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Consultants in Hydrogeology and Water Resources Management

# Pleasant Valley Manufactured Home Community Ecosystem Impact Assessment

*Prepared for:*

Bill and Lilly Smith

*Prepared by:*

Western Water Associates Ltd.
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V1T-8G4

September 26, 2019

WWAL Project 19-080-01VR

western water ASSOCIATES
Consultants in Hydrogeology and Water Resources Management

September 26, 2019

Bill and Lilly

Via Email: billandlilly@shaw.ca

**Re: Pleasant Valley Manufactured Home Community Ecosystem Impact Assessment**

Western Water Associates Ltd. (WWAL) is pleased to provide this Ecosystem Impact Assessment (EIA) for Bill and Lilly Smith to support the Pleasant Valley Manufactured Home Community Development Permit to the City of Vernon.

This EIA provides an assessment of the onsite environmental values, determines the potential for adverse effects to environmental values as a result of development, and develops value-specific mitigation and compensation measures to avoid or limit adverse effects to the vegetation, wildlife and ecosystems present on the site.

Please address any questions about the following EIA to the undersigned,

**WESTERN WATER ASSOCIATES LTD.**

**Trina Koch B.Sc. R.P.Bio.**
**Senior Biologist**

**Reviewed by**

**Douglas Geller, M.Sc., P.Geo.**
**Senior Hydrogeologist and President**

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## 1. BACKGROUND

The proposed Pleasant Valley Manufactured Home Community development is located south of Silver Star Road at 4701 Pleasant Valley Road Vernon, BC (subject property). Because the proposed development is located within the City of Vernon's (COV's) Cities Neighborhood District (DD2), an Ecosystem Impact Assessment (EIA) must be prepared by a QEP under the COV's Cities Environmental Management Areas Strategy (EMAS) in support of a development permit (COV 2012).

According to the EMAS, the EIA must include figures showing lot layout, infrastructure siting, roads, lot access, percentage of impervious coverage and building pads. Additionally, it must describe site conditions before and after development disturbance and use the following procedure for analyzing impacts and determining suitable mitigation:

- Explain methods used to determine impacts;
- Outline the short and long term as well as direct and secondary impacts;
- Evaluate if the potential impacts can be prevented, mitigated or compensated and identify opportunities for alternative layout or design. Avoidance is the first objective;
- Consider the ability for the site to be used outside of features and buffers;
- Consider the type of development and the sensitivity of the site;
- Landscape fragmentation, connectivity, distribution; and
- Identify buffers and setbacks using BMPs or, if not possible, provide an alternative.

This EIA addresses the above noted EMAS requirements and protocol. Figures are attached as Appendix A, Photographs as Appendix B, Option 1, Option 2 and Option 3 Site Plans as Appendix C, a table of wildlife species at risk as Appendix D and Perimeter Acreage Fencing Detail as Appendix E.

## 2. REGULATORY REQUIREMENTS

The following regulatory requirements have been considered in the development of this EIA:

- *City of Vernon Zoning Bylaw #5000, 2003*
- *City of Vernon OCP Bylaw #5470, 2013*
- *B.C. Environmental Management Act*
- *B.C. Water Sustainability Act*
- *B.C. Wildlife Act*
- *BC Weed Control Act*
- *Canada Fisheries Act (Riparian Area Regulation)*
- *Canada Migratory Birds Convention Act*
- *Canada Species at Risk Act*
- *Canada Wildlife Act*

## 3. MUNICIPAL PROPERTY DESIGNATIONS

Development within the subject property is limited under the following municipal designations:

### 1. Zoning: R7 - Mobile Home Residential Bylaw

The entire subject property is zoned as R7 - Mobile Home Residential (Figure 3). R7 zoning allows manufactured homes on individual manufactured home sites in a manufactured home community setting (COV 2003).

### 2. Official Community Plan (OCP): Residential-Low Density

Residential low density areas support single family detached, semi-detached, duplex and row housing at a density of 30 units/ha (12 units/acre). Manufactured home communities are recognized as an attainable form of housing in this area (COV 2013).

### 3. Environmental Management Areas Strategy: Cities Neighborhood District DD2

Environmental management strategies in DD2 include wildlife habitat and corridor conservation; gully protection; lake shore and wetland enhancement and protection; moderate sensitivity ecosystem management; moderate slope protection and management of the interface between residential, agricultural and park lands. Environmental mitigation in DD2 should include riparian area protection, enhancement and reclamation; stormwater management; landscaping and tree protection and the creation and maintenance of parks and green space (COV 2012).

### 4. Environmental Management Area Polygons: Moderate Sensitivity

Much of the subject property is located in a 'Moderate Sensitivity' EMA polygon as shown in Figure 4. A narrow strip of the property's northern extent is located within a Low Sensitivity EMA. Moderate sensitivity polygons limit development based on property specific conditions and the presence or absence of key natural and habitat features. Low Sensitivity polygons require the lowest level of conservation and protection planning, but require property specific environmental information to contribute to the development process (COV 2012).

## 4. METHODS USED TO DETERMINE IMPACTS

WWAL completed a background assessment of the property, which involved investigating Sensitivities Ecosystem Inventory (SEI) Mapping (ENV 2019c), Conservation Data Centre (CDC) Species at Risk mapping (ENV 2019b) and ecological characteristics of the Dry Interior Douglas Fir Biogeoclimatic Zone (IDF xh1) (FLNRORD 2009).

Using SEI and CDC maps as the source, we created base maps of the subject property, including a map of the proposed lot design and a Google Earth orthophoto (Google Earth 2016) for use in the field and met with the client on site to discuss the development plan.

Completed a site investigation of the property on July 23, 2019 to assess biophysical conditions within the development footprint following Resource Inventory Standards Committee Standards for assessing terrestrial and aquatic ecosystems (ILMB 2017). Completed inventories of native and invasive plants, wildlife habitat and wildlife sign or sighting. Assessed surrounding land use, obvious danger trees and noted

signs of previous disturbance. Collected GPS measurements of notable features using a Magellan eXplorist 510 handheld device, took multiple photographs of each lot using a Samsung Galaxy S7 cell phone and documented inventory results and other comments in a field notebook. Identified areas on each lot that were previously disturbed, infested with invasive weeds or otherwise ideal for a manufactured home site location and noted the locations on a field map.

Compared our results with SEI and CDC species at risk and ecosystem at risk mapping, tabulated wildlife, vegetation and ecosystem survey results and investigated the status, habitat and connectivity requirements of identified native species. Identified two Environmentally Sensitive Areas (ESAs) along the southern boundary of the property where development should be limited. Considered all of the data, mapped the ESAs within the property and the ecosystems at risk within each lot. Figures were derived from Google Earth (Google Earth 2016), City of Vernon Mapping (COV 2019), and iMapBC (ENV 2019c).

Met with the Developer, Mr. Bill Smith and the Engineer, Mr. Bruce VanCalsteren of Kerr Wood Leidal (KWL) on August 21, 2019 to discuss alternative design options that restrict manufactured home site placement and road development within the ESAs. Mr. Smith informed WWAL that the original site plan (Option 1), which had not been previously seen by WWAL, included 21 lots but was revised to include only 14 lots in the interest of preserving the natural features of the property (Option 2). Mr. Smith agreed that development should be limited within the ESAs and directed Mr. VanCalsteren to proceed with designing a third version of the site plan. On August 27, 2019, Mr. VanCalsteren provided WWAL with a modified 15-Lot Site Plan (Option 3) that restricts manufactured home site construction to outside the ESAs and includes the ESA 1 and ESA 2 polygons.

The 21-Lot Site Plan (Option 1: May 21, 2019), 14-lot Site Plan (Option 2: May 21, 2019) used during the field assessment) and the revised 15-Lot Site Plan (Option 3: August 27, 2019), which limits development within the ESAs, are included as Appendix C.

## 5. PROPOSED 15-LOT DEVELOPMENT

The proposed 15-Lot manufactured home community extension development comprises an area of approximately 1.3 hectares and is located on a south-facing slope, south of Silver Star Road in Vernon, BC (Appendix A: Figure 1). Its southern boundary meets the toe of a forested slope bordering the existing portion of the Pleasant Valley Manufactured Home Community (Appendix A: Figure 2). A narrow natural gas line right of away (ROW) is located from Silver Star Road to the northeastern corner of the development. The proposed development's northern boundary borders agricultural fields and its western boundary borders undeveloped land designated for future development .

The development layout includes fifteen lots (L1-L15) divided by an access road into upper and lower lot rows (Appendix C: Option 3). The access road extends westward from an existing residential access road within the Pleasant Valley Manufactured Home Community (Appendix A: Figure 6). The proposed lots range in size between 200 $m^2$ and 1500 $m^2$ with the widest lots to the west and the narrower lots within the centre of the upper row. The lot design (i.e. Option 3) has been revised from two previous design options to limit development within ESA 1 and ESA 2 and incorporate a public trail. ESA 1 is about 2,400 $m^2$ and located within southeast corner of the subject property including portions of L9-L12. ESA 1 is about 900 $m^2$ and covers about one third of L14 (Appendix A: Figure 3).

Placement of the road and manufactured home sites has been carefully considered to utilize the flattest portion of the steep lots, avoid the ESAs and utilize previously cleared and weed-infested areas. The percentage impervious coverage of the proposed development, including the manufactured home sites and roads is 25%.

## 6. ENVIRONMENTAL ASSESSMENT

On July 23, 2019 WWAL's Senior Biologist, Trina Koch R.P.Bio., and Junior Biologist Gina Le Bel B.Sc., B.I.T., completed a site investigation of the property to assess biophysical conditions. In this section we provide a summary of biophysical conditions in each of the lots identified in the 14 Lot Site Plan (Appendix C: Option 2) Key environmental assessment features consist of vegetation, ecosystems and wildlife.

### 6.1 Vegetation

WWAL documented eighteen native and nine non-native vegetation species within the subject property (Tables 1 and 2). Overall, the wide eastern lots (L13 and L14) and upper row of narrow lots (L1-L6) were previously disturbed and more weed-infested than the lower lots (L8-L12) and the northeastern lot (L7). Of the native species, ponderosa pine (*Pinus ponderosa*) and pine grass (*Calamagrosis rubescens*) were most abundant and present on nine of the fourteen sites. Bluebunch wheat grass (*Pseudoroegneria spicata*), smooth sumac (*Rhus glabra*) and Saskatoon berry (*Amelanchier alnifolia*) often establish on very dry, south-facing slopes and were observed growing on L7, L8 and L9. L1 to L6 were uniformly disturbed with the area dominated by introduced purple clover (*Trifolium purpurem*) and noxious hoary alyssum (*Berteroa incana*). L14 and to a lesser degree, L13 were sparsely vegetated with native trees and shrubs and dominated by agronomic species like invasive smooth brome grass (*Bromus inermus*).

**Table 1. Native Vegetation Species per Lot Observed per Lot**

| Common Name | Scientific Name | Lots |
|---|---|---|
| Balsam Poplar | *Populus balsamifera* | 5 |
| Bluebunch wheat grass | *Pseudoroegneria spicata* | 7, 8, 9, 10 |
| Choke Cherry | *Prunus virginiana* | 13 |
| Common Snowberry | *Symphoricarpos albus* | 8, 9, 10, 13 |
| Creeping Sage | *Salvia sonomensis* | 8, 9 |
| Douglas Fir | *Pseudotsuga menziesii* | 1, 13 |
| Fir | *Abies* spp. | 8, 9 |
| Oregon Ash | *Fraxinus latifolia* | 8, 9 |
| Oregon Grape | *Mahonia aquifolium* | 8, 9, 10 |
| Pin Cherry | *Prunus pensylvanica* | 10, 14 |
| Pine Grass | *Calamagrosis rubescens* | 1, 2, 7, 8, 9, 10, 11, 12, 13, 14 |
| Ponderosa Pine | *Pinus Ponderosa* | 1, 2, 7, 8, 9, 10, 11, 12, 13 |
| Prickly Rose | *Rosa acicularis* | 9 |
| Red Osier Dogwood | *Cornus sericea* | 7, 8, 9 |
| Saskatoon Berry | *Amelanchier alnifolia* | 7, 8, 9, 13 |
| Silky Lupine | *Lupinus sericeus* | 1, 10, 14 |
| Smooth sumac | *Rhus glabra* | 7, 8, 9, 12 |
| Yellow Lupine | *Lupinus* spp. | 1, 10, 12, 14 |

A ponderosa pine in the centre of Lot 13 was identified as danger tree due to dead limbs, 25% lean and danger top. It was wrapped in flagging, and noted as 'Danger" (Appendix A:Figure 6, Appendix B: Photograph 17).

Although non-native vegetation species were more abundant in the upper lots, noxious wild mustard, introduced purple clover and noxious hoary alyssum were also present in L8 and L9. The most non-native vegetation species were found in L1 (Table 2, Appendix: Figure 6).

**Table 2. Non-Native Vegetation Species Observed per Lot**

| Common Name | Scientific Name | *Status | Lots |
|---|---|---|---|
| Crab Apple | *Malus sylvestris* | Introduced | 10 |
| Goatsbeard | *Tragopogon dubious* | Nuisance | 1, 2, 3, 4, 5, 6, 9, 10 |
| Grape Vine | *Vitis* spp. | Introduced | 1 |
| Hoary Alyssum | *Berteroa incana* | Noxious | 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12 |
| Manitoba Maple | *Acer negundo* | Invasive | 12 |
| Purple Clover | *Trifolium purpureum* | Introduced | 1, 2, 3, 4, 5, 6, 7, 8, 9 |
| Scotch Thistle | *Onopordum acanthium* | Noxious | 13 |
| Smooth Brome Grass | *Bromus inermus* | Invasive | 1, 2, 3, 12, 13, 14 |
| Wild Mustard | *Brassica kaber* | Noxious | 7, 8, 9 |

*__Introduced__: A non-native species**, Invasive**: An invasive species is a non-native species (including seeds, eggs, spores, or other propagules) whose introduction causes or is likely to cause economic harm, environmental harm, or harm to human health. The term "invasive" is used for the most aggressive species. These species grow and reproduce rapidly, causing major disturbance to the areas in which they are present. **Noxious**: Harmful to the environment or wildlife.

### 6.1.1 Vegetation Species at Risk

Although the CDC maps the blue-listed cut-leaved water-parsnip (*Berula erecta*) and red-listed Engelmann's knotweed (*Polygonus engelmannii*) within a 5 km radius of the proposed development, neither of these species were observed on the subject property. Of the two species, Engelmann's knotweed has the highest likelihood of growing within subject property as cut-leaved water parsnip characteristically grows very near freshwater bodies.

## 6.1 Ecosystems

### 6.1.1 Biogeoclimatic Zone

The subject property is located within the dry Interior Douglas Fir (IDF xh1) Biogeoclimatic Zone (MFLNRO 2009). Vegetation in the undisturbed portions of the property include species typical to the driest parts of the zone with the exception of those near the toe of slope, which are typical of wetter zonal areas.

### 6.1.2 Ecological Communities at Risk

Ecological communities at risk observed onsite include three red-listed communities and two blue-listed communities (Appendix A: Figure 6). The blue-listed 'Douglas fir - Ponderosa Pine / Bluebunch Wheatgrass – Pinegrass' Ecological Community was the most common and was observed and was present on 9 of the 14 lots as shown in Figure 6. Others, like the red-listed '*Douglas-fir / Common Snowberry – Saskatoon*' was only observed on Lot 13. Table 3 provides a summary of in which lots the Ecological Communities at risk were observed.

**Table 3. Observed Ecological Communities at Risk per Lot**

| Ecological Community | Provincial Rank | Lots |
|---|---|---|
| Ponderosa Pine / Smooth Sumac | red | 7, 8, 9, 12 |
| *Douglas-fir / Common Snowberry – Saskatoon* | red | 8, 9, 13 |
| *Ponderosa Pine / Common Snowberry / Bluegrasses'* | red | 8, 9, 10 |
| *Douglas-fir / Common Snowberry – Saskatoon* | red | 13 |
| *Douglas fir - Ponderosa Pine / Bluebunch Wheatgrass – Pinegrass* | blue | 1, 2, 7, 8, 9, 10, 11, 12, 13 |
| *Douglas-fir / Bluebunch Wheatgrass – Pinegrass* | blue | 1 and 13 |

Although the provincially red-listed[1] '*Black Cottonwood/Common Snowberry – Roses'*, blue-listed[2] '*Hard-Stemmed Bulrush Deep Marsh*' and blue-listed '*Common Cattail Marsh*' ecological communities are mapped within a 5 km radius of the proposed development (ENV 2019b), they are not located within the subject property.

## 6.2 Wildlife

The many animal trails and sign attest to the ease in which large and small animals move through the property. Connectivity to water, cover, prey and browse for wildlife is of high value, especially along the lower row of lots. The following species or their tracks, calls or scat were observed during the field investigation:

- Ungulate (*Odocoileus spp.*) – tracks along south facing slope of L7 (likely mule deer);
- Red-tailed hawk (*Buteo jamaicensis*) – active hunting above lots L1 and L14;
- Multitude of songbirds - observed flying, and or inhabiting cavities in trees on lots L7-L13;
- Black capped chickadee *(Poecile atricapillus*) were observed within L8 pecking at the bark of a mature Ponderosa pine.
- American black bear (*Ursus americanus)* – scat along footpath/wildlife trail in the gully along the eastern property boundary. Other mammals are likely to use this trail as well.

Mammals with the potential to inhabit or pass through the subject property include the blue-listed grizzly bear (*Ursus arctos*), fringed myotis (*Myotis thysanodes*), western harvest mouse (*Reithrodontomys megalotis*), wolverine (*Gulo gulo*) and the red-listed American badger and Preble's shrew (*Sorex preblei*). Other native species with the potential to inhabit the subject property include the white headed woodpecker (*Picoides albolarvatus*), common garter snake **(***Thamnophis sirtalis*), mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*) and porcupine (*Erethizan dorsatum*) (Lloyd et al. 1990).

### 6.2.1 Wildlife Species at Risk

Thirty-eight species at risk with the potential to inhabit the subject property are listed in Appendix D. These include one amphibian, sixteen bird, six insect, eleven mammal and four reptilian species.

Of the sixteen bird species at risk, nine are song birds, protected under the *Migratory Bird Protection Act* and six are environmentally-significant raptors. The rodent and small mammals inhabiting the surrounding grasslands, proximity to Upper BX Creek and mature stands of ponderosa pine and Douglas fir create ideal habitat for these raptors and song birds. Red-listed avian species with the potential to inhabit the subject property include the barn owl (*Tyto alba*), burrowing owl (*Athene cunicularia*), grasshopper sparrow

[1] BC Red-listed: Any species or ecosystem that is at risk of being lost (extirpated, endangered or threatened)
[2] BC Blue-listed: Any species or ecosystem that is of special concern

(*Ammodramus savannarum*), sandhill skipper (*Polites sabuleti*), Swainson's hawk (*Buteo swainsoni*), and yellow breasted chat (*Icteria virens*) (ENV 2019b).

Amphibians and reptiles that potentially inhabit or move through the subject property include the following five blue-listed species: great basin spadefoot (*Spea intermontana*), western skink *(Eumeces skiltonianus*), western rattlesnake (*Crotalus viridis*), North American racer (*Coluber constrictor*) and gopher snake (*Pituophis catenifer*). The snake species, in particular, prefer south-facing, grassland slopes and dry ponderosa pine and Douglas fir forests (Lloyd et al. 1990).

Of the eleven mammalian species at risk listed in Appendix D, only the Preble's shrew (*Sorex preblei*) and American badger (*Taxidea taxus*) are red-listed,. The American badger is the only species at risk mapped by the Conservation Data Centre (CDC) as inhabiting the subject property (ENV 2019b). This badger is a carnivore that prefers grasslands and shrublands with little groundcover and lives in burrows. It mates mid- to late summer and has one litter averaging three juveniles born in early spring. The young leave the family group in Fall. Density averages one per 2.3 $km^2$ in open country. Although American badger or their dens were not observed within the subject property during the field assessment, there is potential for damage to occur to unidentified dens as a result of excavation during road and manufactured home site development.

Two masked species at risk are mapped within two kilometres of the subject property. These species were identified by the CDC as snakes that inhabit rocky outcrops (CDC 2019). Since rocky outcrops are not located within the subject property, these two snake species are not likely to be impacted by the proposed development.

## 7. POTENTIAL ENVIRONMENTAL IMPACTS

Potential impacts of development are either long or short term and direct or secondary. They include the following:

- Removal of existing wildlife habitat (long term, direct).
- Destruction of migratory bird habitat (short term, direct).
- Destruction of native vegetation (short term, direct).
- Increased infestation of invasive weeds (short term, secondary).
- Reduction in habitat quality and connectivity (short term, direct).
- Reduced wildlife corridor quality (short term, secondary).
- Harm to wildlife moving through the property (short term, secondary).
- Leaks and spills fouling soils, groundwater or BX Creek (short term, direct)
- Harm to species at risk (short term, secondary).
- Harm to ecosystems at risk (short term, secondary).
- Loud noise disrupting wildlife (short term, direct).

## 8. PROPOSED MITIGATION

The following mitigation and composition strategies follow guidance provided in Guidelines for Amphibian and *Reptile Conservation during Urban and Rural Land Development in British Columbia* (MWLAP 2014), *Guidelines for Raptor Conservation during Urban and Rural and Development in British Columbia* (ENV 2013)

and *Develop with Care Thompson Okanagan Region* (ENV 2014) and *Environmental Areas Strategy* (COV 2012). Mitigation strategies are separated into those related to site development and management and those that are environmentally-related, as required by the Environmental Area Strategy, Terms of Reference for Professional Reporting (COV 2012).

## 8.1 Site Development and Management

Due to high ecological habitat in southern portions of the subject property, ESA1 and ES2 conservation areas have been incorporated into a 15-Lot Site Plan (Appendix A: Figure 7, Appendix C: Option 3). Land clearing, planting of non-native species and temporary or permanent building placement should not occur in either ESA.

Establish a nature trail from Silver Star Road, through the Gas Line ROW and down through the gully to Upper BX Creek and the Pleasant Valley Manufactured Home Park Access Road as shown in Appendix A: Figure 7. Clear the grassy area along the ROW for the footpath but use the existing footpath/wildlife trail through the gully so that native vegetation is not cleared for pathway creation.

Place manufactured home sites in areas of sufficient grade and outside of ESA 1 and ESA 2, as shown in Appendix C: Option 3.

Reduce fuel loads for wildfire management by trimming lower dead branches while maintaining green shrubby vegetation.

Minimize lighting in the developed manufactured home community as it can alter the day/night cycle of some wildlife and their feeding and hunting cycles;

Only allow perimeter fencing that is easily crossed by bear, deer and smaller mammals (Appendix E).

Provide residents with information on the wildlife, plant and ecological communities within the subject property and the trail access to Upper BX Creek east of the subject property. Direct residents to use native and xeriscape plants in small garden areas situated outside of ESA 1 and ESA2.

## 8.2 Environmental Resources

### 8.2.1 Before Construction

Develop a plan that identifies potential spills and ways to mitigate or avoid them. Train workers in spill prevention and emergency response. Avoid the use of pesticides, fertilizers, and road salt.

Retain a QEP to look for American badger dens before excavation occurs in grassy, open areas. The QEP will report species at risk to the CDC.

Remove danger trees.

Retain a QEP to complete a nesting survey should be completed before healthy trees are cleared. If a raptor nest is discovered, a minimum buffer of undisturbed vegetation should be maintained as per Table 6 in *Guidelines for Raptor Conservation* (ENV 2013).

Place a temporary construction fence along the northern boundaries of ESA 1 and ESA2 to ensure that machinery, vehicles and large equipment can not access the conservation areas (Appendix A: Figure 7).

Clean machinery to restrict the spread of invasive plant species.

### 8.2.2 During Construction

Complete clearing and grubbing for road works between August 30 and March 31 to avoid working within the Migratory Bird Breeding Bird Window (March 31-August 30).

Do not remove any tree with a Swainson's hawk, bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrinus*), gyrfalcon (*Falco rusticolus*), osprey (*Pandion haliaetus*) or burrowing owl (*Athene cunicularia*) nest, whether the nest is active or not.

Limit removal of mature Douglas fir and ponderosa pine, with the exception of danger trees. The number and species of mature trees requiring removal for road and manufactured home site clearing should be noted by a QEP and replaced at a 1:1 ratio in open areas currently infested with invasive weeds

Contain contaminates with appropriate stormwater and wastewater management. Respond quickly when a spill occurs and report the spill to the Provincial Emergency Program (1-800-663-3456), then suitably dispose of spill materials and contaminated soils, water and other materials as required under the *Environmental Management Act.*

### 8.2.3 After Construction

Remove all temporary fencing, construction debris and garbage from the site.

Replant matures trees at a 1:1 ratio. Optimal planting locations are shown in Appendix A: Figure 7.

Continue invasive plant removal on an annual basis throughout the subject property.

Seed disturbed areas with a native seed mix of blue bunch wheatgrass and pine grass.

Secure all household garbage to prevent access by wildlife (e.g. bear, racoon).

## 9. CONCLUSIONS

WWAL completed an EIA for Bill and Lilly Smith. Field investigation and background study identified two conservations areas, identified as ESA 1 and ESA 2. As a result of these finding, Mr. Smith modified the a 14-Lot Site Plan (Appendix C: Option2) to a 15-Lot Site Plan, which avoids areas of the highest ecological value (Appendix C- Option 3). Mitigation includes restriction clearing in ESA 1 and 2, QEP monitoring, establishing a nature trail, reseeding invasive weed infestations with a native grass sed mix and compensation planting of ponderosa pine and Douglas fir. If proposed mitigation strategies in this report are followed, impacts of developing the subject property into the proposed 15-Lot Manufactured home community will be minimized.

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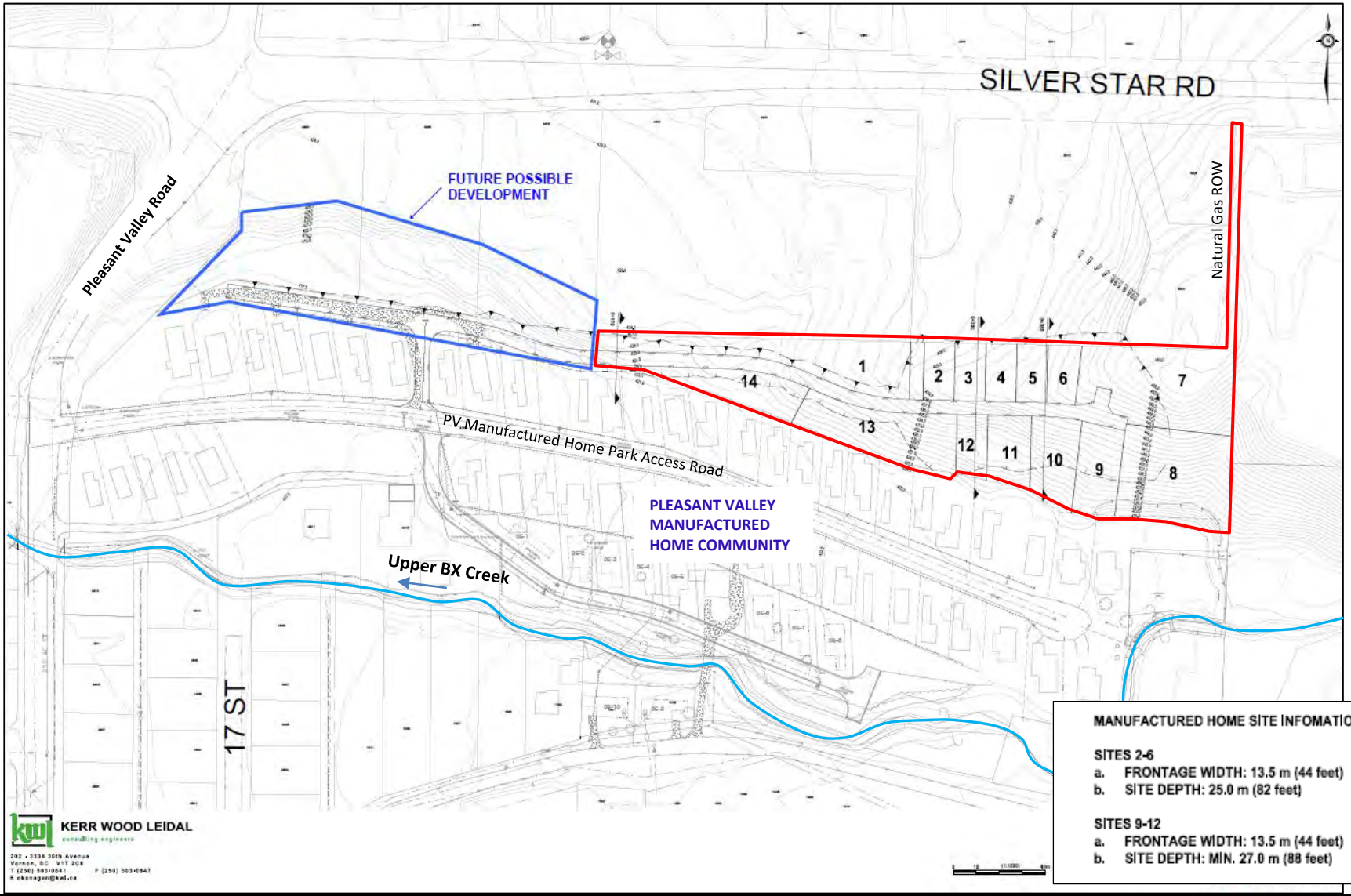
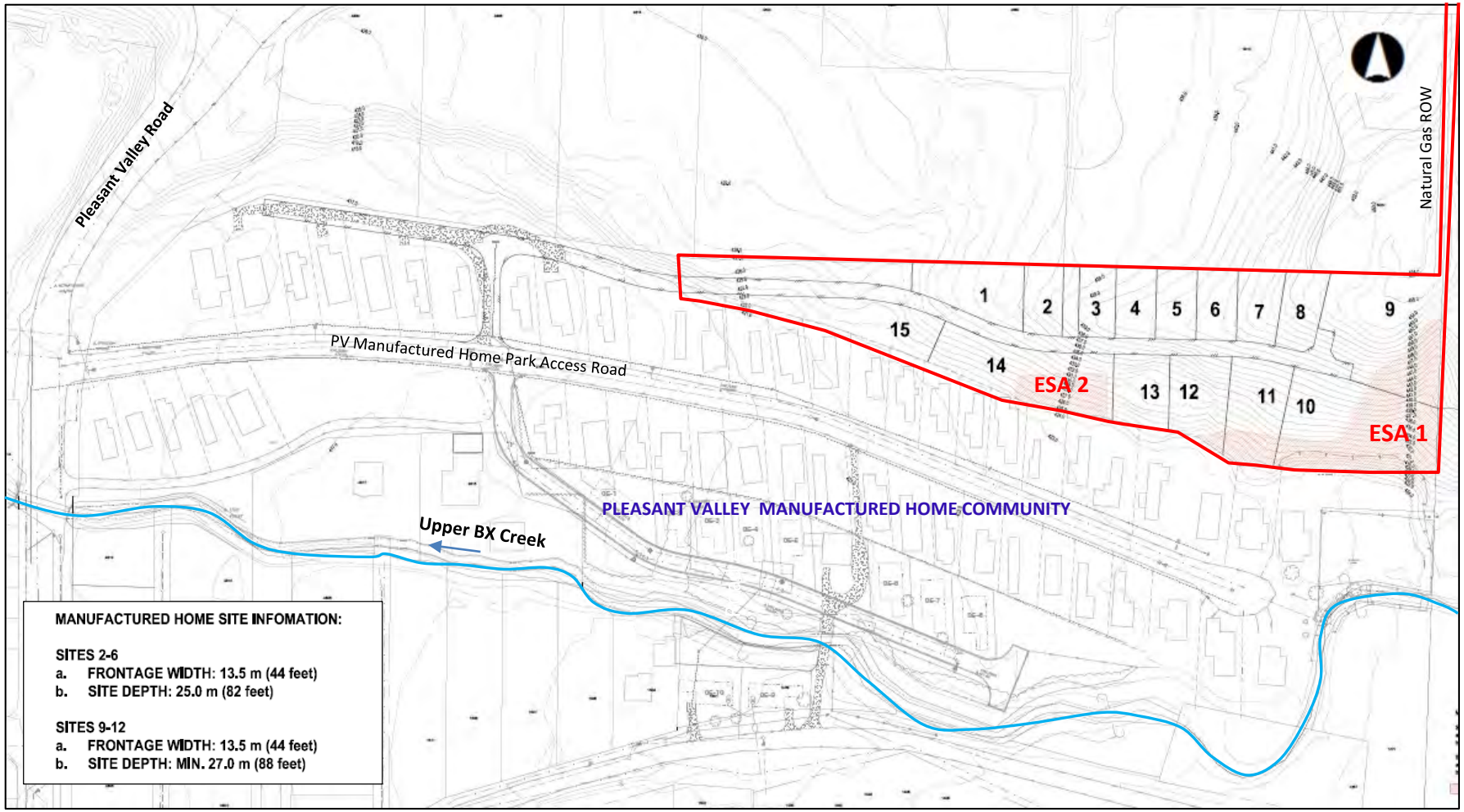
# APPENDIX A

Figures

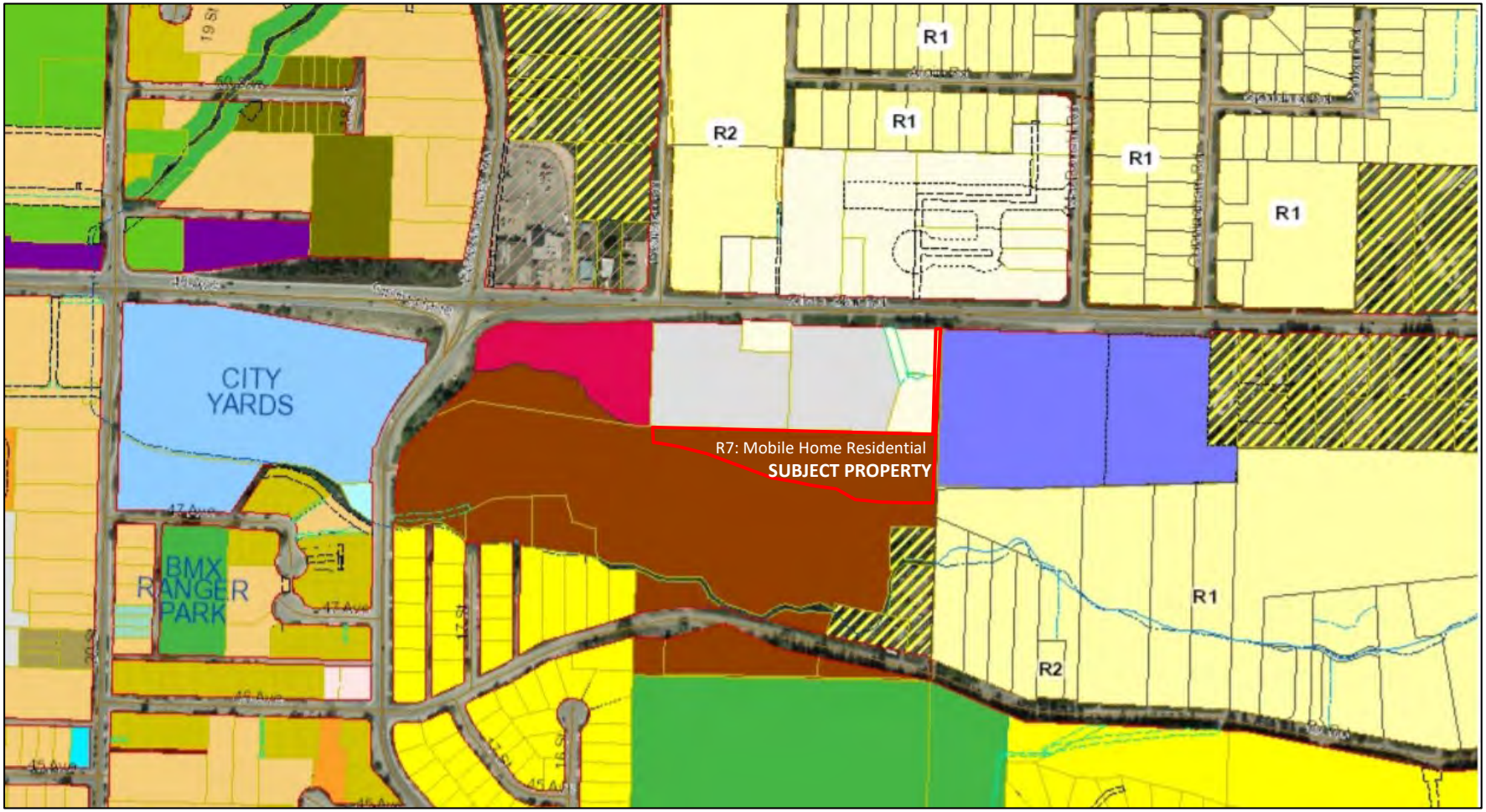

| | | | | |
|---|---|---|---|---|
| Pleasant Valley Manufactured Home Community EIA | TITLE **Figure 1:** Subject Property | | | |
| western water ASSOCIATES LTD | DRAWN GL | DATE August 2019 | PROJECT NO. 19-080-01VR | |
| | CHECKED TK | PV Road Mobile Home Park EIA | TOPOGRAPGY | |
| | REVIEWED DG | | SOURCE. City of Vernon Mapping | |



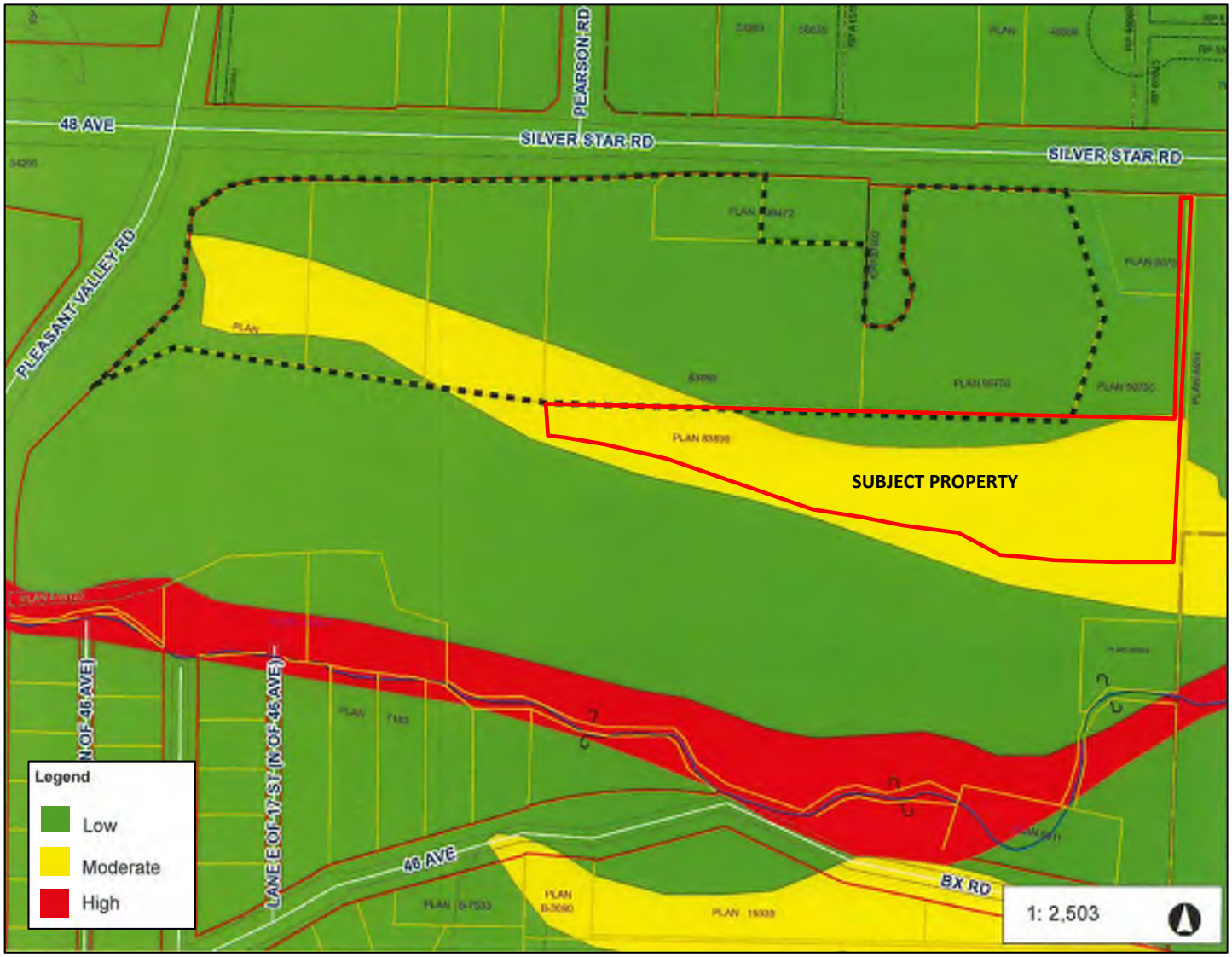

| | | | | |
|---|---|---|---|---|
| Pleasant Valley Manufactured Home Community EIA | TITLE | **Figure 2:** 14-Lot Site Plan Used for Field Assessment | | |
| western water ASSOCIATES LTD | DRAWN GL | DATE August 2019 | PROJECT NO. 19-080-01VR | |
| | CHECKED TK | **OPTION 2** | TOPOGRAPGY | |
| | REVIEWED DG | | SOURCE. KWL Conceptual Drawing 2019 | |




| | | | | |
|---|---|---|---|---|
| Pleasant Valley Manufactured Home Community EIA | TITLE | **Figure 3:** Revised 15-Lot Site Plan with ESAs | | |
| western water ASSOCIATES LTD | DRAWN GL | DATE August 2019 | PROJECT NO. 19-080-01VR | |
| | CHECKED TK | | TOPOGRAPGY | |
| | REVIEWED DG | **OPTION 3** | SOURCE. KWL Conceptual Drawing 2019 | |

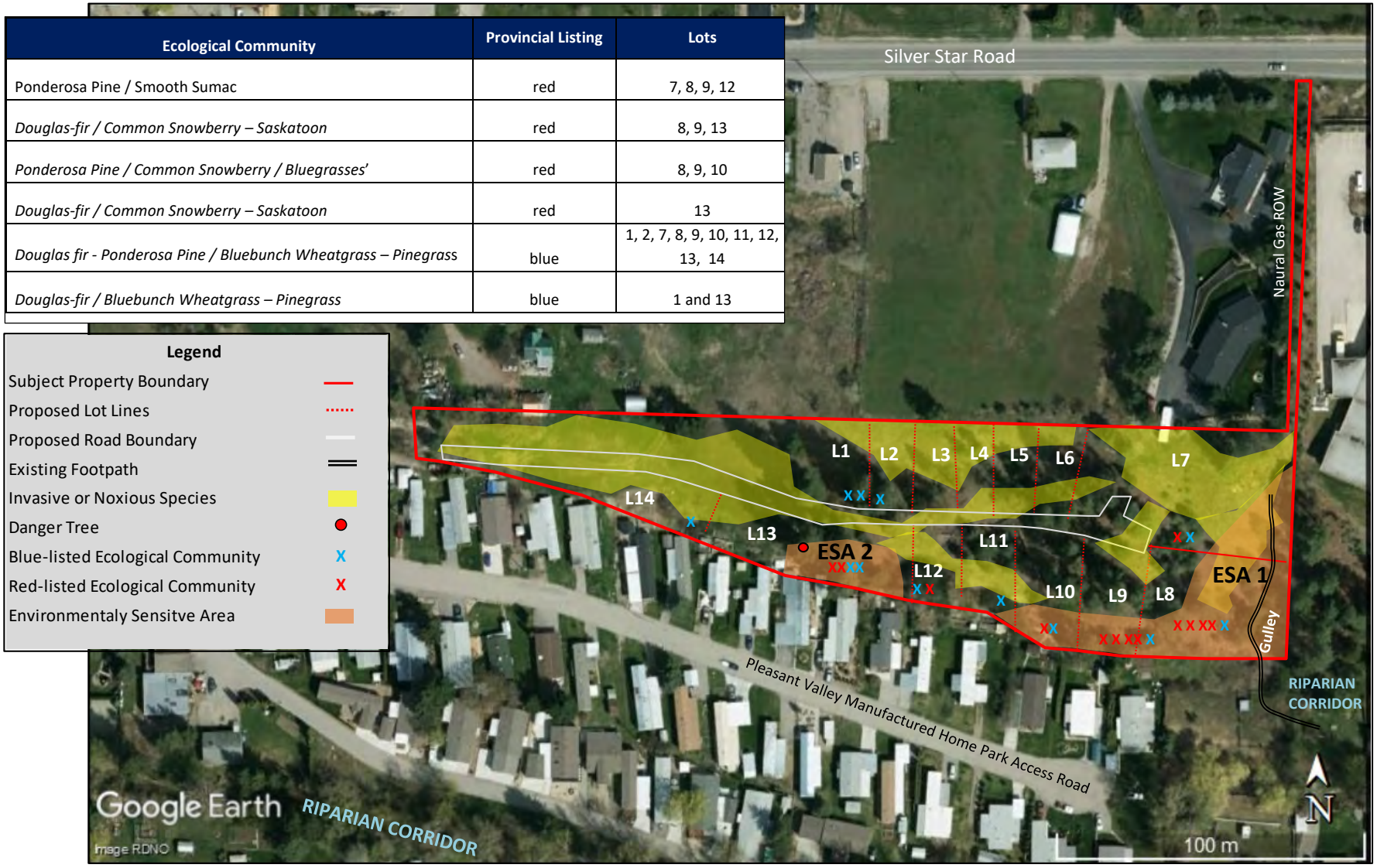



| | | | | |
|---|---|---|---|---|
| Pleasant Valley Manufactured Home Community EIA | TITLE **Figure 4:** Site Zoning | | | |
| western water ASSOCIATES LTD | DRAWN GL | DATE August 2019 | PROJECT NO. 19-080-01VR | |
| | CHECKED TK | PV Road Mobile Home Park EIA | TOPOGRAPGY | |
| | REVIEWED DG | | SOURCE. City of Vernon Mapping | |




| | | | | |
|---|---|---|---|---|
| Pleasant Valley Manufactured Home Community EIA | TITLE | **Figure 5: Environmental Management Area Ranking** | | |
| western water ASSOCIATES LTD | DRAWN GL | DATE August 2019 | PROJECT NO. 19-080-01VR | |
| | CHECKED TK | PV Road Mobile Home Park EIA | TOPOGRAPGY | |
| | REVIEWED DG | | SOURCE. City of Vernon Mapping | |

| Ecological Community | Provincial Listing | Lots |
|---|---|---|
| Ponderosa Pine / Smooth Sumac | red | 7, 8, 9, 12 |
| *Douglas-fir / Common Snowberry – Saskatoon* | red | 8, 9, 13 |
| *Ponderosa Pine / Common Snowberry / Bluegrasses'* | red | 8, 9, 10 |
| *Douglas-fir / Common Snowberry – Saskatoon* | red | 13 |
| *Douglas fir - Ponderosa Pine / Bluebunch Wheatgrass – Pinegrass* | blue | 1, 2, 7, 8, 9, 10, 11, 12, 13, 14 |
| *Douglas-fir / Bluebunch Wheatgrass – Pinegrass* | blue | 1 and 13 |




# Pleasant Valley Manufactured Home Community EIA

TITLE

**Figure 6: 14-Lot Site Plan with ESA Polygons, Suggested Building Pad Locations and Ecological Communities**

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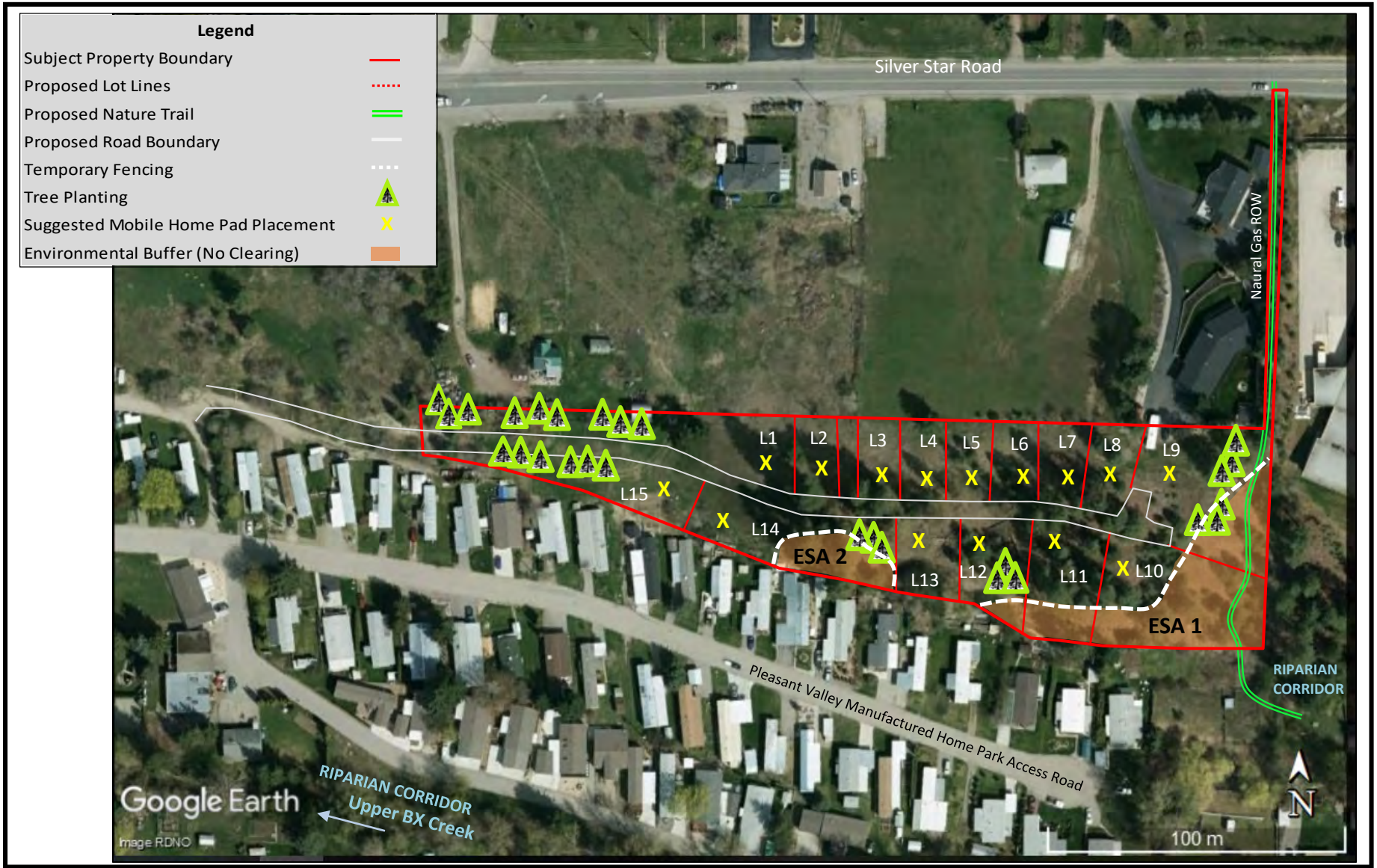
| | | | | | |
|---|---|---|---|---|---|
| DRAWN | GL | DATE | August 2019 | PROJECT NO. | 19-080-01VR |
| CHECKED | TK | | PV Road Mobile Home Park EIA | DWG. NO. | n/a |
| REVIEWED | DG | | | SOURCE. | Google Earth 2019 |




| | | | | |
|---|---|---|---|---|
| Pleasant Valley Manufactured Home Community EIA | TITLE: **Figure 7: 15-Lot Site Plan with ESA Polygons, Ponderosa Pine Planting Areas and Proposed Gully Trail** | | | |
| western water ASSOCIATES LTD | DRAWN: GL | DATE: August 2019 | PROJECT NO.: 19-080-01VR | |
| | CHECKED: TK | PV Road Mobile Home Park EIA | DWG. NO.: n/a | |
| | REVIEWED: DG | | SOURCE.: Google Earth 2019 | |

# APPENDIX B
Photographs

Photograph 1. Lot 1: Ponderosa Pine and pine grass (July 23, 2019)

Photograph 2. Lot 2: Ponderosa pine and invasive hoary alyssum (July 23, 2019)

Photograph 3. Lot 3:  Invasive hoary alyssum and purple clover (July 23, 2019)

Photograph 4. Lot 4: Invasive hoary alyssum and purple clover (July 23, 2019)

Photograph 5. Lot 5: Invasive hoary alyssum, purple clover and balsam poplar (July 23, 2019)

Photograph 6. Lot 6: Invasive hoary alyssum, purple clover and grasses (July 23, 2019)

Photograph 7. Lot 7: Mature ponderosa pine (July 23, 2019)

Photograph 8. Lot 7: Clearing between ponderosa pine (July 23, 2019)

Photograph 9. Lot 7: Sumac on the grassy slope (July 23, 2019)

Photograph 10. Lot 8: Ponderosa pine and bunchgrass on steep slope (July 23, 2019)

Photograph 11. Lot 9: Ponderosa pine and bunchgrass (July 23, 2019)

Photograph 12. Lot 10: Common snowberry, bunchgrass and ponderosa pine (July 23, 2019)

Photograph 13. Lot 11: Ponderosa pine (July 23, 2019)

Photograph 14. Lot 12: Invasive woolly mullein, native Douglas fir and choke cherry (July 23, 2019)

Photograph 15. Lot 13: Ponderosa pine, bunchgrass and brome grass (July 23, 2019)

Photograph 16. Lot 14: Previously cleared area surrounded by ponderosa pine (July 23, 2019)

Photograph 17. Lot 14: Dead-standing ponderosa pine (July 23, 2019)

Photograph 18. Northern view of the gas line right of way (July 23, 2019)

# APPENDIX C

Lot Site Plans : Option 1-3

SAVED 2019/05/17, 2:36 AM

Paper Size = ANSI D
A1 Full Size, this border measures 520 mm x 800 mm

0 10 50 100 millimeters


**MANUFACTURED HOME SITE INFOMATION:**

**SITES 2-9**
a. **FRONTAGE WIDTH: 9.5 m (31 feet)**
b. **SITE DEPTH: 25.0 m (82 feet)**

**SITES 12-19**
a. **FRONTAGE WIDTH: 9.5 m (31 feet)**
b. **SITE DEPTH: MIN. 27.0 m (88 feet)**

**KERR WOOD LEIDAL**
consulting engineers

202 - 3334 30th Avenue
Vernon, BC V1T 2C8
T (250) 503-0841 F (250) 503-0847
E okanagan@kwl.ca

0 10 (1:1500) 40m

# PV MHP
# OPTION 1: (2019-05-21)
# MAXIMUM DENSIFICATION

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Paper Size = ANSI D
A1 Full Size, this border measures 520 mm x 800 mm

0 10 50 100 millimeters

SILVER STAR RD

17 ST

250 AC ST

SUPERSEDED

1 2 3 4 5 6 7 8 9 10 11 12 13 14

05-1 05-2 05-3 05-4 05-5 05-6 05-7 05-8 05-9 05-10

**MANUFACTURED HOME SITE INFOMATION:**

**SITES 2-6**
a. FRONTAGE WIDTH: 13.5 m (44 feet)
b. SITE DEPTH: 25.0 m (82 feet)

**SITES 9-12**
a. FRONTAGE WIDTH: 13.5 m (44 feet)
b. SITE DEPTH: MIN. 27.0 m (88 feet)

0 10 (1:1500) 40m

# PV MHP
# OPTION 2: (2019-05-21)
# 14 LARGE LOTS

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E okanagan@kwl.ca

O:\2200-2299\2273-002\501-Drawings\b_Figures\Conceptual Option #2 (14 Lots).dwg

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Paper Size = ANSI D
A1 Full Size, this border measures 520 mm x 800 mm

0 10 50 100 millimeters

SILVER STAR RD

17 ST

250 AC ST

SUPERSEEDED

1 2 3 4 5 6 7 8 9 10 11 12 13 14

05-2 05-3 05-4 05-5 05-6 05-7 05-8 05-9 05-10

**MANUFACTURED HOME SITE INFOMATION:**

**SITES 2-6**
a. FRONTAGE WIDTH: 13.5 m (44 feet)
b. SITE DEPTH: 25.0 m (82 feet)

**SITES 9-12**
a. FRONTAGE WIDTH: 13.5 m (44 feet)
b. SITE DEPTH: MIN. 27.0 m (88 feet)

APPROXIMATE ENVIRONMENTAL AREA

**NOTE:**
**HOUSE PADS SHOWN ARE IN PRELIMINARY LOCATIONS ONLY. TO BE CONFIRMED DURING DETAILED DESIGN.**

**KERR WOOD LEIDAL**
consulting engineers

202 - 3334 30th Avenue
Vernon, BC V1T 2C8
T (250) 503-0841 F (250) 503-0847
E okanagan@kwl.ca

0 10 (1:1500) 40m

# PV MHP
## OPTION **3**: (2019-09-13)
## 15 LARGE LOTS (ENVIRONMENTAL)

Q:\2200-2299\2273-002\501-Drawings\3- Figures\Conceptual Option #2 (14 Lots).dwg

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# APPENDIX D

Wildlife Species at Risk with the Potential to Inhabit the Subject Property

# **APPENDIX D**: Species at Risk with the Potential to Inhabit the Subject Property

| English Name | Scientific Name | COSEWIC | BC List | SARA | Class (English) |
|---|---|---|---|---|---|
| Great Basin Spadefoot | *Spea intermontana* | T (Apr 2007) | Blue | 1-T (Jun 2003) | amphibians |
| American Bittern | *Botaurus lentiginosus* | | Blue | | birds |
| Barn Owl | *Tyto alba* | T (Nov 2010) | Red | 1-T (Jun 2018) | birds |
| Barn Swallow | *Hirundo rustica* | T (May 2011) | Blue | 1-T (Nov 2017) | birds |
| Bobolink | *Dolichonyx oryzivorus* | T (Apr 2010) | Blue | 1-T (Nov 2017) | birds |
| Burrowing Owl | *Athene cunicularia* | E (Apr 2017) | Red | 1-E (Jun 2003) | birds |
| Grasshopper Sparrow | *Ammodramus savannarum* | | Red | | birds |
| Great Blue Heron, *herodias* subspecies | *Ardea herodias* | | Blue | | birds |
| Horned Lark, *merrilli* subspecies | *Eremophila alpestris merrilli* | | Blue | | birds |
| Lark Sparrow | *Chondestes grammacus* | | Blue | | birds |
| Lewis's Woodpecker | *Melanerpes lewis* | T (Apr 2010) | Blue | 1-T (Jul 2012) | birds |
| Long-billed Curlew | *Numenius americanus* | SC (May 2011) | Blue | 1-SC (Jan 2005) | birds |
| Olive-sided Flycatcher | *Contopus cooperi* | SC (May 2018) | Blue | 1-T (Feb 2010) | birds |
| Short-eared Owl | *Asio flammeus* | SC (Mar 2008) | Blue | 1-SC (Jul 2012) | birds |
| Swainson's Hawk | *Buteo swainsoni* | | Red | | birds |
| Western Screech-Owl, *macfarlanei* subspecies | *Megascops kennicottii macfarlanei* | T (May 2012) | Blue | 1-T | birds |
| Yellow-breasted Chat | *Icteria virens* | E (Nov 2011) | Red | 1-E (Jun 2003) | birds |
| Checkered Skipper | *Pyrgus communis* | | Blue | | insects |
| Emma's Dancer | *Argia emma* | | Blue | | insects |
| Immaculate Green Hairstreak | *Callophrys affinis* | | Blue | | insects |
| Monarch | *Danaus plexippus* | E (Nov 2016) | Blue | 1-SC (Jun 2003) | insects |
| Nevada Skipper | *Hesperia nevada* | | Blue | | insects |
| Sandhill Skipper | *Polites sabuleti* | | Red | | insects |
| American Badger | *Taxidea taxus* | E (Nov 2012) | Red | 1-E (Jun 2018) | mammals |
| Columbia Plateau Pocket Mouse | *Perognathus parvus* | | Blue | | mammals |
| Fisher | *Pekania pennanti* | | Blue | | mammals |
| Fringed Myotis | *Myotis thysanodes* | DD (May 2004) | Blue | 3 (Mar 2005) | mammals |
| Northern Bog Lemming, *artemisiae* subspecies | *Synaptomys borealis artemisiae* | | Blue | | mammals |
| Preble's Shrew | *Sorex preblei* | | Red | | mammals |
| Spotted Bat | *Euderma maculatum* | SC (Nov 2014) | Blue | 1-SC (Jul 2005) | mammals |
| Townsend's Big-eared Bat | *Corynorhinus townsendii* | | Blue | | mammals |
| Western Harvest Mouse | *Reithrodontomys megalotis* | SC (Apr 2007) | Blue | 2009) | mammals |
| Western Small-footed Myotis | *Myotis ciliolabrum* | | Blue | | mammals |
| Wolverine, *luscus* subspecies | *Gulo gulo luscus* | SC (May 2014) | Blue | 1-SC (Jun 2018) | mammals |
| Gopher Snake, *deserticola* subspecies | *Pituophis catenifer deserticola* | T (Apr 2013) | Blue | 1-T (Jan 2005) | reptiles |
| North American Racer | *Coluber constrictor* | T (Nov 2015) | Blue | 1-SC (Aug 2006) | reptiles |
| Western Rattlesnake | *Crotalus oreganus* | T (May 2015) | Blue | 1-T (Jul 2005) | reptiles |
| Western Skink | *Plestiodon skiltonianus* | SC (Nov 2014) | Blue | 1-SC (Jan 2005) | reptiles |

# APPENDIX E

Wildlife Perimeter Fencing

***The ideal wildlife friendly fence*** should (1) allow relatively free passage for animals to jump over and crawl under, and (2) be highly visible for both ungulates and birds. You can combine or tailor many of the ideas presented here

Fences should be low enough for adult animals to jump, preferably 40” or less, and the top two wires should be no less than 12” apart. Deer and elk easily tangle their back legs if the top wires are closer together. The bottom wire or rail should be high enough for pronghorn, calves and fawns to crawl under, at least 18” from the ground. Increasing visibility using a top rail, high-visibility wire,

can help ungulates and birds, such as hawks, owls and swans, better navigate fences.

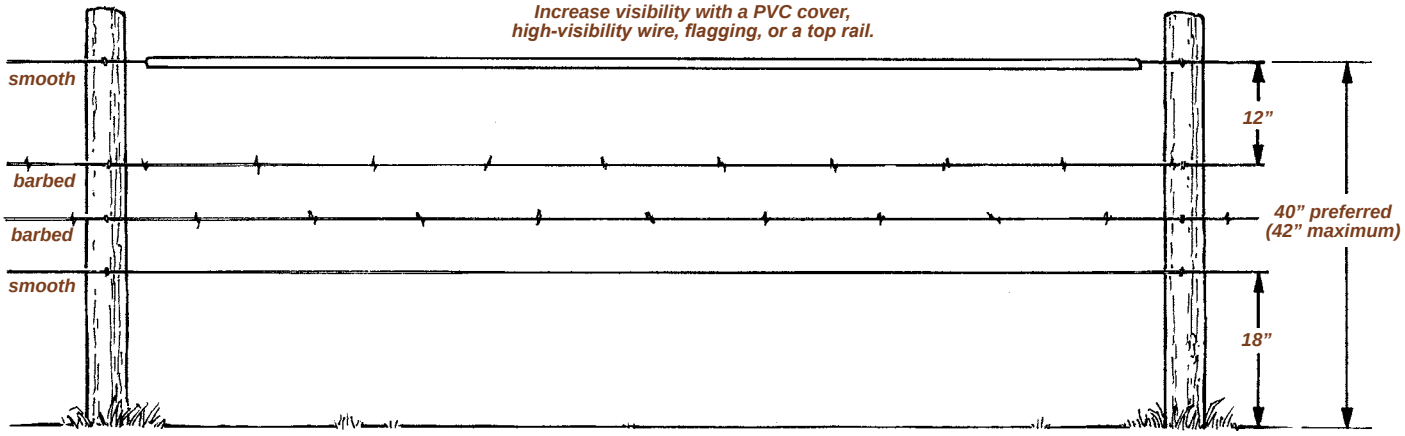
### *Wildlife Friendly Ideal*

Wildlife friendly fences should be low enough for adult animals to jump, high enough for animals to crawl under, and minimize the chance of tangling. Montana Fish, Wildlife and Parks (FWP) recommends:

- A top wire or rail preferably no more than 40” above the ground, and absolutely no more than 42”;
- At least 12” between the top two wires;
- At least 18” between the bottom wire or rail and the ground;
- Smooth wire or rail for the top, smooth wire on bottom.
- No vertical stays;
- Posts at 16.5-foot intervals;
- Gates, drop-downs, or other passages where wildlife concentrate and cross.

Using smooth wire – barbless wire, high-visibility tape or braid, or high-tensile electric wire – for the top and bottom strands will prevent snagging and injuries. In wildlife migration areas, drop-down fence, lay-down fence or crossings can be used for seasonal wildlife passage.

### *IDEAL WILDLIFE FRIENDLY FENCE*




The friendliest fences are very visible and allow wild animals to easily jump over or slip under the wires or rails.

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