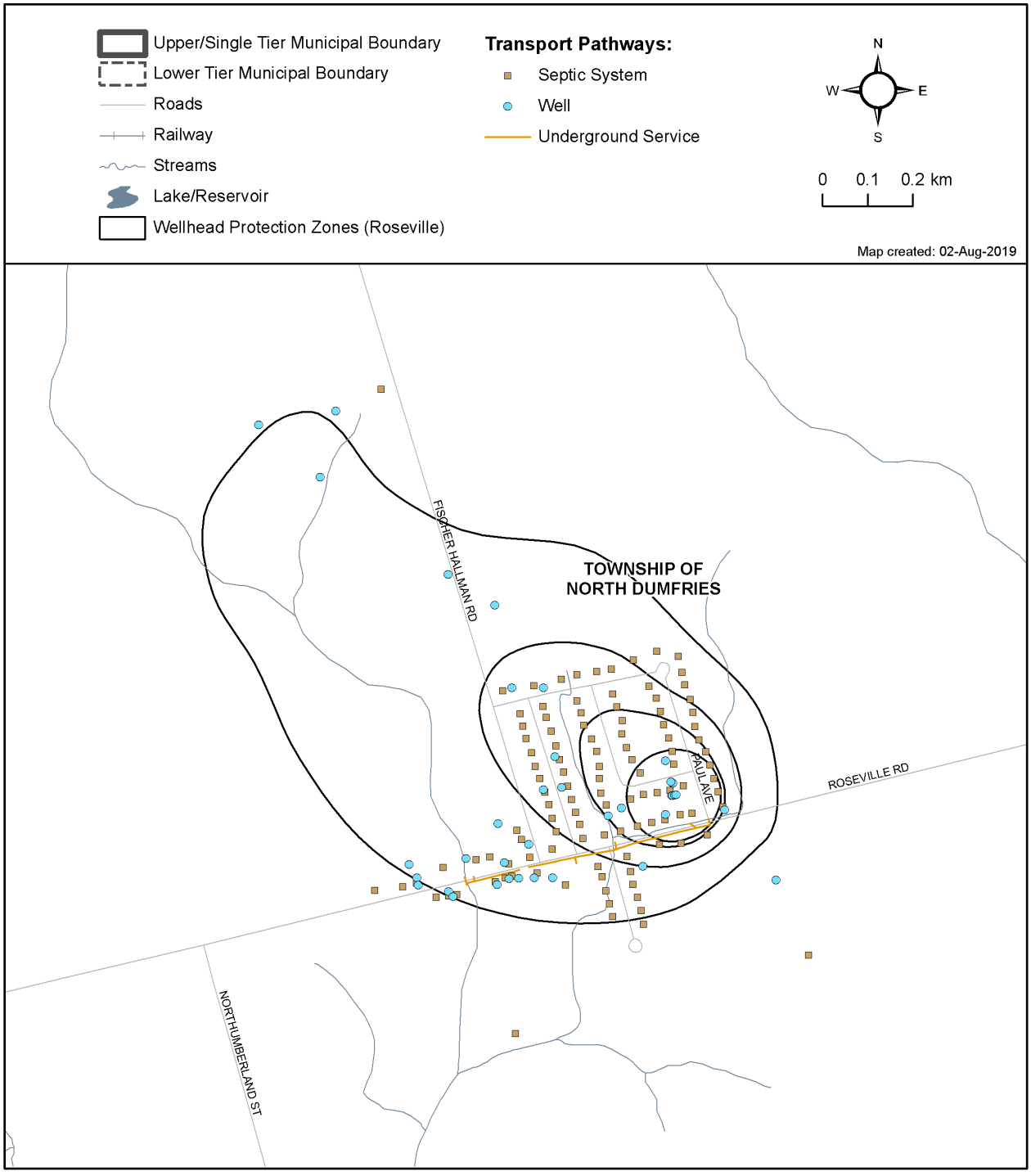
## Map 8.6—92: Roseville Well Suppy Wellhead Protection Areas



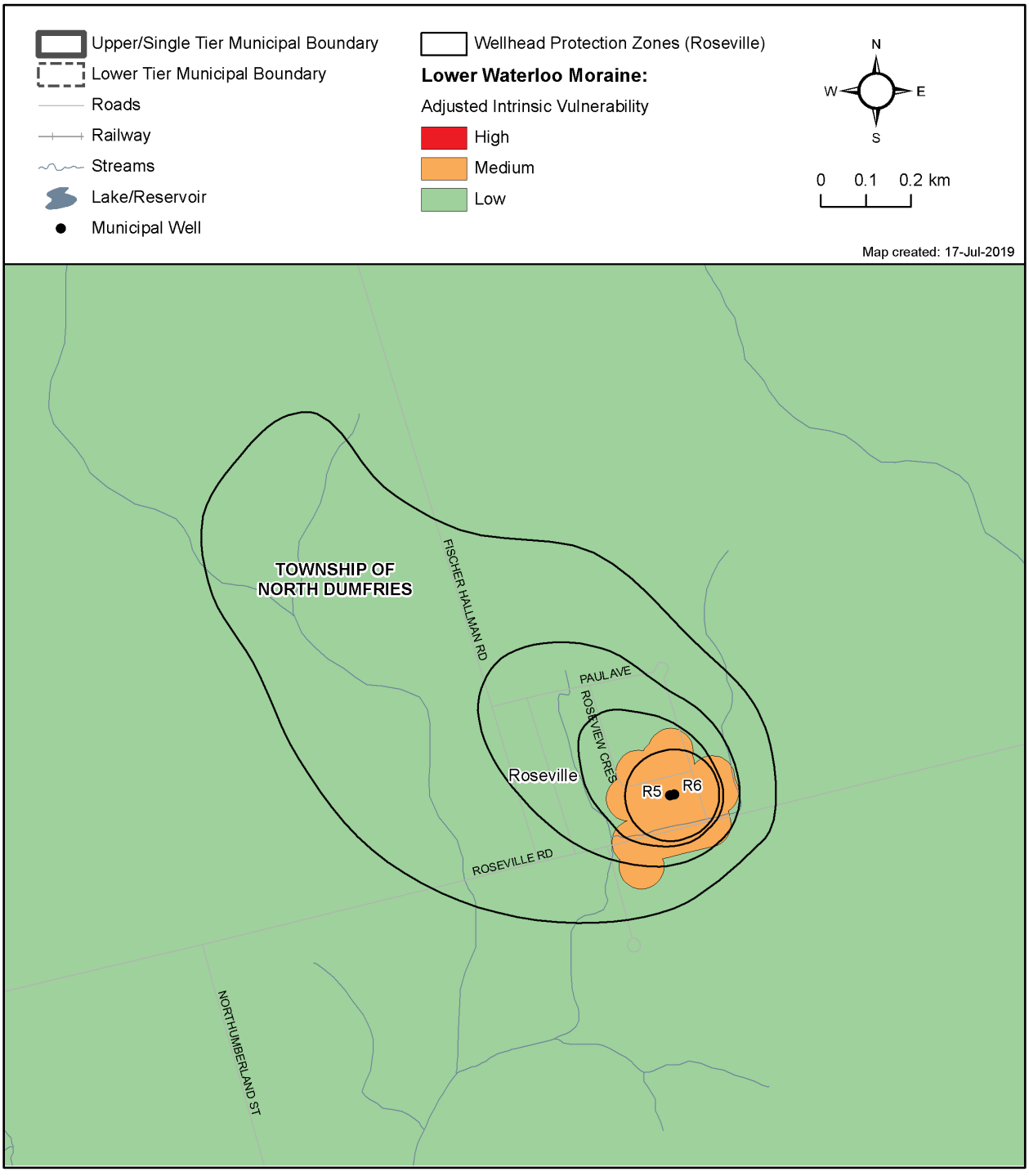
## Map 8.6—93: Roseville Well Supply Wellhead Protection Area Unadjusted Intrinsic Vulnerability



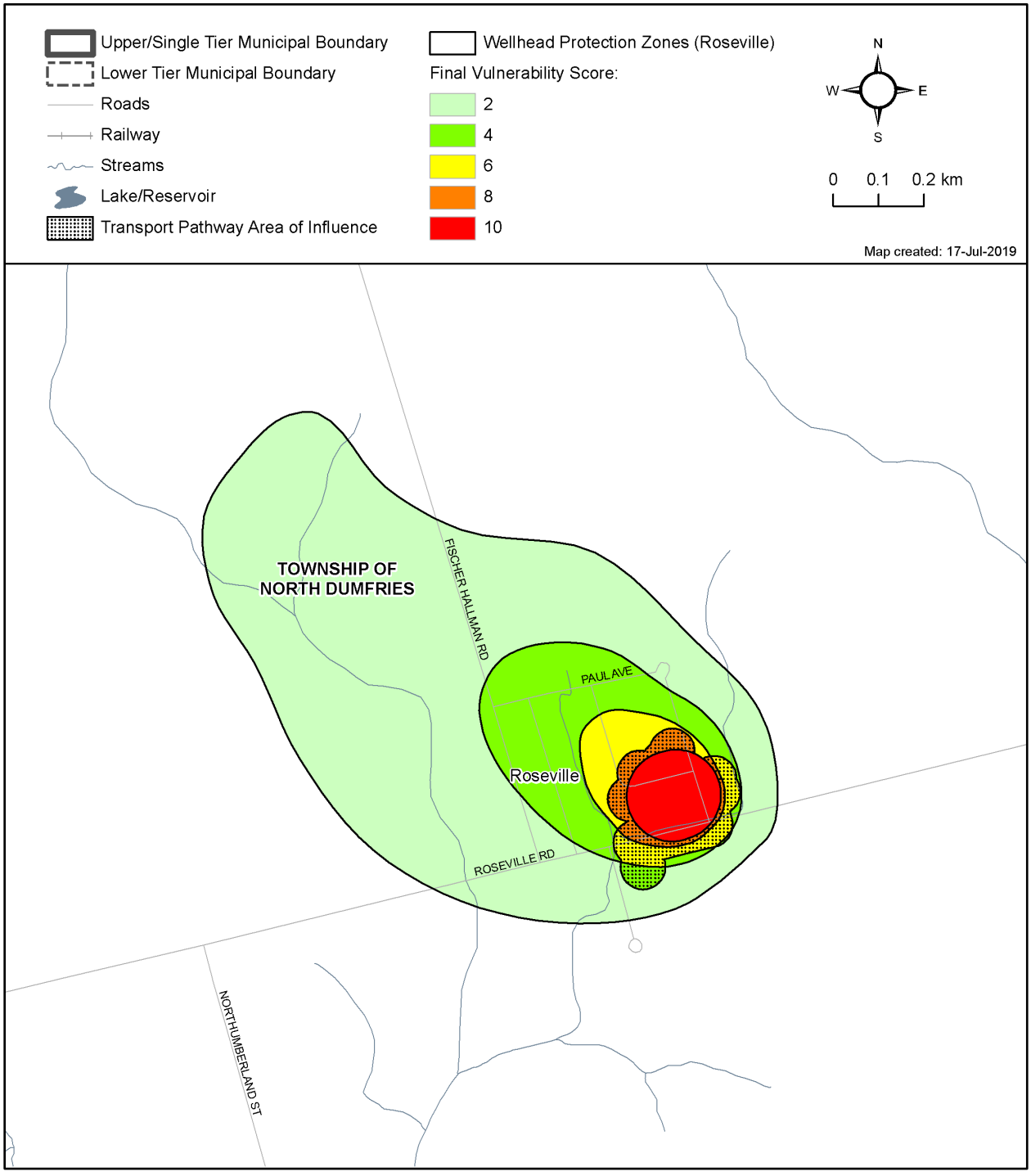
## Map 8.6—94: Roseville Water Supply Transport Pathways



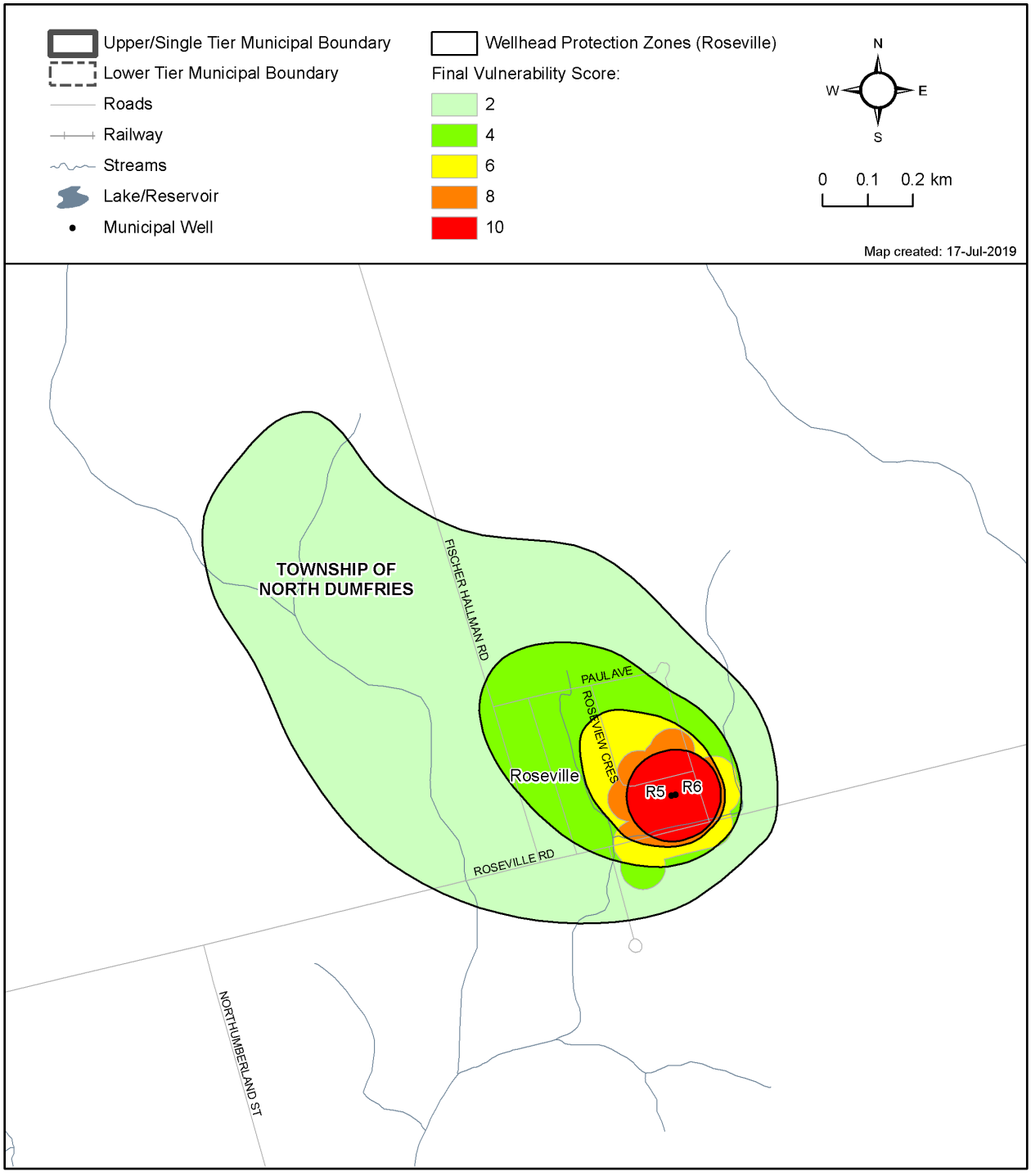
## Map 8.6—95: Roseville Well Supply Wellhead Protection Area Adjusted Intrinsic Vulnerability



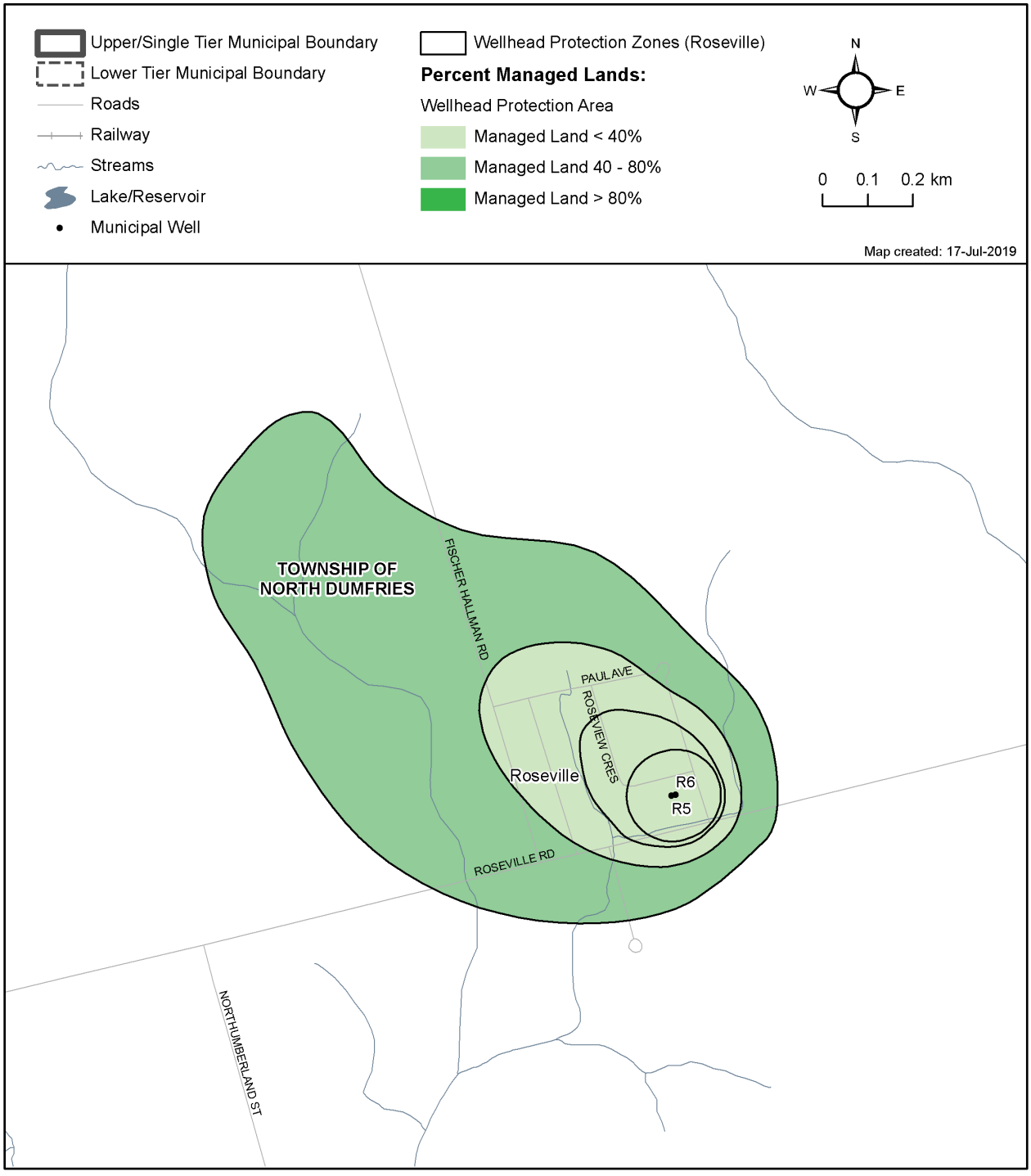
## Map 8.6—96: Roseville Water Supply Areas of Influence



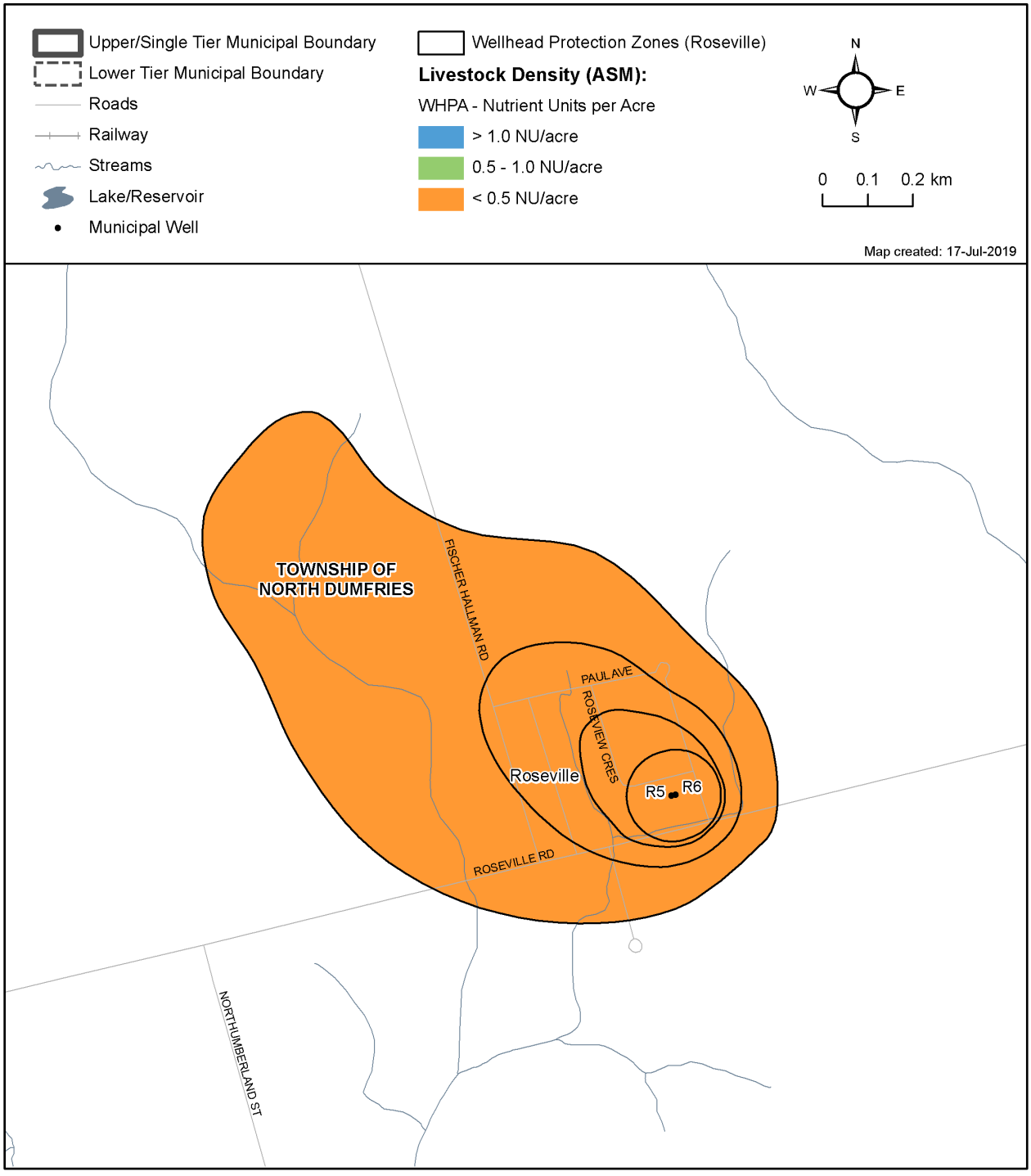
## Map 8.6—97: Roseville Well Supply Wellhead Protection Area Final Vulnerability



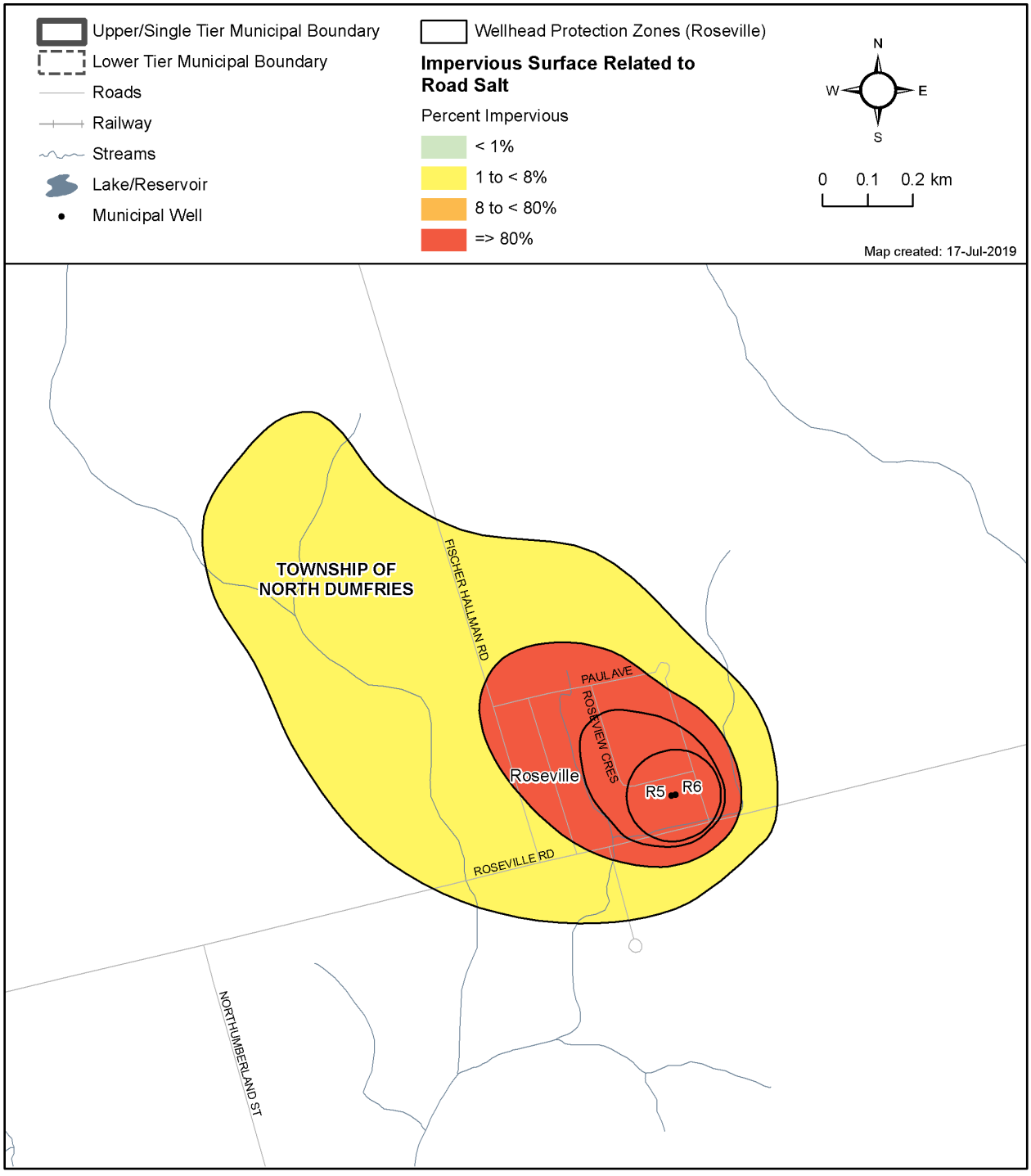
## Map 8.6—98: Roseville Well Supply Percent Managed Lands



## Map 8.6—99: Roseville Well Supply Livestock Density



## Map 8.6—100: Roseville Well Supply Percent Impervious Surfaces



### 8.6.11 St. Clements Wellfield

The water supply for the St. Clements Wellfield is obtained from production wells SC2, SC3 and SC4, which distribute water to a population of approximately 1,267 people (**Table 8—1**). The serviced areas are presented on **Map 8.6—261.** SC2 and SC3 are screened over depths ranging from 15 m to 20 m below ground surface within the Upper Waterloo Moraine Sands (AFB1) and resulted in the application of AFB1 for vulnerability scoring. SC4 is screened deeper in the Middle Waterloo Moraine Sands (AFB2) from approximately 30 to 37 m BGS but is hydraulically connected to the AFB1 unit due to the absence of the ATB1 till unit (**Table 8.1—6**).

#### Vulnerability and Transport Pathways

The WHPAs are presented on **Map 8.6—262.** The unadjusted intrinsic vulnerability is shown on **Map 8.6—263** and the adjusted intrinsic vulnerability is shown on **Map 8.6—265.** Analysis of the attributes of each potential transport pathway (**Map 8.6—264**) in the St. Clements Wellfield identified numerous clusters of well and septic systems in the WHPA-A through WHPA-D zones that warranted increases to the ISI. **Map 8.6—266** shows the area of influence for these transport pathways, while **Map 8.6—267** shows the final vulnerability scoring.

#### Identification of Significant, Moderate and Low Drinking Water Quality Threats in the St. Clements Wellhead Protection Areas

The identification of a land use activity as a significant, moderate, or low drinking water threat depends on its risk score, determined by considering the circumstances of the activity and the type and vulnerability score of any underlying protection zones, as set out in the Tables of Drinking Water Threats. Information on drinking water threats is also accessible through the Source Water Protection Information Portal. The information above can be used with the vulnerability scores shown in **Map 8.6—267** to help the public determine where certain activities are or would be significant, moderate and low drinking water threats.

**Table 8.6—71** provides a summary of the threat levels possible in the St. Clements Wellfield for Chemicals, Dense Non-Aqueous Phase Liquids (DNAPLs), and Pathogens. “Yes” indicates that the threat classification level is possible for the indicated threat type under the corresponding vulnerable area / vulnerable score; “No" indicates that it is not. The colours shown for each vulnerability score correspond to those shown in **Map 8.6—267**.

**Table 8.6—21: Identification of Drinking Water Quality Threats in the St. Clements Wellhead Protection Areas**

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| Chemicals | WHPA-A/B | 10 | Yes | Yes | Yes |
| Chemicals | WHPA-C | 8 | Yes | Yes | Yes |
| Chemicals | WHPA-C/D | 6 | No | Yes | Yes |
| Chemicals | WHPA-D | 2 & 4 | No | No | No |
| DNAPLs | WHPA-A/B/C | Any Score | Yes | No | No |

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| DNAPLs | WHPA-D | 6 | No | Yes | Yes |
| DNAPLs | WHPA-D | 2 & 4 | No | No | No |
| Pathogens | WHPA-A/B | 10 | Yes | Yes | No |

**Threats and Issues Enumeration for the St. Clements Wellfield**

The percent managed land, livestock density, and percent impervious values for each protection zone in the Wellfield are shown in **Map 8.6—268, Map 8.6—269** and **Map 8.6—270**, respectively.

The total number of identified significant drinking water threats in this Wellfield is 69. The number of properties in this wellfield with identified significant drinking water threats is 62. Details surrounding the types of threats and circumstances found in the St. Clements wellhead protection areas are outlined in **Table 8.6—72**.

No Significant Conditions were identified in this wellfield as per Technical Rule 126.

No drinking water Issues have been identified in this wellfield as per Technical Rule 114.

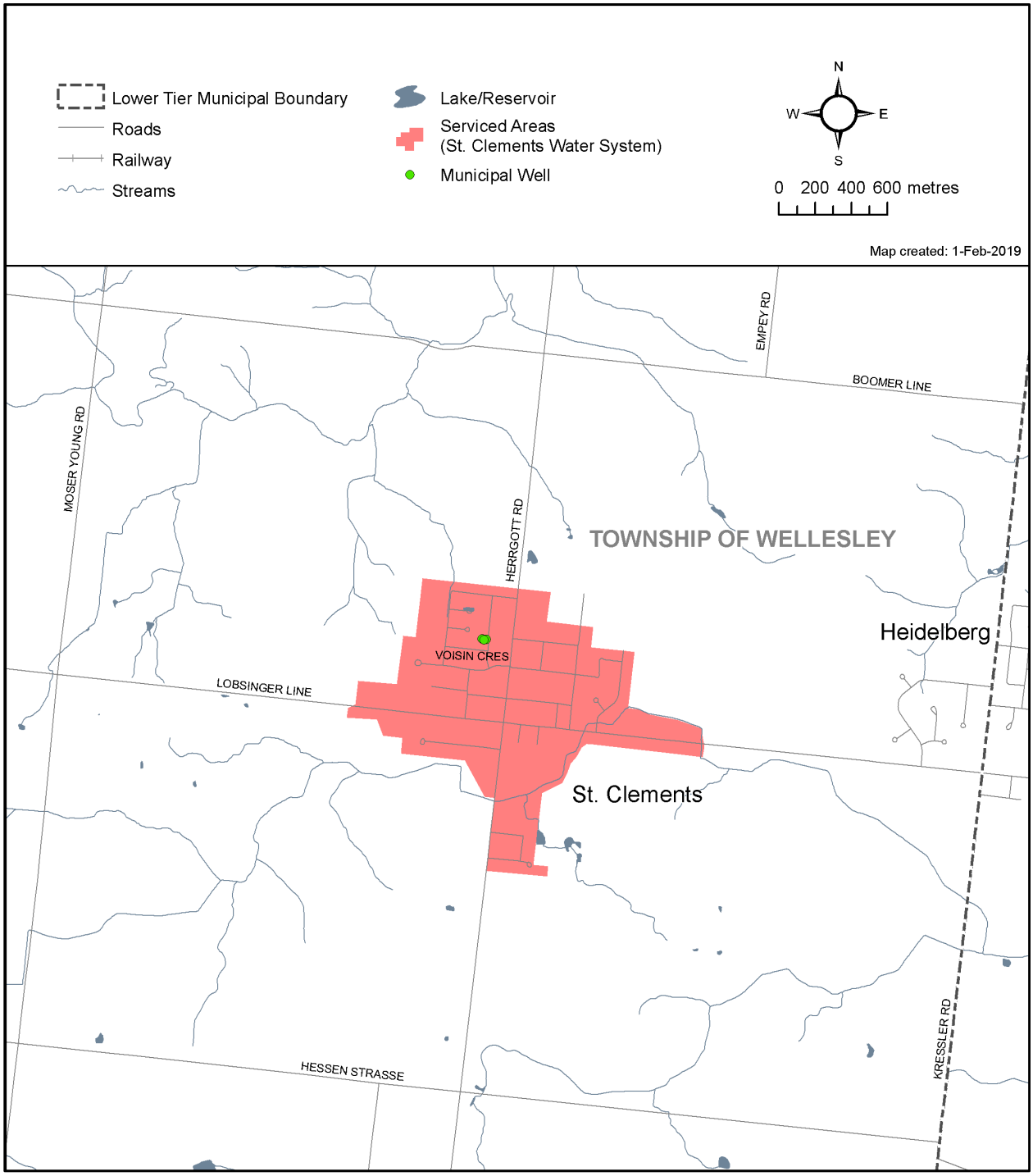
**Table 8.6—22: Significant Drinking Water Quality Threats in the St. Clements Wellhead Protection Areas(current to February 2019)**

| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| 2 | Sewage system or sewage works - onsite sewage systems | 34 | WHPA-A<br>WHPA-B |
| | Sewage system or sewage works - onsite sewage systems holding tanks | 33 | WHPA-A<br>WHPA-B |
| 12 | Application of road salt | 1 | WHPA-A |
| 17 | Storage of an organic solvent | 1 | WHPA-B |
| **Total Number of Significant Threat Activities** | | **69** | |
| **Total Number of Properties with Significant Threats** | | **62** | |

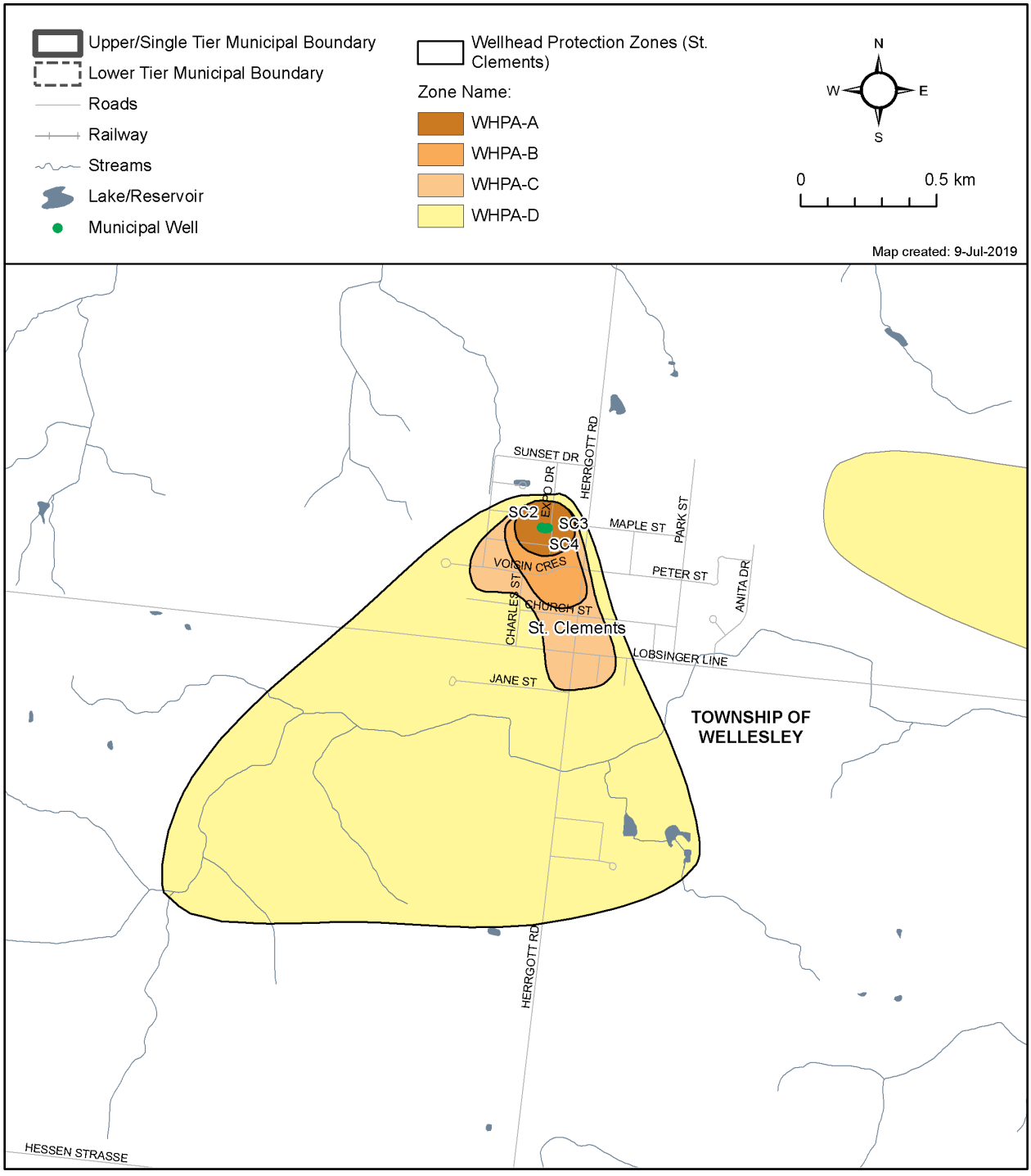
[1] Prescribed Drinking Water Quality Threat Number refers to the prescribed drinking water threat listed in O. Reg. 287/07 s.1.1 (1)

[2] Where applicable, waste, sewage, and livestock threat numbers are reported by sub-threat; fuel and DNAPL by Prescribed Drinking Water Threat category.

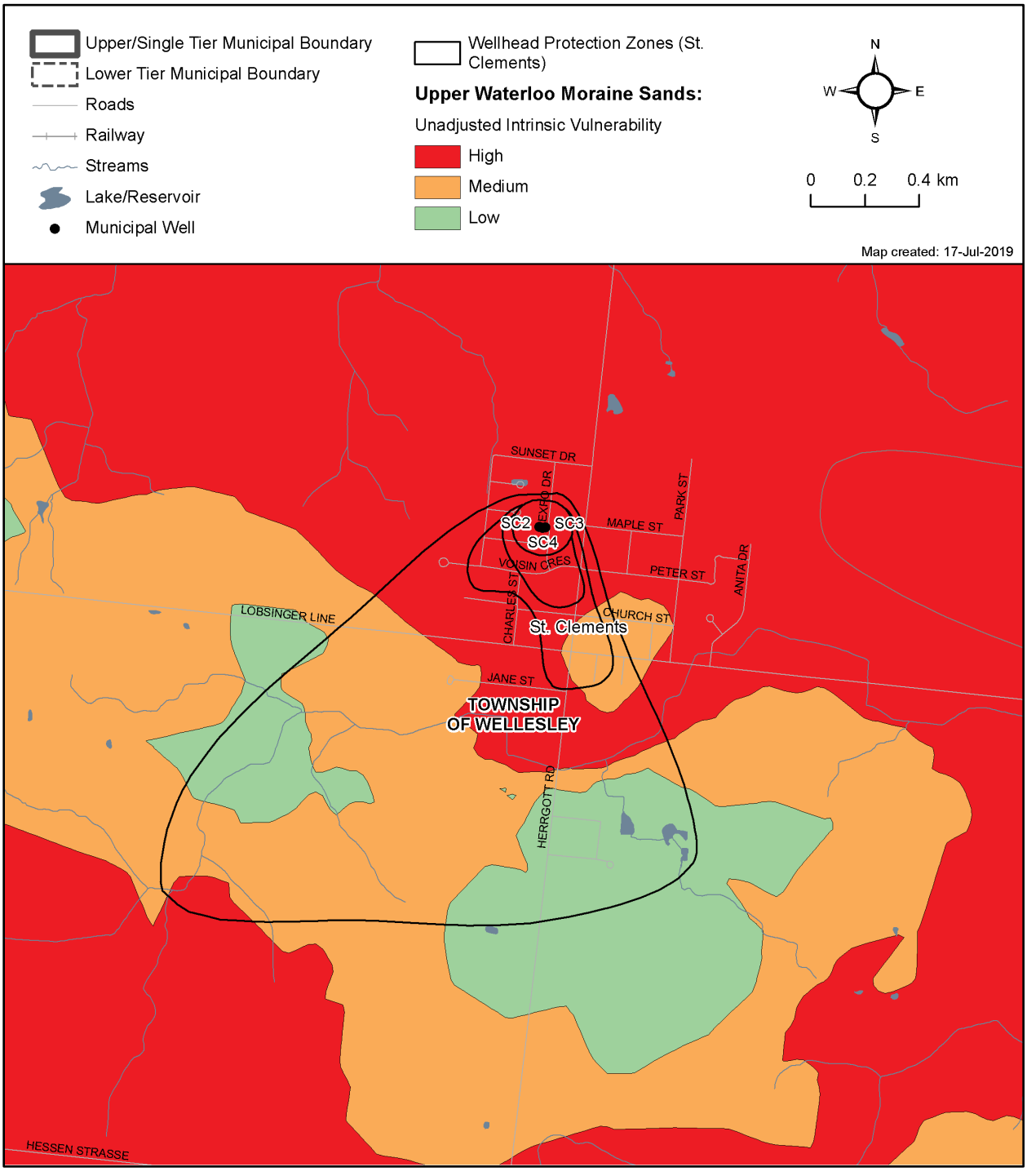
## Map 8.6—101: St. Clements Well Supply Serviced Areas



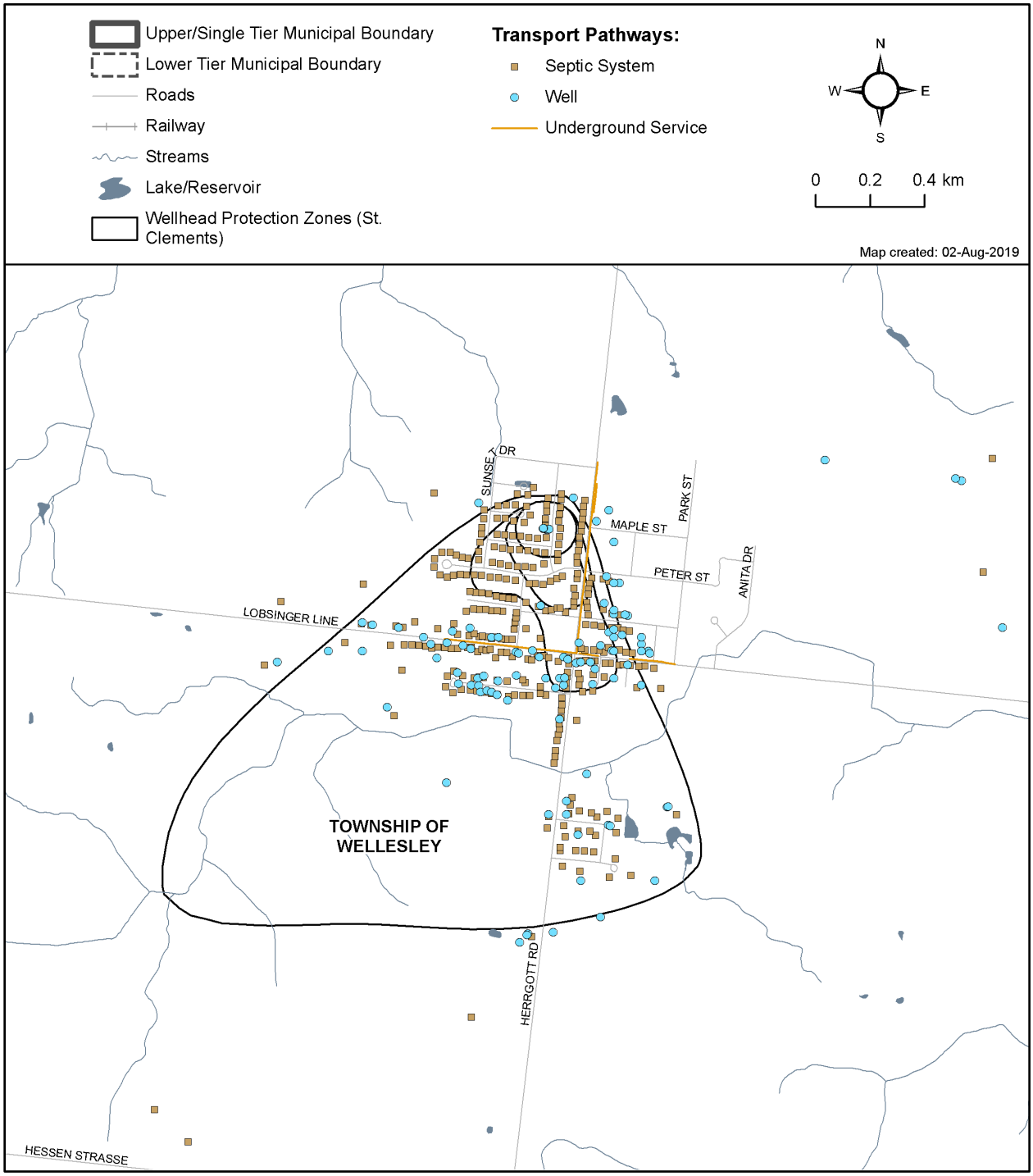
## Map 8.6—102: St. Clements Well Supply Wellhead Protection Area



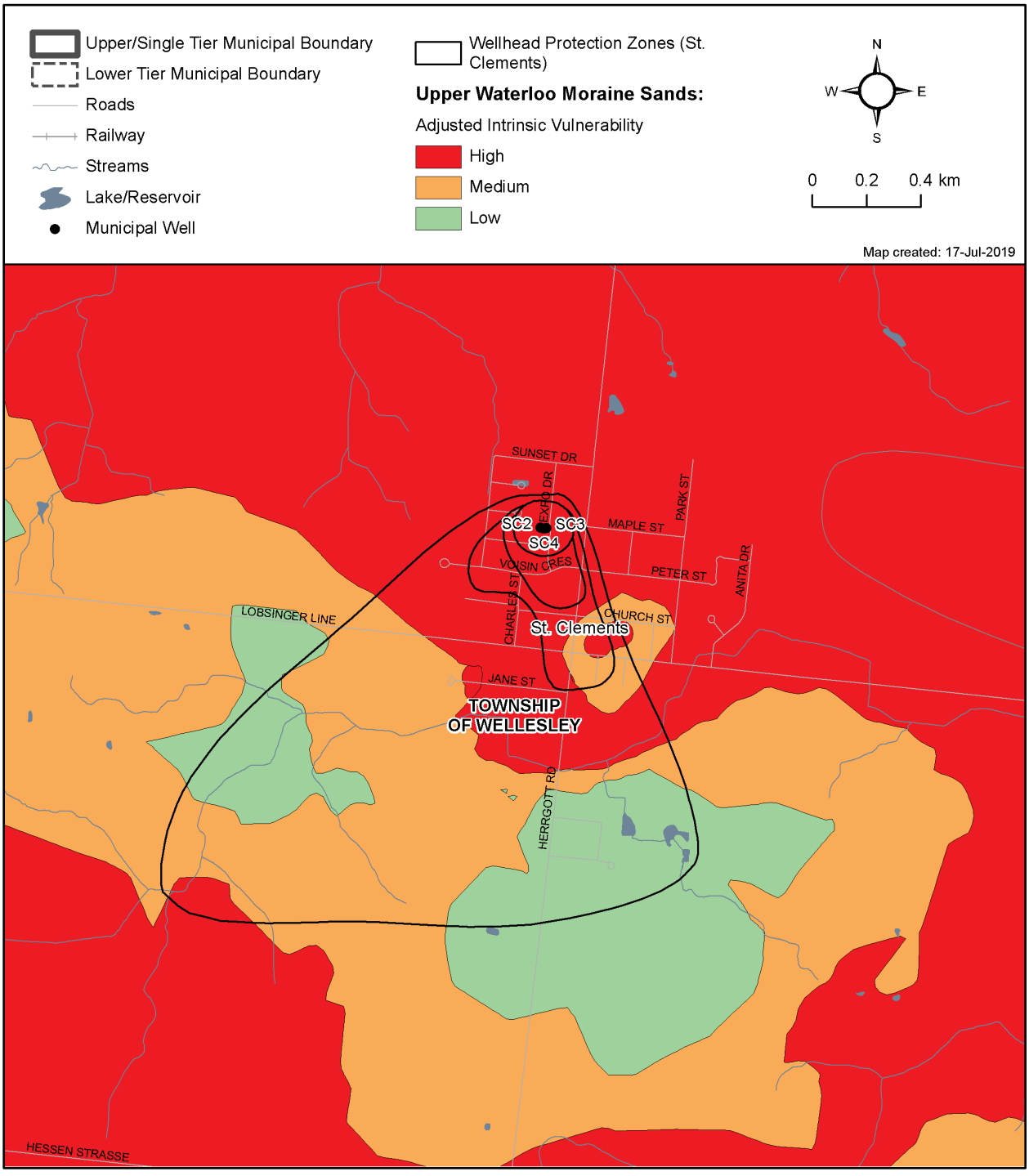
## Map 8.6—103: St. Clements Well Supply Wellhead Protection Area Unadjusted Intrinsic Vulnerability



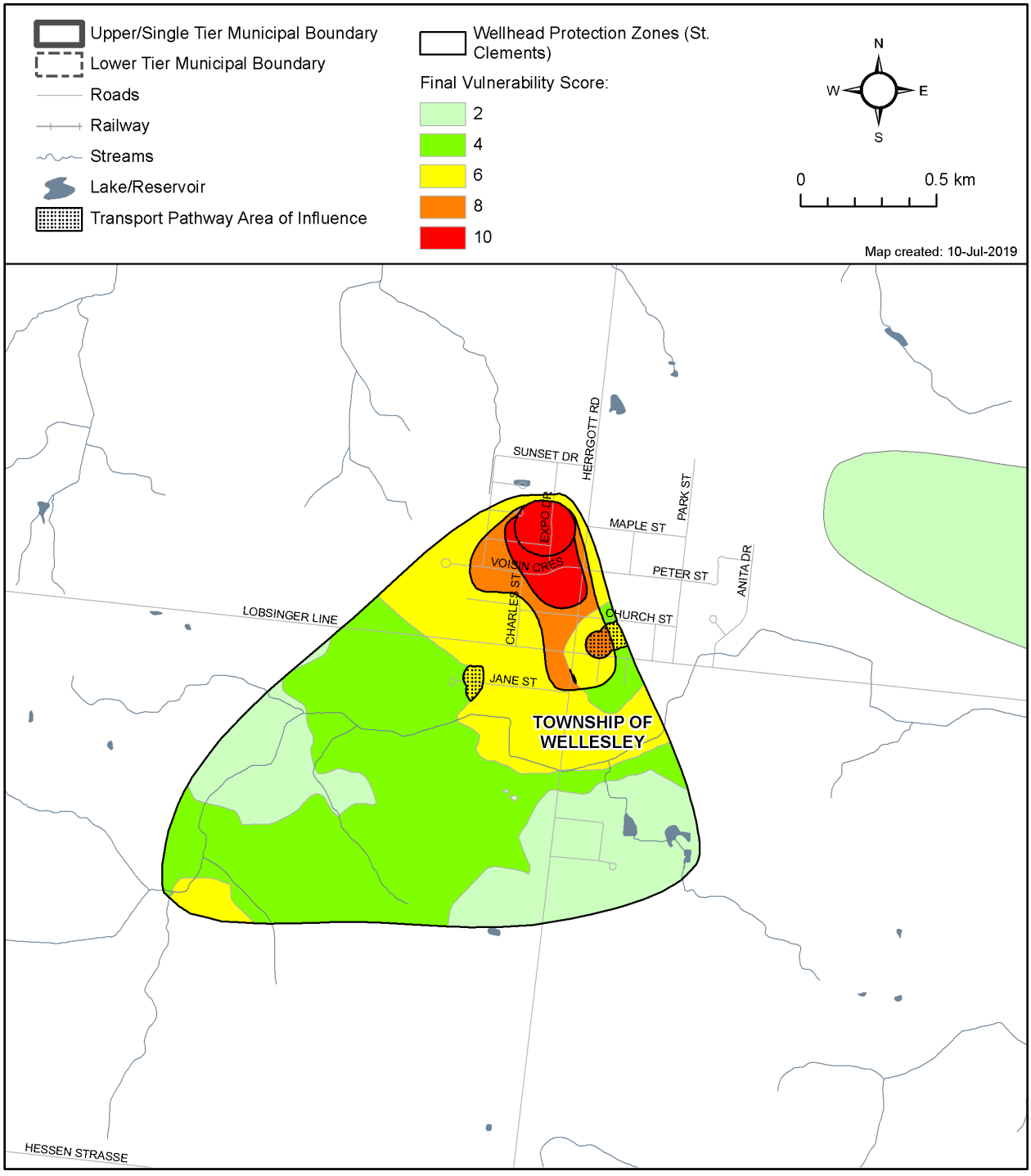
## Map 8.6—104: St. Clements Well Supply Transport Pathways



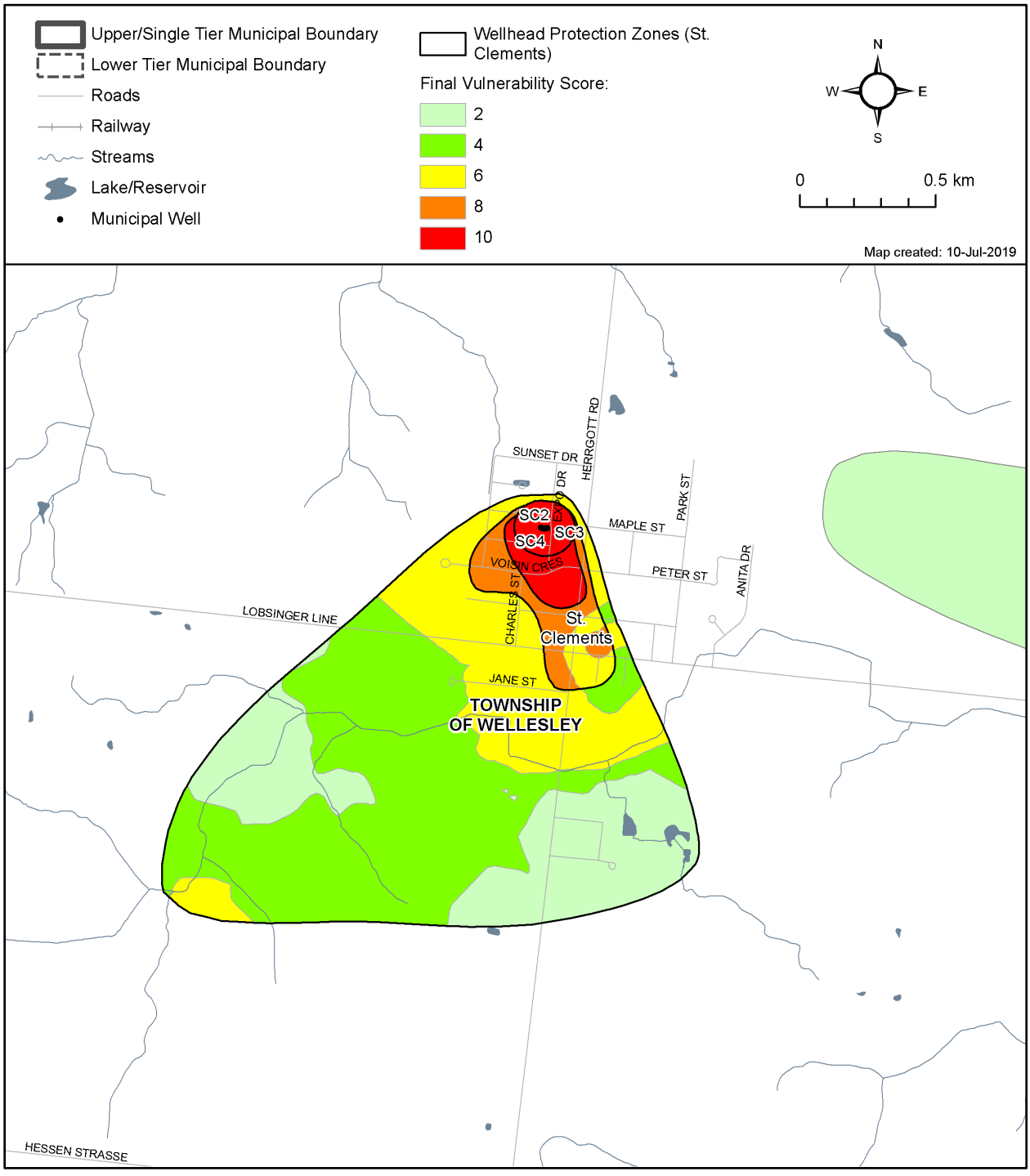
## Map 8.6—105: St. Clements Well Supply Wellhead Protection Area Adjusted Intrinsic Vulnerability



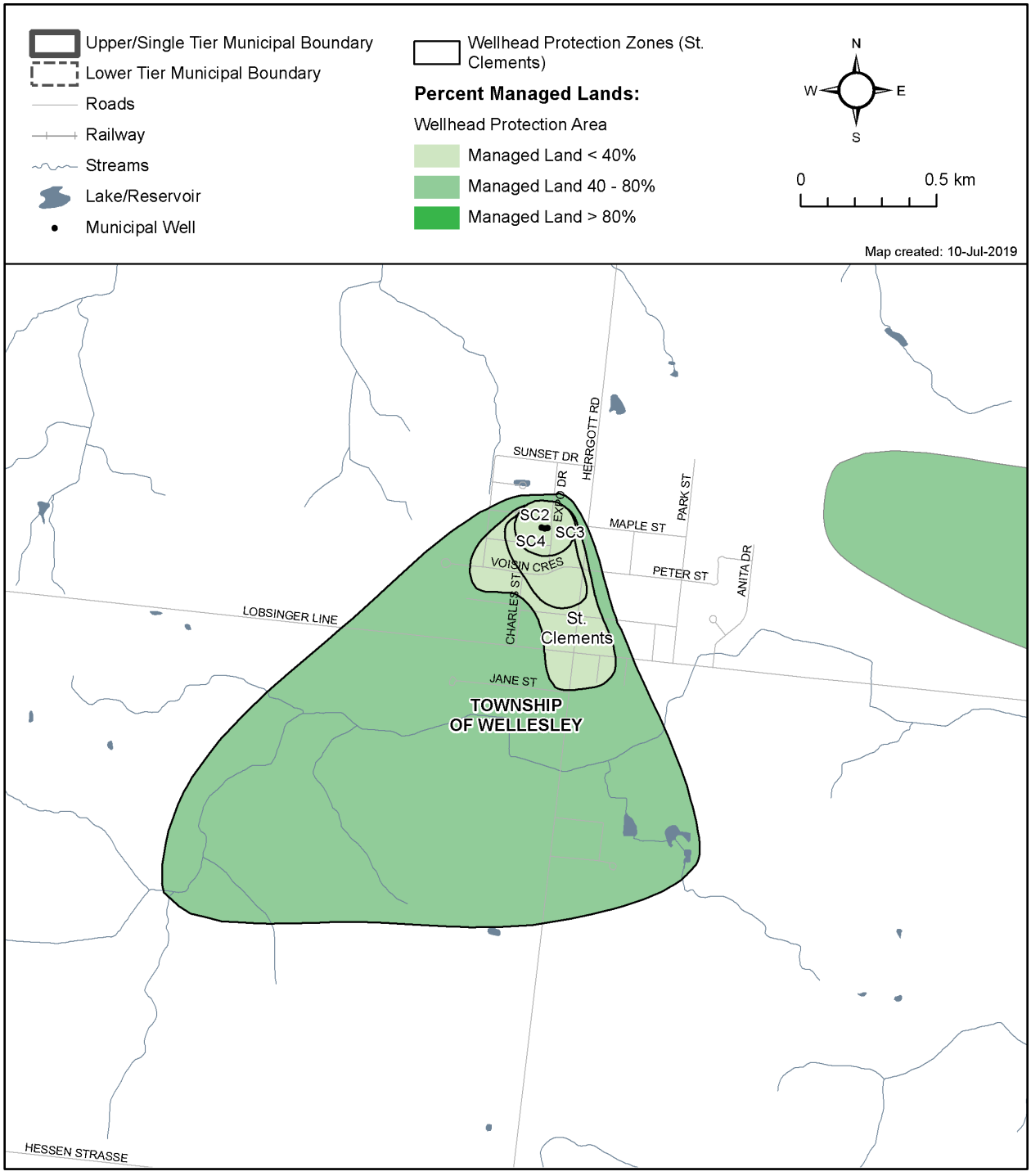
## Map 8.6—106: St. Clements Well Supply Transport Pathway Area of Influence



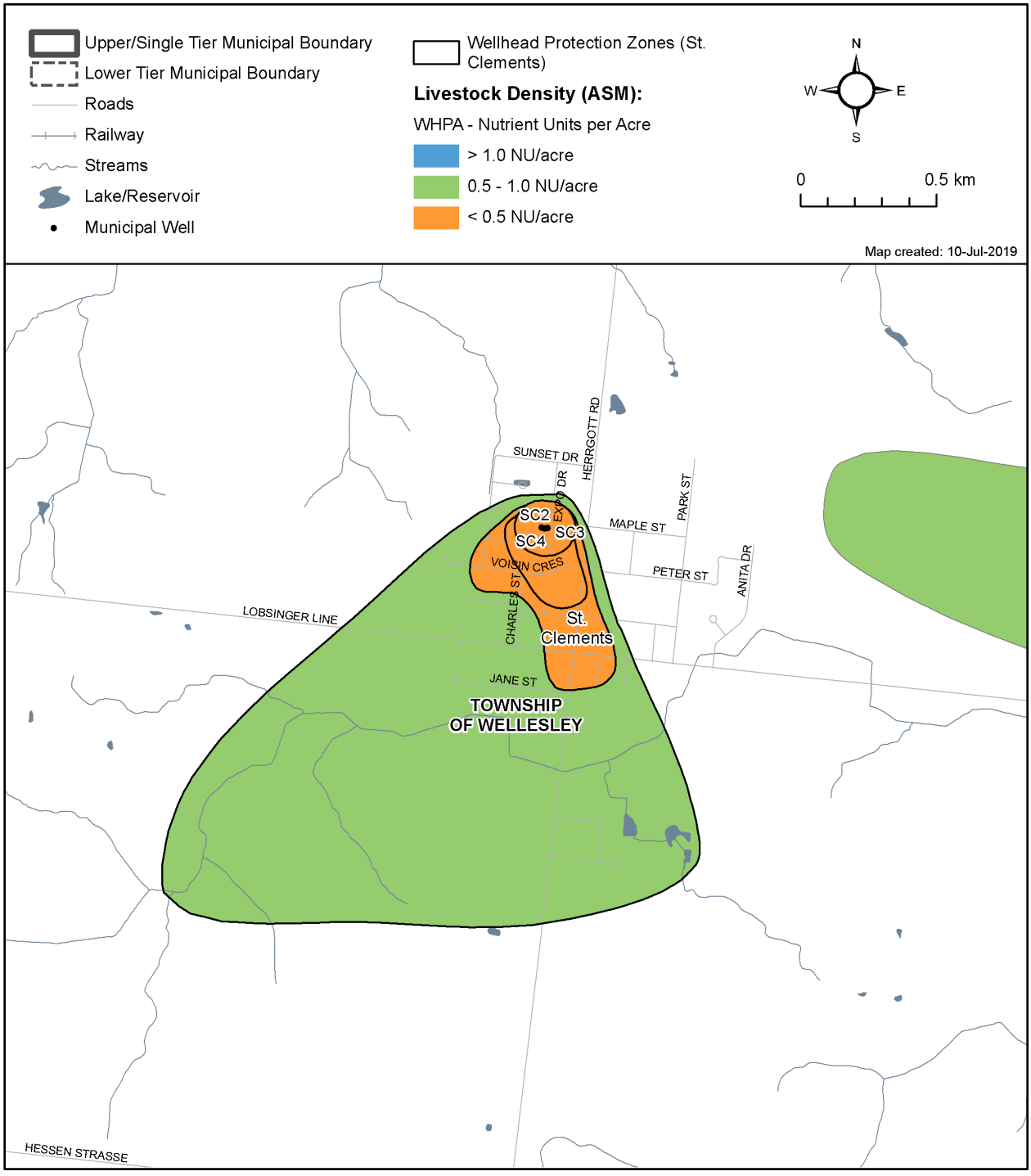
## Map 8.6—107: St. Clements Well Supply Wellhead Projection Area Final Vulnerability



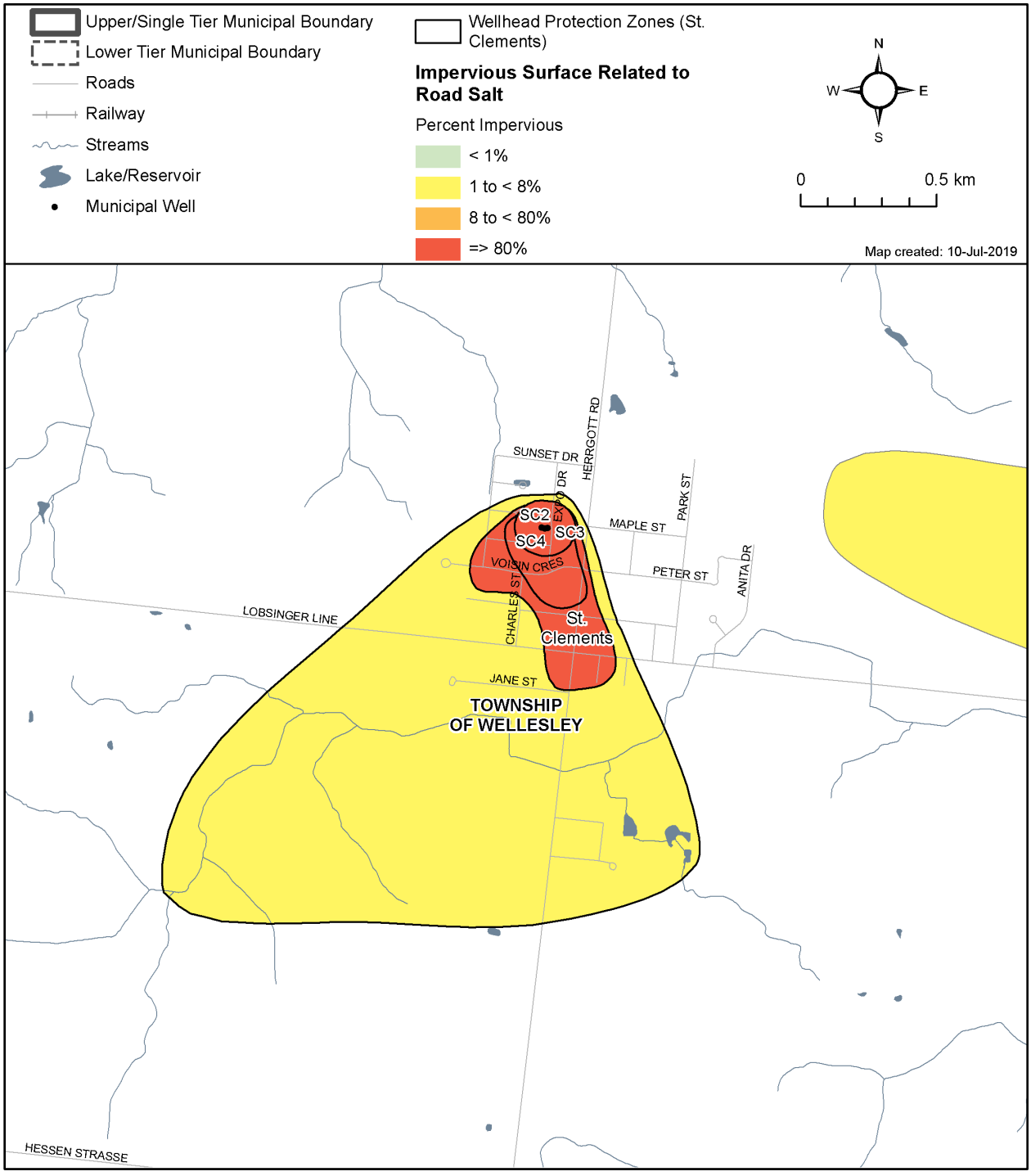
## Map 8.6—108: St. Clements Well Supply Percent Managed Lands



## Map 8.6—109: St. Clements Well Supply Livestock Density



## Map 8.6—110: St. Clements Well Supply Percent Impervious Surface



### 8.6.12 Wellesley Wellfield

The water supply for the Wellesley Wellfield is obtained from Production Wells WY1 and WY5, which supply water to a population of approximately 3,472 people (**Table 8—1**). The serviced areas are presented on **Map 8.6—271**. WY1 is screened within a sand and gravel unit corresponding to the Pre-Catfish Creek Aquifer (AFD1) from 45 m BGS to 54 m BGS, while WY5 is screened across both aquifer AFD1 and approximately 3 m of dolostone bedrock from 45 to 54 m BGS (**Table 8.1—6**).

#### Vulnerability and Transport Pathways

The WHPAs are presented on **Map 8.6—272**. The unadjusted intrinsic vulnerability is shown on **Map 8.6—273** and the adjusted intrinsic vulnerability is shown on **Map 8.6—275.** Analysis of the attributes of each potential transport pathway (**Map 8.6—274**) in the Wellesley WHPA resulted in the identification of two aggregate properties within WHPA-D, and several well clusters within the WHPA-A and WHPA-B zones that warrant increased ISI. **Map 8.6—276** shows the area of influence for these transport pathways, while **Map 8.6—277** shows the final vulnerability scoring.

#### Identification of Significant, Moderate and Low Drinking Water Quality Threats in the Wellesley Wellhead Protection Areas

The identification of a land use activity as a significant, moderate, or low drinking water threat depends on its risk score, determined by considering the circumstances of the activity and the type and vulnerability score of any underlying protection zones, as set out in the Tables of Drinking Water Threats. Information on drinking water threats is also accessible through the Source Water Protection Information Portal. The information above can be used with the vulnerability scores shown in **Map 8.6—277** to help the public determine where certain activities are or would be significant, moderate and low drinking water threats.

**Table 8.6—73** provides a summary of the threat levels possible in the Wellesley Wellfield for Chemicals, Dense Non-Aqueous Phase Liquids (DNAPLs), and Pathogens. “Yes” indicates that the threat classification level is possible for the indicated threat type under the corresponding vulnerable area / vulnerable score; “No" indicates that it is not. The colours shown for each vulnerability score correspond to those shown in **Map 8.6—277**.

**Table 8.6—23: Identification of Drinking Water Quality Threats in the Wellesley Wellhead Protection Areas**

| Threat Type | Vulnerable Area | Vulnerability Score | Significant Threats | Moderate Threats | Low Threats |
|---|---|---|---|---|---|
| Chemicals | WHPA-A | 10 | Yes | Yes | Yes |
| Chemicals | WHPA-B | 8 | Yes | Yes | Yes |
| Chemicals | WHPA-B/C/D | 6 | No | Yes | Yes |
| Chemicals | WHPA-C/D | 2 & 4 | No | No | No |
| DNAPLs | WHPA-A/B/C | Any Score | Yes | No | No |
| DNAPLs | WHPA-D | 6 | No | Yes | Yes |
| DNAPLs | WHPA-D | 2 & 4 | No | No | No |
| Pathogens | WHPA-A | 10 | Yes | Yes | No |
| Pathogens | WHPA-B | 8 | No | Yes | Yes |
| Pathogens | WHPA-B | 6 | No | No | Yes |

### Threats and Issues Enumeration for the Wellesley Wellfield

The percent managed land, livestock density, and percent impervious surface value for each protection zone in the wellfield are shown in **Map 8.6—278, Map 8.6—279, and Map 8.6—280**, respectively**.**

The total number of identified significant drinking water threats in this wellfield is 17. The number of properties in this Wellfield with identified significant drinking water threats is 6. Details surrounding the types of threats and circumstances found in the Wellesley wellhead protection areas are outlined in **Table 8.6—74**.

No Significant Conditions were identified in this wellfield as per Technical Rule 126.

No drinking water Issues have been identified in this wellfield as per Technical Rule 114.

**Table 8.6—24: Significant Drinking Water Quality Threats in the Wellesley Wellhead Protection Areas(current to February 2019)**

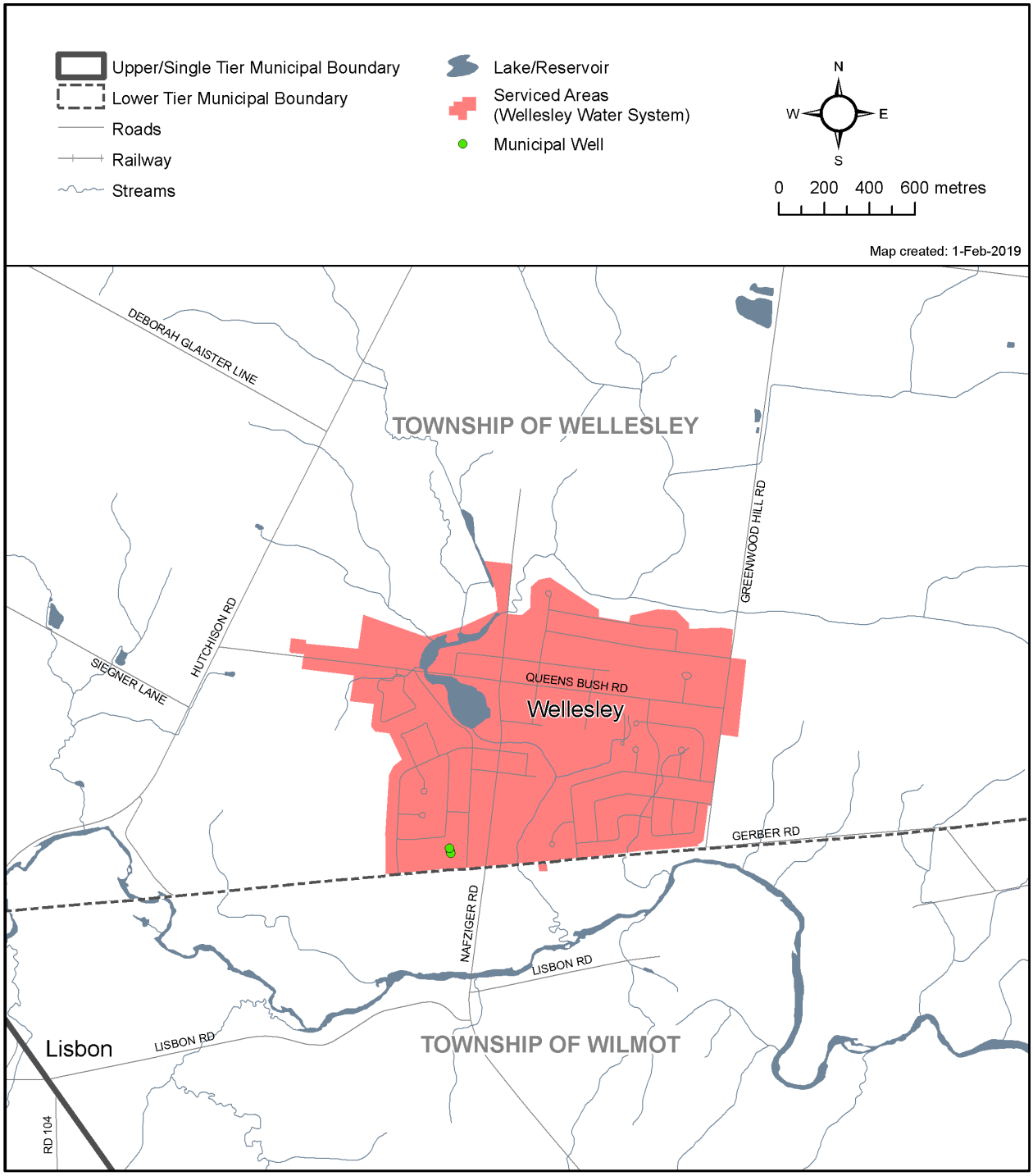
| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| 2 | Sewage system or sewage works - onsite sewage systems holding tanks | 1 | WHPA-A |
| 3 | Application of agricultural source material (ASM) to land | 1 | WHPA-A |
| 4 | Storage of agricultural source material (ASM) | 1 | WHPA-A |
| 8 | Application of commercial fertilizer to land | 1 | WHPA-A |
| 9 | Storage of commercial fertilizer | 1 | WHPA-A |
| 10 | Application of pesticide to land | 1 | WHPA-A |
| 11 | Storage of a pesticide | 2 | WHPA-A |
| 12 | Application of road salt | 6 | WHPA-A |
| 15 | Storage and handling of fuel | 1 | WHPA-A |

| PDWT[1] # | Threat Subcategory[2] | Number of Activities | Vulnerable Area |
|---|---|---|---|
| 21 | Management or handling of agricultural source material - agricultural source material (ASM) generation (grazing and pasturing) | 1 | WHPA-A |
| | Management or handling of agricultural source material - agricultural source material (ASM) generation (yards or confinement) | 1 | WHPA-A |
| **Total Number of Significant Threat Activities** | | **17** | |
| **Total Number of Properties with Significant Threats** | | **6** | |

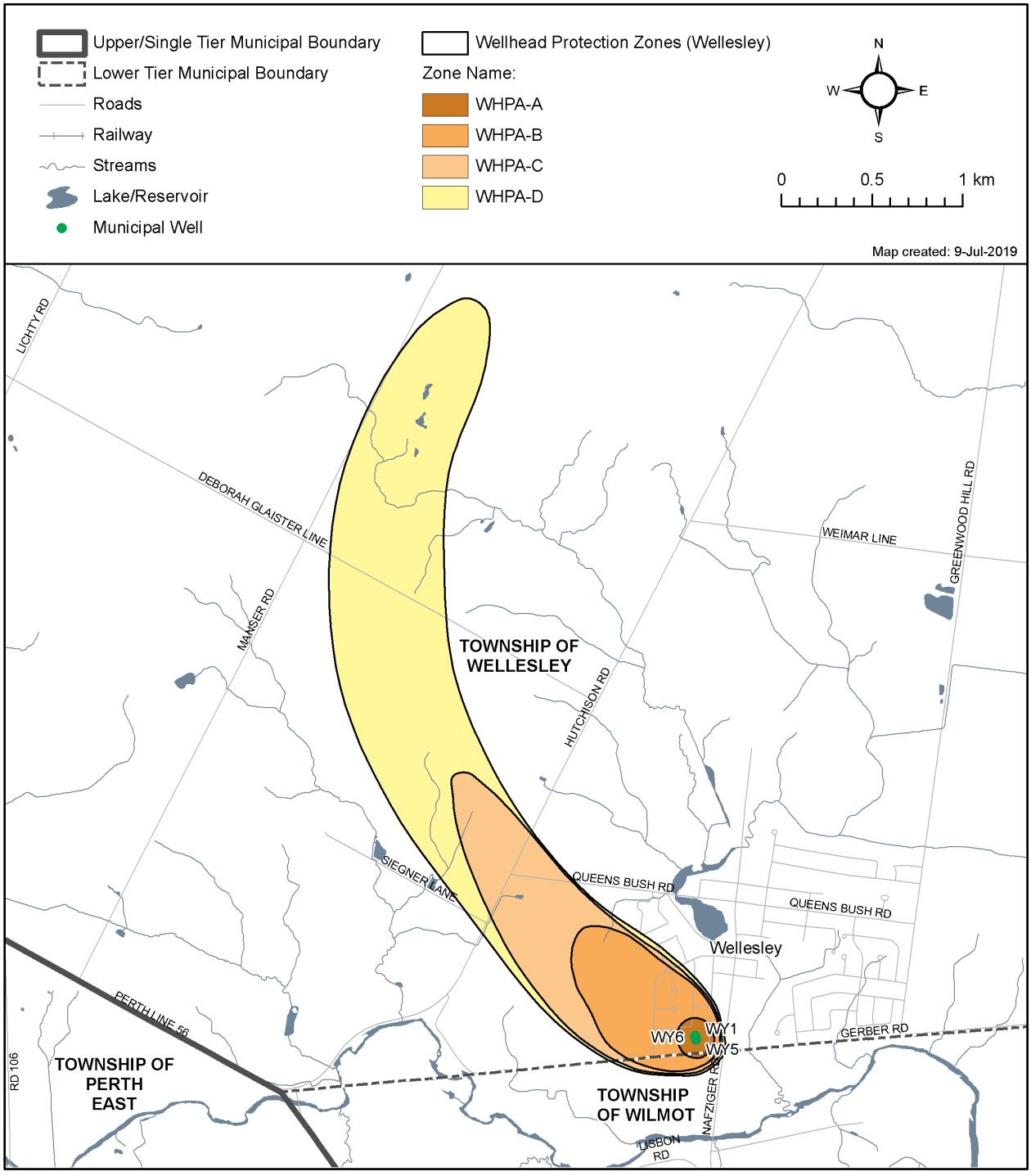
[1] Prescribed Drinking Water Quality Threat Number refers to the prescribed drinking water threat listed in O. Reg. 287/07 s.1.1 (1)

[2] Where applicable, waste, sewage, and livestock threat numbers are reported by sub-threat; fuel and DNAPL by Prescribed Drinking Water Threat category.

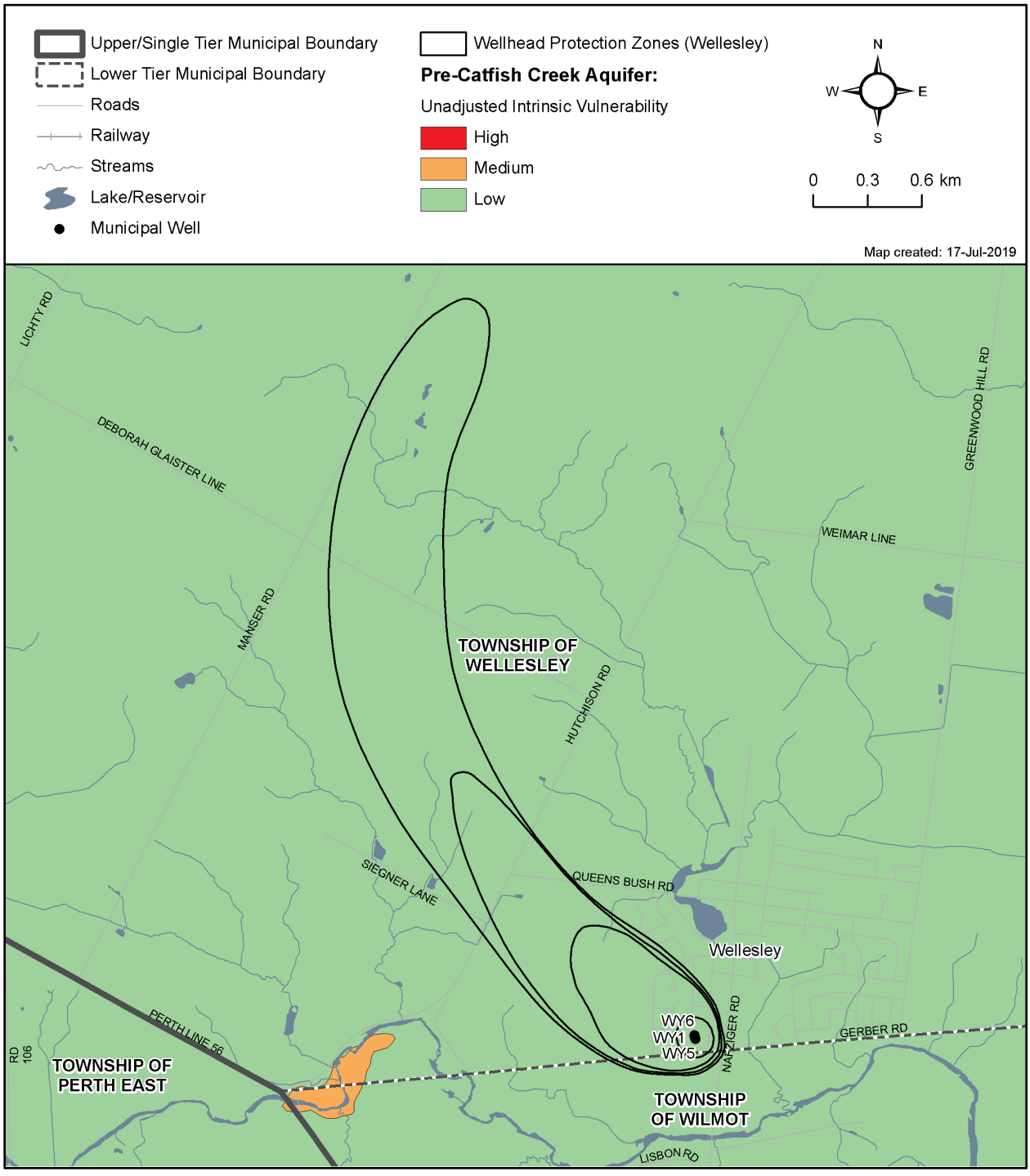
## Map 8.6—111: Wellesley Well Supply Serviced Areas



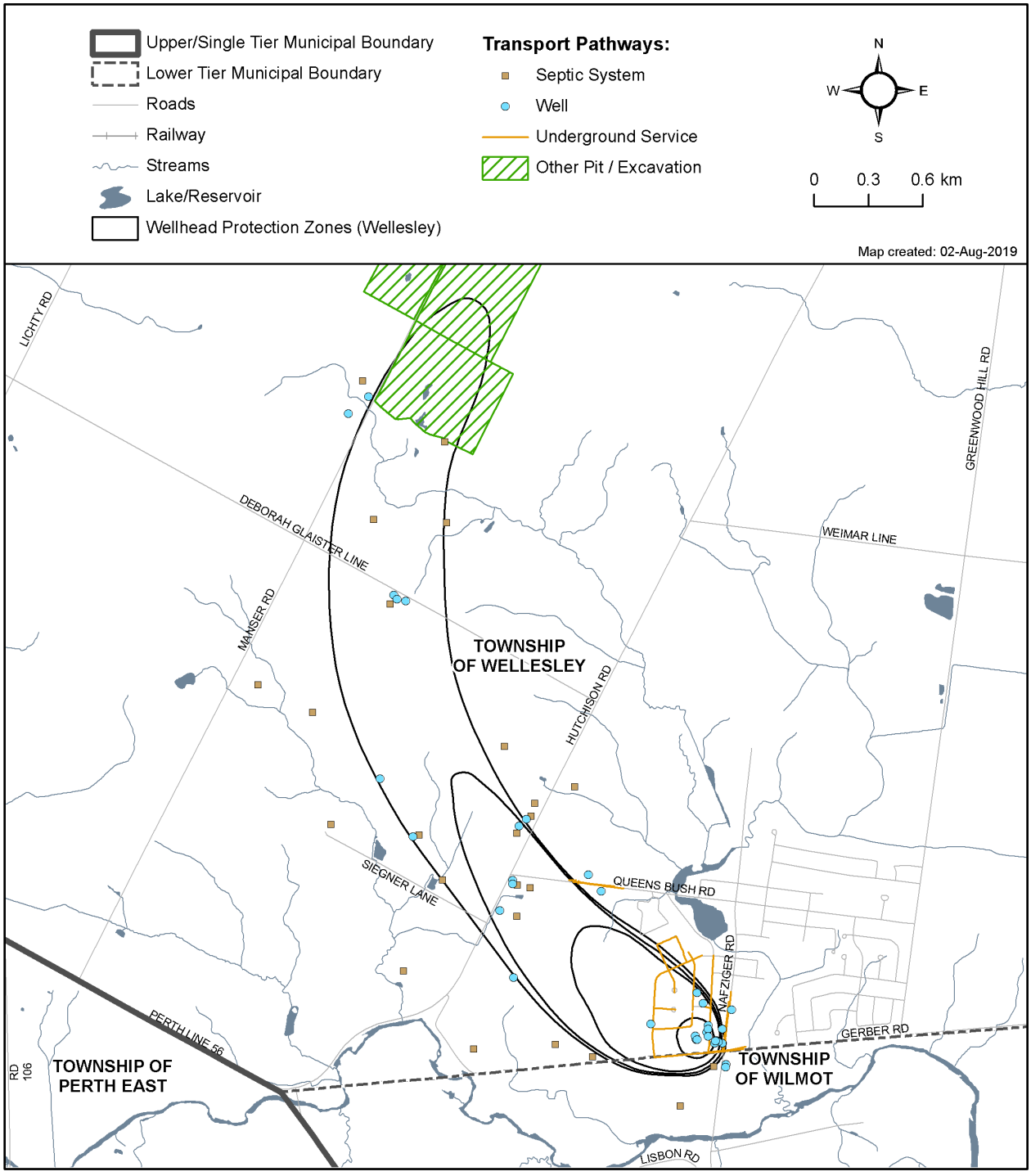
## Map 8.6—112: Wellesley Well Supply Wellhead Protection Area



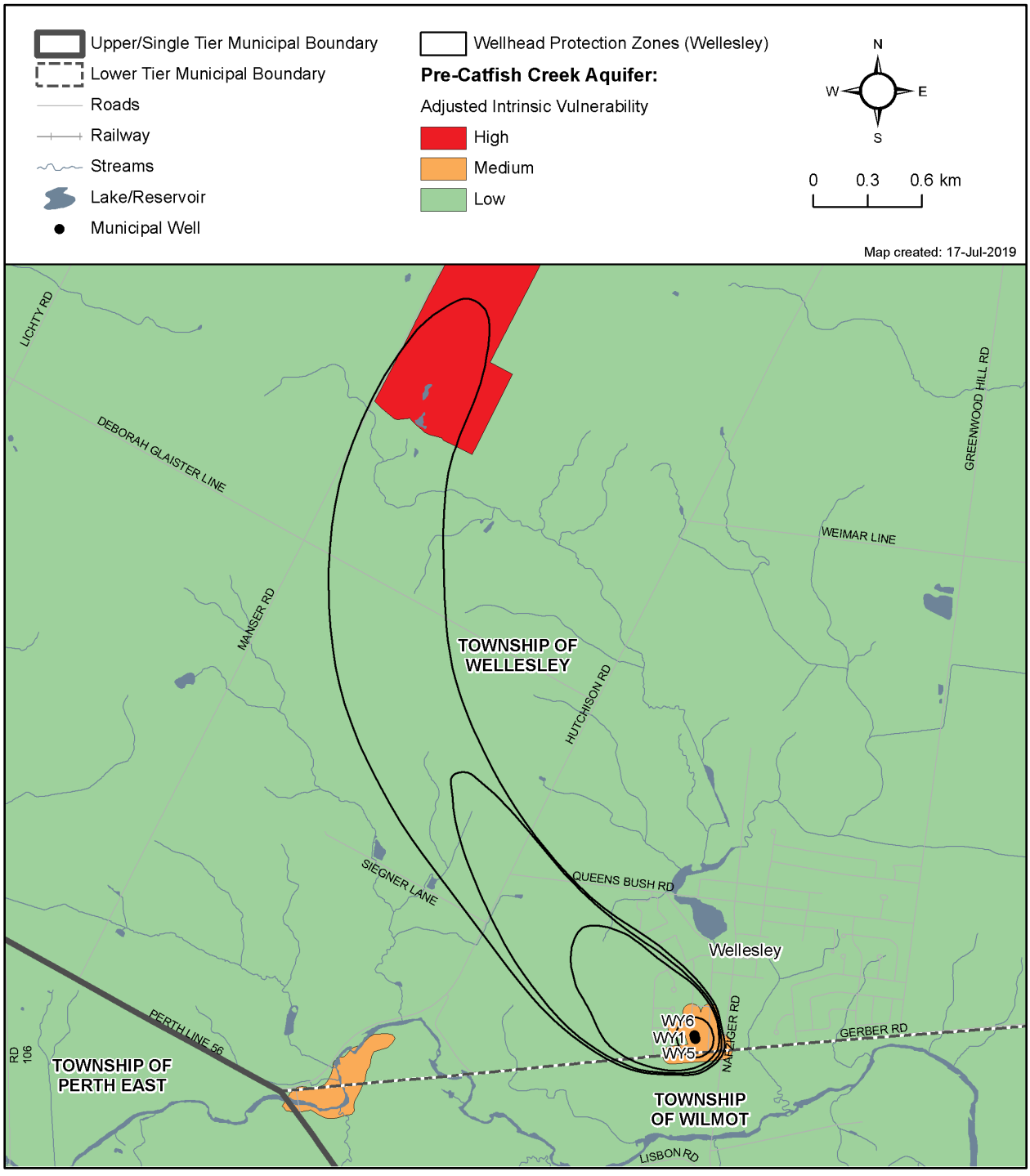
## Map 8.6—113: Wellesley Well Supply Wellhead Protection Area Unadjusted Intrinsic Vulnerability



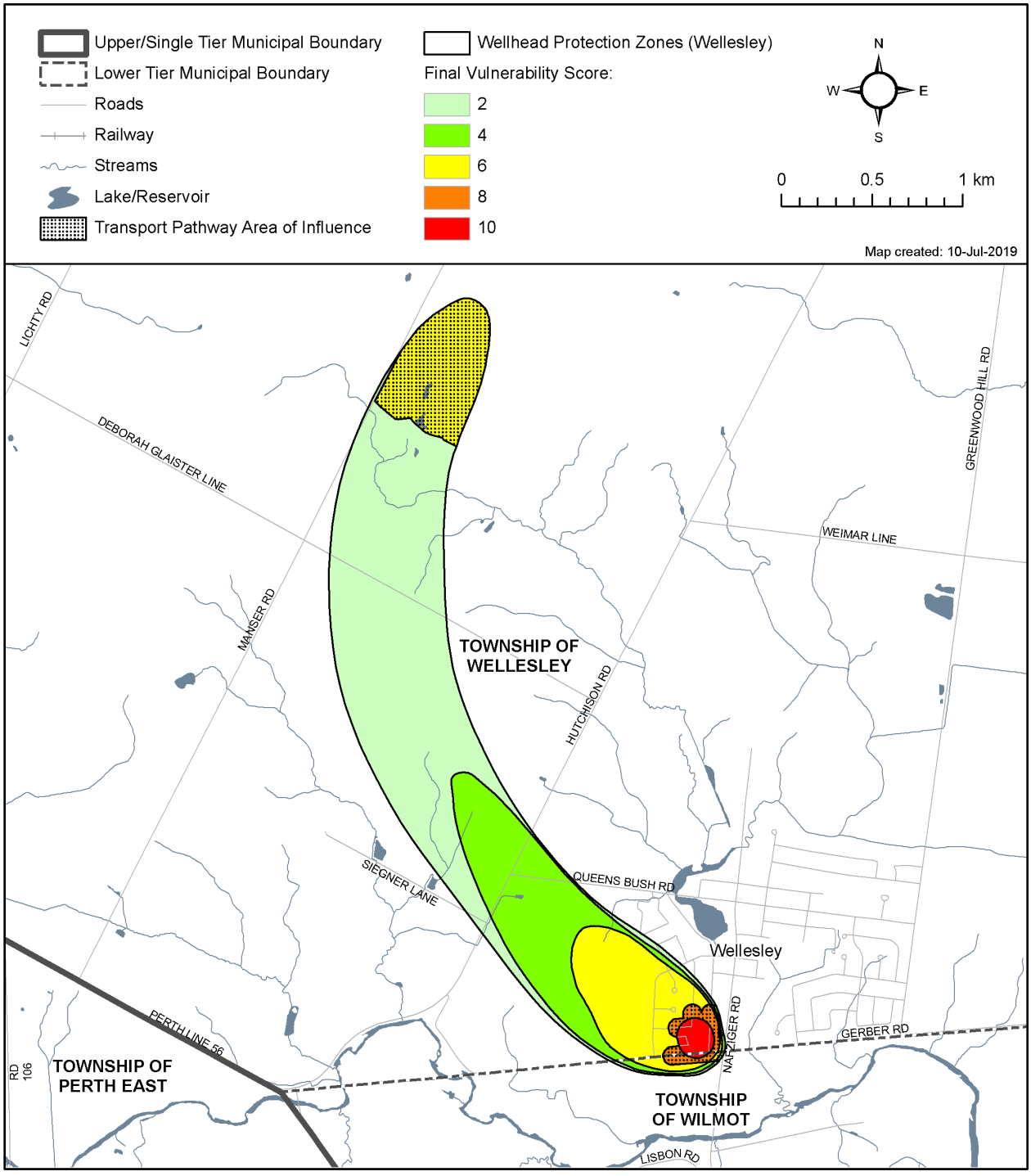
## Map 8.6—114: Wellesley Well Supply Transport Pathways



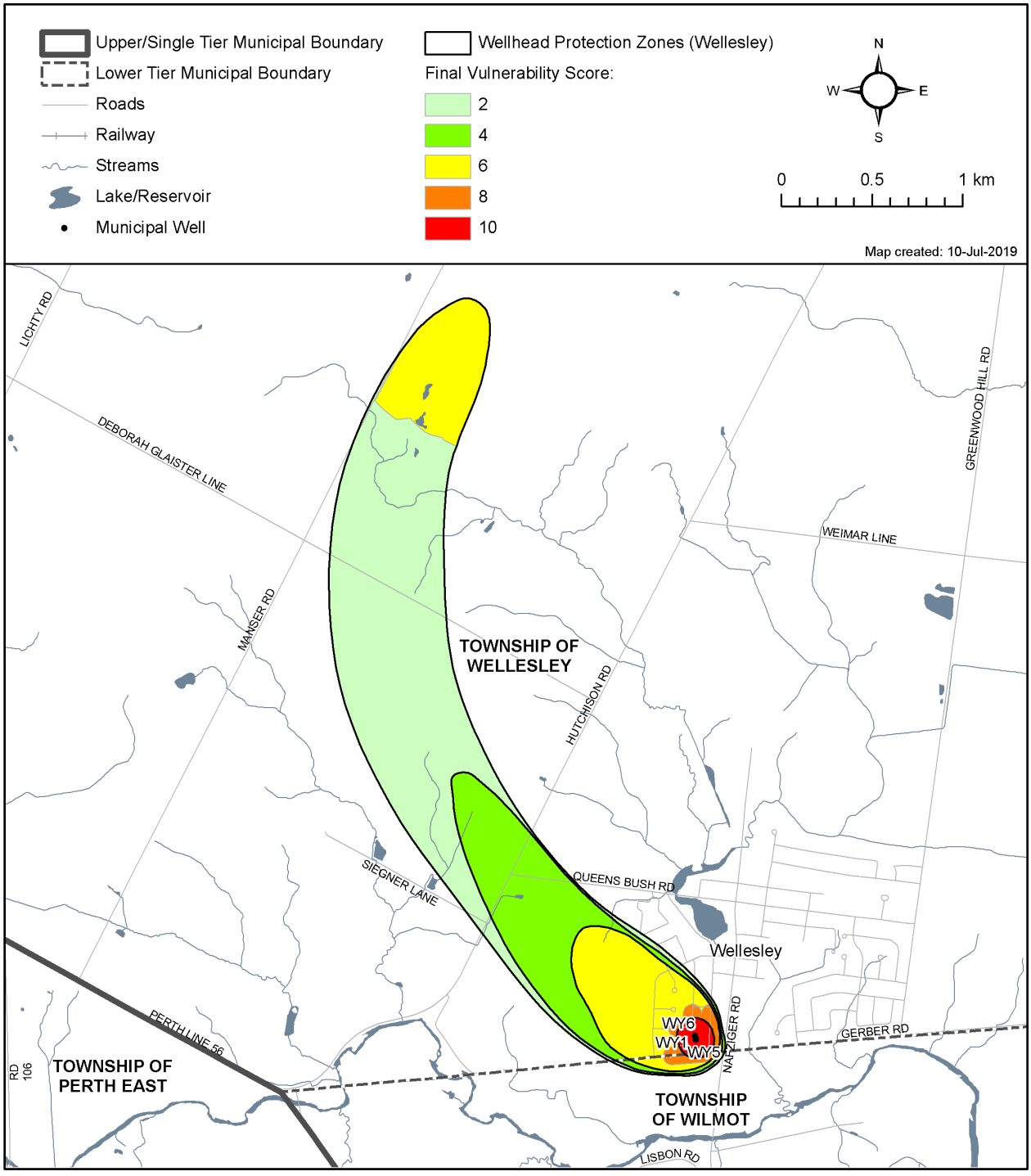
## Map 8.6—115: Wellesley Well Supply Wellhead Protection Area Adjusted Intrinsic Vulnerability



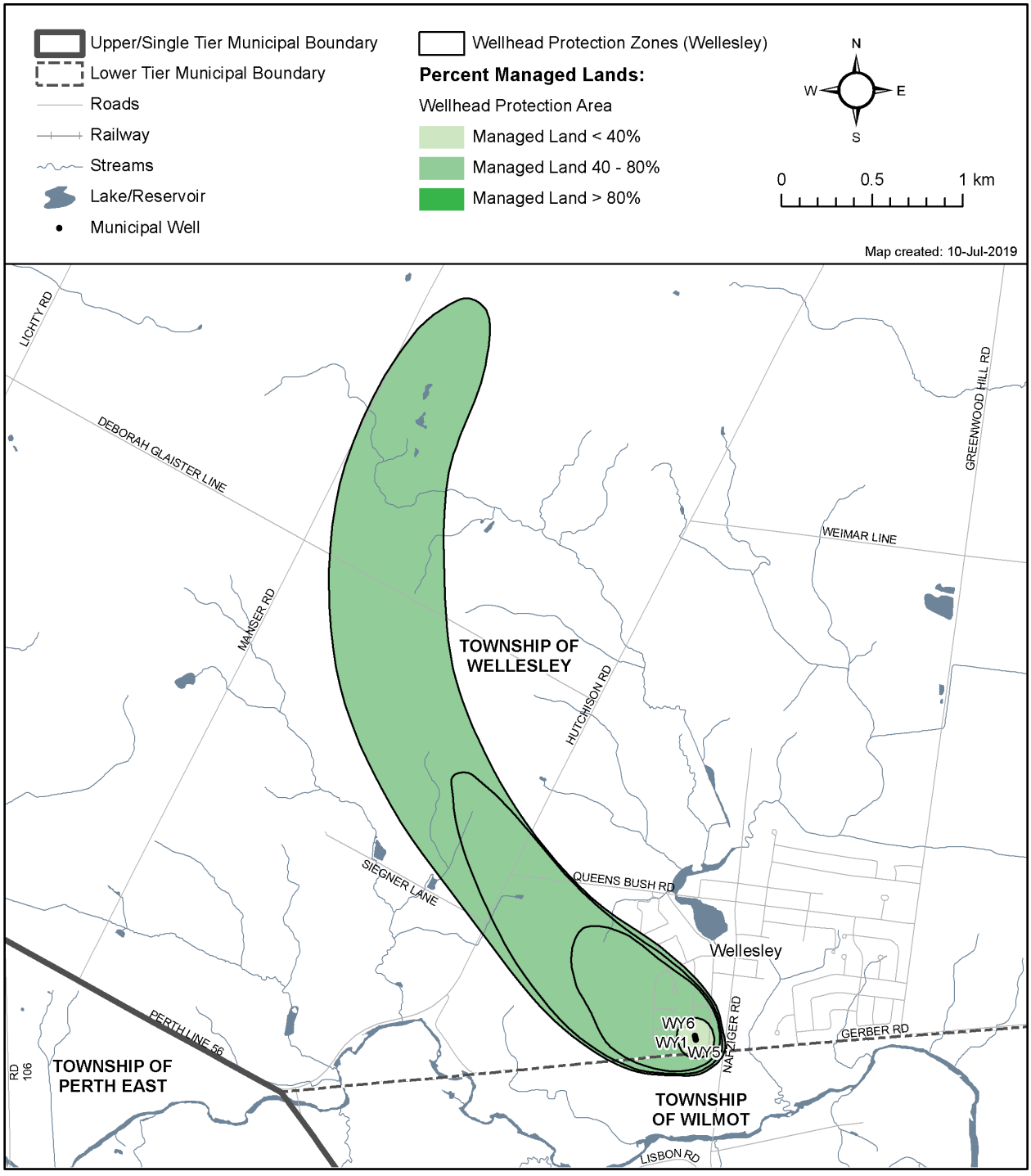
## Map 8.6—116: Wellesley Well Supply Transport Pathway Area of Influence



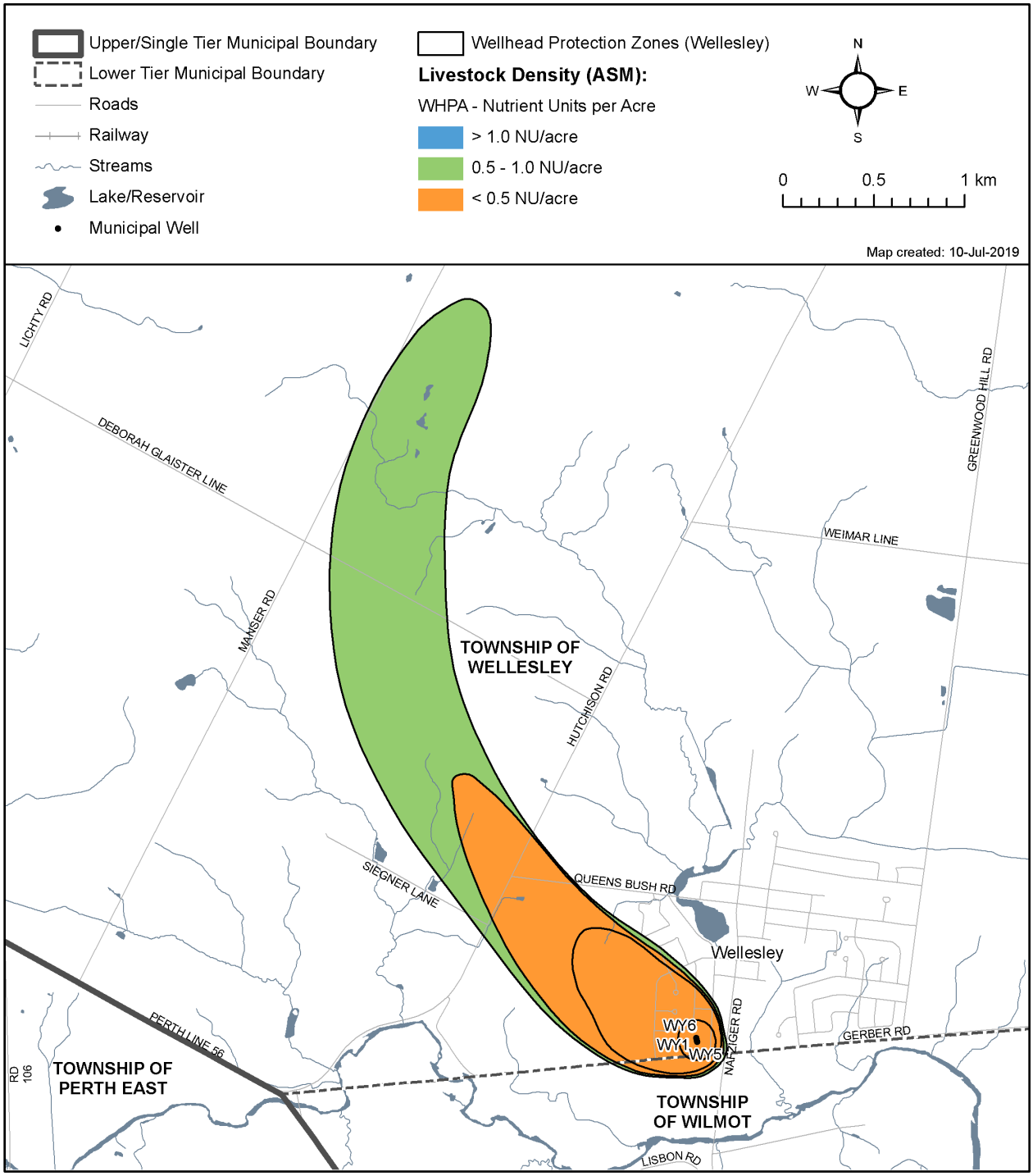
## Map 8.6—117: Wellesley Well Supply Wellhead Protection Area Final Vulnerability



## Map 8.6—118: Wellesley Well Supply Percent Managed Lands



## Map 8.6—119: Wellesley Well Supply Livestock Density



## Map 8.6—120: Wellesley Well Supply Percent Impervious Surfaces