

2016

The Summer Village of Bondiss Wildfire Mitigation Strategy



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The *Summer Village of Bondiss Wildfire Mitigation Strategy* was prepared under the guidance of the Summer Village of Bondiss' Council.

Council Members include:

- Peter Golanski, Mayor
- Lawrence Habiak, Councilor
- Fred Harmatys, Councilor
- Ed Tomaszuk, Chief Administrative Officer

Special thanks to the following individuals who added professional input to the Wildfire Mitigation Strategy:

- Nikki Hahn-McKay, Wildfire Ranger, Lac La Biche Wildfire Management Area, Agriculture and Forestry
- Ron Jackson, Director of Emergency Management, Athabasca County



¹ Alberta Environment and Sustainable Resource Development. 2013. *Guidebook for Community Protection: A Guidebook for Wildland/Urban Interface Communities*. Government of Alberta

² Partners in Protection. 2003. *FireSmart: Protecting your Community from Wildfire, Second Edition*. Partners in Protection.

Executive Summary

Wildfire is an important aspect of the natural ecological cycle. However, the impacts of a wildfire can be devastating, consuming valuable time and resources. The purpose of the *Summer Village of Bondiss Wildfire Mitigation Strategy* is to provide a proactive approach to reducing the impacts of a potential wildfire; this approach is known as FireSmart. Twelve recommendations are being made to the Summer Village of Bondiss to help mitigate against wildfire. These recommendations are separated into four categories: Education, Development, Vegetation Management and Legislation.

Recommendations

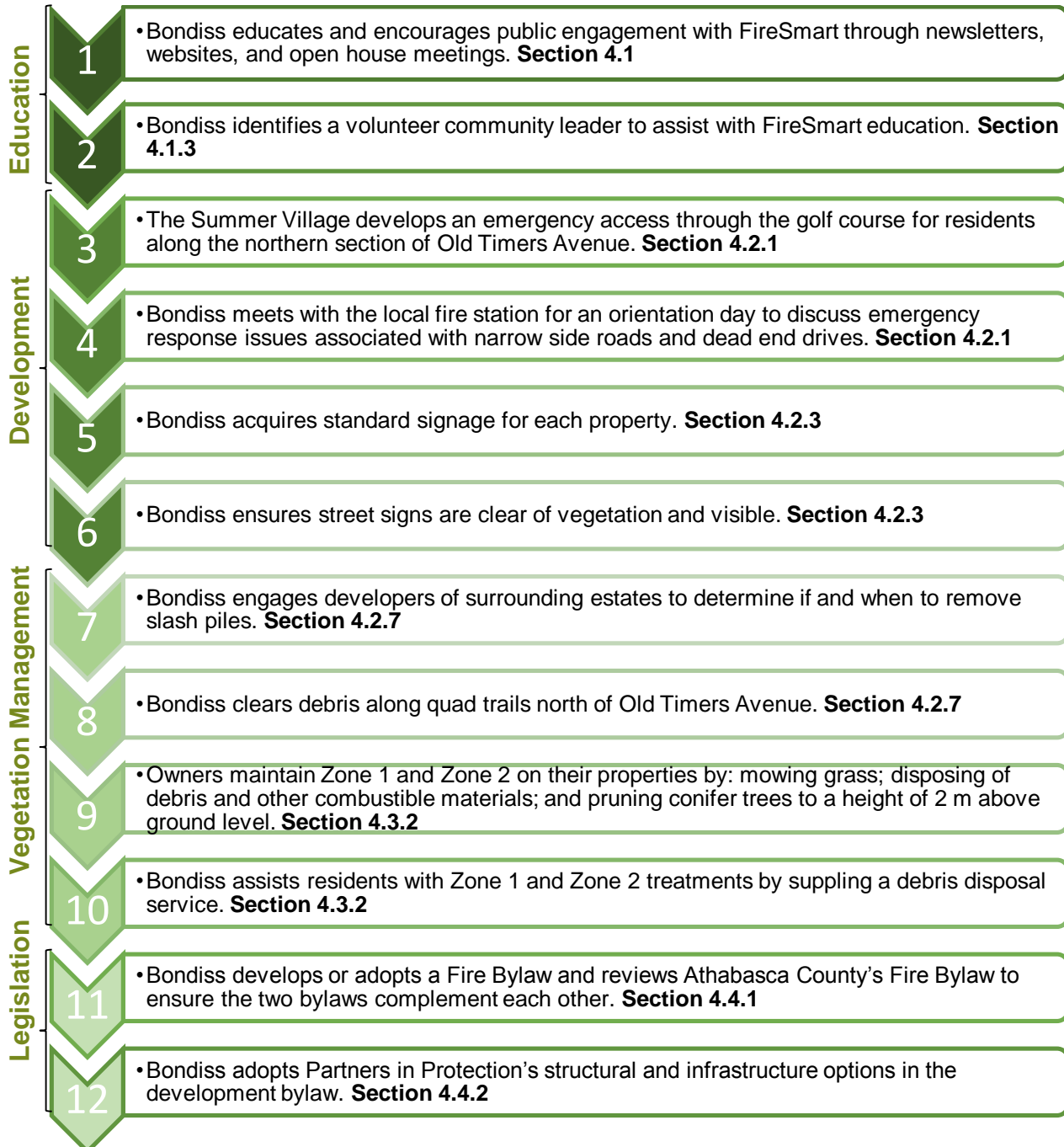


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1 Introduction

Wildfire is an important aspect of the natural ecological cycle in Alberta. However, the impacts of a wildfire can be devastating to a community, consuming valuable time and resources. The Summer Village of Bondiss must recognize and prepare for the potential threat of a wildfire.

The *Summer Village of Bondiss Wildfire Mitigation Strategy* identifies the susceptibility of Bondiss to wildfire and provides recommendations to mitigate against wildfire. The Wildfire Preparedness Guide (**Appendix II**) compliments the Wildfire Mitigation Strategy, serving as a strategic document which will assist emergency responders from Athabasca County during an incident within Bondiss.

Initially, the project began with a startup meeting between the Bondiss Council and CPP Environmental to discuss the process of the project. Field assessments were then conducted to gather data on differing community attributes. Attributes considered during field assessments included:

- Community and landscape descriptions
- Vegetation types
- Values at risk: standard, critical, dangerous goods, and special values
- Access
- Utilities
- Emergency response characteristics
- Existing fuel management schemes

The *Summer Village of Bondiss Wildfire Mitigation Strategy* is organized into four main sections: Planning Area and Stakeholders, Wildfire Threat Assessment, FireSmart Activities, and Summary of Recommendations. The Planning Area and Stakeholder section describes general location and stakeholders involved with the plan. The Wildfire Threat Assessment section considers values at risk, wildfire behaviour potential, wildfire incidence and firefighting capabilities; wildfire behaviour potential was determined by using the fire growth model, Prometheus. The FireSmart Activities section is an evaluation of risks and hazards specific to Bondiss. The Summary of Recommendations section is based on the issues identified in the FireSmart Activities section.

Objectives

- Identify wildfire risks and hazards
- Develop strategies to help mitigate risks and hazards
- Develop strategies to encourage continuing education about FireSmart
- Ensure legislation is effective for managing fire risks and hazards

It must be noted that CPP Environmental does not advocate the removal of vegetation in riparian zones, or other sensitive areas. Riparian areas are ecologically important and should not be treated with FireSmart prescriptions.

2 Planning Area and Stakeholders

2.1 Planning Area

The Summer Village of Bondiss is located on the southeastern shore of Skeleton Lake, within Athabasca County, approximately 160 km north northeast of Edmonton, Alberta (**Figure 1**). The planning area includes Bondiss and adjacent lands up to 2 km from Bondiss' borders. See **Appendix III** for planning area map.



Figure 1. General location

The Summer Village of Bondiss and its planning area lie along the border of the Dry Mixedwood Sub-region and the Central Mixedwood Sub-region in the south eastern part of the Boreal Forest Natural Region. Forest stands in the planning area are generally dominated by trembling aspen (*Populus tremuloides*), but also consist of smaller white spruce (*Picea glauca*) stands, black spruce (*Picea mariana*) stands, and mixedwood stands. Terrain is gently rolling to flat.

2.2 Stakeholders

Knowledge and assistance about the planning area was provided by several stakeholders. Key stakeholders involved in the planning were:

- The Summer Village of Bondiss
- The residents of Bondiss
- Athabasca County Protective Services
- Alberta Agriculture and Forestry, Lac La Biche Wildfire Management Area

The Summer Village of Bondiss was responsible for reviewing documents, considering recommendations, approving the plan, implementing strategies and administering the project. Athabasca County Protective Services provided local knowledge, strategies, and tactics for fire suppression. Alberta Agriculture and Forestry reviewed and provided technical advice for the project.

3 Wildfire Threat Assessment

Wildfire threat was assessed by analyzing values at risk, wildfire behaviour potential, wildfire incidence, and firefighting capabilities within the planning area. **Wildfire threat in Bondiss is high during the spring and fall while it is low during the summer.** Wildfire Behaviour maps (**Appendix IV**), Wildfire Threat Rating maps (**Appendix V**), and the Prometheus Wildfire Model (**Appendix VIII**) were used to assist the wildfire threat analysis. Wildfire Behaviour and Wildfire Threat Rating maps were acquired from FireWeb³; which is operated by Agriculture and Forestry.

3.1 Values at Risk

Values at risk encompasses four broad types of values: standard, critical, dangerous goods, and special values. Standard values are homes and other common structures found in communities. Critical values are infrastructure that is vital to the wellbeing of those who reside in the planning area. Dangerous goods values are anything which may pose a safety threat to emergency responders or the public. Special values are areas that have natural, cultural, historical, or emotional importance to a community. Values at risk are identified in **Table 1** and on the operations map in **Appendix II**.

Table 1. Values at Risk

Values at Risk	Description	
	Within Bondiss	Planning Area
Standard	170 residences	N/A
Critical	None identified	None identified
Dangerous Goods	None identified	None identified
Special	Skeleton Lake Golf & Country Club	None identified

Note: Alberta’s electrical distribution system delivers low voltage electricity directly to consumers; these lines are not considered critical infrastructure for the purpose of this plan. High voltage electrical transmission lines are considered critical infrastructure.

³ <http://wildfire.alberta.ca/fire-smart-industry/alberta-wildfire-system-fire-web.aspx>

3.2 Wildfire Behaviour Potential

Wildfire behaviour is “the manner in which fuel ignites, flame develops, and fire spreads and exhibits other related phenomena as determined by the interaction of fuels, weather,⁴ and topography⁴.”

3.2.1 Vegetation Fuel Types

The landscape, within 2 km of Bondiss, consists of deciduous (**Figure 2**) dominated forests with spruce (**Figure 3**) and mixedwood (**Figure 4**) patches throughout. Grass (**Figure 5**) surrounds the edge of Skeleton Lake and along utilities corridors. Agricultural lands are common in the planning area. Agricultural lands were considered non-fuels because the Canadian Forest Fire Behaviour Prediction System (CFFBP) does not have data on how fires behave on agricultural lands; it is recognized that wildfires can be sustained on these lands. Anywhere that is less than 25% vegetated, such as within a community, is considered a non-fuel for the purposes of landscape fire prediction. Ground-truthing, satellite imagery and aerial photography were all used to identify forest fuel types, by a certified AVI photo interpreter, in accordance with CFFBP. **Table 2** shows common language corresponding to their CFFBP designation. See **Appendix VI** for fuels map.

Table 2. CFFBP designation.

CFFBP Designation	Common language Equivalent
D1	Deciduous
C2	Spruce
M1	Mixedwood
O1	Grass



Figure 2. Deciduous fuels

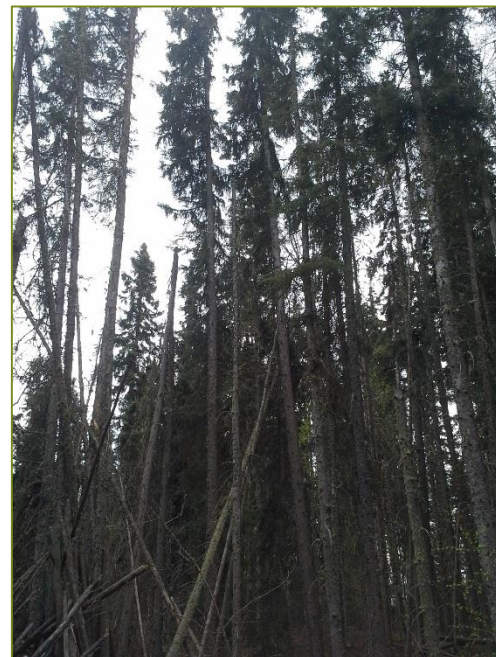


Figure 3. Spruce fuels

⁴ Canadian Interagency Forest Fire Centre. 2002. *The 2002 Glossary of Forest Fire Management Terms*.



Figure 4. Mixedwood fuels



Figure 5. Grass fuels

3.2.2 Fire Season Weather

Temperature, relative humidity, precipitation, and wind speed/direction were used to understand seasonal wildfire potential within, and surrounding Bondiss. Historical weather (**Table 3**) was acquired from April 1, 2005 – October 31, 2014 from the Atmore AGDM (Climate ID 3060406) near Atmore Alberta, 25 km northeast of Bondiss. Temperature, relative humidity and wind speed were averaged using daily noon actuals; values at 12:00 noon. Precipitation (**Figure 6**) was calculated using the monthly average. The Fire Weather Index (FWI) is a general index of fire danger throughout forested areas in Canada⁵. The 90th percentile FWI was calculated to better understand what months are at a higher risk of sustaining a wildfire in the Bondiss area. The 90th percentile was calculated and all days equal to or greater than the 90th percentile are considered to be days where a fire could spread (**Figure 7**). Spring, summer, and fall prevailing wind directions, in the form of wind roses, were generated using the “Canadian Wind Energy Atlas” website⁶ (**Figure 8, Figure 9, and Figure 10**). Wind roses were generated seasonally using a height of 30 meters; 30 meters was the closest measurement to the ground.

⁵ Natural Resources Canada. *Canadian Wildfire Information System*. Accessed July 29, 2015.

<http://cwfis.cfs.nrcan.gc.ca/maps/fw?type=fwi>

⁶ Environment Canada, *Canadian Wind Energy Atlas*. Accessed July 29, 2015.

<http://www.windatlas.ca/en/maps.php>

Table 3. Atmore fire season weather

Atmore AGDM, Alberta (Climate ID 3060406) (April 1, 2005 - October 31, 2014)						
Season	Month	Average Temp (°C)	Average RH (%)	Average Precipitation (mm)	Average Wind Speed (km/h)	90 th Percentile FWI (average days/year)
Spring	April	14	52	4	19	0
	May	15	46	38	17	7
Summer	June	18	55	62	13	3
	July	21	57	60	13	3
	August	20	57	41	13	2
Fall	September	16	54	30	15	3
	October	7	60	21	15	3

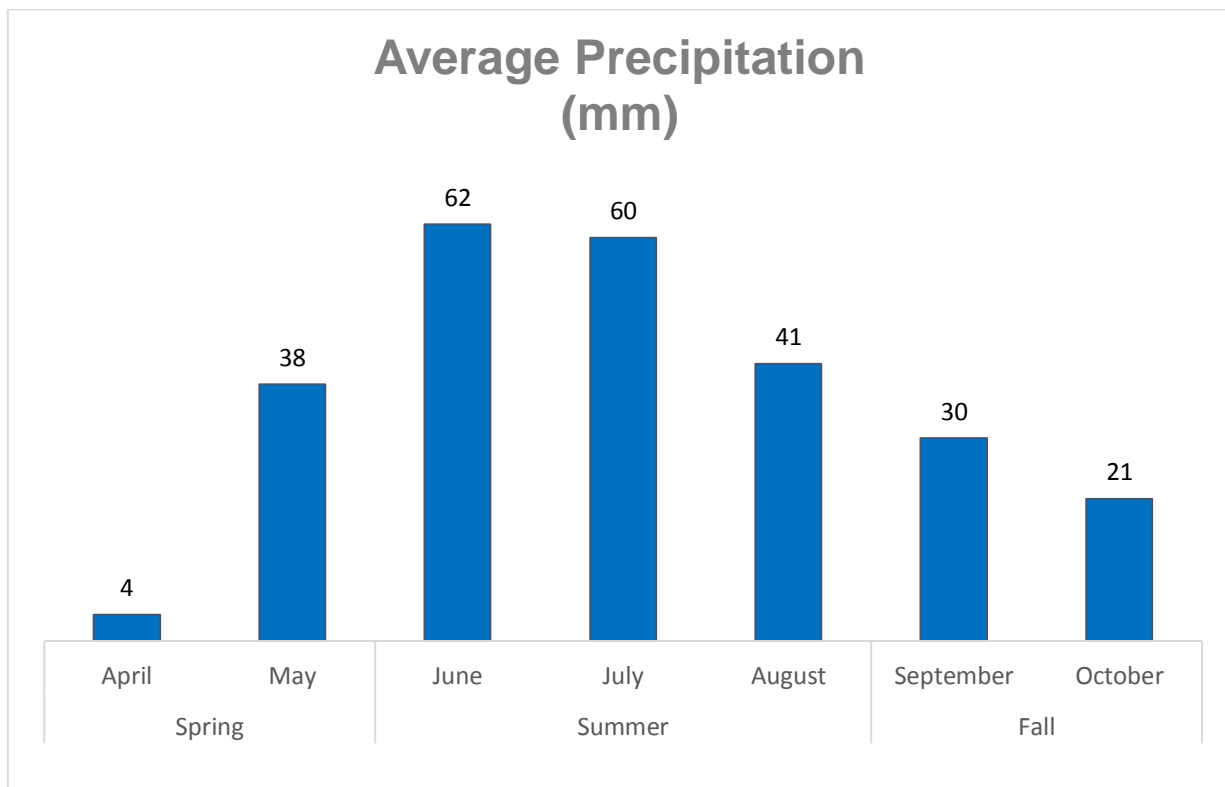


Figure 6. Average precipitation

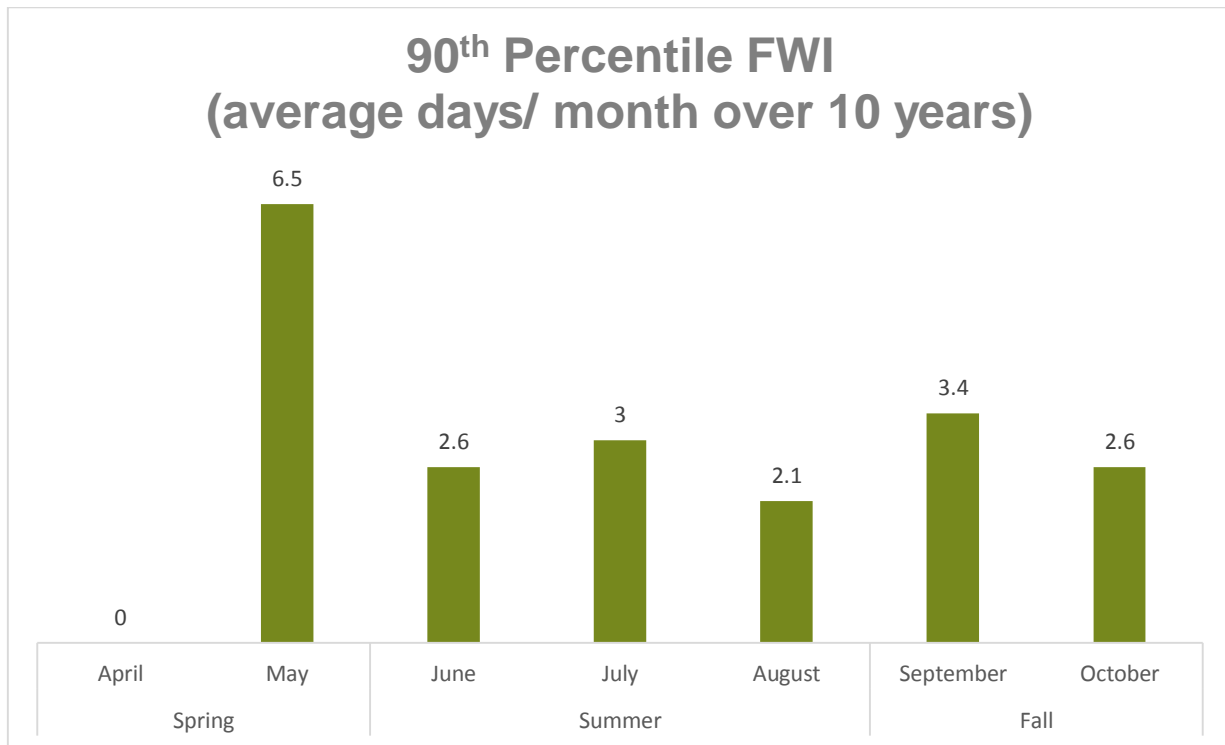


Figure 7. 90th Percentile FWI

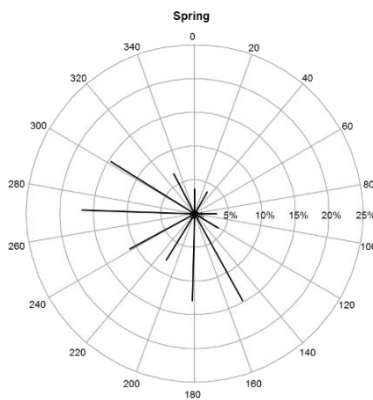


Figure 8. Spring winds

Prevailing spring winds range from the northwest to the south east.

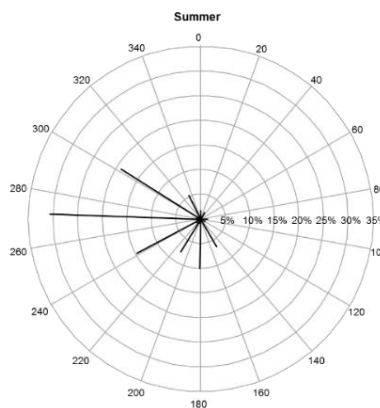


Figure 9. Summer winds

Prevailing summer winds generally come out of the west but range from the northwest to the southeast.

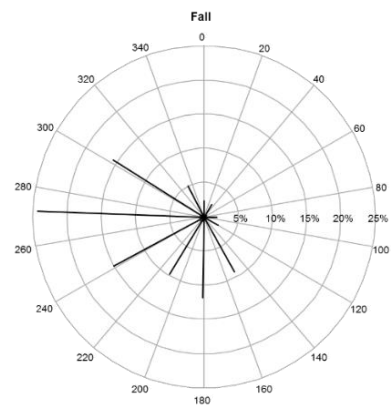


Figure 10. Fall winds

Prevailing fall winds generally come out of the west but range from the northwest to the southeast.

3.2.3 Topography

Topography influences fire behaviour similar to that of wind. As the slope of a hill increases so will a fire’s rate of spread. It is important to identify slope to properly analyze potential fire behaviour. The topography in the planning area is gently rolling to flat. The subtle elevation changes will have little effect on landscape fire behaviour. See **Appendix VI** for topography map.

3.2.4 Wildfire Behaviour Analysis

Prometheus, a widely utilized wildfire growth model across Canada⁷, is implemented in this strategy to better understand how a fire may be influenced by the vegetation fuels, weather and topography observed in the planning area. Prometheus simulations assist wildfire consultants in analyzing the possible intensity, size and consequence of a wildfire. Information gathered from simulations can then be applied to the seven wildfire disciplines (**Section 4.0**) to help mitigate against a destructive wildfire. As with all models, Prometheus has practical limitations and assumptions. The assumptions made in this model are listed in **Table 4**.

Table 4. Prometheus Assumptions

Prometheus Assumptions	
Model Assumption	User Assumption
No fire suppression	Grass 80% cured
Fuel types consistent	Scenarios start at 10:00
Only forest fuels considered	90 th percentile weather will support fire growth
Barriers are effective if they are 1.5 times wider than flame lengths	Weather in Bondiss does not vary from Atmore
Barriers include roads, waterbodies, and large areas of maintained or non-fuels	Topography is flat and will not influence scenario
Does not consider spotting (Figure 11)	An area that is less than 25% vegetated is a non-fuel

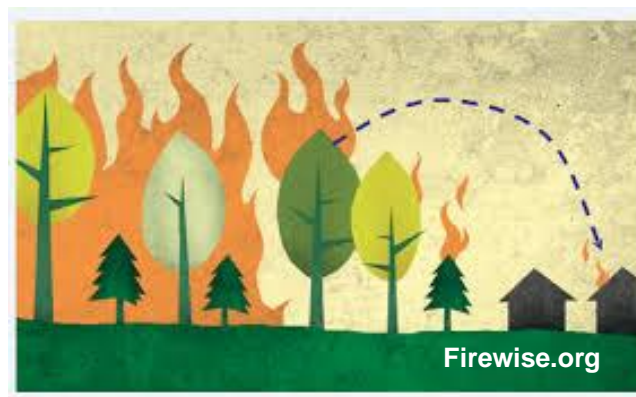


Figure 11. Example of Spotting

⁷ The Canadian Forest Service – Northern Forestry Centre, *Development and Structure of Prometheus: the Canadian Wildland Fire Growth Simulation Model* (2010)

3.2.4.1 Prometheus Wildfire Model Run

Several Prometheus Wildfire Model simulations were completed. The simulation summarized in Table 5 was selected to illustrate an extreme scenario within the planning area. See Appendix VII for Prometheus Model.

Table 5. Weather summary for Prometheus Model

Summary Weather on May 11, 2011				
Max Temperature	Min Relative Humidity	Wind Direction	Average Wind Speed	Max FWI
22°C	18%	Southeast	29 km/h	32
Summary Fire Data				
Ignition Point	Time of Ignition	Fire Growth Stopped	Total Area Consumed	General Fire Behaviour
West end of Skeleton Lake Estates	13:00	22:00	210 hectares (519 acres)	Moderate

The simulation was ignited at the west end of the Skeleton Lake Estates development. The fire spreads rapidly, reaching 11 hectares (27 acres) in the first hour, spreading northwest. Fire growth is rapid until 19:00, after which spread rates slow due to a decrease in temperature and wind speed and an increase in relative humidity. The simulation was stopped at 22:00 and reached a final size of 210 hectares (519 acres).

The Prometheus simulation represents an extreme fire danger rating based on the weather and fuel conditions. It illustrates the importance of FireSmart within Bondiss and the surrounding communities. The northern section of Bondiss is susceptible to a fire because of large areas of continuous forest. This simulation shows the fire growing aggressively through this area. High winds during a fire could also carry embers (also known as spotting) throughout the community when the fire is upwind of Bondiss. Spotting increases the chances of home ignitions. A fire moving at the rate of the simulation would overwhelm local resources and may smolder for several days or weeks after the initial spread. Special resources such as bull dozers, helicopters or personnel would be needed to fully extinguish a similar fire. If the residences within Bondiss and the surrounding county follow FireSmart principles, the defensibility of homes can be improved. If all properties are FireSmart it will create a defensible barrier where firefighters can safely work and decrease the probability of home ignitions through spotting.

3.3 Wildfire Incidence

The residents of Bondiss identified a wildfire incidence approximately 15 years ago. The village had to evacuate due to this large wildfire approaching from the southeast.

In addition, a search was completed on July 24, 2015 using FireWeb⁸, an Alberta Government information tool. The search focused on human and lightning caused wildfires within the planning area. The results showed no wildfire incidences. However, this data may not be accurate because Bondiss is not within the forest protection zone where majority of data is collected.

⁸ <http://wildfire.alberta.ca/fire-smart-industry/alberta-wildfire-system-fire-web.aspx>

3.4 Firefighting Capabilities

There are nine fire departments in Athabasca County which mainly rely on volunteer firefighters. Boyle Fire Rescue is the closest department to Bondiss and would be the primary responder to any incident within the summer village. **Table 6** lists the two closest Fire Departments and their distance from Bondiss.

Table 6. Fire Department and distance from Bondiss

Fire Department	Distance from Bondiss
Boyle Fire Rescue	5 km
Athabasca Fire Department	45 km



4 FireSmart Activities

Recommendations were based on wildland/urban interface disciplines while considering values at risk, wildfire behaviour potential, wildfire incidence, and firefighting capabilities. Wildland/urban interface disciplines, as identified by the *FireSmart Guidebook for Community Protection*, are: public education, development, vegetation management, legislation, inter-agency cooperation, cross-training, and emergency planning.

4.1 Public Education

Public education will increase residents' understanding of recommendations developed to mitigate wildfires.

Newsletters, websites, and open house meetings are all important in the distribution of FireSmart information. To increase the success of resident education and engagement FireSmart objectives should be highlighted and explained in the distribution mediums.

Recommendation 1

Bondiss educates and encourages public engagement with FireSmart through newsletters, websites, and open house meetings

4.1.1 Information

Information distributed should focus on and highlight Zone 1 as a priority area for Bondiss. Zone 1 is the area within a 10 m radius from structures. This area should have priority as maintenance of the area will reduce the risk of home ignition and increase the defensibility of the structure. In order to further inform residents, information should also include, but not be limited to the three fuel management approaches: fuel removal, reduction, and/ or conversion. To assist home owners, FireSmart Canada's *Structure and Site Assessment* form is included in **Appendix VIII**; FireSmart Canada's *Protecting Your Community from Wildfire* is referenced within the form to assist users.

4.1.2 Distribution

The council of Bondiss should ensure ongoing distribution and availability of FireSmart information in the spring and summer so that it is available during the seasons when property owners will most likely conduct vegetation management. Public notices should only be done with seasonal relevance; there should not be notices in the winter. Once the council establishes FireSmart procedures within Bondiss, word of mouth and public involvement will assist the education process. The goal of education is to develop engaged and dedicated landowners to create a community with a FireSmart culture.

4.1.3 Educational Resources Implementation

To assist the education process Bondiss should consider becoming a part of the FireSmart Canada Community Recognition Program (FCCRP)⁹. This process has already started with the Wildfire Mitigation Strategy and Preparedness Guide documents. A member of council, employee or a community leader of Bondiss would attend a Local FireSmart Representative workshop to learn how to acquire and maintain FCCRP for Bondiss. A community leader taking on this responsibility will increase the success of implementing recommendations on private property.

Recommendation 2

Bondiss identifies a volunteer community leader to assist with FireSmart education

⁹ FireSmart Canada, *FireSmart Community Champion Workshops* – Accessed January 6, 2016

Education Contacts and Resources

Education Contacts:

- Provincial FireSmart Representative Stuart Kelm
 - Email: stuart.kelm@gov.ab.ca
 - Phone: (780) 422 4452

Education Resources:

- FireSmart Canada - <https://www.firesmartcanada.ca/>
- Alberta Agriculture - <http://agriculture.alberta.ca/acis/climate-maps.jsp>

4.2 Development

4.2.1 Access

Bondiss Drive and Old Timers Drive are the two main roads within Bondiss. Bondiss Drive is approximately three kilometers long and has two means of access/egress. Old Timers Drive is approximately two kilometers long and has one means of access/egress. At the north end of Old Timers Drive it is possible for residents to use the golf course (**Figure 12**) as an emergency access. Although this would not be an emergency access for the entire length of Old Timers Drive, it would create an emergency access for the last one kilometer of the drive. It is recommended that the summer village works with the golf course and agree to a specified emergency escape route through the golf course. In addition, it is recommended that Bondiss meets annually with Boyle Fire Department to discuss access issues and other possible limitations to safe access/egress.

NOTE: An emergency access does not require that a road be built; only a path or clearing that would accommodate a vehicle to pass through in an emergency.



Figure 12. Golf course

Recommendation 3

Bondiss develops an emergency access through the golf course

Recommendation 4

Bondiss meets with the local fire station for an orientation day to discuss emergency response issues associated with narrow side roads and dead end drives.

4.2.2 Water Availability

Water availability for Bondiss are located in either Bondiss or Boyle. In Bondiss, water can be accessed from the boat launch, off Old Timers Drive (**Figure 13 and Figure 14**). In Boyle, there is a water treatment plant and fill station (**Figure 15**), and several fire hydrants throughout the community (**Figure 16**).



Figure 13. Boat launch, Old Timers Drive



Figure 14. Boat launch, Old Timers Drive



Figure 15. Boyle water treatment plant and fill station



Figure 16. Fire hydrant within Boyle

4.2.3 Signage

No standard lot signage is present within Bondiss. It is recommended that standard signage be established on each property at the end of the driveway, clearly identifying the lot number so it can be seen from the road (**Figure 17**). This will assist emergency responders in finding properties quickly.

Some community street signs had vegetation interference (**Figure 18**). It is recommended to clear or trim vegetation to improve the visibility of signs.

Recommendation 5

Bondiss acquires standard signage for each lot.

Recommendation 6

Bondiss ensures street signs are cleared of vegetation



Figure 17. Proposed lot signage



Figure 18. Signage with vegetation interference

4.2.4 Utilities

The powerlines in Bondiss appeared in good standing, with no vegetation interference by non-insulated lines. Recent mulching under the lines was noted during field assessments (**Figure 19**). The maintenance program by the electrical provider appears to be sufficient to prevent unnecessary ignition potentials. Natural gas residential distribution lines supply most households.



Figure 19. Mulching under powerlines

4.2.5 Staging Areas

Two municipal parks within Bondiss could be utilized as staging areas during an emergency incident: the park area between Old Timers Drive and Birch Crescent (**Figure 20**); and the park at the west end of Spruce Avenue (**Figure 21**). However, both of these parks have one access/egress and would only be suitable for short-term emergencies.



Figure 20. Staging area along Birch Crescent



Figure 21. Staging area along Spruce Avenue

4.2.6 Building Materials

The different materials used to build structures will affect fire behaviour.

4.2.6.1 Roofing

Roofing in Bondiss tends to be a mix of asphalt shingles (**Figure 22**) or tin roofing (**Figure 23**); only one roof was identified to have wooden shakes. Asphalt shingles and tin roofing are fire resistant. Untreated wooden shakes burn easily when exposed to radiant heat or direct contact with firebrands (embers)¹⁰.



Figure 22. Asphalt shingles

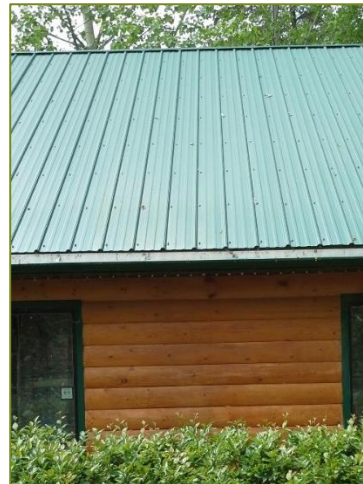


Figure 23. Tin roofing

¹⁰ FireSmart Protecting Your Community From Wildfire – 2003

Observable roofs within Bondiss have minor debris buildup (**Figure 24**). Debris buildup decreases the fire resistance of asphalt and tin roofing. Therefore, clearing debris maximizes fire resistance of roofing.

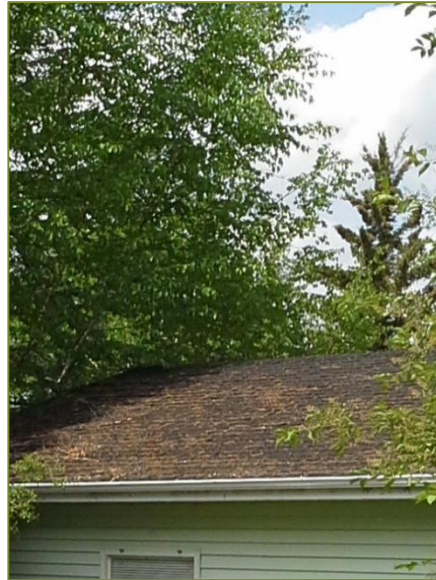


Figure 24. Debris buildup

4.2.6.2 Siding

Siding materials within Bondiss are a mix of vinyl (**Figure 25**) and wood siding (**Figure 26**). Neither siding type are fire resistant. Vinyl melts when subjected to heat, exposing flammable materials underneath. Wood siding offers very little fire resistance; however logs or heavy timber exteriors are more fire resistant when compared to wooden siding.



Figure 25. Vinyl siding



Figure 26. Wooden siding

4.2.7 Storage of Flammable Materials

Combustible materials (**Figure 27 and Figure 28**), such as firewood, debris piles or building materials can be hazardous. Within FireSmart Zone 1 (see Section 4.3.2), residents should relocate combustible materials 10 meters or more from structures. Unused materials or yard waste should be removed from properties and disposed of properly.



Figure 27. Debris piled beside house



Figure 28. Yard waste dumped along quad trail

Large slash piles (**Figure 29**) were noted in the new development, East Skeleton Lake Estates. It is recommended that the summer village contacts the developer to ensure that the slash piles will be removed. Yard waste (pictured above) and abundance of dead and down material (**Figure 30**) was noted along a quad trail north of Old Timers Drive. The yard waste is outside of the boundaries of Bondiss but may be from Bondiss' residents. It is recommended that the summer village of Bondiss remove the combustible materials from these areas. See **Appendix IX –Vegetation Management**.

Recommendation 7

Bondiss engages developers of surrounding estates to determine if and when to remove slash piles

Recommendation 8

Bondiss clears debris along quad trails north of Old Timers Avenue



Figure 29. Slash pile



Figure 30. Dead and down material

4.2.8 Ignition Sources

Railway tracks (Figure 31) and ATV trails (Figure 32) are potential ignition sources of a wildfire. These areas should be monitored, especially during times of high hazard.



Figure 31. Railway tracks



Figure 32. ATV trails

Bondiss uses signage (Figure 33 and Figure 34) to help inform the public during high fire hazard and other times during the year. This is a good practice that should be continued.



Figure 33. ATV signage



Figure 34. Fire Ban signage

4.3 Vegetation Management

4.3.1 Vegetation Management and Riparian Zones

It must be noted that CPP Environmental does not advocate the removal of vegetation in riparian zones, or other sensitive areas. Riparian areas are ecologically important and should not be treated with FireSmart prescriptions.

4.3.2 General Vegetation Management

Application of FireSmart's three priority zones (Figure 35) of vegetation management will reduce hazards and improve the defensibility of a community, structure or area. Table 7 lists suggested fuel management for each of the zones.

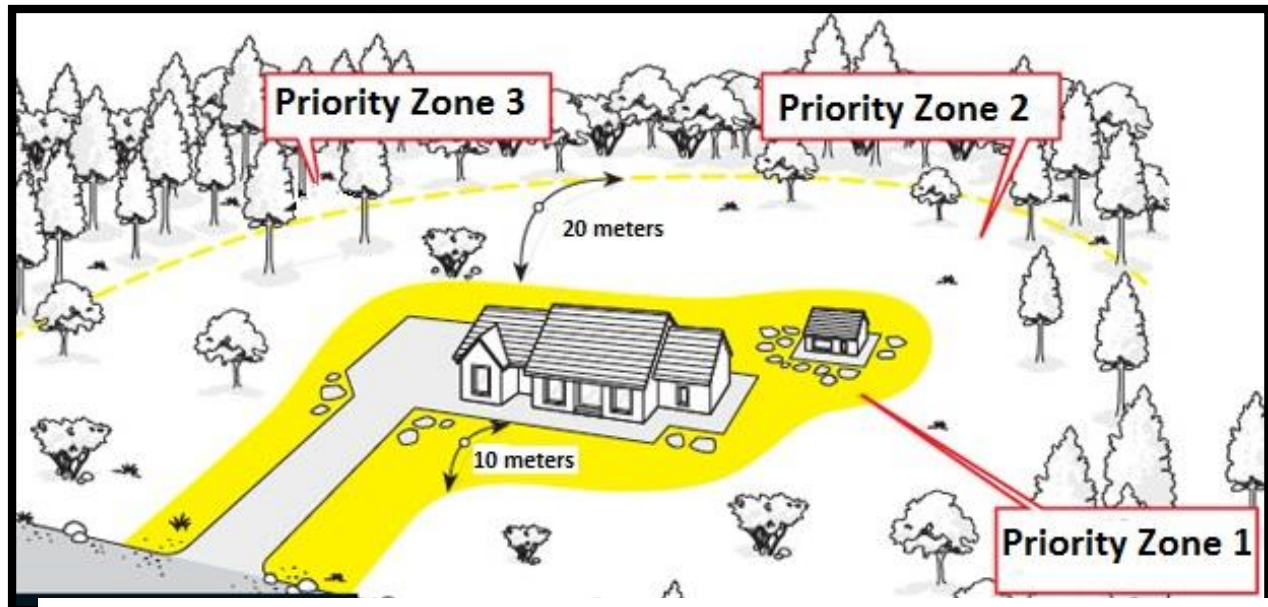


Figure 35. Priority zones around structures

Zone 1, also known as the first priority, is a 10 meter wide perimeter around a structure and is considered the most critical area. Keeping this area clear of flammable vegetation and debris reduces the risk of homes igniting during a wildfire, increases defensibility of the structure, and is essential to the FireSmart process.

Zone 2 is the area extending from 10 meters to 30 meters radius from a building. Maintenance of priority Zone 2 acts to lower the intensity and the rate of spread of a wildfire. If Zone 2 is on the owner's property and interferes with a riparian zone, vegetation should not be modified, reduced, or removed¹¹.

Zone 3 extends out from 30 meters. Zone 3 could be necessary if there are high hazard levels due to heavy continuous forest vegetation and steep topography that are not reduced sufficiently by fuel management in Zone 2. This zone will typically apply to the community or county to manage. Table 7. is a summary of essential fuel management techniques.

¹¹ Fisheries Act and/or Public Lands Act authority is required within riparian zones and the bed and shore of waterbodies prior to any disturbance to the vegetation or land.

Table 7. Zone 1, 2, and 3 Fuel Management

Zone 1
Mow grass (10 centimeters or less)
Remove ground litter and downed trees
Remove over mature, dead and dying trees
Plant fire resistant vegetation
Thin and/or prune existing vegetation
Remove piled debris
Zone 2 & 3
Thin understory
Prune lower branches on conifer trees (within 2 meters from the ground)

Resource and Education Links

- Information on Riparian Areas of Alberta - <http://cowsandfish.org/>
- FireSmart Guide to Landscaping - <https://www.firesmartcanada.ca/images/uploads/resources/FireSmart-Guide-to-Landscaping.pdf>
- FireSmart Protecting Your Community - <https://www.firesmartcanada.ca/images/uploads/resources/FireSmart-Protecting-Your-Community.pdf> (Chapter 3 pages 3 -13)
- Tree Help Pruning Trees: a step-by-step guide – <http://tree-pruning.com/index.html>

4.3.2.1 Community Vegetation Management

Stakeholders within Bondiss have completed several projects to decrease fire hazards. Skeleton Lake golf course has done extensive pruning and debris removal on their property (**Figure 36**). The summer village cleaned up the municipal reserve between Spruce Avenue and Park Drive (**Figure 37**). Vegetation underneath powerlines in the community was recently mulched by Fortis. These projects collectively make Bondiss safer.



Figure 36. Golf course pruning



Figure 37. Municipal reserve

4.3.2.2 Residential Vegetation Management

Lots within Bondiss are generally well maintained. **Figure 38** shows that some landowners are very proactive with pruning coniferous trees. However a small number of lots do need vegetation management (**Figure 39**). It is recommended that residents implement Zone 1 and Zone 2 FireSmart treatment areas on all private property within the summer village. To assist residents, it is recommended that Bondiss offers a vegetation debris disposal service. This service encourages property cleanup of wildfire hazards by supplying a means for property owners to dispose of debris. These initiatives illustrate the importance of FireSmart and the dedication of Bondiss to achieve a FireSmart Community.

Recommendation 9

Property owners mow and maintain grass, debris, and other combustible materials. Prune conifer trees to a height of 2 meters above ground level (Priority Zone 1 and Zone 2 depending where property line ends)

Recommendation 10

Bondiss supplies a debris disposal service to assist residents with Zone 1 and Zone 2 treatments on private property



Figure 38. Pruned lot



Figure 39. Pruning needed

4.4 Legislation

4.4.1 Fire Bylaw

The summer village of Bondiss does not have a fire bylaw. It is recommended that Bondiss create, or adopt a fire bylaw. A fire bylaw gives the community legal authority to remove or stop hazardous practices. While choosing a bylaw to emulate, Bondiss should ensure the fire bylaw complements the Athabasca County Fire Services Bylaw, because Bondiss acquires fire suppression services from Athabasca County.

4.4.2 Development Bylaw

As per chapter 3 of Partners in Protection’s *FireSmart – Protecting Your Community from Wildfire* (2003), The Summer Village of Bondiss should include the structural and infrastructure options within the development bylaw¹².

Recommendation 11

Bondiss develops or adopts a Fire Bylaw. Review Athabasca County’s Fire Bylaw to ensure the bylaws complement each other

Recommendation 12

Bondiss adopts Partners in Protection’s structural and infrastructure options in their development bylaw.

Development Resource and Education

- FireSmart Protecting Your Community from Wildfire - www.firesmartcanada.ca/images/uploads/resources/FireSmart-Protecting-Your-Community.pdf (Chapter 3, pg. 19 – 39)

¹² Partners in Protection, *FireSmart – Protecting Your Community from Wildfire* (2003), Chapter 3 (pg. 3-19 to 3-39)

4.5 Interagency Cooperation

Boyle Fire Rescue, which is operated by Athabasca County, provides primary emergency response services for Bondiss. To ensure the proper protective services are provided to the communities, Athabasca County Protective Services has set up mutual aid agreements with several surrounding municipalities and agencies. **Table 8**, is a list of all mutual aid agreements in place.

Table 8. Mutual aid agreements

Adjacent Municipality	Mutual Aid Agreement
Municipal District of Lesser Slave River	Yes
Westlock County	Yes
County Thorhild	Yes
Smokey Lake County	Yes
Lac La Biche County	Yes
Municipal District of Opportunity	Yes
Agriculture and Forestry Lac La Biche Wildfire Management Area	Yes

Wildland/urban interface fires can at times exceed the capabilities of the local emergency responders. When mutual aid agreements are in place an understanding is confirmed that additional resources of personnel and equipment are identified and are available. They can also be beneficial to share specialized equipment as this will alleviate some of the cost and allow equipment to be shared. As an example if the local fire department is in need of a sprinkler kit, but does not have one, they can put in a request to Agriculture and Forestry to obtain one. These agreements can include neighboring municipalities and in some cases industry. Annual reviews should be carried out; this ensures opportunities for fire protection officials to discuss and review any changes or updates.

4.6 Cross-Training

Agriculture and Forestry, Lac La Biche Wildfire Management Area, has stated that if any of the local fire departments have any interest in joint exercises they would welcome the opportunity. These exercises should emphasize mutual aid scenarios. This could be coordinated with a hazard reduction burn of grass fires. Having multiple agencies participate in these training exercises will benefit all parties by illustrating key differences in strategies, tactics, and equipment.

4.7 Emergency Planning

The Summer Village of Bondiss is a partner in the Regional Emergency Response Plan that includes Athabasca County, the Town of Athabasca, the Village of Boyle, and five Summer Villages.

5 Summary of Recommendations

The risk assessment tool, included in **Appendix X**, shows that if the suggested recommendations are implemented the fire hazard rating score will drop from 450 to 315. Each of the recommendations is ordered upon urgency and effort to assist each of the communities in making a working plan. Urgency and effort levels were set using the following criteria:

Urgency is a measure of timeliness and is rated as high, medium, or low. The rates of timeliness mean:

High	The recommendation is critical and should be commenced as soon as possible.
Moderate	Recommendation is important and may be worked on as a staged approach to program improvement.
Low	The recommendation may be completed as resources become available.

Effort is a measure of resources required over a period of time and is rated as high, medium, or low. The rates of resources mean:

High	Requires direct project funding (for contracted services), possibly a multi-year project, preferably managed through dedicated resources for the term of the project, involves significant external stakeholder involvement.
Moderate	May require direct project funding (for contracted services), generally completed within one business year, managed with assigned resources and possibly involves external stakeholder input.
Low	Generally will not require direct project funding, managed through existing resources as routine business, often can be completed within one or two business quarters and generally does not involve external stakeholders.

Note: The following tables contain the recommendations, indicating their respective urgency and level of effort required for implementation.

5.1 Education Recommendations

Urgency	Effort	Recommendation	Frequency	Reference Section
Moderate	Moderate	<p>1. Recommendation Action: Bondiss educates and encourages public engagement with FireSmart through newsletters, websites, and open house meetings.</p> <p>Project Lead: Summer Village Council</p> <p>Benefits: Community Education and involvement.</p>	Annually	4.1
Moderate	Low	<p>2. Recommendation Action: Bondiss identifies a volunteer community leader to assist with FireSmart education.</p> <p>Project Lead: Summer Village Council</p> <p>Benefits: Community involvement and ownership of FireSmart; more resources for council to utilize.</p>	One Time	4.1.3

5.2 Development Recommendations

Urgency	Effort	Recommendation	Frequency	Reference Section
Low	High	<p>3. Recommended Action: Bondiss develops an emergency access through the golf course for residents along the northern section of Old Timers Avenue.</p> <p>Project Lead: Summer Village Council</p> <p>Benefits: Makes access/egress safer in an emergency</p>	One Time	4.2.1
High	Low	<p>4. Recommended Action: Bondiss meets with the local fire station for an orientation day to discuss emergency response issues associated with narrow side roads and dead end drives.</p> <p>Project Lead: Summer Village Council</p> <p>Benefits: Clear communication between community and fire department.</p>	When needed	4.2.1
High	Moderate	<p>5. Recommended Action: Bondiss acquires standard signage for each property.</p> <p>Project Lead: Summer Village Council</p> <p>Benefits: Faster response times for emergency services.</p>	One Time	4.2.3

Moderate	Moderate	<p>6. Recommended Action: Bondiss ensures street signs are clear of vegetation and visible.</p> <p>Project Lead: Summer Village Council</p> <p>Benefits: Faster response times for emergency services.</p>	One Time	4.2.3
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5.3 Vegetation Management Recommendations

Urgency	Effort	Recommendation	Frequency	Reference Section
High	Moderate	<p>7. Recommendation Action: Bondiss engages developers of surrounding estates to determine if and when to remove slash piles</p> <p>Project Lead: Summer Village Council</p> <p>Benefits: Decreases fire hazards</p>	One Time	4.2.7
High	Low	<p>8. Recommendation Action: Bondiss clears debris along quad trails north of Old Timers Avenue</p> <p>Project Lead: Summer Village Council</p> <p>Benefits: Decreases fire hazards</p>	One Time	4.2.7
High	Low	<p>9. Recommendation Action: Owners maintain Zone 1 and Zone 2 on their properties by: mowing grass; disposing of debris and other combustible materials; and pruning conifer trees to a height of 2 m above ground level</p> <p>Project Lead: Property owners</p> <p>Benefits: Protecting property by removing points of ignition.</p>	Annually/ When needed	4.3.2
High	Moderate	<p>10. Recommendation Action: Bondiss assists residents with Zone 1 and Zone 2 treatments by supplying a debris disposal service</p> <p>Project Lead: Summer Village Council</p> <p>Benefits: Encourages residents to clear flammable debris from property</p>	Annually/ Semi-Annually	4.3.2

5.4 Legislation Recommendations

Urgency	Effort	Recommendation	Frequency	Reference Section
Moderate	Moderate	<p>11. Recommendation Action: Bondiss develops or adopts a Fire Bylaw and reviews Athabasca County's Fire Bylaw to ensure the two bylaws complement each other.</p> <p>Project Lead: Summer Village Council</p> <p>Benefits: Ensure that Bondiss' Bylaw is inclusive and has no discrepancies with primary fire responders.</p>	One Time	4.4.1
Moderate	Moderate	<p>12. Recommendation Action: Bondiss adopts Partners in Protection's structural and infrastructure options in the development bylaw.</p> <p>Project Lead: Summer Village Council</p> <p>Benefits: Ensure that Bondiss' Development bylaw addresses fire safety.</p>	One Time	4.4.2

Appendix I - Glossary

Glossary

Barriers to Spread – A fire barrier is an area that cannot burn, or burns slowly, which emergency responders may use as a staging point, anchor point, safety zone, or evacuation route.

Combustible Material – Materials that must be heated at temperatures above normal, between 37.8°C and 93.3 °C (100°F and 200 °F), before they will ignite.

Coniferous – Plants that do not shed leaves in the fall. In this report coniferous is synonymous with spruce or pine trees.

Continuous Fuels – Patches of forest or grass fuels that do not have any barriers to spread. These areas may have the ability to support fire over longer distances.

Cured Grass – Dried grass. Grass cures in the fall and remains cured until spring green up.

Deciduous – Plants that shed leaves in the fall. In this report deciduous is synonymous with aspen or poplar trees.

Dry Hydrant – A fire hydrant that is not pressurized. A dry hydrant is a pipe that goes out to a water body so that a pumper truck can draw water from water body.

Effort – A measure of resources required over a period of time.

Fine Fuel Moisture Code (FFMC) – A numerical indicator of the ease of ignition of litter and other cured fine fuels such as small twigs, needles and grasses.

Fire Behavior – The manner in which fuel ignites, flame develops, fire spreads and exhibits other related phenomena.

Fire Hazard – A material, substance or action that may cause a wildfire.

FireSmart – Actions taken to minimize the unwanted effects of wildfire.

Fire Resistant – Material that is designed to resist burning and withstand heat.

Fire Weather Index (FWI) – This is a numeric rating of fire intensity. It is suitable as a general index of fire danger throughout the forested areas of Canada.

Flammable – Materials that will burn or catch on fire easily at normal temperatures; below 37.8°C or 100°F

Flank Fire – A fire that is burning at an angle approximately 90° to the wind.

Fuels – Combustible materials. In this report fuels tends to describe trees, plant debris (such as dead branches, leaves, etc.) but may also include man made materials.

Head Fire Intensity (HFI) – The energy that a fire generates. HFI is separated into six classes, one being low fire behaviour and six being extreme fire behaviour. See **table below** for more information:

Head Fire Intensity Class Description & Firefighting Methods		
Head Fire Intensity	Fire Behaviour	Firefighting Methods
1	Very low vigour, smouldering ground or creeping surface fire, low intensity	Self-extinguishing unless high drought code and/or build-up index values prevail, in which case mop-up is generally extensive.
2	Low vigour surface fire	Direct attack by firefighters with hand tools and water is possible. Constructed fireguard should hold.
3	Moderately vigorous surface fire	Hand-constructed fireguards are likely to be challenged. Heavy equipment is generally successful in controlling such fires. Indirect attack suggested.
4	Highly vigorous surface fire, may be torching trees or intermittent crown fire	Control efforts at the fire's head may fail. Indirect attack only by firefighting personnel.
5	Very high vigorous surface fire or crown fire	Very difficult to control. Suppression action must be restricted to the fire's flanks. Indirect attack with aerial ignition may be effective.
6	Extreme disastrous fire	Suppression actions should not be attempted until burning conditions improve.

Heat Transfer – Exchange of thermal energy, between physical systems depending on the temperature and pressure by dissipating heat.

Conduction: when heat (energy) is transferred through solid matter.

Convection: when heat (energy) is transferred between objects that are in physical contact.

Radiation: When heat (energy) is transferred from warmer surfaces to cooler surroundings (e.g. the heat from the sun).

Inherent Risk – A fire hazard based on an evaluation of the current state of the community.

Intensity – Measures of energy output. Amount of energy released during a fire.

Mixedwood – A mixture of both coniferous and deciduous trees. Typically spruce and aspen.

Mutual Aid Agreement – Allows municipalities to prepare for emergency events that exceed their local resource capabilities.

Ninetieth Percentile (90th) – A measure of statistical distribution. The 90th percentile is the value which refers to the top 10% of the data.

Prevailing Winds – The predominant winds in that area.

Rate of Spread (ROS) – The distance a fire will spread in a given period, measured in meters per minute.

Relative Humidity (RH) – It is the ratio of moisture in the air (water vapor) to the amount that the air can hold at the same temperature and pressure if it were saturated.

Residual Risk – A risk based on an evaluation demonstrating the change in risk with the implementation of recommendations and the community proactively participating in FireSmart.

Riparian Zone – An area of land adjacent to a stream, lake, or wetland that contains vegetation that, due to the presence of water, is distinctly different from the vegetation of adjacent upland areas.

Risk – The probability of an undesirable event occurring.

Spotting – when a fire creates embers that travel through the air and can ignite fuels or structures (**Figure 11**).

Staging Area – An area that can be utilized to pre-position equipment and personnel during, or prior to, an incident.

Stand(s) – A group of trees that are similar in size, species, and understory.

Stakeholder – The range of groups and individuals who have a formal or informal stake in planning and management decisions.

Urgency – A measure of timeliness.

Wildland/Urban interface – The area where buildings are adjacent to, or within, forests, grasslands, scrublands, or other wildland vegetation.

Zone 1 – The area extending 0 to 10 meters from a structure.

Zone 2 – The area beyond Zone 1 that begins at 10 meters from a structure and extends to 30 meters from the structure.

Zone 3 – The area beyond Zone 2 that begins at 30 meters from a structure and extends to 100 meters from a structure.

Appendix II – Wildfire Preparedness Guide

WILDFIRE PREPAREDNESS GUIDE

January 2016
CPP Environmental

The Summer Village of Bondiss

Key Contacts

Athabasca County 1-780-675-2273
Toll-Free 1-844-662-2273
After-Hours Emergency line 1-780-689-9000

Alberta Agriculture and Forestry Lac La Biche
1-780-623-5388

Utilities

Alta Gas (Gas) 1-866-222-2067
Fortis (power) 310-4300

RCMP

Emergency/Search and Rescue 911

Alberta Emergency Management Agency (AEMA)

24 hour 1-866-618-2362

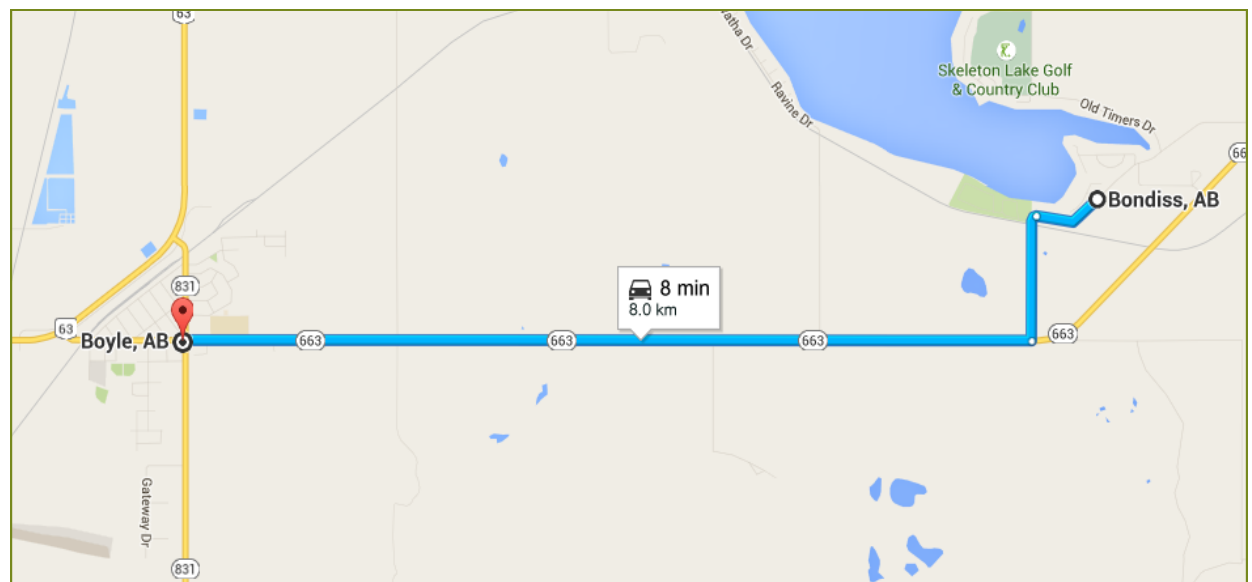
Village Administration Office

1-780-675-9270

Area Description

Number of residences: Bondiss (170)

Has 2 main roads: Bondiss Drive and Old Timers Drive. Bondiss Drive has two means of access and Old Timers Road has one means of access.



Fire Behaviour Factors

Forest Fuel— Grass (O1), Deciduous (D1) (with Spruce understory), Mixedwood (M1)

Topography—Flat terrain

The village is approx. 8 km east of Boyle. From Boyle, drive east on highway 663 for approximately 6.5 km, turn north on Bondiss Dr, drive 1 km.

Values at Risk

Critical— N/A

Dangerous Goods— N/A

Special— Skeleton Lake Golf & Country Club

Staging Areas

1. Municipal Park—located between Old Timers Drive and Birch Crescent.
2. Municipal Park— West end of Spruce avenue.

Roads & Turnarounds

Signage— Has no standard lot signage

Access— Bondiss Drive— 2 means of access; Old Timers Drive- 1 means of access/egress

Roads— Roads are suitable for two passing vehicles.

Loop Turnarounds— Does not require backup maneuvers for large apparatuses.

Ditches—suitable for two-way travel.

Private Driveways— Width is ~5 meters; length ~10 meters

Water Supply

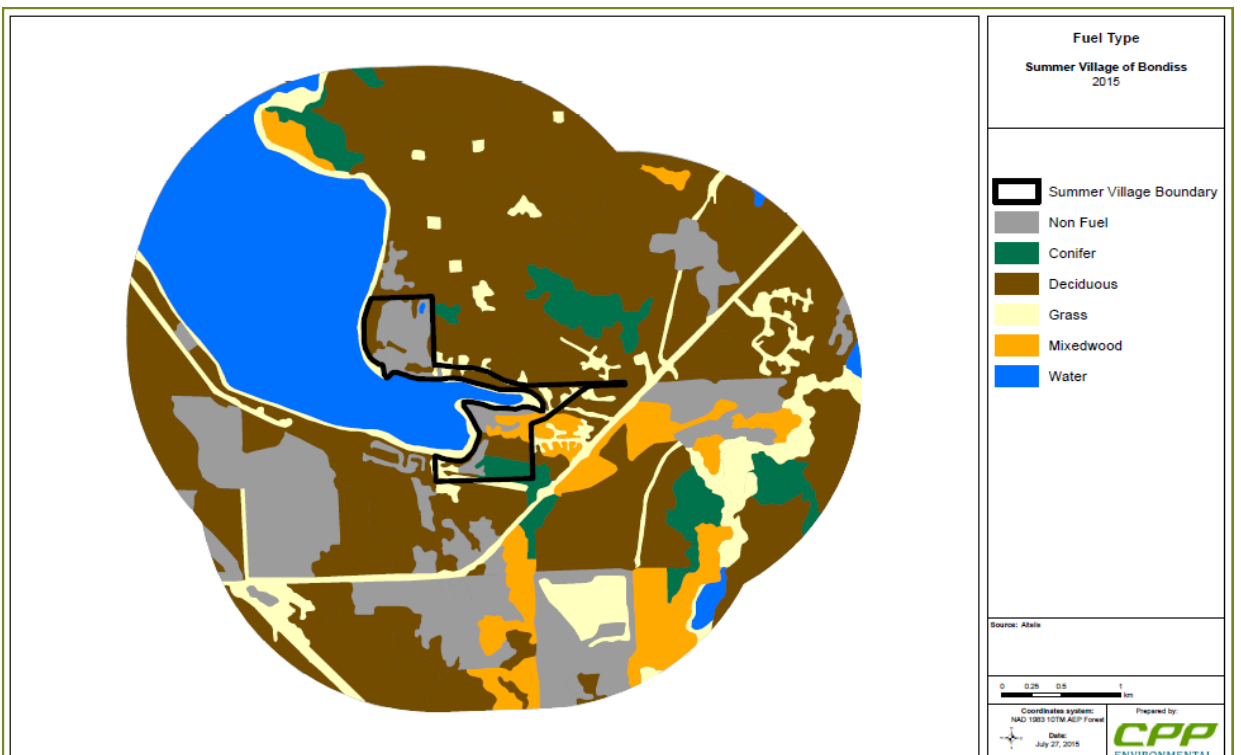
Boat Launch— Off Old Timers Drive within Bondiss.

Boyle Water Treatment Plant—In Boyle

Communications

Mutual Aid (Provincial Fire) 156.8550 (TXRX)

Alberta FireNet 152.57000 (TXRX)



Fire Department Resources

Boyle Fire Department

- engine
- water tender
- rescue unit
- squad truck

Athabasca Fire Department

- 21-Personnel
- 1-Type 1 Engine
- 1-Type 3 Engine
- 1-Water Tender
- 1-Rescue Unit
- 1-Quad

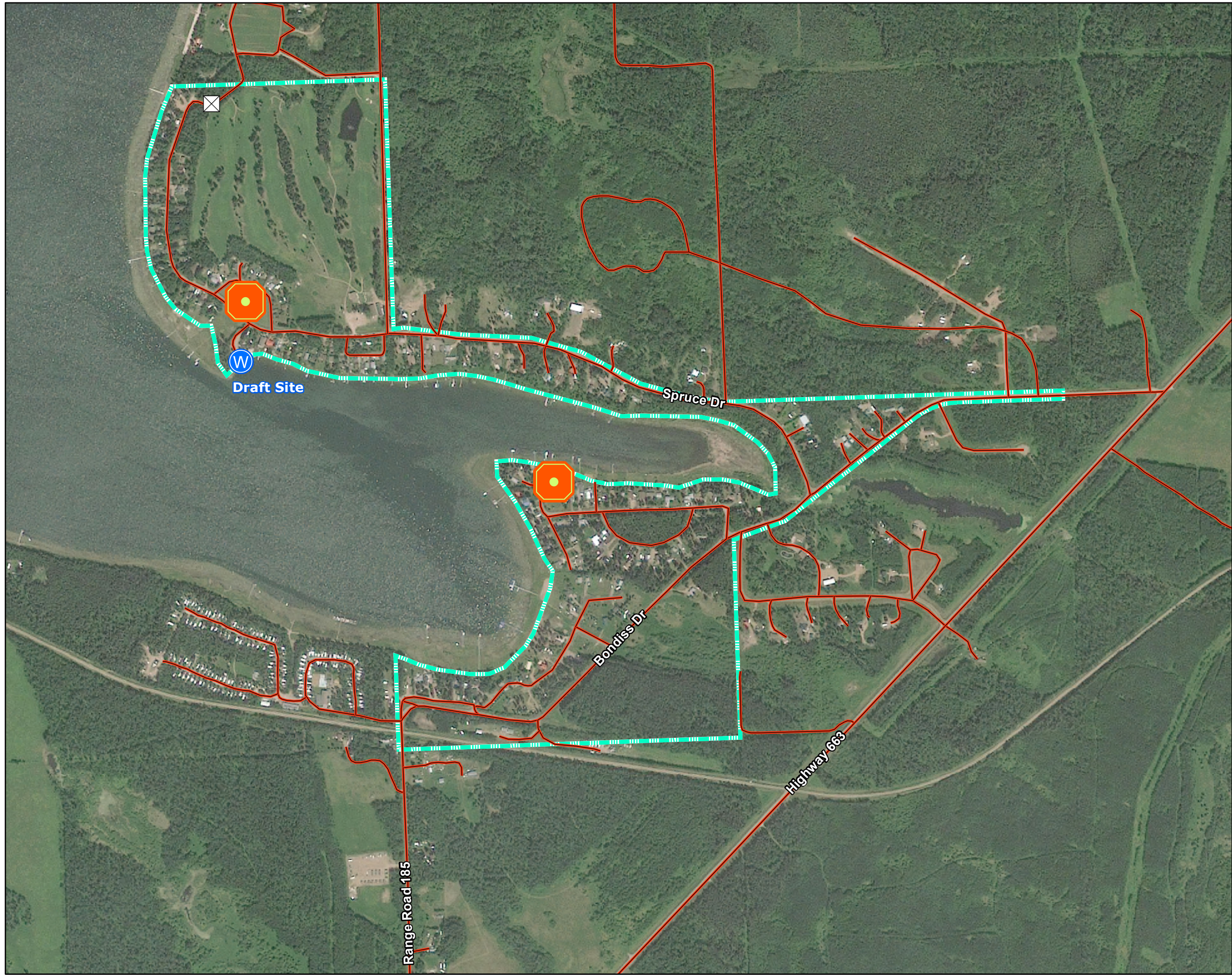
Evacuation Protocol

Bondiss

Evacuation Routes-






- 1) **Northern Portion**—South on Old Timers Drive, north on Bondiss Drive, to 663.
- 2) **Southern Portion**—South or North on Bondiss Drive, continue on Bondiss Drive to 663.

Muster Point— Boyle Community Hall

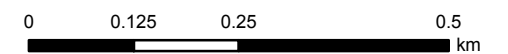


Operations

Summer Village of Bondiss 2016

-  Summer Village Boundary
-  Water Source
-  Staging Areas
-  Gate
-  Road

Source: ESRD, CPP Environmental

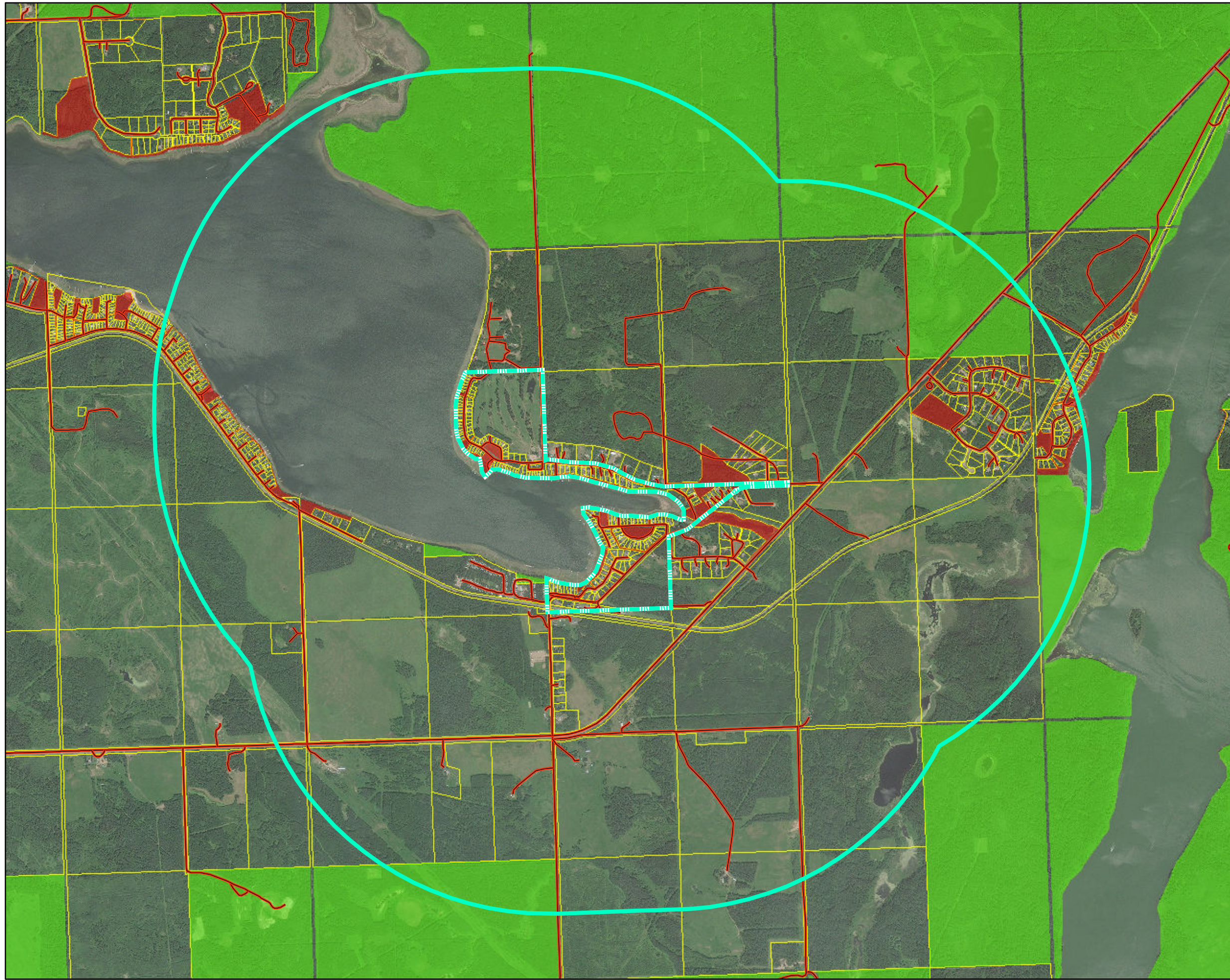


Coordinates system:
NAD 1983 10TM AEP Forest

Date:
July 27, 2015

Prepared by:
CPP
ENVIRONMENTAL

Appendix III – Planning Area



Planning Area

Summer Village of Bondiss
2016

 Planning Area

 Bondiss

 Road

Classified Land Ownership

 Municipal

 Provincial

 Private

Source: ESRD, CPP Environmental

0 0.25 0.5 1
km

Coordinates system:
NAD 1983 10TM AEP Forest

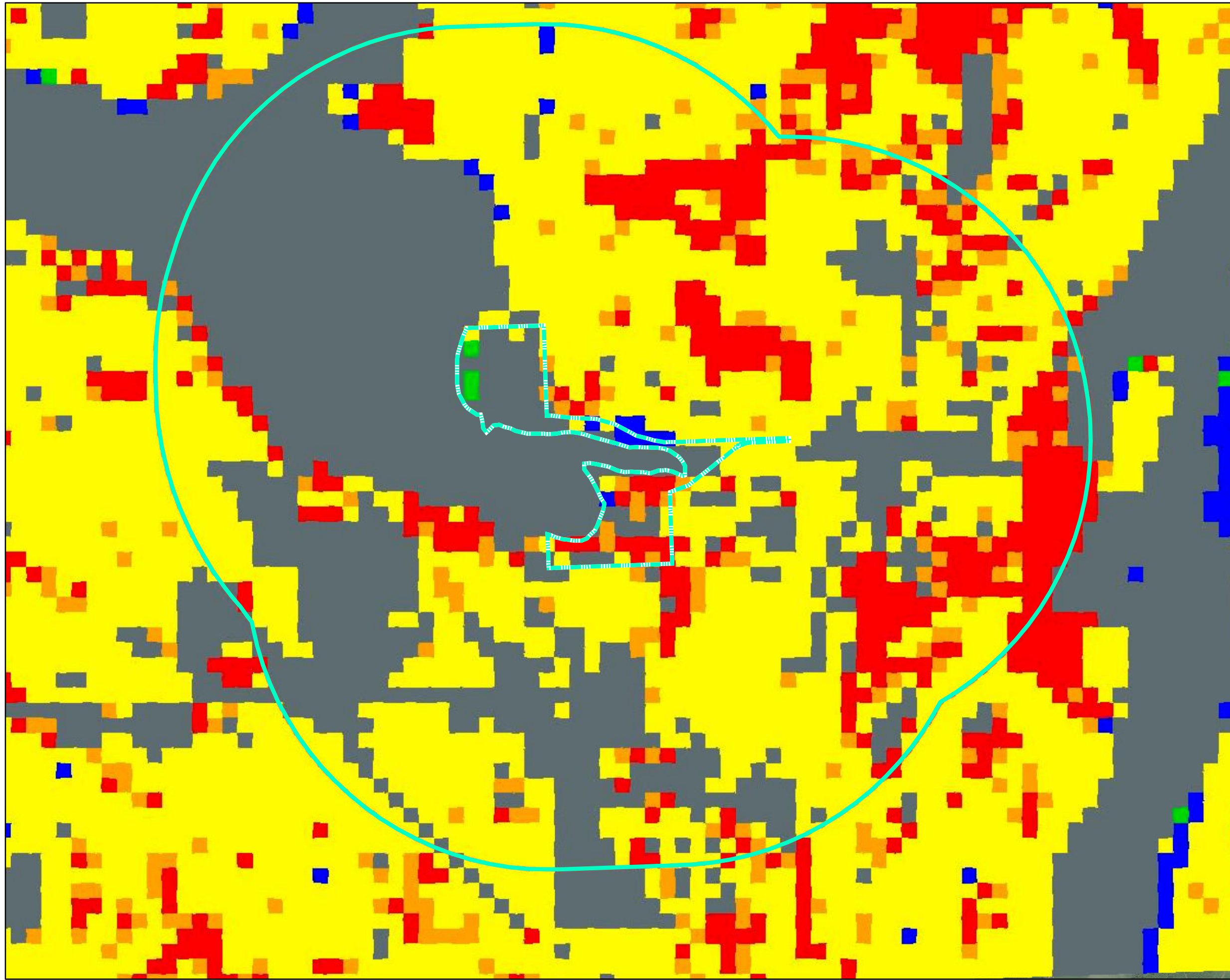
Date:
October 29, 2015



Prepared by:

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Appendix IV – Wildfire Behaviour Potential

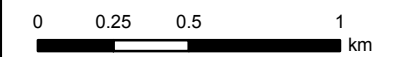


Wildfire Threat Rating: Spring

**Summer Village of Bondiss
2016**

- Planning Area
- Bondiss
- Non Fuel
- Low Wildfire Threat Potential
- Moderate Wildfire Threat Potential
- High Wildfire Threat Potential
- Very High Wildfire Threat Potential
- Extreme Wildfire Threat Potential

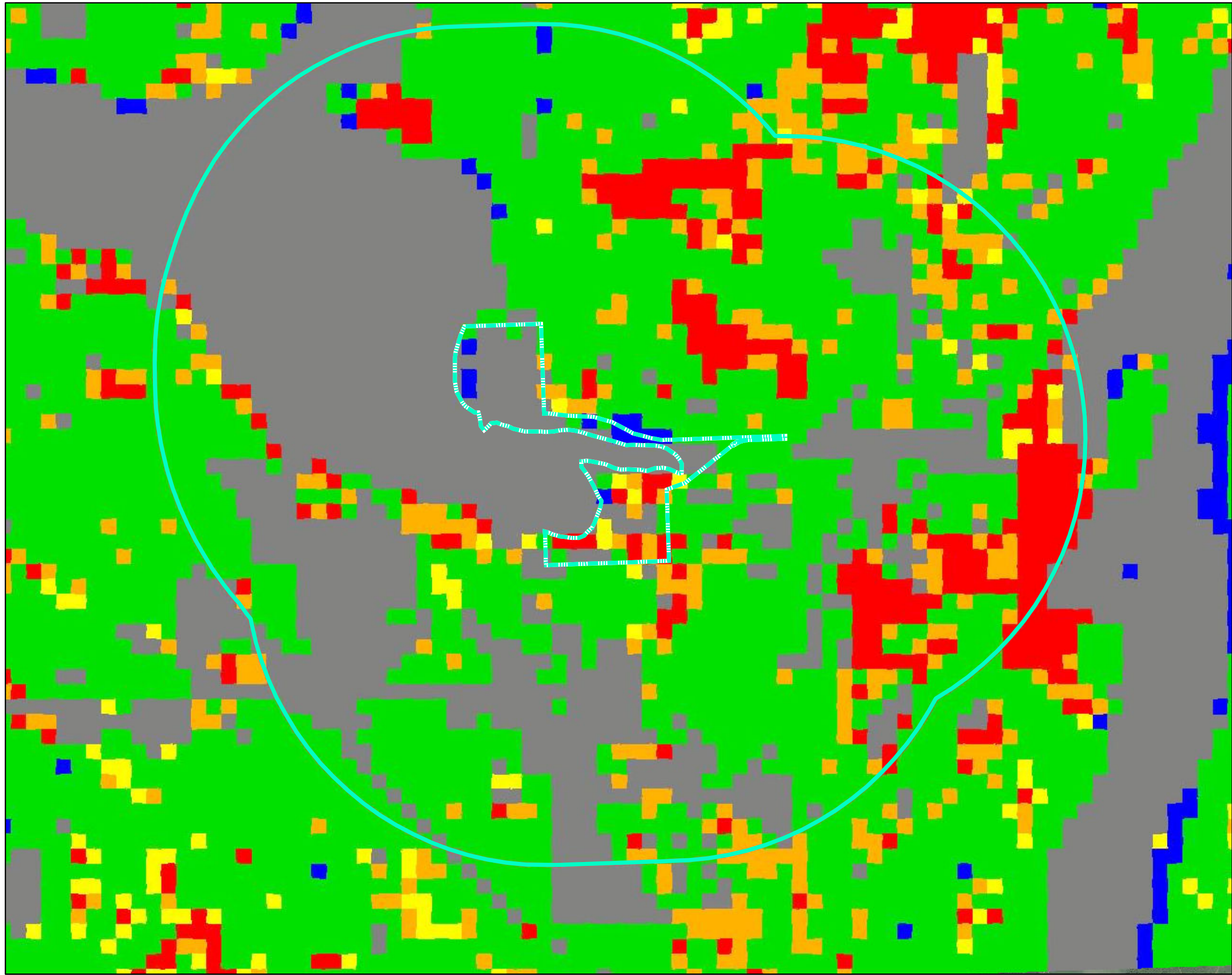
Source: Alberta Ministry of Agriculture and Forests
CPP Environmental



Coordinates system:
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November 9, 2015

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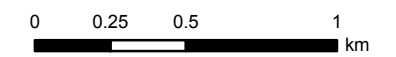


Wildfire Threat Rating: Summer

**Summer Village of Bondiss
2016**

-  Planning Area
-  Bondiss
-  Non Fuel
-  Low Wildfire Threat Potential
-  Moderate Wildfire Threat Potential
-  High Wildfire Threat Potential
-  Very High Wildfire Threat Potential
-  Extreme Wildfire Threat Potential

Source: Alberta Ministry of Agriculture and Forests
CPP Environmental



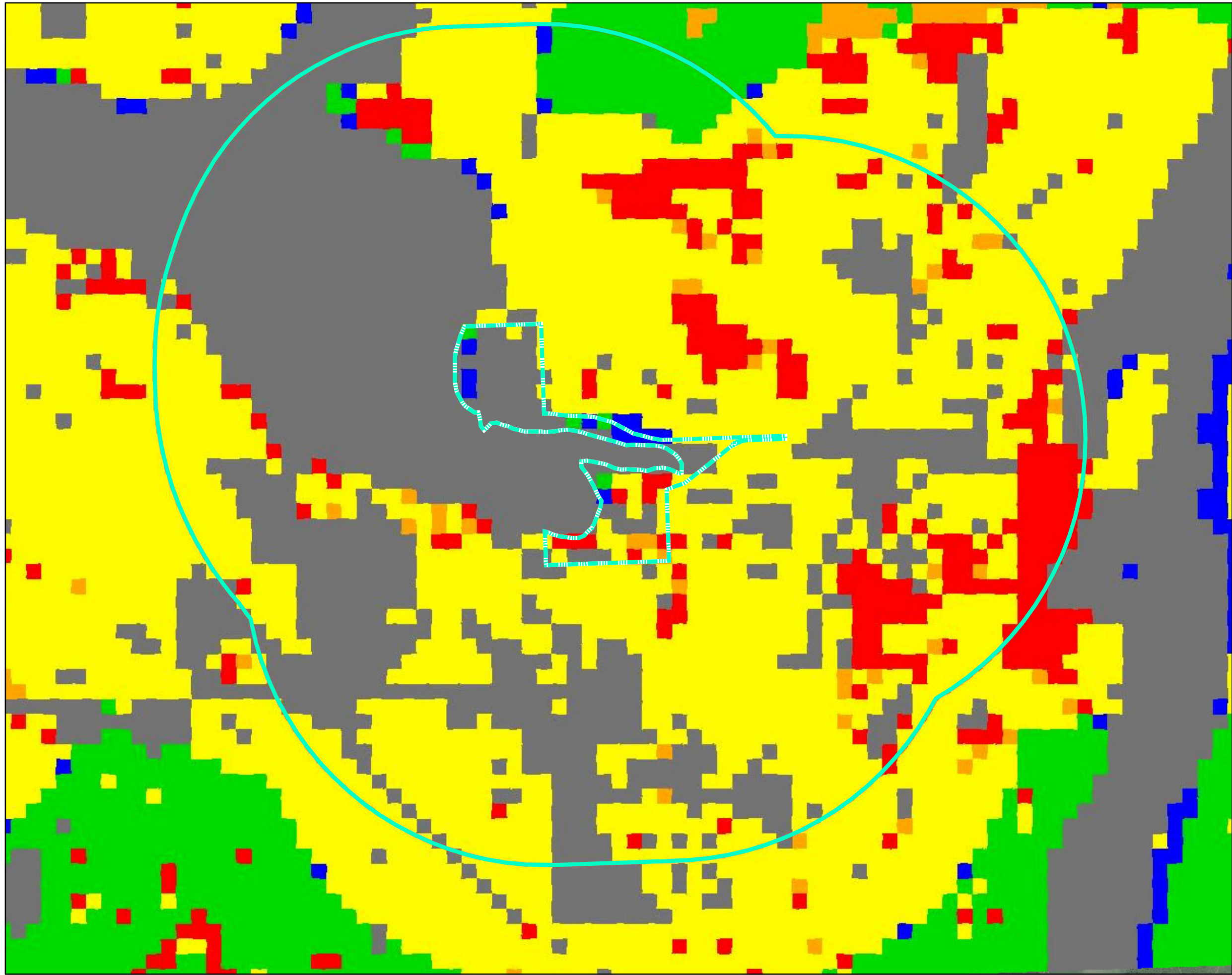
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Date:
November 9, 2015



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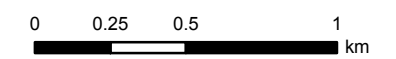


Wildfire Threat Rating: Fall


Summer Village of Bondiss
2016

- Planning Area
- Bondiss
- Non Fuel
- Low Wildfire Threat Potential
- Moderate Wildfire Threat Potential
- High Wildfire Threat Potential
- Very High Wildfire Threat Potential
- Extreme Wildfire Threat Potential

Source: Alberta Ministry of Agriculture and Forests
CPP Environmental



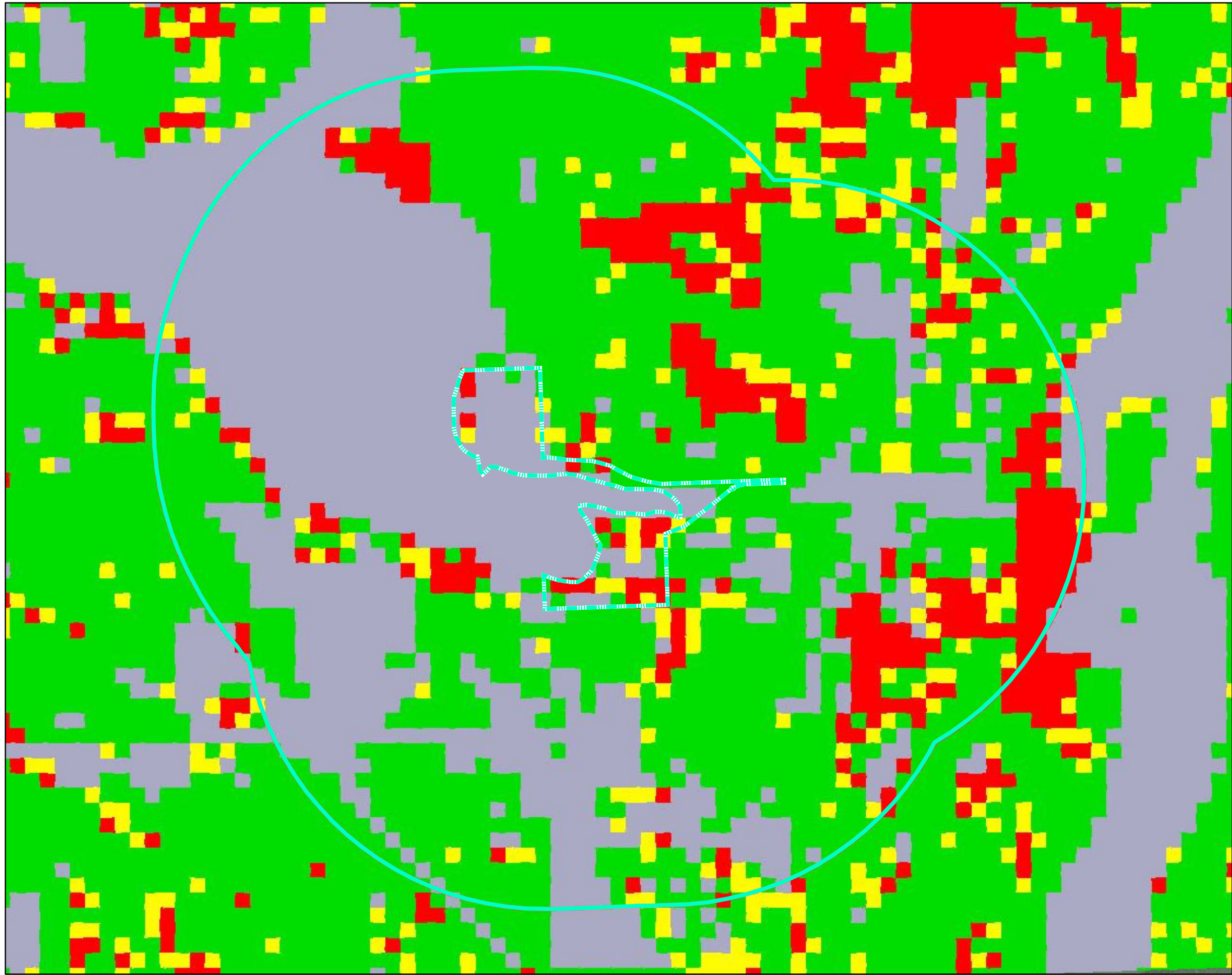
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Date:
November 9, 2015






Prepared by:


Appendix V – Wildfire Threat Rating

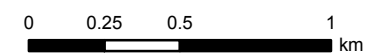


Fire Behaviour Potential: Spring

**Summer Village of Bondiss
2016**

-  Planning Area
-  Bondiss
-  Non-Fuel
-  Low Fire Behaviour Potential
-  Moderate Fire Behaviour Potential
-  High Fire Behaviour Potential
-  Very High Fire Behaviour Potential
-  Extreme Fire Behaviour Potential

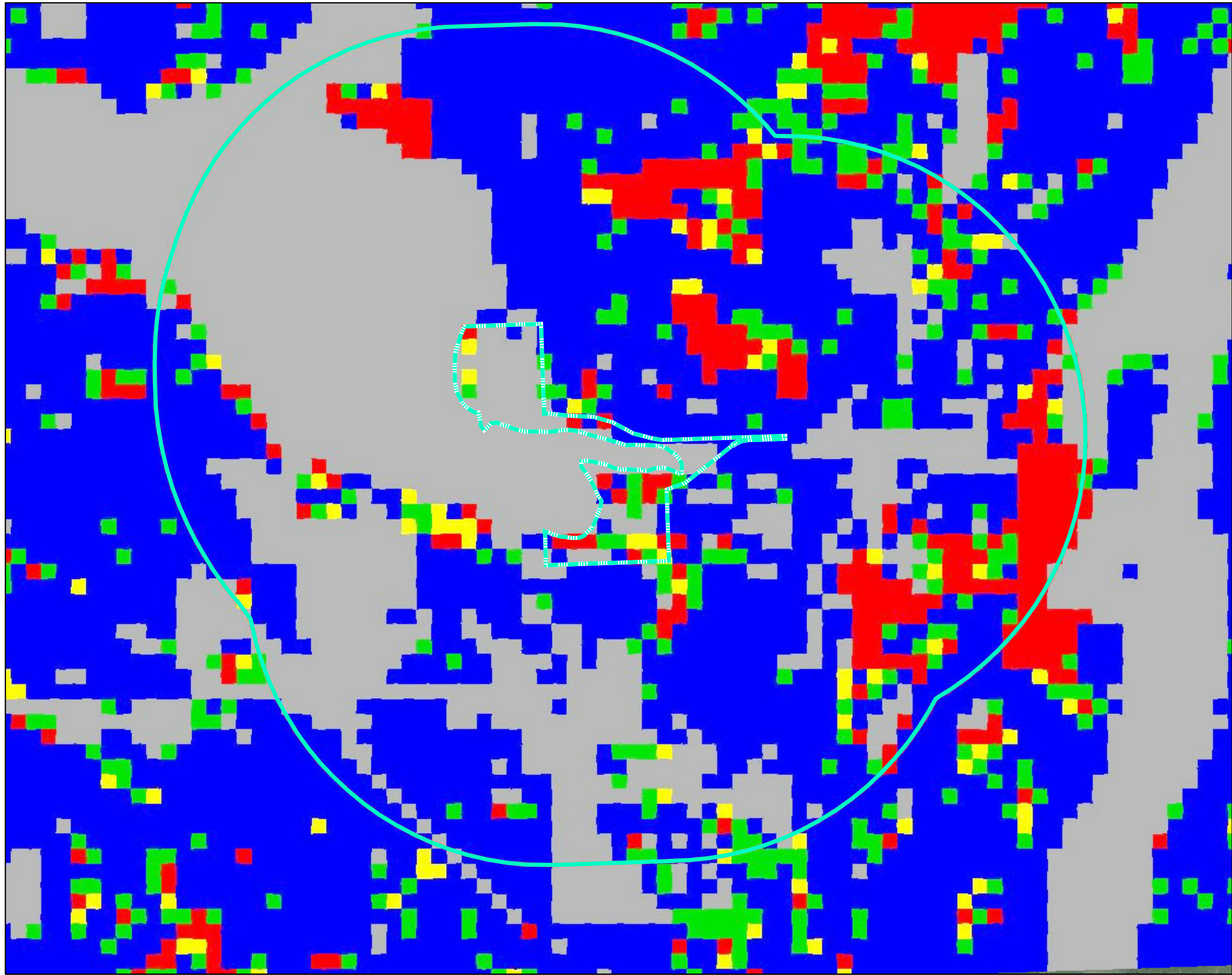
Source: Alberta Ministry of Agriculture and Forests
CPP Environmental



Coordinates system:
NAD 1983 10TM AEP Forest

Date:
November 9, 2015

Prepared by:
CPP
ENVIRONMENTAL



Fire Behaviour Potential: Summer


Summer Village of Bondiss
2016

- Planning Area
- Bondiss
- Non-Fuel
- Low Fire Behaviour Potential
- Moderate Fire Behaviour Potential
- High Fire Behaviour Potential
- Very High Fire Behaviour Potential
- Extreme Fire Behaviour Potential

Source: Alberta Ministry of Agriculture and Forests
CPP Environmental

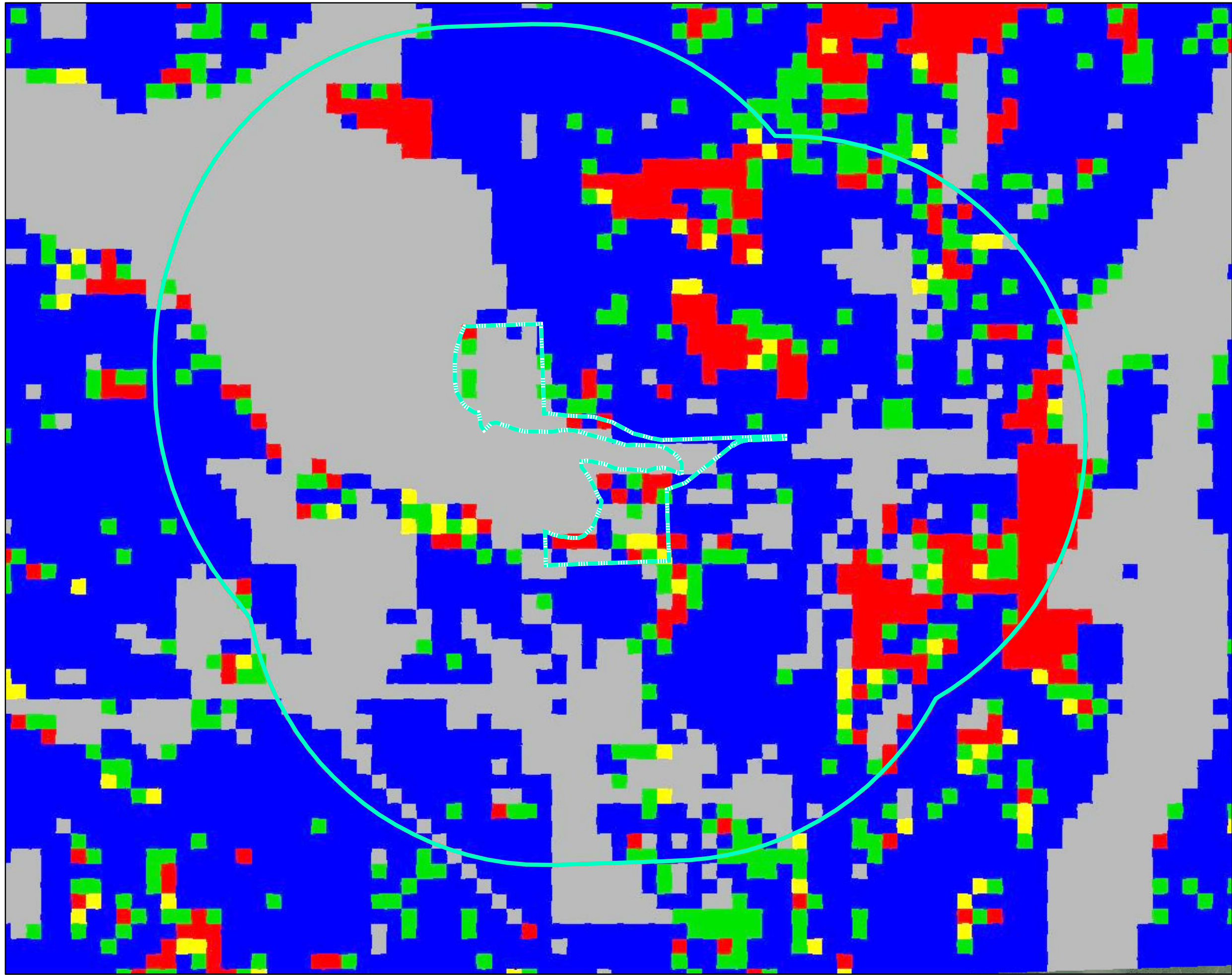
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Date:
November 9, 2015

Prepared by:

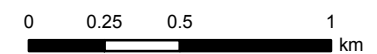



Fire Behaviour Potential: Fall

Summer Village of Bondiss
2016

-  Planning Area
-  Bondiss
-  Non-Fuel
-  Low Fire Behaviour Potential
-  Moderate Fire Behaviour Potential
-  High Fire Behaviour Potential
-  Very High Fire Behaviour Potential
-  Extreme Fire Behaviour Potential

Source: Alberta Ministry of Agriculture and Forests
CPP Environmental



Coordinates system:
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Date:
November 9, 2015





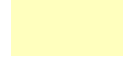


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Appendix VI – Fuels and Topography

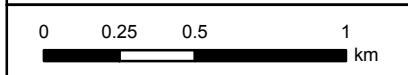


Forest Fuel Types

Summer Village of Bondiss
2016

-  Summer Village Boundary
-  Non Fuel
-  Conifer
-  Deciduous
-  Grass
-  Mixedwood
-  Water

Source: Altalis

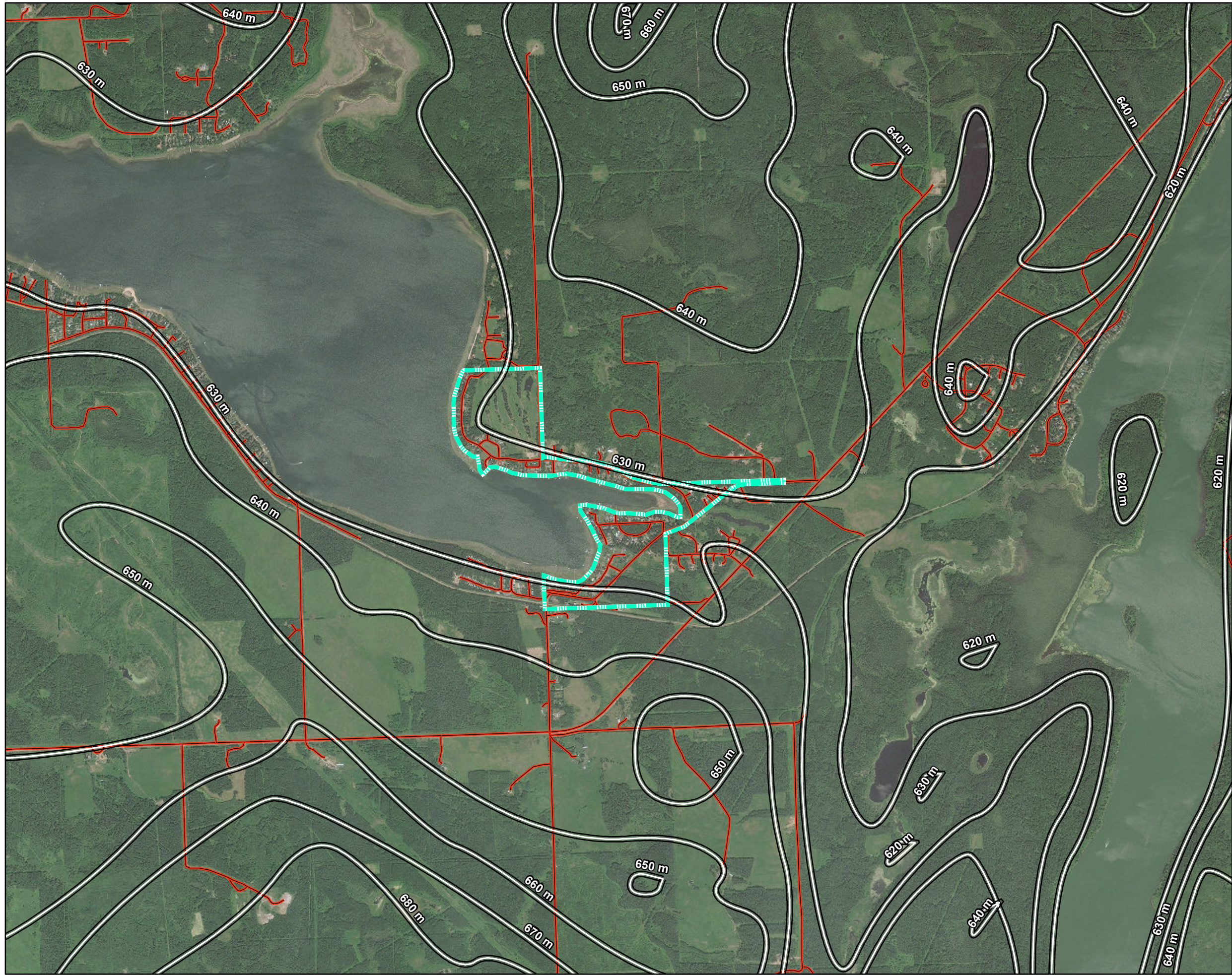


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



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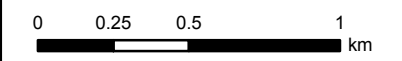


Topography

Summer Village of Bondiss
2016

-  Bondiss
-  Contours
-  Road

Source: ESRD, CPP Environmental

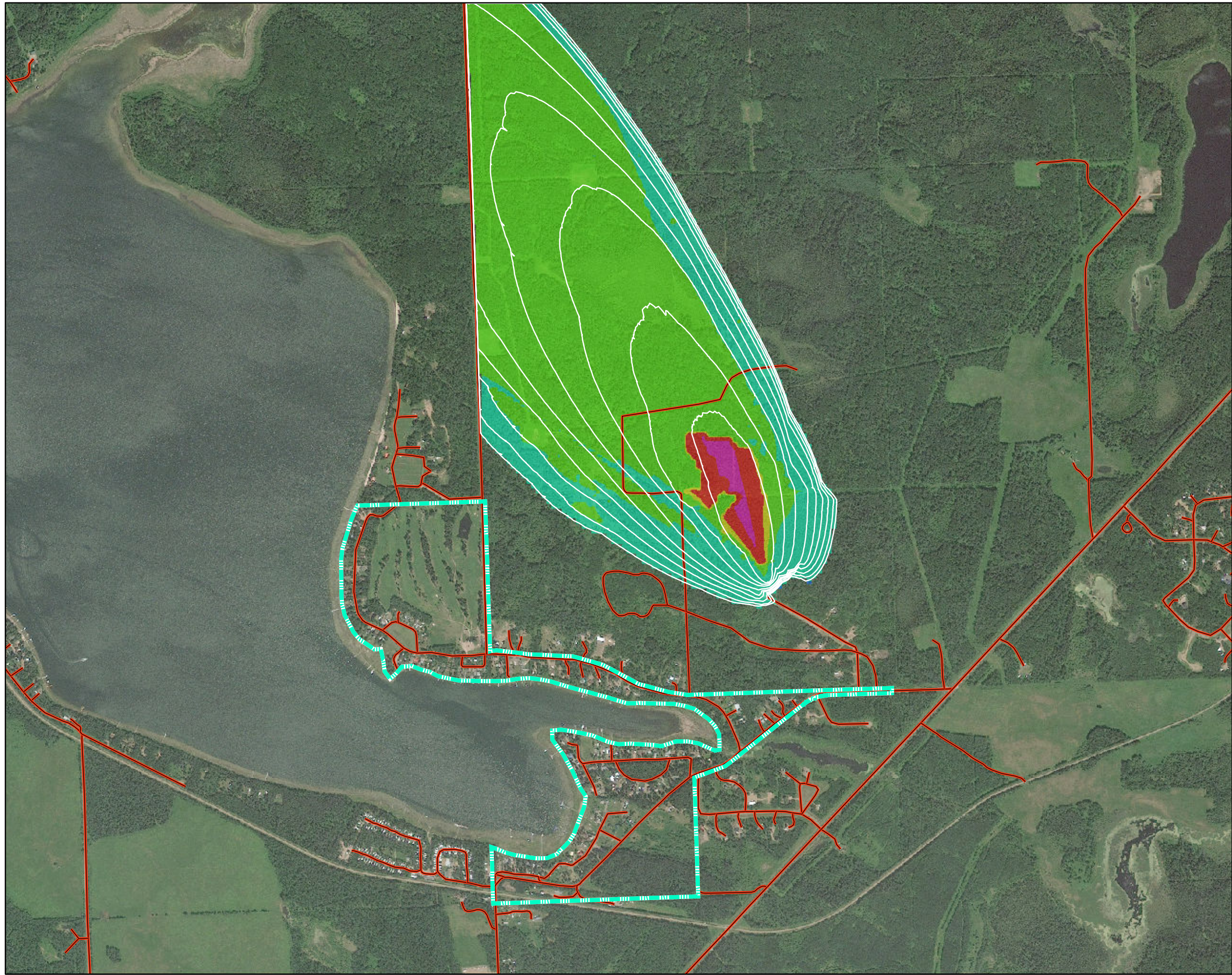


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NAD 1983 10TM AEP Forest

Date:
October 29, 2015

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ENVIRONMENTAL

Appendix VII – Prometheus Wildfire Model



Prometheus Scenario

Summer Village of Bondiss
2016

 Bondiss

 Road

Fire Behavior

 Very Low

 Low

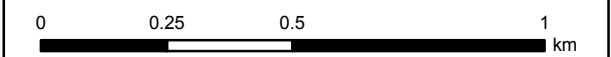
 Moderate

 High

 Very High

 Extreme

Source: ESRD, CPP Environmental



Coordinates system:
NAD 1983 10TM AEP Forest

Date:
October 29, 2015



Prepared by:



Prometheus Scenario																				
Date and Time	Weather Factors				Precipitation (mm)	Fire Weather Indices							Area Consumed		Percent HFI					
	Temperature (°C)	Relative Humidity (%)	Wind Direction (deg)	Wind Speed (km/h)		Hourly FFMC	Hourly ISI	Hourly FWI	FFMC	DMC	DC	BUI	Time Step Area (ha)	Area (ha)	< 10 (kW/m)	10 - 500 (kW/m)	500 - 2000 (kW/m)	2000 - 4000 (kW/m)	4000 - 10000 (kW/m)	> 10000 (kW/m)
5/11/2011 10:00	20.1	24	150	22	0	91.4	15.9	17.6	90	9	87	14.3	0	0	0	0	0	0	0	0
5/11/2011 11:00	20.1	21	140	35	0	92.3	34.5	30.6	90	9	87	14.3	0	0	0	0	0	0	0	0
5/11/2011 12:00	20.2	21	150	32	0	92.2	29.5	27.6	93	10	87.3	13.2	0	0	0	0	0	0	0	0
5/11/2011 13:00	21.3	18	160	32	0	93.1	33.6	30.4	93	10	87.3	13.2	0	0	100	0	0	0	0	0
5/11/2011 14:00	21.6	19	150	30	0	92.9	29.5	27.9	93	10	87.3	13.2	11.57	11.57	0	17.61	60.23	2.84	17.05	2.27
5/11/2011 15:00	21.6	20	150	32	0	92.8	31.8	29.3	93	10	87.3	13.2	24.02	35.59	0	23.96	75.15	0.89	0	0
5/11/2011 16:00	21.4	18	140	26	0	93	24.5	24.5	93	10	87.3	13.2	38.8	74.39	0	50	49.39	0	0	0.61
5/11/2011 17:00	21	19	140	32	0	92.8	32.2	29.5	93	10	87.3	13.2	45.33	119.72	0	42.68	57.32	0	0	0
5/11/2011 18:00	20.3	19	140	35	0	92.7	36.9	32.2	93	10	87.3	13.2	40.52	160.24	1.57	57.08	41.35	0	0	0
5/11/2011 19:00	19	22	130	28	0	91.7	22.4	22.5	93	10	87.3	13.2	20.27	180.51	0	85.64	14.36	0	0	0
5/11/2011 20:00	17	28	120	24	0	90	14.4	15.9	93	10	87.3	13.2	13.01	193.52	0	96.84	3.16	0	0	0
5/11/2011 21:00	15.7	29	120	26	0	89.6	15	16.3	93	10	87.3	13.2	10.02	203.54	2.22	96.37	1.41	0	0	0
5/11/2011 22:00	14.5	30	120	24	0	89.2	12.7	14.2	93	10	87.3	13.2	6.63	210.17	3.4	96.6	0	0	0	0

Appendix VIII – FireSmart Structure and Site Assessment Form

Name		Date	
Address		Phone	
Qtr	Sec	Twp	Rge
West	Meridian	GPS	

STRUCTURE AND SITE HAZARD ASSESSMENT FORM

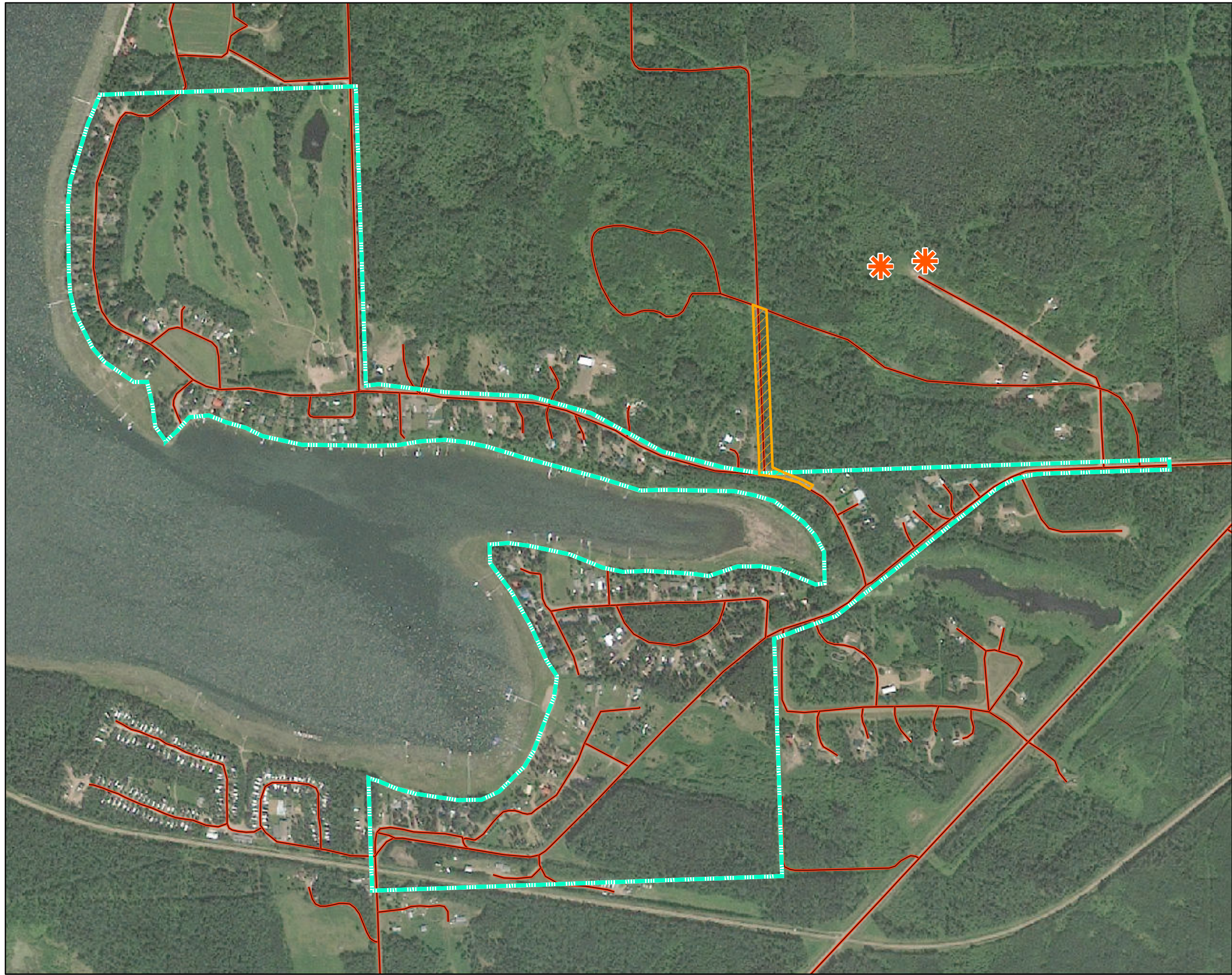
Factor	Page	Characteristics and Point Ratings				Score	
1 Roofing Materials	2~5	Metal, tile, asphalt, ULC-rated shakes or non-combustible material	Unrated wood shakes				
		0	30				
2 Roofing Cleanliness	2~6	No combustible material	Scattered combustible Materials, <1cm in depth	Clogged gutter, combustible material > 1cm in depth			
		0	2	3			
3 Building Exterior	2~7	Non-combustible stucco or metal siding	Log, heavy timbers		Wood or vinyl siding or wood shake		
		0	1		6		
4 Eaves, vents and openings	2~8	Closed eaves, vents screened with 3mm mesh and accessible	Closed eaves, vents not screened with 3mm mesh		Open eaves, vents not screened, debris accumulation		
		0	1		6		
5 Balcony, desk, or porch	2~9	None, or fire-resistant material sheathed in	Combustible material, sheathed in		Combustible material, not sheathed in		
		0	2		6		
6 Window and door glazing	2~10	Tempered	Double Pane		Single Pane		
			Small/Med	Large	Small/Med	Large	
		0	1	2	2	4	
7 Location of nearby combustibles	2~11	None or > 10 m from structure		< 10 m from structure			
		0		6			
8 Setback from edge of slope	2~12	Adequate		Inadequate			
		0		6			
9 Forestry Vegetation (overstory)	2~14	Deciduous	Mixed Wood		Coniferous		
			Separated	Continuous			
		< 10 meters	0	30	30	30	
10 - 30 meters	0	10	10	30			
10 Surface vegetation	2~16	Lawn or non-combustible material	Wild grass or shrubs		Dead and down woody material		
			Scattered	Abundant			
		< 10 meters	0	30	30	30	
10 - 30 meters	0	5	5	30			
11 Ladder fuels 10-30 meters	2~17	Absent	Scattered		Abundant		
		0	5		10		
Hazard Level		Low < 21 points	Moderate 21 -29 points		Total Score for Factors 1-11		
		High 30-35 points	Extreme >35 points		Structure and Site Hazard Level		

AREA HAZARD ASSESSMENT FORM

12 Forestry Vegetation (overstory)	2~18	Deciduous	Mixed Wood		Coniferous		
			Separated	Continuous			
		0	15		15	30	
13 Surface vegetation	2~18	Lawn or non-combustible material	Wild grass or shrubs		Dead and down woody material		
			Scattered	Abundant			
		0	5		5	15	
14 Ladder fuels	2~18	Absent	Scattered		Continuous		
		0	5		10		
15 Slope	2~19	0 - 10%	10 - 25%		>25%		
			Even	Gullied	Even	Gullied	
		0	4	5	8	10	
16 Position on slope	2~20	Valley bottom or lower slope	Mid-slope		Upper-slope		
		0	3		5		
Hazard Level		Low < 21 points	Moderate 21 -29 points		Total Score for Factors 12-16		
		High 30-35 points	Extreme >35 points		Area Hazard Level		





Remarks

Appendix IX – Vegetation Management

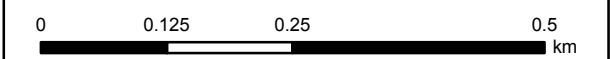


Vegetation Management


Summer Village of Bondiss 2016

-  Bondiss
-  Slash Piles
-  Debris Accumulation
-  Road

Source: ESRD, CPP Environmental



Coordinates system:
NAD 1983 10TM AEP Forest



Date:
October 29, 2015

Prepared by:


Appendix X – Wildfire Risk Assessment

Wildfire Risk Assessment For Rural Communities								
COMMUNITY:		The Summer Village of Bondiss		INHERENT		STRATEGIES TO OBTAIN	RESIDUAL	
				Rating	Scores	RESIDUAL RISK	Rating	Scores
ACCESS TO SAFE ZONES	A Lake	0 or 3	0	No Change	0 or 3	0		
	B Large Non-Fuel Surface	0 or 3	3		0 or 3	3		
	C Cleared Area (Vegetation Maintained)	0 or 3	0		0 or 3	0		
	D County Road	0 or 3	0		0 or 3	0		
	E Subdivision Road	0 or 3	0		0 or 3	0		
		/15	3		/15	3		
NUMBER OF HOMES	A 0 to 30	1		No Change	1			
	B 31 to 60	2			2			
	C 61 to 90	3			3			
	D 91 to 120	4			4			
	E > 120	5	5		5	5		
		/5	5		/5	5		
ECONOMIC RISK	Average Property Value:			No Change				
	A \$0 - \$300 000	1	1		1	1		
	B \$300 001 - \$500 000	2			2			
	C \$500 001 - \$750 000	3			3			
	D > \$750 000	4			4			
	Avg Home Cost: \$ 298 000	/4	1	/4	1			
VALUES AT RISK	Presence of:			No Change				
	A Critical Infrastructure	0 or 3	0		0 or 3	0		
	B Dangerous Goods Infrastructure	0 or 3	0		0 or 3	0		
	C Special Values	0 or 3	0		0 or 3	0		
		/9	0	/9	0			
POLITICAL RISK	A Local media involvement and no structural impact to Emergency Services or programs	1		Create or adopt fire bylaw to ensure that legislation is in place	1	1		
	B Local media involvement and internal structural changes to Emergency Services or programs	2	2		2			
	C Regional media involvement, lack of public confidence, and external changes to Emergency Services or county	3			3			
		/3	2		/3	1		

DEFENSIBILITY OF COMMUNITY	DENSITY OF STRUCTURES	A < 20 m between homes B 21 - 40 m between homes C 41 - 100 m between homes D > 100m between homes	3 2 1 0 /3	3 3	No Change	3 2 1 0 /3	3 3
	BARRIERS TO FIRE SPREAD	A East w/ Barrier within 200m B West w/ Barrier within 200m C South w/ Barrier within 200m D North w/ Barrier within 200m	0 or 2 0 or 4 0 or 4 0 or 2 /12	0 0 0 2 2	No Change	0 or 2 0 or 4 0 or 4 0 or 2 /12	0 0 0 2 2
	FOREST FUEL PATCH SIZE	A No forest patch present within community B Patch 0.1 - 0.9 ha within community boundary C Patch 1 - 2.9 ha within community boundary D Patch > 3 ha within community boundary	0 1 3 5 /5	 5 5	No Change	0 1 3 5 /5	 5 5
	RESIDENTIAL FIRESMART	A 0-20 % B 21-40 % C 41-60 % D 61-80 % E 81-100 %	4 3 2 1 0 /4	 1 1	Residents adopt and implement FireSmart principles.	4 3 2 1 0 /4	 0 0
	FUEL MAINTENANCE REQUIRED	A Utility ROW maintenance B Fuel maintenance required - other agency C Fuel maintenance required - municipality	0 or 1 0 or 1 0 or 1 /3	0 0 0 0	No Change	0 or 1 0 or 1 0 or 1 /3	0 0 0 0
	ACCESS	A Loop turnarounds/ cul-de-sacs are suitable for large fire apparatus without back-up B 2 or more means of egress C Standard visible lot signage	0 or 1 0 or 1 0 or 1 /3	1 1 1 3	Acquire standard lot signage and develop escape route through the golf course	0 or 1 0 or 1 0 or 1 /3	1 0 0 1
	SUPPRESSION CAPABILITY	A Responding Fire Department has proper equipment for bush fires B Fire fighters have basic wildfire fighting training C Mutual Aid Agreements are present	0 or 1 0 or 1 0 or 1 /3	0 0 0 0	No Change	0 or 1 0 or 1 0 or 1 /3	0 0 0 0
			TOTAL:	25		TOTAL:	21

Wildfire Risk Assessment For Rural Communities									
COMMUNITY:		The Summer Village of Bondiss		INHERENT		STRATEGIES TO OBTAIN	RESIDUAL		
				Rating	Scores	RESIDUAL RISK	Rating	Scores	
LIKELIHOOD OF OCCURRENCE	FUEL TYPES	A D Fuels - Deciduous		0 or 1	1	No Change	0 or 1	1	
		B O Fuels - Grasses		0 or 2	2		0 or 2	2	
		C M Fuels - Mixedwood		0 or 3	3		0 or 3	3	
		D C Fuels - Patchy conifer		0 or 2	2		0 or 2	2	
		E C Fuels - Conifer		0 or 4	0		0 or 4	0	
					/10	8		/10	8
	SLOPE & FUEL TYPE	VAR on or within 100 m of the top crest of a sustained slope				No Change			
		Fuel Type: <u>M1</u> Slope % : <10		0 to 6	0		0 to 6	0	
					/6	0		/6	0
	FUEL STRUCTURE	DEAD & DOWN	A Absent- No dead or down material		0		Clear logs and branches along quad trail off of Old Timers Avenue	0	0
			B Scattered- 3-5m separating logs, branches &		1	1		1	
	C Abundant-Continuous logs, branches & twigs		3		3				
					/3	1		/3	0
	LADDER FUEL	A Absent- <25% of trees have ladder fuels		0	0	No Change	0	0	
B Scattered- 25% - 75% of trees have ladder		3		3					
C Abundant- > 75% of trees have ladder fuels		5		5					
				/5	0		/5	0	
PRESENT LANDSCAPE IGNITION SOURCES	A Recreation (Presence)		0 or 1	1	No Change	0 or 1	1		
	B Overhead Utility Line adjacent to forest		0 or 1	1		0 or 1	1		
	C < 1 km from primary/secondary roadway		0 or 1	1		0 or 1	1		
	D <1km from railway		0 or 1	1		0 or 1	1		
				/4	4		/4	4	
RESIDENTIAL BURNING TYPES ALLOWED	A Incinerator Fires		0 or 1	1	Create or adopt fire bylaw that states what types of fires are allowed	0 or 1	0		
	B Open Fires		0 or 1	1		0 or 1	0		
	C Backyard Fire Pits - Standard Design		0 or 1	1		0 or 1	1		
				/3	3		/3	1	
PROBABILITY OF EXTREME FIRE BEHAVIOR	A 90 th Percentile of FWI > 30		4		No Change	4			
	B 90 th Percentile of FWI > 17		3			3			
	C 90 th Percentile of FWI > 9		2	2		2	2		
	D 90 th Percentile of FWI < 9		1			1			
				/4	2		/4	2	
Consequence x Likelihood = INHERENT RISK		450		TOTAL:	18	TOTAL:		15	
Consequence x Likelihood = RESIDUAL RISK		315							

Wildfire Risk Assessment Process © 2015 CharettePelIPoscente Environmental Corp.

		Wildfire Risk Matrix																	
		Likelihood																	
		1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35
Consequence	3	3	9	15	21	27	33	39	45	51	57	63	69	75	81	87	93	99	105
	6	6	18	30	42	54	66	78	90	102	114	126	138	150	162	174	186	198	210
	9	9	27	45	63	81	99	117	135	153	171	189	207	225	243	261	279	297	315
	12	12	36	60	84	108	132	156	180	204	228	252	276	300	324	348	372	396	420
	15	15	45	75	105	135	165	195	225	255	285	315	345	375	405	435	465	495	525
	18	18	54	90	126	162	198	234	270	306	342	378	414	450	486	522	558	594	630
	21	21	63	105	147	189	231	273	315	357	399	441	483	525	567	609	651	693	735
	24	24	72	120	168	216	264	312	360	408	456	504	552	600	648	696	744	792	840
	27	27	81	135	189	243	297	351	405	459	513	567	621	675	729	783	837	891	945
	30	30	90	150	210	270	330	390	450	510	570	630	690	750	810	870	930	990	1050
	33	33	99	165	231	297	363	429	495	561	627	693	759	825	891	957	1023	1089	1155
	36	36	108	180	252	324	396	468	540	612	684	756	828	900	972	1044	1116	1188	1260
	39	39	117	195	273	351	429	507	585	663	741	819	897	975	1053	1131	1209	1287	1365
	42	42	126	210	294	378	462	546	630	714	798	882	966	1050	1134	1218	1302	1386	1470
	45	45	135	225	315	405	495	585	675	765	855	945	1035	1125	1215	1305	1395	1485	1575
	48	48	144	240	336	432	528	624	720	816	912	1008	1104	1200	1296	1392	1488	1584	1680
	51	51	153	255	357	459	561	663	765	867	969	1071	1173	1275	1377	1479	1581	1683	1785
	54	54	162	270	378	486	594	702	810	918	1026	1134	1242	1350	1458	1566	1674	1782	1890
	57	57	171	285	399	513	627	741	855	969	1083	1197	1311	1425	1539	1653	1767	1881	1995
	60	60	180	300	420	540	660	780	900	1020	1140	1260	1380	1500	1620	1740	1860	1980	2100
63	63	189	315	441	567	693	819	945	1071	1197	1323	1449	1575	1701	1827	1953	2079	2205	
66	66	198	330	462	594	726	858	990	1122	1254	1386	1518	1650	1782	1914	2046	2178	2310	
69	69	207	345	483	621	759	897	1035	1173	1311	1449	1587	1725	1863	2001	2139	2277	2415	
70	70	210	350	490	630	770	910	1050	1190	1330	1470	1610	1750	1890	2030	2170	2310	2450	

Hazard Rating	
Low	
Moderate	
High	
Extreme	