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RE: ARCHAEOLOGICAL OVERVIEW ASSESSMENT OF THE PROPOSED PRAIRIE CREEK MINE ALL SEASON ACCESS ROAD

1.0 INTRODUCTION

The Prairie Creek Mine is situated in the southern Mackenzie Mountains of the Northwest Territories, approximately 90 km northwest of Nahanni Butte. The mine is 100% owned by Canadian Zinc Corporation (CZN), and consists of significant mine infrastructure and facilities constructed in the early 1980s. CZN also has permits for a winter access road that connects the Mine site with the Liard Highway east of Nahanni Butte. The Prairie Creek Mine is located on territorial land surrounded by the Nahanni National Park Reserve (NNPR). Approximately 80 km of the western portion of the 180 km access road traverses through the NNPR (Figures 1 through 3). CZN has proposed an “all season” road (the Project), generally following the winter road alignment, and CZN has contracted Lifeways of Canada Limited (Lifeways) to prepare an Archaeological Overview Assessment (AOA). The following AOA assesses the archaeological potential of the road along with related infrastructure, including borrow sources, borrow access roads, camps, staging areas and other supporting facilities, new land disturbances associated with installation of bridges and culverts, the all season road right of way (ROW), and road realignments.

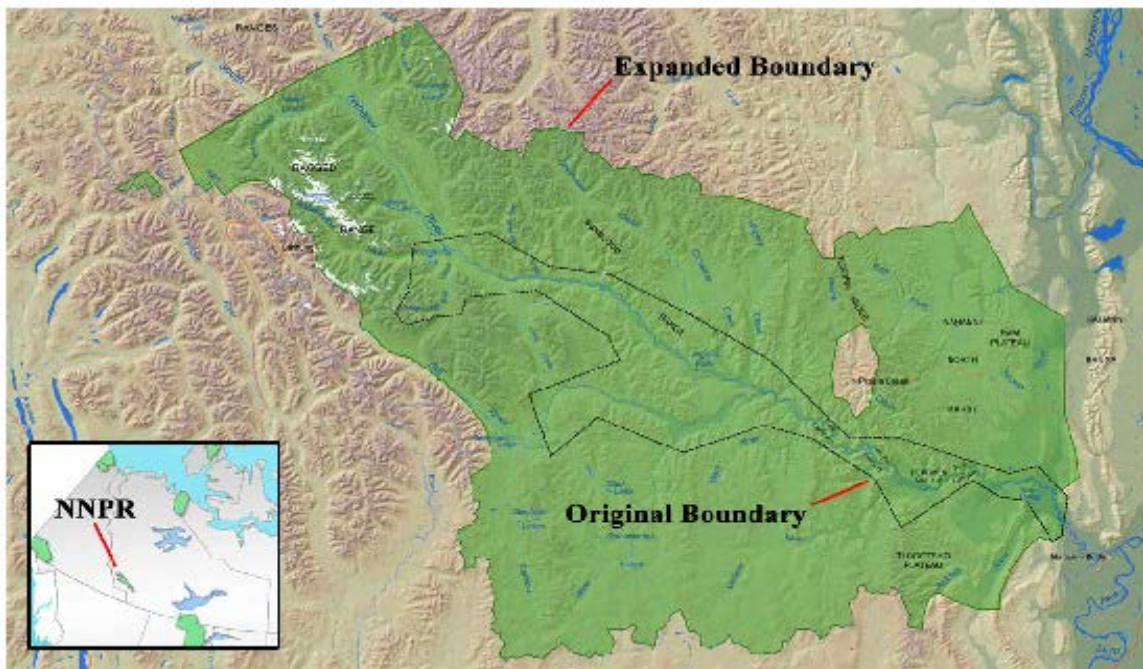
The AOA is a desktop review of the Project that summarizes the existing knowledge of archaeological resources and available traditional knowledge to assess landforms for their heritage resource potential. The AOA is organized into a summary of previous research, including known heritage resource sites and traditional knowledge for the general Project area, interpretation of the Project in terms of the potential for impacts to heritage resources including GIS modelling, recommendations on the scope and schedule of an Archaeological Impact Assessment (AIA) and recommendations for a draft Cultural Resource Protection Plan.

2.0 PREVIOUS RESEARCH

In addition to studies conducted for CZN along the road alignment between the NNPR and Nahanni Butte, archaeological field work within the general vicinity of the Project area has been completed by Parks Canada (Parks) within the NNPR. Geographically, this work was limited to the original park boundaries. The park was expanded in 2009 to its current extent (Figure 4). Parks carried out preliminary archaeological assessment of present and potential visitor impact areas in the late 1970’s (Amsden 1977 and 1978), and reported historic trapper and prospector sites in almost all areas of the park that were examined, with Precontact sites (indigenous sites that predate European contact in the

late 18th Century) limited to the lowermost portion of the South Nahanni watershed. Yohin Lake, identified as a location for Precontact settlement by Amsden (ibid), was revisited in 1989 by B.K.O. Reeves (Integrated Environments 1990) and several sites were also recorded during the course of multi-year life sciences targeted surveys by the Canadian Wildlife Services (Marsh and Scotter 1975 and 1976; Scotter and Marsh 1977; Cairns et al. 1978). More recently, Parks has carried out a small survey of the Virginia Falls campground that did not result in any new sites being recorded, and from 2000 to 2005 Parks undertook a yearly archaeological survey and assessment of cultural resources within the extant Park boundaries (Arthurs 2011). Survey work targeted the areas along the Flat and South Nahanni River corridors and along the shorelines of Rabbitkettle and Yohin Lakes. These field investigations identified or revisited 98 archaeological sites within Park boundaries (Arthurs 2011).

Figure 4: Map of the Nahanni National Park Reserve showing original boundary and 2009 expansion (from Arthurs 2011).



Since the expansion of the NNPR, Parks completed a review of cultural resource sites near Glacier Lake. This study assessed conditions at a Precontact site found in Fairy Meadows, and three historic sites, one of which dated to an exploratory expedition in the 1930's (Deck 2013).

Outside of the NNPR, the Canadian Museum of History has been responsible for the majority of the archaeological survey work done in the region, beginning in the 1950's with R.S. MacNeish (1951 and 1953), and followed by several large surveys of the Mackenzie River Valley (Miller 1972; Miller et al. 1973). More recently, heritage studies along the Mackenzie River have been undertaken for oil and gas, transportation, and communication infrastructure. These have included surveys for the Mackenzie Pipeline Archaeological Project (Losey 1973), transportation corridor overview (Fedirchuk and Millar 1981), Mackenzie Gas Project (Thomson and Stoddard 2001; Clarke et al. 2003 and 2004; Webster et al. 2007), the Mackenzie Valley Fibre Link Project (Layton 2015).

Subsequent investigations include T'logsho Plateau Survey (Hanks 1991) which identified a number of quarry sites on the plateau which is now within the expanded NNPR; the Samba K'e Archaeology Project, which identified several Precontact sites near Trout Lake (MacKay 2014), and the Lue Tue Sulai (Five Lakes) Archaeology Project (MacKay 2013), which identified several sites (Precontact and historic) along relatively smaller waterbodies in the area.

In 2015, Kalo Stantec completed a survey of the proposed Howard's Pass Access Road (Young et al. 2016). The proposed road is 79 km long, extending along the Yukon – Northwest Territories border through the Sahtu Settlement Area, the Dehcho Traditional Territory, the NNPR and Nááts'ihch'oh National Park. Field investigation of 103 potential zones was completed, identifying six new Precontact archaeological sites consisting of lithic artifacts, but without identifying any diagnostic lithic materials.

There have been two archaeological investigations associated with CZN's access road. In September 2009, Points West Heritage Consulting Ltd. completed an AIA of selected portions of the proposed winter road between the Liard Highway and the Prairie Creek Mine (Prager 2009), and in September 2012, Golder Associates Ltd. completed an AIA of a proposed realignment of the access road, the Nahanni Range realignment between Nahanni Butte and the Grainger Gap (Murphy 2013). These AIAs included consultation with Nahanni Butte Dene Elders and community members, which was incorporated into the study programs. Both surveys included Nahanni Butte member involvement, and employed low-level aerial reconnaissance, pedestrian survey of high potential areas, and the judicious placement of shovel tests in areas without subsurface exposures. No heritage sites were recorded as a result of the two AIAs.

Previously Recorded Archaeological Sites

The majority of archaeological surveys in the vicinity of the project area have been focused on the shorelines of large waterbodies – the Laird, Mackenzie, Flat, and South Nahanni Rivers, the shoreline of Glacial Lake Nahanni, Rabbit Kettle and Yohin Lakes; Cli, Sibbeston, Little Doctor and Trout Lakes, among others. As a result, the majority of archaeological sites in the region are recorded within a short distance of these waterbodies. However, sites have been recorded along smaller streams and lakes, when investigation of these areas have been conducted (Young et al. 2016).

Culturally, the majority of heritage resources recorded in the vicinity of the Project are contemporary sites associated with hunting and trapping activities, or earlier (historic) sites associated with similar activities. Gold prospecting did occur in the mountain ranges within NNPR beginning with the Klondike Gold Rush (1897 -1899) and continuing into the twentieth century, perhaps most famously with the rumours of the lost McLeod Mine associated with the mysterious deaths of the McLeod Brothers around 1908, and the death of Swiss prospector Martin Jorgenson in 1915 (Arthurs 2011). Therefore, there is a possibility that these sites are associated with prospecting activities in addition to hunting and trapping. Relatively fewer sites are recorded as Precontact with only 13 of the 54 sites that have been recorded to date within 50 km of the Project (about 20%). There are no previously recorded heritage sites within the Project footprint.

Seventeen heritage sites are recorded within 20 km of the Project with four (JgRu-1 to -4), within 5 km (Table 1). The sites closest to the Project are all at or near the confluence of the South Nahanni and Liard Rivers, and were recorded by Amsden in 1977. JgRu-1 is a historic settlement consisting of three fallen chimneys, each adjacent to a large pit, interpreted as the remains of possible earth houses. Excavations at JgRu-1 revealed two occupation components, one attributable to contemporary or recent occupation, likely Dene, and the other as a probable historic European occupation. It is at the confluence of the South Nahanni and Liard Rivers and has been interpreted as the site of a trading post (Amsden 1978).

Table 1: Previously recorded heritage sites within 20 km of the Project.

Site Name	Classification	Type/Feature	Permit/Reference	Comments	Distance from Project
JgRu-1	indigenous historic; contemporary	trading post?	Amsden 1978	Three chimneys associated with pits, interpreted as a trading post	1.7 km
JgRu-2	Precontact	isolated find	Amsden 1978	Complete chert biface was recovered	2.3 km
JgRu-3	indigenous historic	campsite	Amsden 1978	Hearth feature, bone flesher	3.2 km
JgRu-4	Precontact	isolated find	Amsden 1978	Isolated lithic flakes	4.2 km
JiSf-1	undetermined	possible campsite	2001-00014	Axe-cut stumps near present day campsites	17 km
ZAVR-117	Precontact	isolated find		A biface found by a resident near the Blackstone River	17 km
JhRw-7	undetermined	isolated find		50 m north of Yohin Lake.	18 km
JhRw-2	indigenous historic; contemporary	trail		Trail extends from the north shore of Yohin Lake with the South Nahanni River.	19 km
JhRw-9	contemporary	campsite (hunting)	2002-00006	A modern, hunter/trapper camp at Yohin Lake.	19 km
JiSe-1	contemporary	campsite	2001-00014	A modern, Indigenous campsite in Third Canyon.	19 km
JhRw-8	undetermined	isolated find		Isolated find near Yohin Lake.	19 km
JhRw-6	Precontact	isolated find	1978-440	Concentration of burned bone fragments on Yohin Lake.	19 km
JhRw-4	Precontact	possible campsite	1978-440	Black chert end scraper and bone fragments.	19 km
JhRw-5	Precontact	isolated find	1978-440	Chert flakes and bond fragments	19 km
JhRw-3	precontact	possible campsite	1978-440	Two bifaces and 100+ flakes on Yohin Lake.	19 km
JiSg-1	contemporary	campsite	2001-00014	Modern, trapper/pro prospector campsite at the confluence Mary and South Nahanni rivers	20 km
JgRv-1	indigenous historic	trail		Trail east from Jackfish River along the bank of the South Nahanni River.	20 km
JhRw-1	undetermined	group of previously recorded sites; various.	1973-334	Designation refers to group of sites on Yohin Lake.	20 km

JgRu-2, -3 and -4 were recorded as small historic/Precontact indigenous finds, also near the confluence of the South Nahanni and Liard Rivers. JgRu-2 represents the location of a complete chert biface

recovered in the backdirt of the construction site for the new Nahanni National Park Operations Centre. JgRu-3 consists of a hearth feature and bone refuse, and a moose metapodial flesher, recovered in subsurface test pits excavated in a terrace overlooking the Liard River. JgRu-4 was recorded as isolated lithic flakes from two localities on a terrace overlooking the South Nahanni River (Amsden 1978).

Table 2: Previously recorded heritage sites located between 20 and 50 km from the Project.

Site Name	Classification	Type/Feature	Permit/Reference	Distance from Project
JhSa-5	undetermined	campsite, axe cut stumps	2001-00014	22 km
JhRx-1	historic	cabin, cache, trail	2001-00014	23 km
JhSa-1	undetermined			23 km
JjSh-3	contemporary	campsite (trapping)	2001-00014	24 km
JjSh-1	contemporary	campsite (trapping)	2001-00014	25 km
JjSh-2	contemporary	campsite (hunting)	2001-00014	25 km
JhSa-4	historic; contemporary	campsite	2001-00014	25 km
JhSa-2	historic; contemporary	cabin	2001-00014	25 km
JhSa-3	contemporary	burial	2001-00014	25 km
JhSe-1	contemporary	campsite (trapping)	2001-00014	26 km
JhSd-2	indigenous historic	campsite (trapping)	2001-00014	28 km
JhSd-1	contemporary	campsite	2001-00014	29 km
JjSi-3	contemporary	campsite	2001-00014	30 km
JjSi-2	historic; contemporary	campsite	2001-00014	30 km
JjSi-1	undetermined	campsite		31 km
JhSd-0	undetermined	campsite		33 km
JhSc-1	historic	campsite		34 km
JhSc-2	contemporary	campsite	2001-00014	34 km
JjSi-4	historic	portage	2001-00014	34 km
JhSc-3	indigenous historic; historic	campsite	2001-00014	35 km
JhSc-5	indigenous historic	campsite	2001-00014	35 km
JhSc-7	contemporary	campsite (trapping)	2001-00014	35 km
JhSc-6	undetermined	campsite	2001-00014	35 km
JhSc-4	undetermined	isolated find	2001-00014	35 km
JjSj-1	contemporary	campsite	2001-00014	38 km
JlSh-2	indigenous historic	campsite		40 km
JlSh-1	indigenous historic	campsite (spring, winter)		40 km
JlRu-4	Precontact	isolated find (lithic)	1972-326	45 km
JlRu-3	Precontact	isolated find (lithic)	1972-326	46 km
JlRu-1	Precontact	isolated find (lithic)	1972-326	46 km
JlRu-2	undetermined	campsite (fishing)?	1972-326	47 km
JjSk-2	undetermined	campsite	1978-440	47 km
JjSk-5	contemporary	trail	2002-00006	47 km
JjSk-4	contemporary	campsite	2002-00006	48 km
JhSj-1	undetermined	campsite		48 km
JjSk-6	contemporary	trail	2002-00006	48 km
JdRw-1	contemporary	campsite		49 km
JjSk-7	Precontact	scatter	2002-00006	49 km
JjSk-3	undetermined	axe cut stumps	2002-00006	49 km
JlRt-2	Precontact	scatter	1972-326	50 km

Thirteen sites are between 10 and 20 km from the proposed alignment (Table 1). Of these, only five are Precontact, three of which are isolated finds. Six sites are recorded as historic or contemporary sites associated with trapping or potentially prospecting activities. Nine are near Yohin Lake (including four of the Precontact sites); the rest were recorded near the South Nahanni River, with the exception of one Precontact isolated find near the Blackstone River.

Forty heritage sites have been previously recorded between 20 and 50 km from the Project. These include five Precontact sites (all lithic scatters), 10 sites of undetermined classification, and 25 historic or contemporary sites (primarily campsites associated with hunting or trapping activities). The information is summarized in Table 2. Not recorded in Table 2 is a contemporary cabin on the west side of Grainger Gap near a lake which is owned by Raymond Vital of Nahanni Butte (D. Harpley, pers. comm.).

3.0 ARCHAEOLOGICAL POTENTIAL OF THE PROJECT

The September 2009, Points West Heritage Consulting Ltd. (Points West) AIA focused on select portions of the winter access road considered to have elevated heritage resource potential (Prager 2009). A previous winter road consisting of a cutline prepared in the 1980's was used for two winters by the previous owner of the Mine to transport equipment to the Prairie Creek Mine Site from Highway 7 at Lindberg Landing. The AIA investigated three areas that had been identified during a Nahanni Butte Dene traditional knowledge study and included Second or Grainger Gap, Wolverine or Silent Hills Pass, and the crossing of the Tetcela River. The AIA was conducted under NWT Archaeologist Permit 2009-023A and Parks Canada Research Permit HAH-2009-3917 (Prager 2009). Prior to the field studies, the archaeologist met with Nahanni Butte community members and the field reconnaissance was completed over a two-day period with a representative of CZN, Wilbert Antoine, and Nahanni Butte Elders Leon Konisenta, Raymond Vital and Tom Betsaka. The AIA consisted of an overflight of the three areas of interest with ground reconnaissance along the road corridor through the entire length of the Grainger Gap pass, both sides of the main Tetcela River crossing, and a Tetcela tributary crossing further west. Pedestrian survey methods included visual inspection of all ground exposures and subsurface testing with eight shovel tests at the Tetcela River crossing and nine shovel tests at the western portion of Grainger Gap. Although no archaeological sites were recorded during the study, a recent camp was noted on the west end of Grainger Gap comprised of a wooden tent frame, cut brush, a pail, a glass jar, and a stone-lined firepit that was interpreted as dating to the 1980's (Prager 2009).

In September 2012, Golder Associates Ltd. undertook an AIA of a proposed realignment of the winter access road, the Nahanni Range realignment between Nahanni Butte and Grainger Gap (Murphy 2013). The realignment extends from just northeast of the community of Nahanni Butte north along the Nahanni Front Range to Grainger Gap where it meets up with the old winter road alignment from Lindberg Landing. The AIA was conducted under NWT Archaeologist Permit 2012-016 over a two-day period. The study was planned in conjunction with Elders and community members in Nahanni Butte with several members being consulted about the project who provided input into the study design. The field studies included the participation of Wilbert Antoine from CZN and Peter Marcellais and Elder Leon Konisenta from Nahanni Butte. The entire ROW was examined by helicopter and pedestrian survey was focused on the crossing of the Liard River. No new historic resource sites were recorded or revisited by the 2012 AIA, however, two traditional land use sites were noted. These included an older cutline maintained by Raymond Vital as a snowmobile trail to access his camp on the Liard River, and a small handcut trail used to retrieve an animal that had been hunted.

The previous AIAs for the Project targeted specific areas and for a specific type of impact. In 2009, Points West examined three areas identified by the Nahanni Butte Dene as having the highest potential for heritage resource occurrence and did not include a formal assessment of any other portions of the road. The 2012 AIA focused on the Nahanni Range realignment to Grainger Gap. The surveys were also based on winter road use using existing cutlines where possible. In the 2009 study, Prager noted that “it may be possible that some deeply buried deposits exist on the west side of the Tetcela River crossing where there has been flood deposition, but this is not considered a major concern in the case of a winter road which typically involves comparatively little ground disturbance. Since this crossing is simply at a mid-stream point and not near a typical focal point such as a confluence, the chances of archaeological remains being present at this location are considered low” (ibid 2009:16).

The potential impacts associated with the Project, including borrow sources, borrow access roads, camps, staging areas, and other supporting facilities and new land disturbances associated with installation of bridges and culverts, clearing the road ROW, and road realignments is more intrusive and has more potential to impact yet unrecorded heritage resource sites, if present. The changes and addition of infrastructure associated with an all-season road should be subject to an AIA that takes into account the previous work.

GIS Modelling

As part of the AOA, Lifeways completed GIS modelling of the Project using LiDAR supplied by CZN. The GIS modelling included attributes such as proximity to water, known travel routes, heritage resource sites, available traditional knowledge, topography and LiDAR data, landform interpretation through aerial photography, and the interpretation and judgment of a professional archaeologist (Figure 3). More specifically, the GIS model included the following attributes:

- **Distance from Water – Regional Scale:** Water location model, represents all areas within the study area that are within 4 km of a major waterbody (3,000 acres in size or greater) and within 500 m of a smaller waterbody. According to the record of previously recorded sites for this area, 86.7% of previously recorded sites meet these criteria. Exceptions include a cluster of sites associated with a quarry to the south and a cluster of sites associated with a Sahtu Settlement Area.
- **Elevation – Regional Scale:** For previously recorded sites with data on elevation, elevation ranges from 496 to 731 metres above sea level (masl). Values within two standard deviations of the median elevation value lie between 493 and 611 masl. This is a very small range for elevation given the terrain of the study area and is likely not meaningful, although a polygon indicating the small area within the study area that meets this definition has been included.
- **Local Topographical Models:** Given the variation in topography over the relatively large length of the project, three separate models were constructed for mountainous, hilly, and flat terrain.
 - **Flat** - The flatter topography towards the south end of the Project (and near the Liard River) is likely the highest-potential area. Relatively higher or exposed topographic features were extracted from LiDAR data. Higher features were assigned a higher value. An additional point was added to the topographical potential score if the feature was south facing.
 - **Mountainous** - The northwest end of the Project lies in the narrow Prairie Creek valley. The topographic model for this area was aimed at identifying flat, low-lying topographic features with relative elevation scores within a certain range (i.e., not high above the valley, but not

- within or level with the creek channel). All areas which met these criteria were assigned a value of 1. An additional point was added to the score if the aspect was south facing.
- **Hills** - An area of foothills and rolling terrain lies between the flat and mountainous portions of the Project. The topographical model for this area was similar to the one for the mountainous region, but with a narrower allowed value for relative elevation and for slope to account for the less extreme elevation differences. Given the relative scarcity of water in this area of the Project, areas of high potential were limited to locations within 300 m of a recorded water source.

Interpretation of GIS modelling

As the modelling is based on previously recorded sites, the highest potential areas are along the south end of the Project close to the Liard River (Figure 3 Maps 1 to 10) with areas of elevated potential shown along its tributaries, the bank of the Liard River, and old drainage channels and flood scars. Between the Liard River and Grainger Gap, the elevated potential from the model shows up in and around potential borrow sources and the drainages along the Nahanni Range north of Bluefish Lake (Figure 3 Maps 10 to 21). The area between Bluefish Lake and Grainger Gap also shows elevated potential for topography. Between Grainger Gap and Wolverine Pass, (Figure 3 Maps 21 to 29) the model shows elevated potential close to the passes and some elevated potential along watercourses and areas of high elevation near proposed borrow sources. Going west from Wolverine Pass to Sundog Creek the ROW crosses Tetcela River, and drainages including the inlet to Mosquito Lake (Figure 3 Maps 29 to 47). Through this section of the ROW, the model shows elevated potential at drainage crossings, borrow sources, and flat areas along the edge of drainages in valleys and one area that shows elevated potential for topography (Figure 3 Map 33). The ROW then follows Sundog Creek to a high elevation pass and then a tributary of Prairie Creek (Funeral Creek) to Prairie Creek and on to the Mine site (Figure 3 Maps 47 to 61). Similar to the last section, the model shows elevated potential at flat areas along the creek valleys, drainage crossings and borrow sources, with Prairie Creek also having elevated potential due to proximity of water.

Traditional Land Use

Available traditional knowledge and community interviews were incorporated in the survey design of both previous AIAs for the winter access road. The 2009 survey was based on the results of a Traditional Knowledge Assessment of the Prairie Creek Mine Operation (Nahá Dehé Dene Band 2009) and supplemented by interviews with community members prior to undertaking the field work (Prager 2009). The 2012 AIA also included interviews with community members to identify high potential areas (Murphy 2012) and both surveys included the participation of community members in the field assessments. Traditional knowledge used in the design of the AIAs included the importance of Grainger Gap, Wolverine Pass, the Tetcela River, the north bank of the Liard River and Bluefish Lake as important use areas for Nahanni Butte people. Community members also discussed the specific location of trails and camps that are currently used for traditional activities along the Liard River and Nahanni Front Range.

4.0 SUMMARY AND RECOMMENDATIONS

The Prairie Creek Mine is situated in the southern Mackenzie Mountains of the Northwest Territories, approximately 90 km northwest of Nahanni Butte. CZN has proposed an “all season” road generally along the permitted winter road alignment. The Project is a 180 km long, all season access road that will connect the Prairie Creek Mine to the Liard Highway, approximately 80 km of which is in the NNPR, and includes related infrastructure such as borrow sources, borrow access roads, camps, staging areas and other supporting facilities, new land disturbances associated with installation of bridges and culverts, and clearing the ROW and road realignments. This AOA was prepared to assess the archaeological potential of the road based on the existing knowledge of archaeological resources and available traditional knowledge to assess land forms for their heritage resource potential.

Based on the review of previous research, both for the Project and in the general Project area, available traditional knowledge, and GIS modelling, a preconstruction AIA is recommended for the Project. The scope of the AIA should take into consideration, and supplement, the work that has been previously completed for the winter road. CZN has committed to include Nahanni Butte Dene in ground-truthing during such an AIA, under the direction of a professional archaeologist. CZN has also committed to developing a Cultural Resource Protection Plan that includes providing preconstruction road survey crews with a heritage resource booklet showing the range of heritage resources that might exist, to aid in possible field identification.

Types of sites that may be impacted by the Project include historic mining or prospecting camps, tent frames, hunting blinds, sheep or caribou fencing, quarry sites, Precontact campsites, burials, fire pits, tent poles, depressions or berm foundations, Precontact or historic artifact scatters, and cairn drive lanes or directional markers. Although most of the previously recorded sites in the general Project area were recorded along rivers and lakes, this is somewhat biased as most of the studies were focused on rivers and lakes. The T’logsho Plateau Survey, completed by C. Hanks (1991) with similar topography to the Ram Plateau resulted in several Precontact sites being recorded above the tree line, including a hunting blind structure and several lithic scatters, one of which included a “Clovis” like fluted projectile point base (Hanks 1991:6) dating the site to the Palaeo-Indian Period. Similarly, although historic prospecting activity was concentrated along the South Nahanni and Flat Rivers, there are references to explorations up tributary creeks, such as Prairie Creek.

It is recommended that the scope of the preconstruction AIA should focus on the infrastructure associated with the Project, especially the borrow sources, camps, staging areas, drainage crossings and areas that were not included in the previous studies or identified specifically during consultation with Nahanni Butte Dene. More specifically:

- **Between Highway 7 and Wolverine Pass** (Figure 2 Maps 1 to 4) the AIA should be concentrated on the proposed borrow sources and water crossings. Although the winter road between Highway 7 and Grainger Pass has been subject to AIA studies in 2009 and 2012, the more intrusive impacts associated with an all-season road at watercourse crossing should be evaluated based on the level of impact. Deviations from the winter road, and all the new infrastructure such as borrow sources and their access roads should also be examined. The potential of the watercourse crossing and proposed borrow sources was shown as elevated in

the GIS model, and community interviews discussed the importance of Grainger Gap and the banks of the Liard River.

- **From Wolverine Pass to Sundog Creek** (Figure 2 Maps 5 to 7) the GIS model shows elevated potential at drainage crossings, borrow sources, and flat areas along the edge of drainages in valleys and one area of topography west of the Tetcela River crossing. The 2012 AIA did examine the Tetcela River crossing on the ground and did a fly over of Wolverine Pass. However, Prager (2009) did suggest that there might be deeply buried deposits on the west side of the Tetcela River that have a low potential of containing a heritage site within the flood deposits. It is recommended that the scope of the AIA for this portion of the Project include the borrow sources, drainage crossing, Wolverine Pass, and flat areas along the drainage valleys.
- **From Sundog Creek to the Prairie Mine Site** (Figure 2 Maps 7 to 9) the Project, for the most part, is routed along creek valleys and is already built to all season standards. Similar to the last section, the GIS model shows elevated potential at flat areas along the creek valleys, drainage crossings, and borrow sources with Prairie Creek also having elevated potential due to proximity of water. This section of the Project has not been subject to any previous archaeological survey and was not mentioned in any of the available traditional knowledge or community interviews. Therefore, it is recommended that the scope of the AIA for this portion of the Project be those areas identified as having elevated potential, and only where new disturbance will occur.

The areas identified by this AOA as having elevated potential are based on a review of available maps, satellite imagery, previous research, LiDAR-based GIS modelling, and previous experience by the author. However, the areas identified need to be visually verified in the field by low level helicopter overflight by a professional archaeologist. It is not expected that all areas identified will require ground truthing but that the interpretations contained herein be sampled and verified by ground truthing and subsurface testing. The AIA should also address secondary and tertiary impacts to any heritage sites by either expanding the survey parameters at areas that have elevated potential outside of the Project, and/or policies that will restrict use of the road by the general public.

5.0 CULTURAL RESOURCE PROTECTION PLAN

Once the AIA has been completed, irrespective of the results, a Cultural Resource Protection Plan will be developed. The plan will build on the heritage resource booklet and will include illustrated descriptions of site types that are common to the Project area with examples from the AIA or previous research. Once the AIA is completed, in the unlikely event that cultural material is uncovered during the construction of the Project, work should stop temporarily and depending on the jurisdiction involved, either Parks or the PWNHC be contacted to discuss how to proceed.

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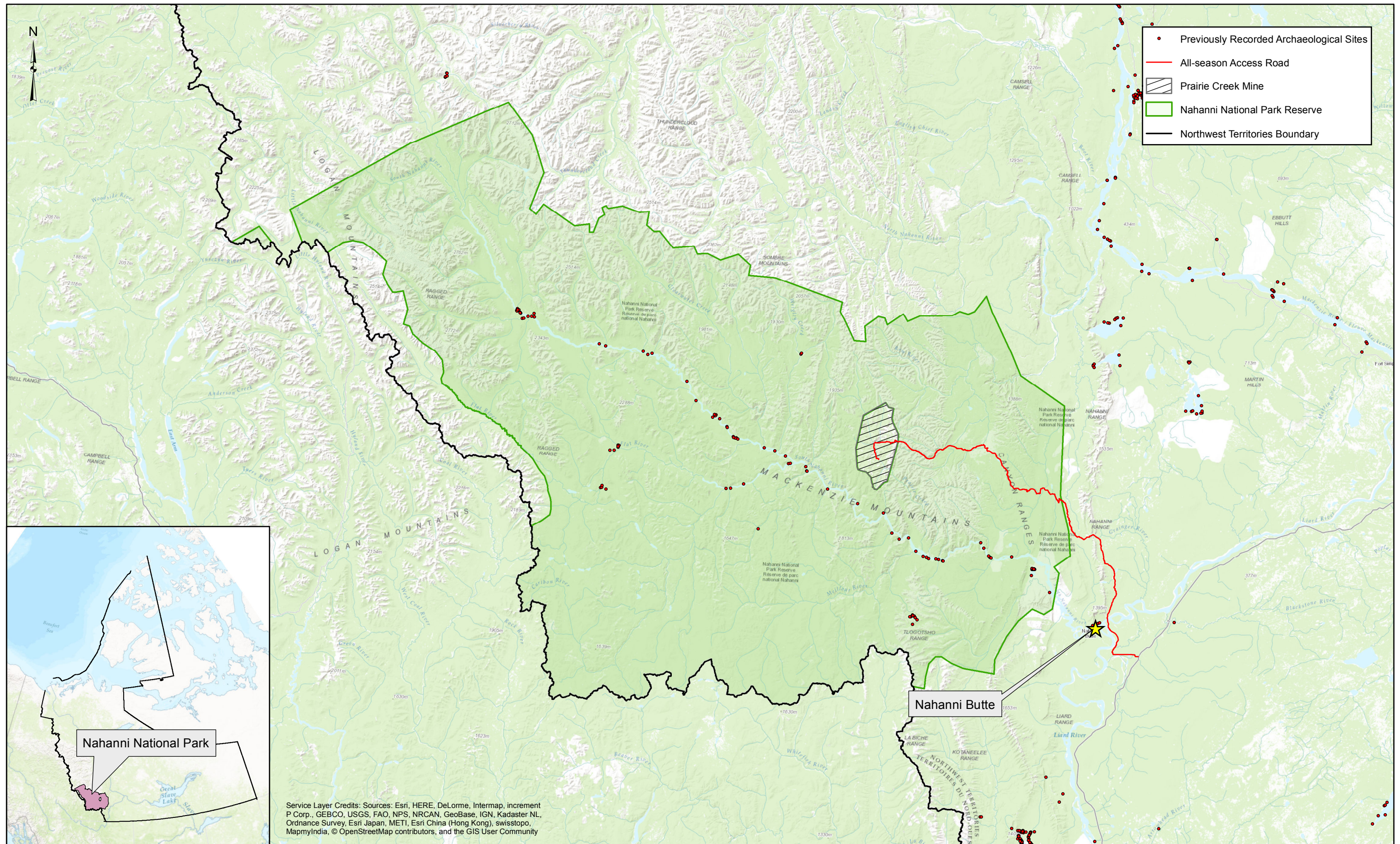


Figure 1: Location of All-season Access Road, Nahanni National Park Reserve, Prairie Creek Mine, and Previously Recorded Archaeological Sites.

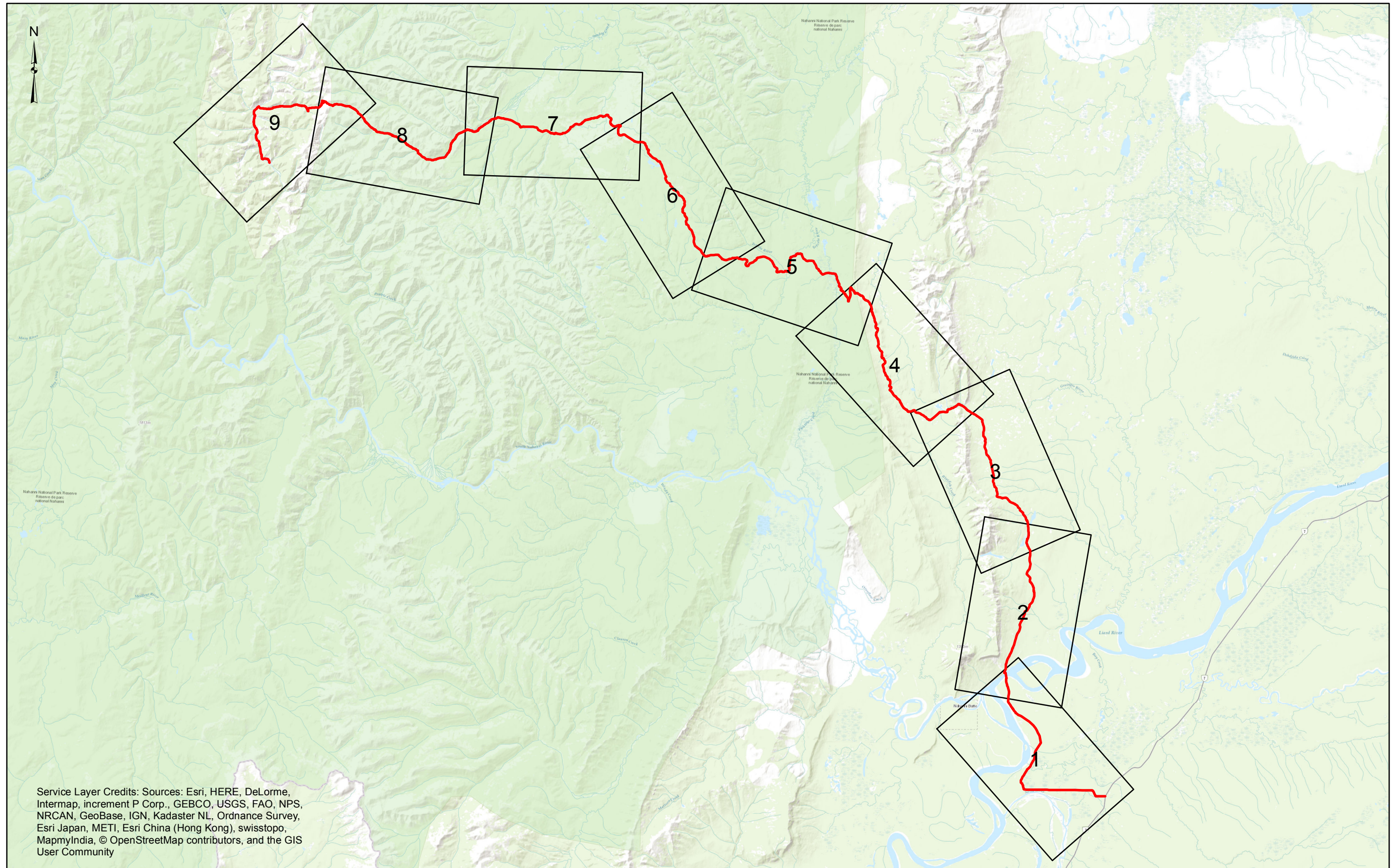


Figure 2: Index Map for 1:50,000 NTS Topographic Maps

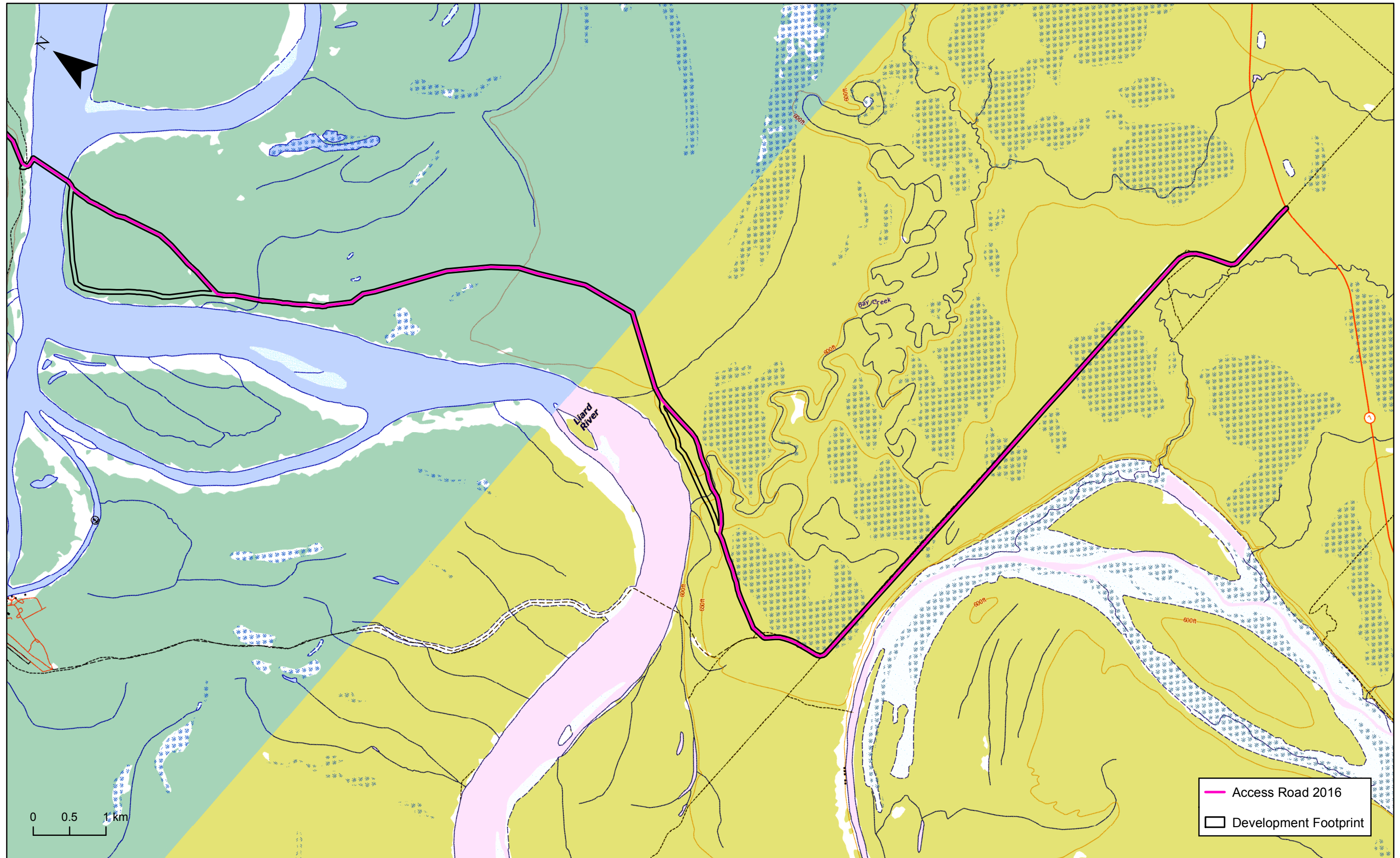


Figure 2: Access Road with previously recorded archaeological sites and 1:50,000 NTS Topographic Map, Map 1 of 9.

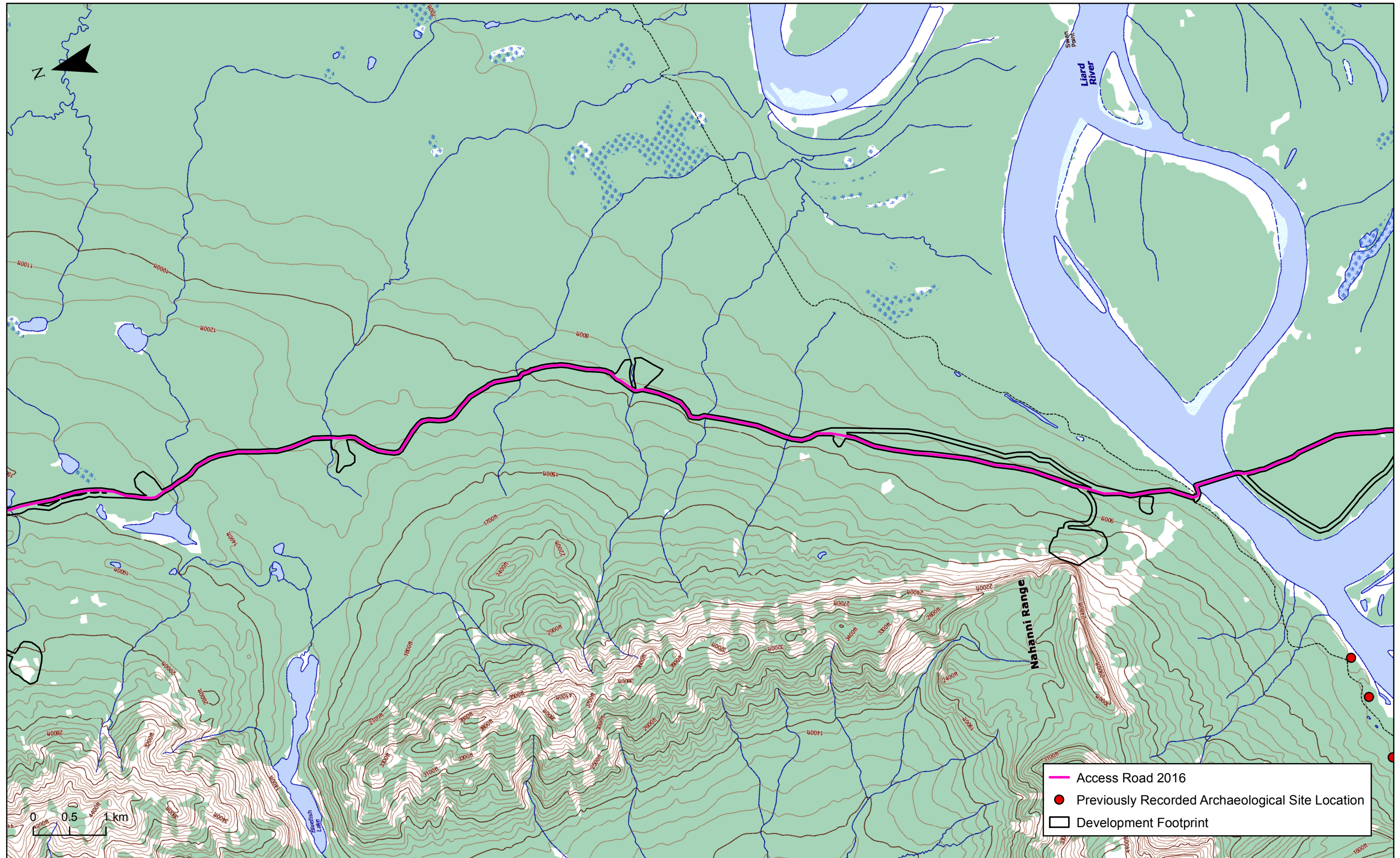


Figure 2: Access Road with previously recorded archaeological sites and 1:50,000 NTS Topographic Map, Map 2 of 9.

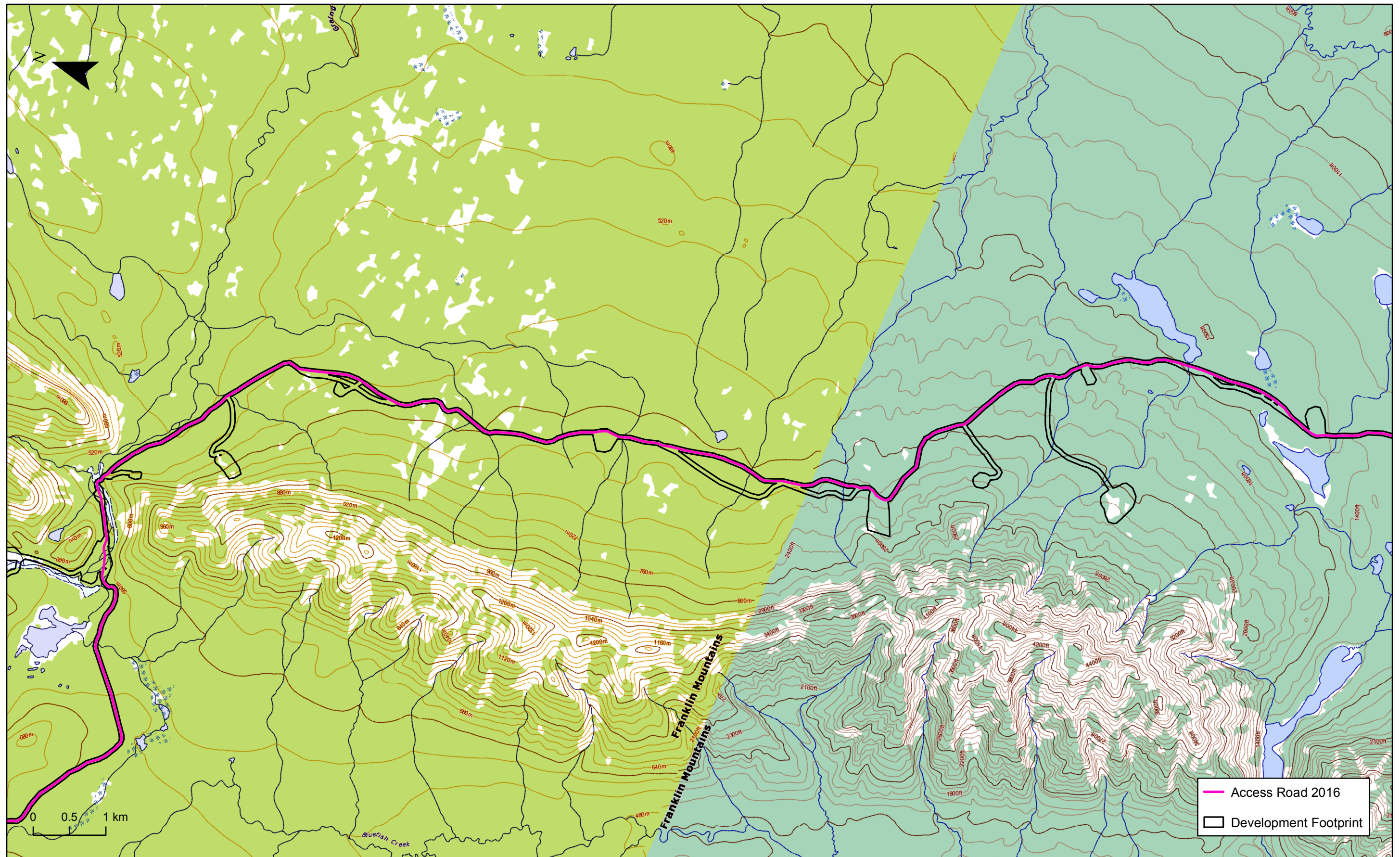


Figure 2: Access Road with previously recorded archaeological sites and 1:50,000 NTS Topographic Map, Map 3 of 9.

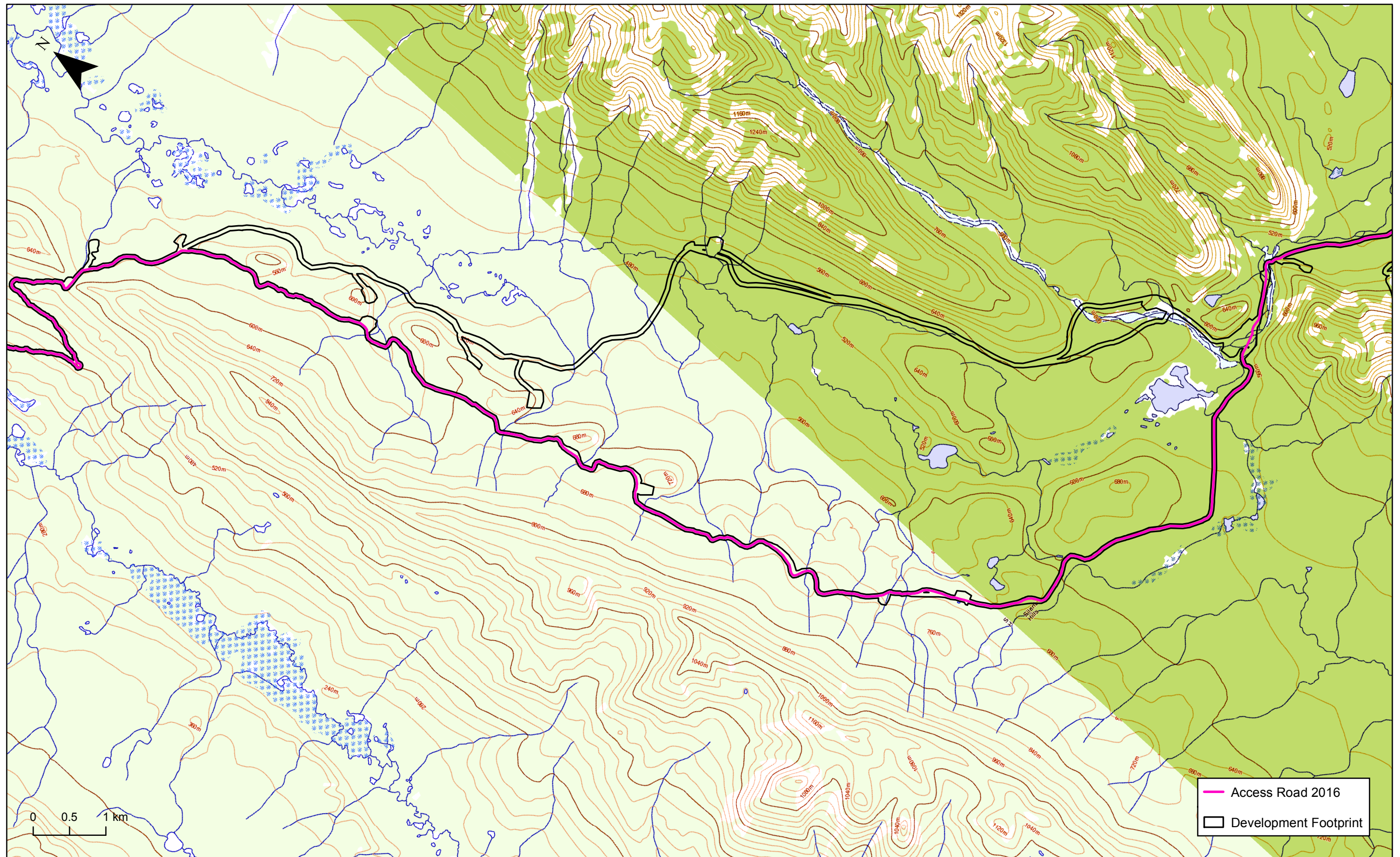


Figure 2: Access Road with previously recorded archaeological sites and 1:50,000 NTS Topographic Map, Map 4 of 9.

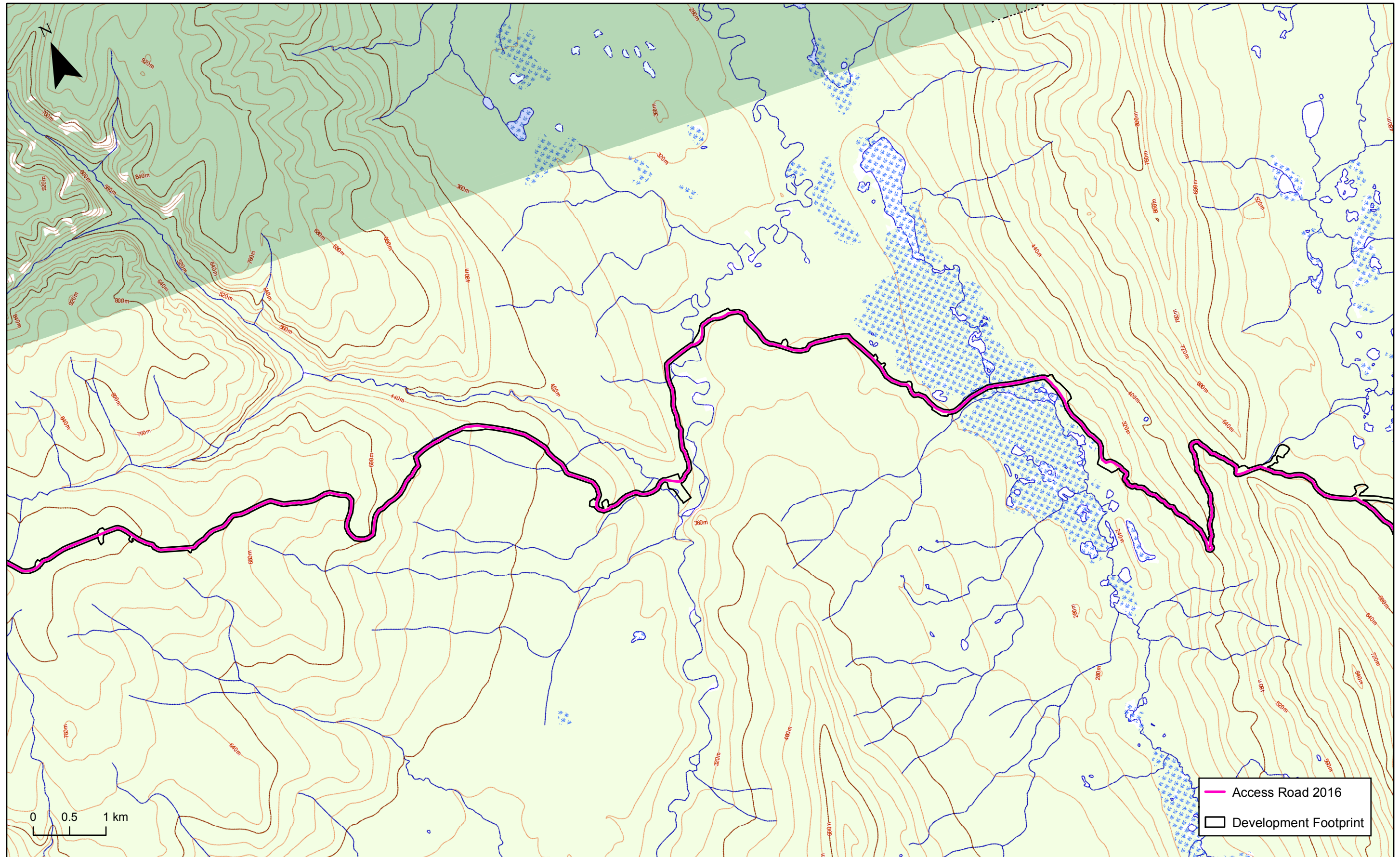


Figure 2: Access Road with previously recorded archaeological sites and 1:50,000 NTS Topographic Map, Map 5 of 9.

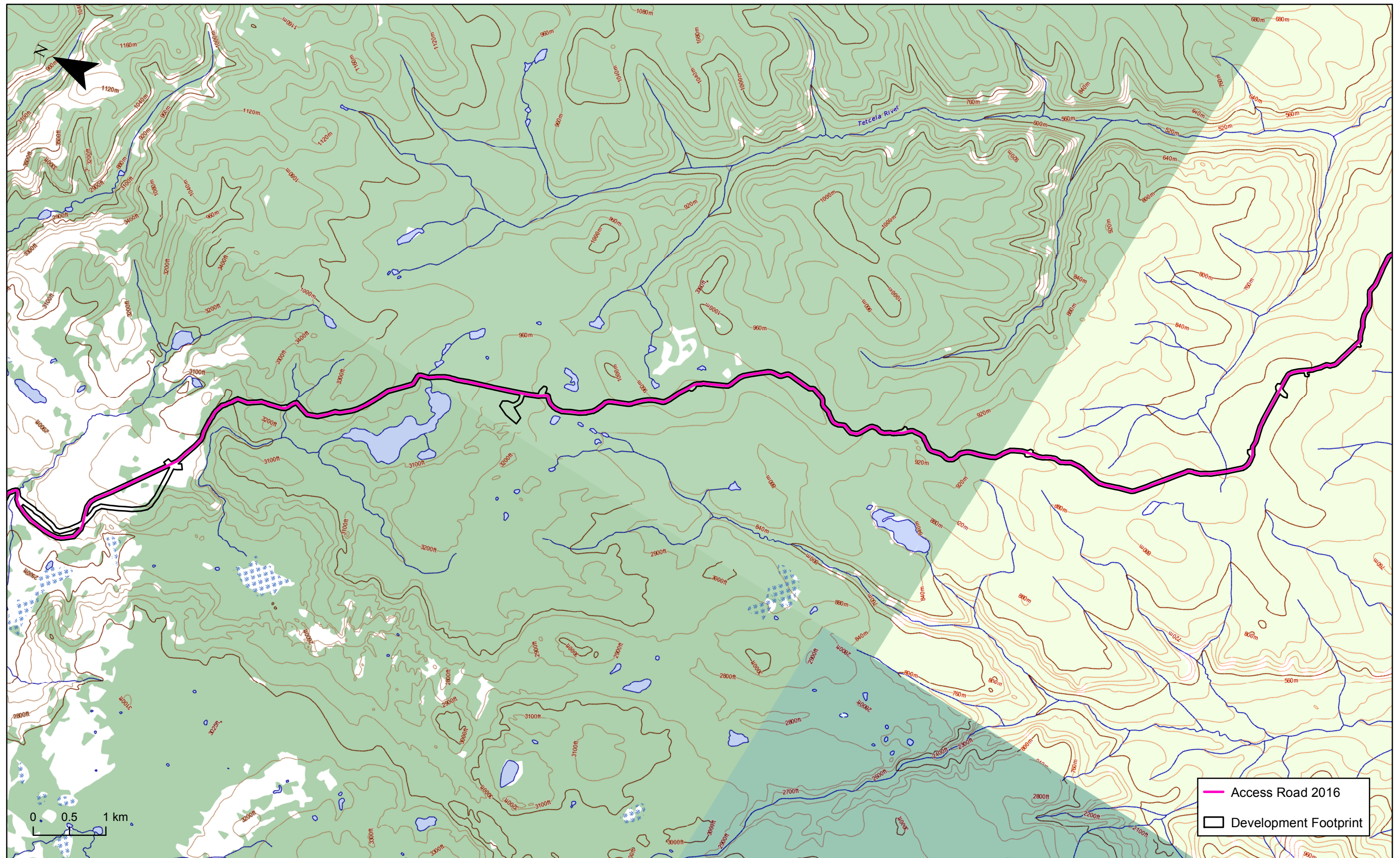


Figure 2: Access Road with previously recorded archaeological sites and 1:50,000 NTS Topographic Map, Map 6 of 9.

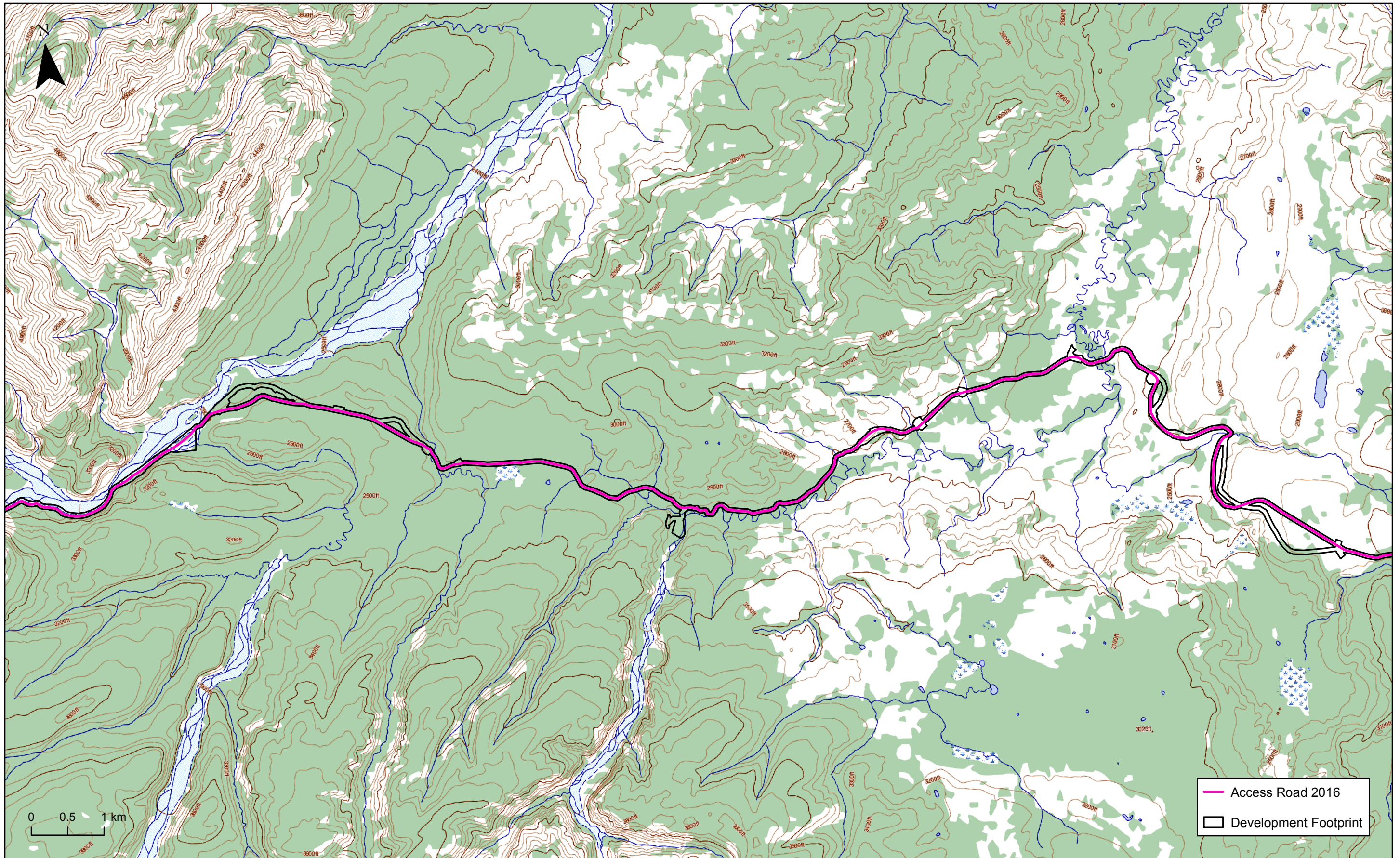


Figure 2: Access Road with previously recorded archaeological sites and 1:50,000 NTS Topographic Map, Map 7 of 9.

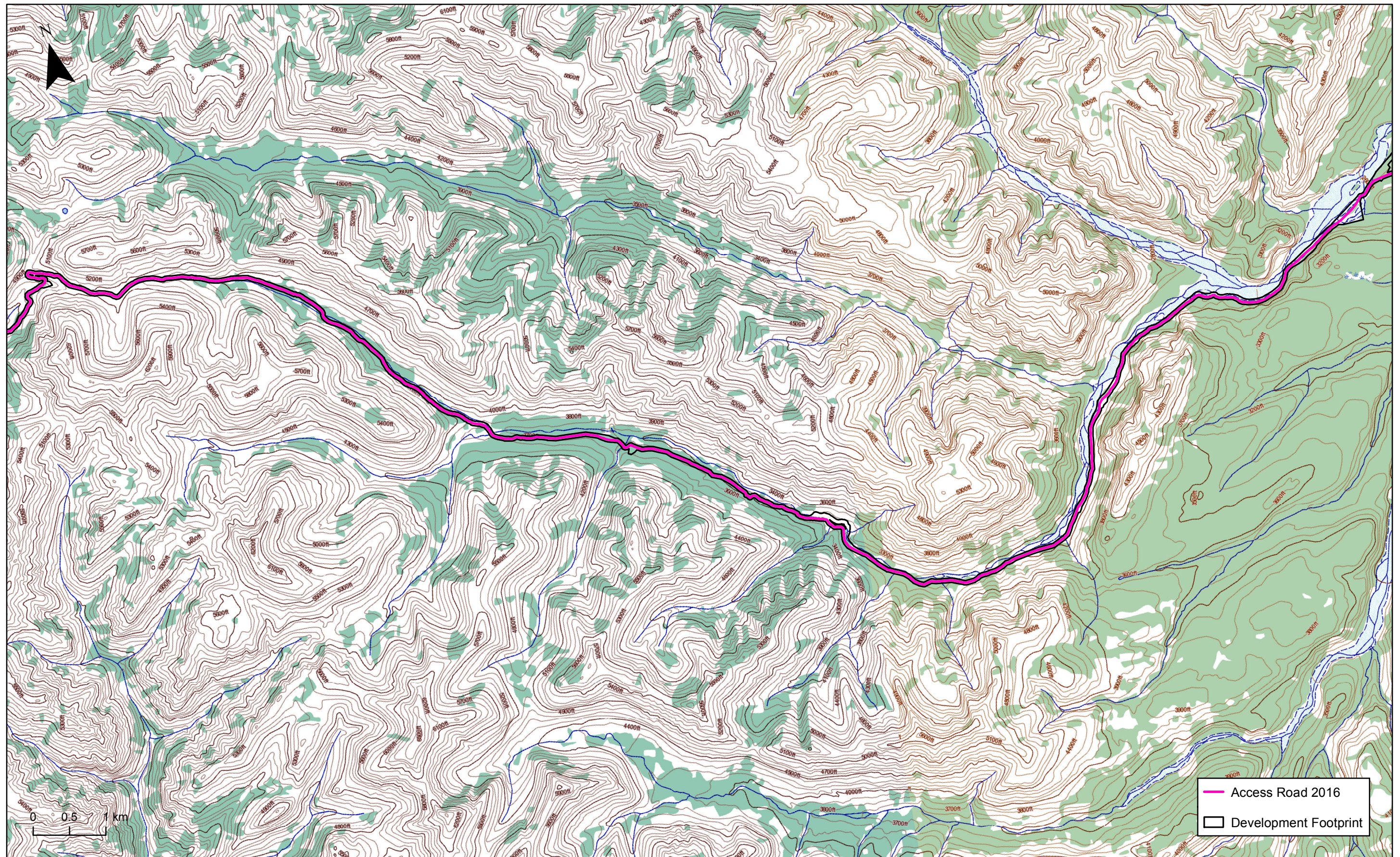


Figure 2: Access Road with previously recorded archaeological sites and 1:50,000 NTS Topographic Map, Map 8 of 9.

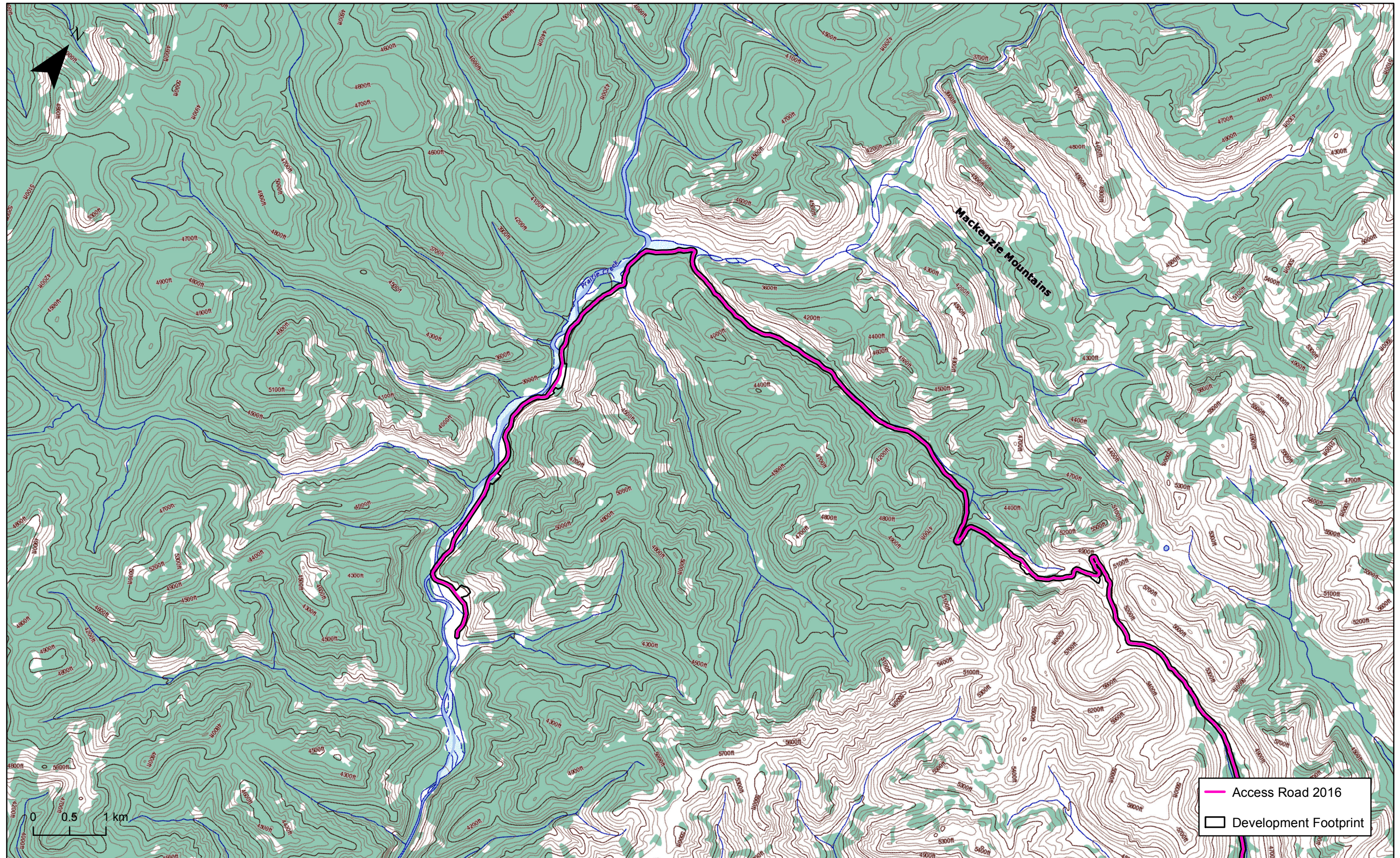


Figure 2: Access Road with previously recorded archaeological sites and 1:50,000 NTS Topographic Map, Map 9 of 9.

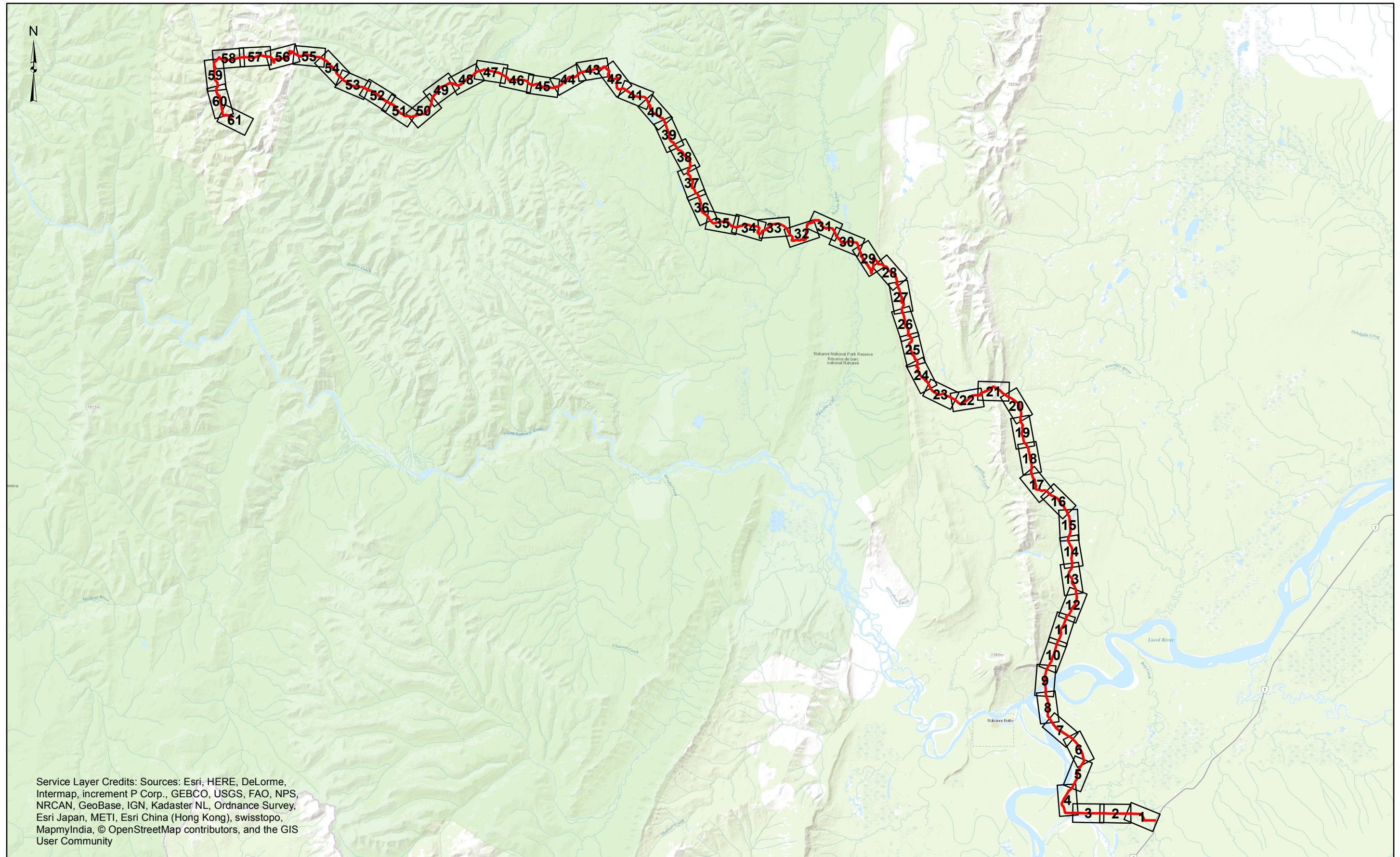


Figure 3: Index Map for Potential Model

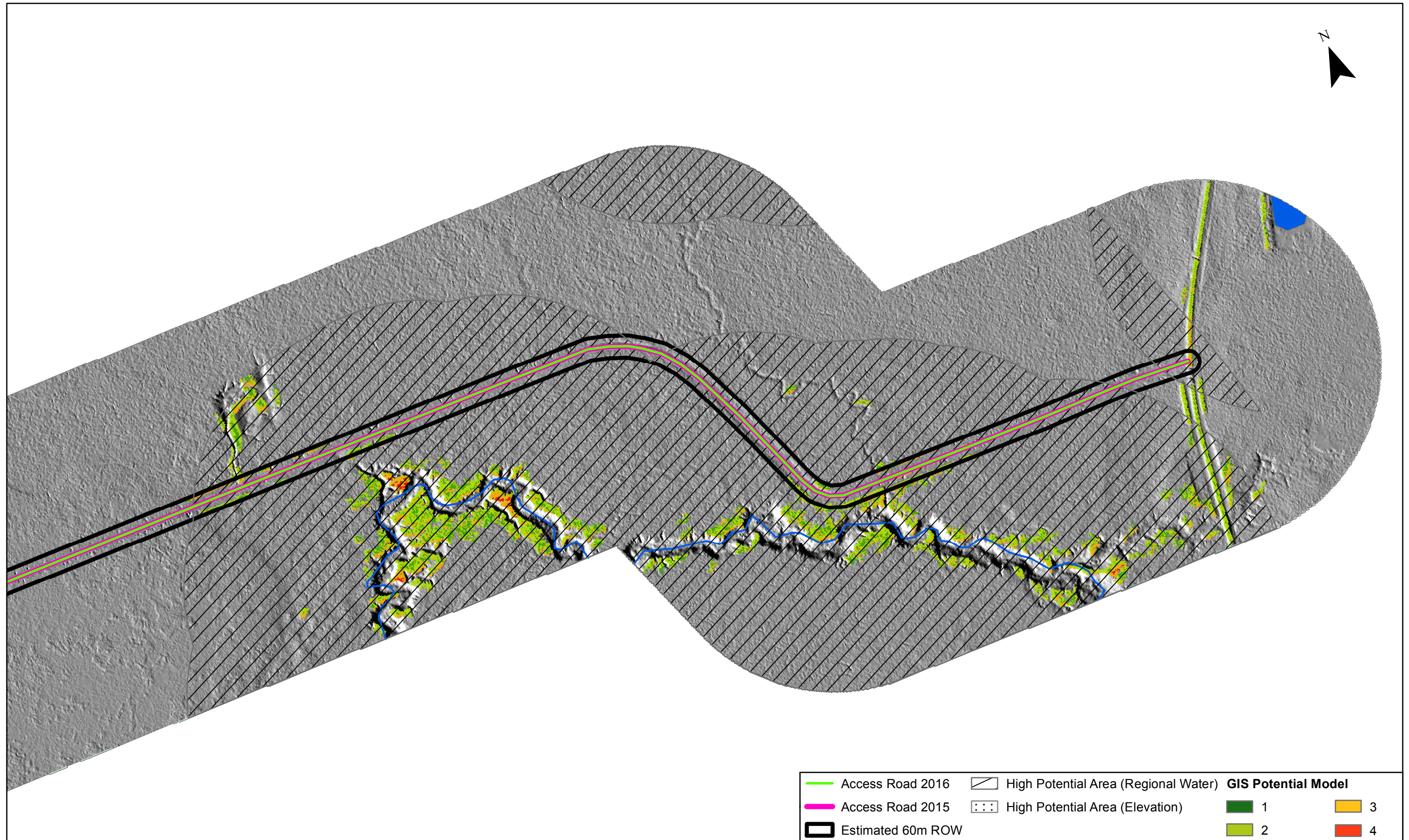


Figure 3: Potential Model, Map 1 of 61

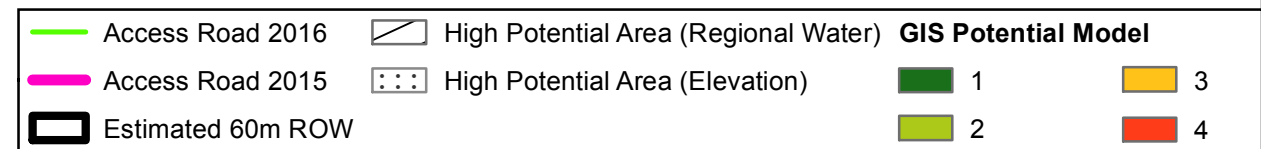
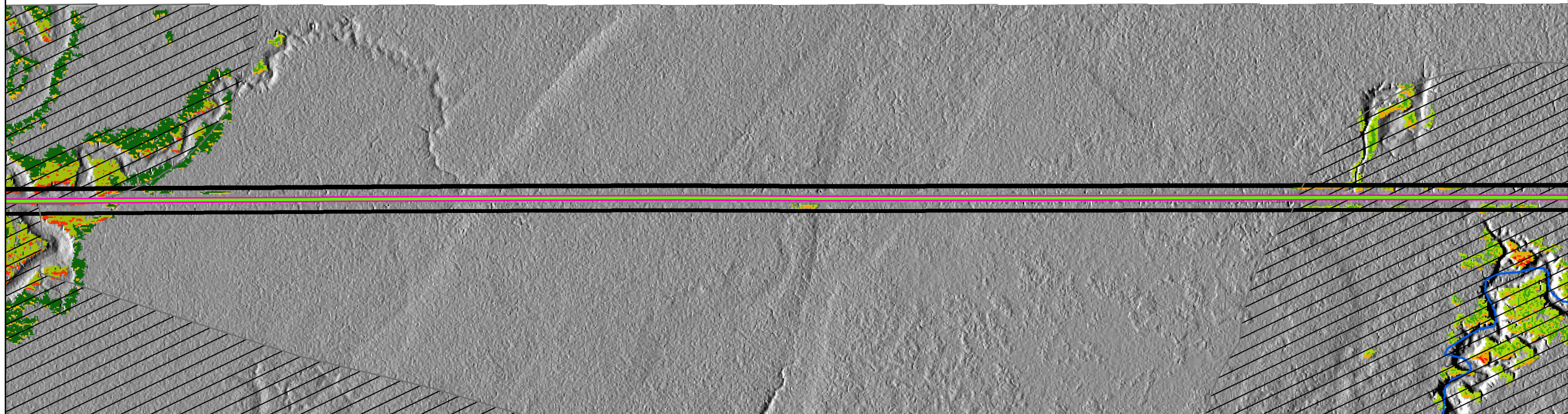


Figure 3: Potential Model, Map 2 of 61

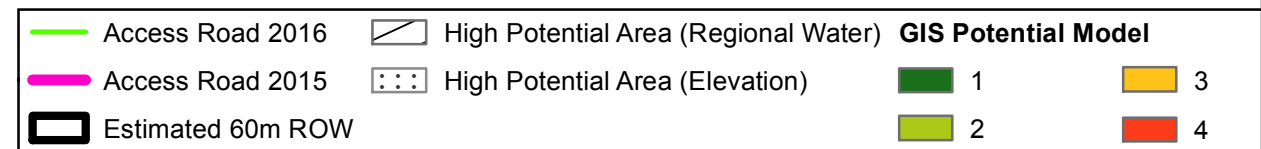
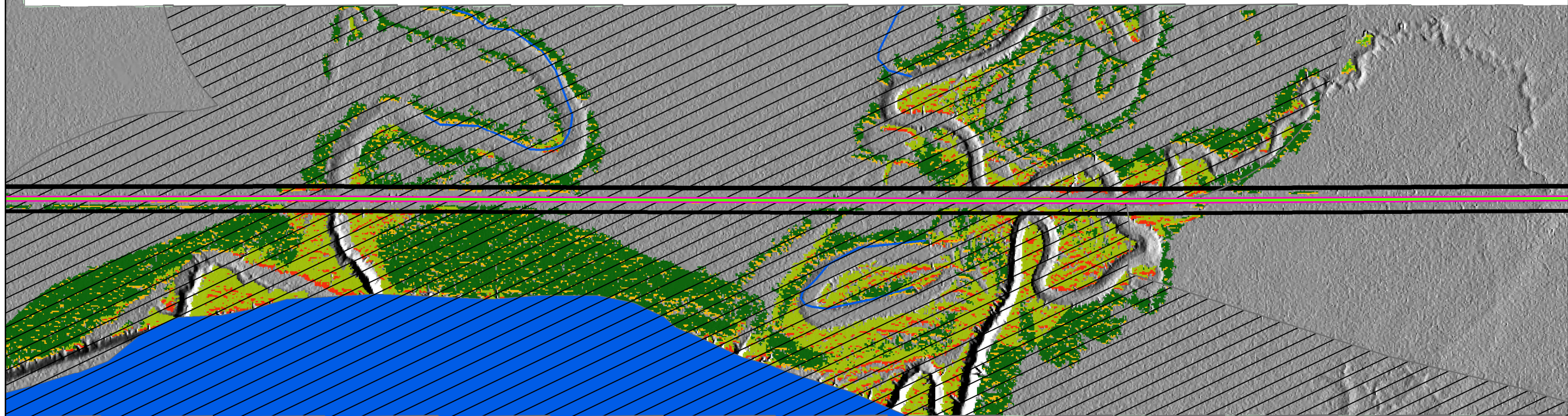


Figure 3: Potential Model, Map 3 of 61

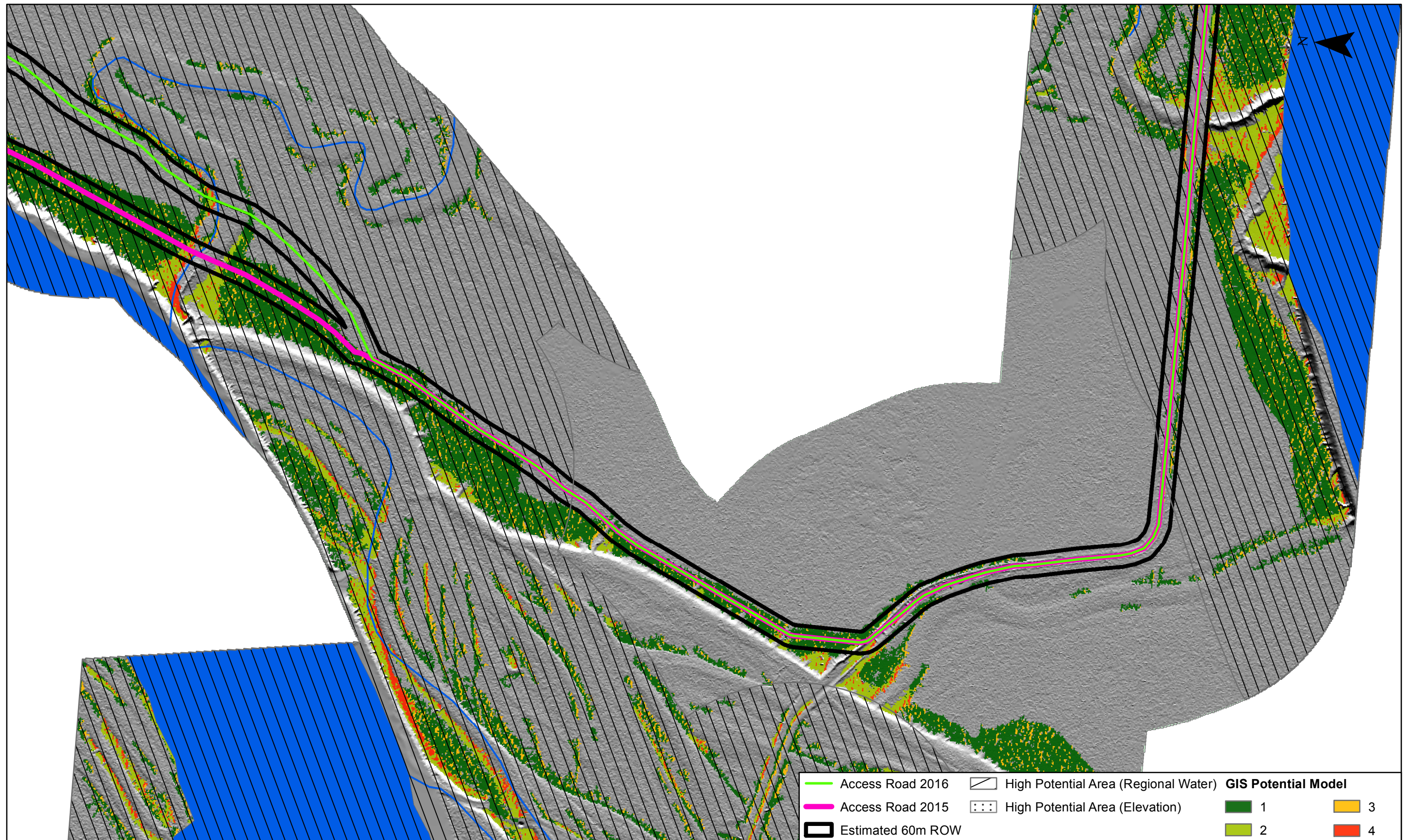


Figure 3: Potential Model, Map 4 of 61



Figure 3: Potential Model, Map 5 of 61

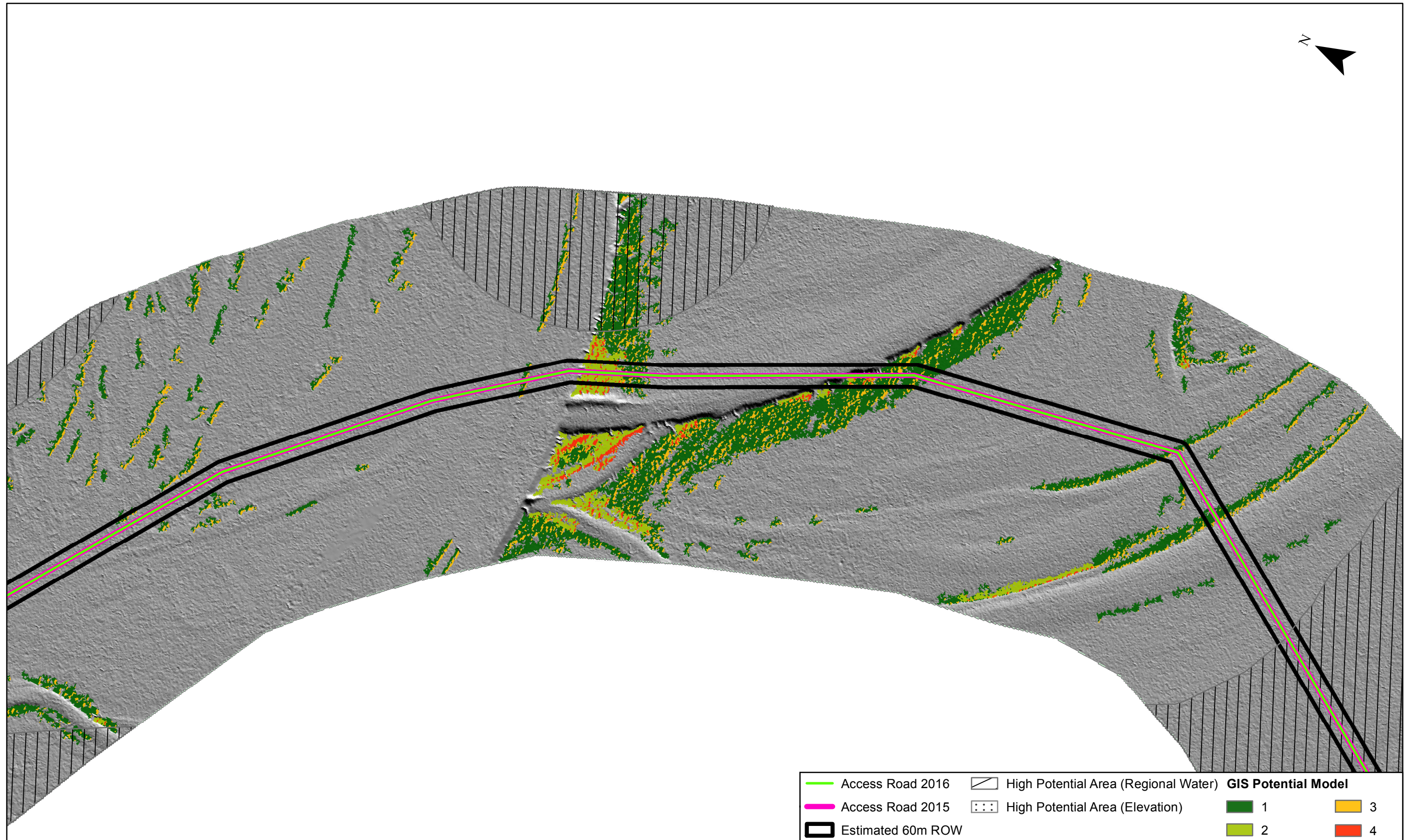


Figure 3: Potential Model, Map 6 of 61

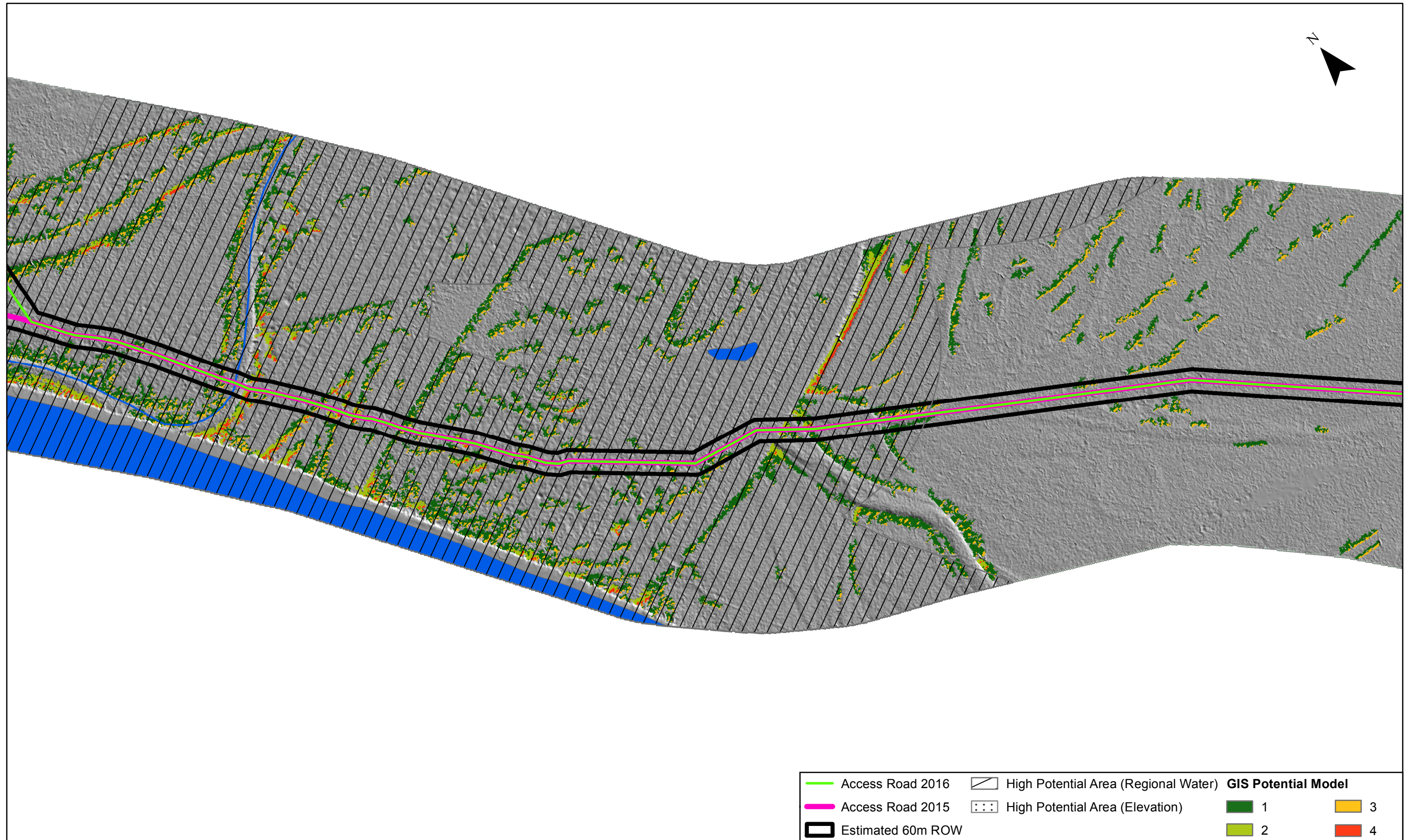


Figure 3: Potential Model, Map 7 of 61

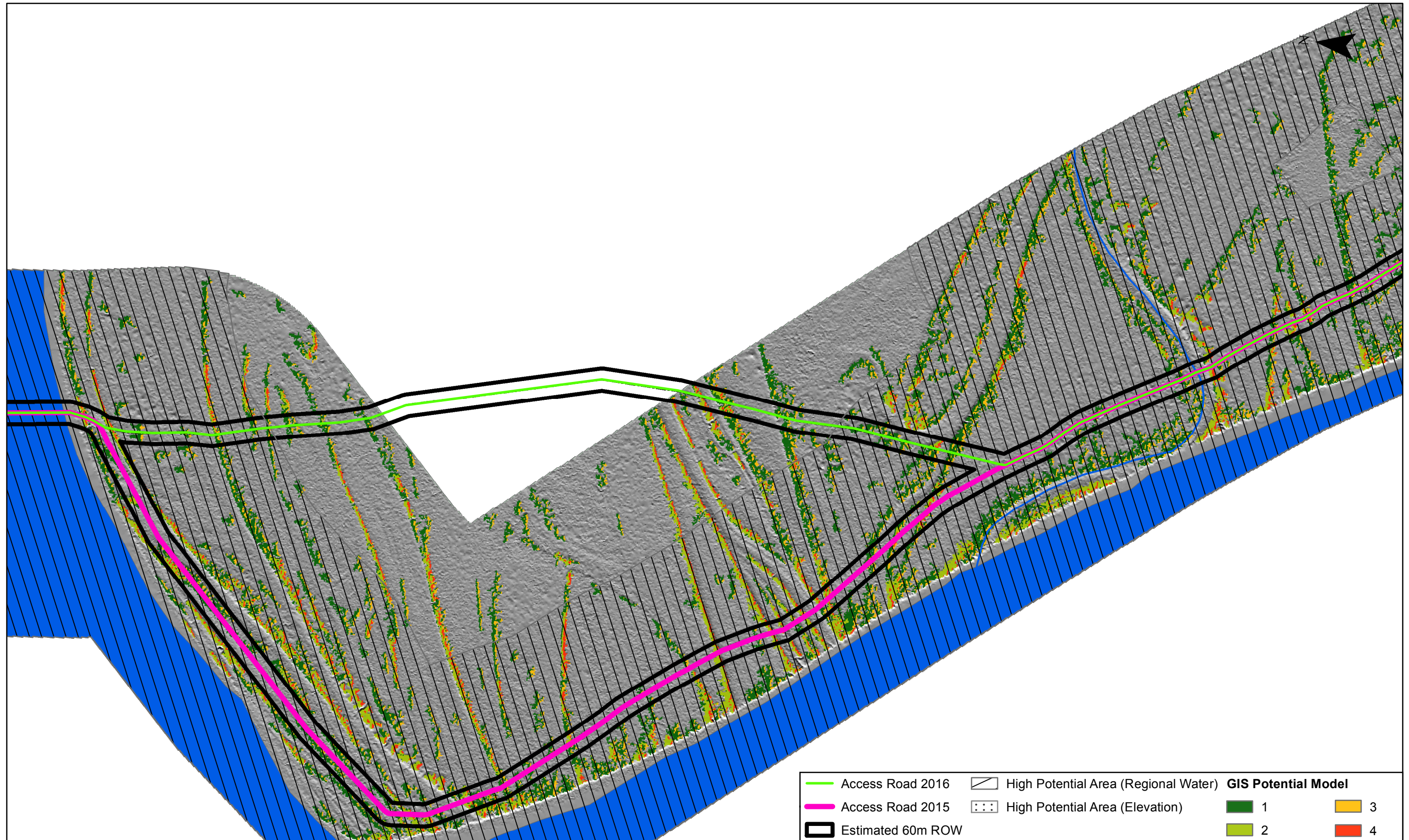


Figure 3: Potential Model, Map 8 of 61

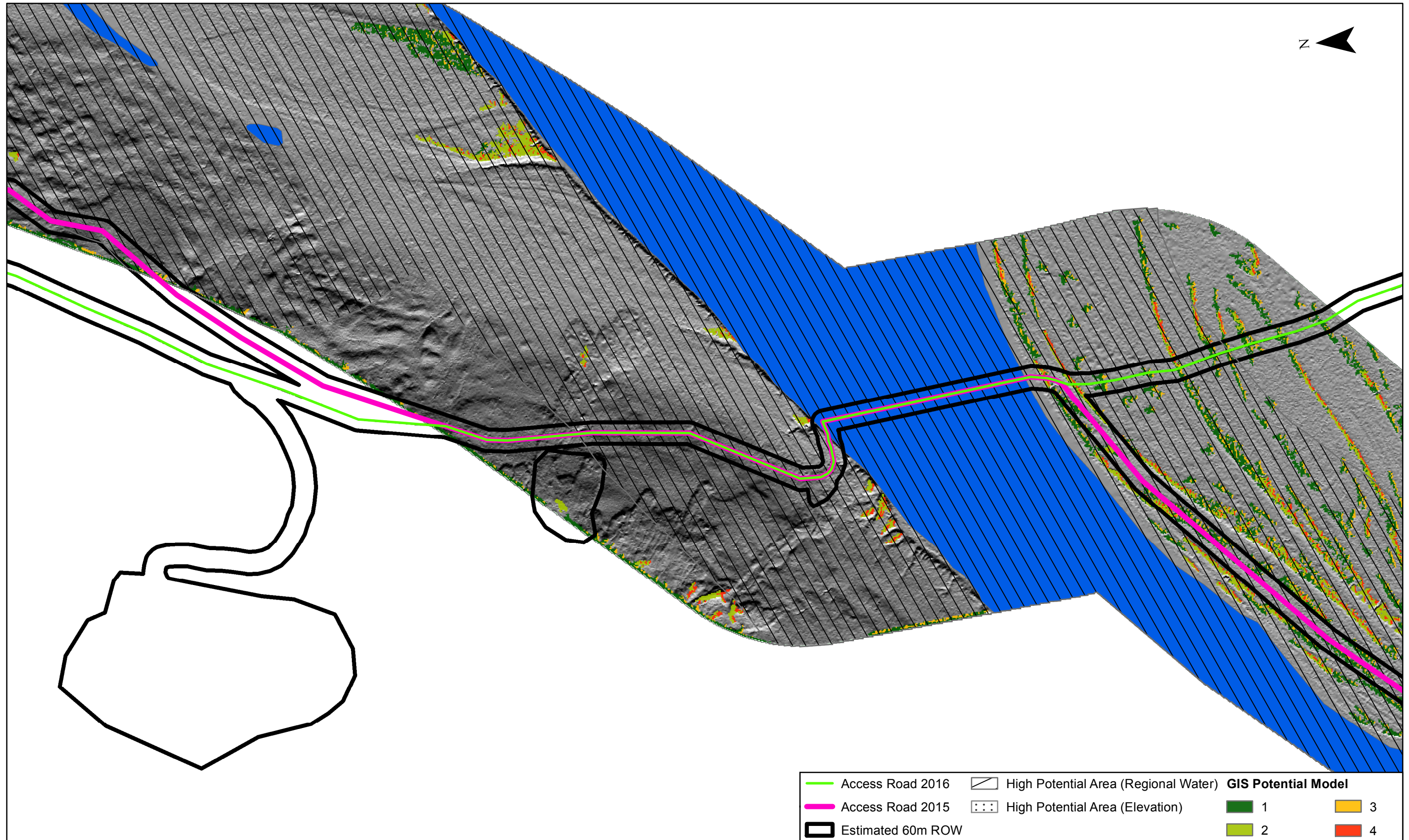


Figure 3: Potential Model, Map 9 of 61

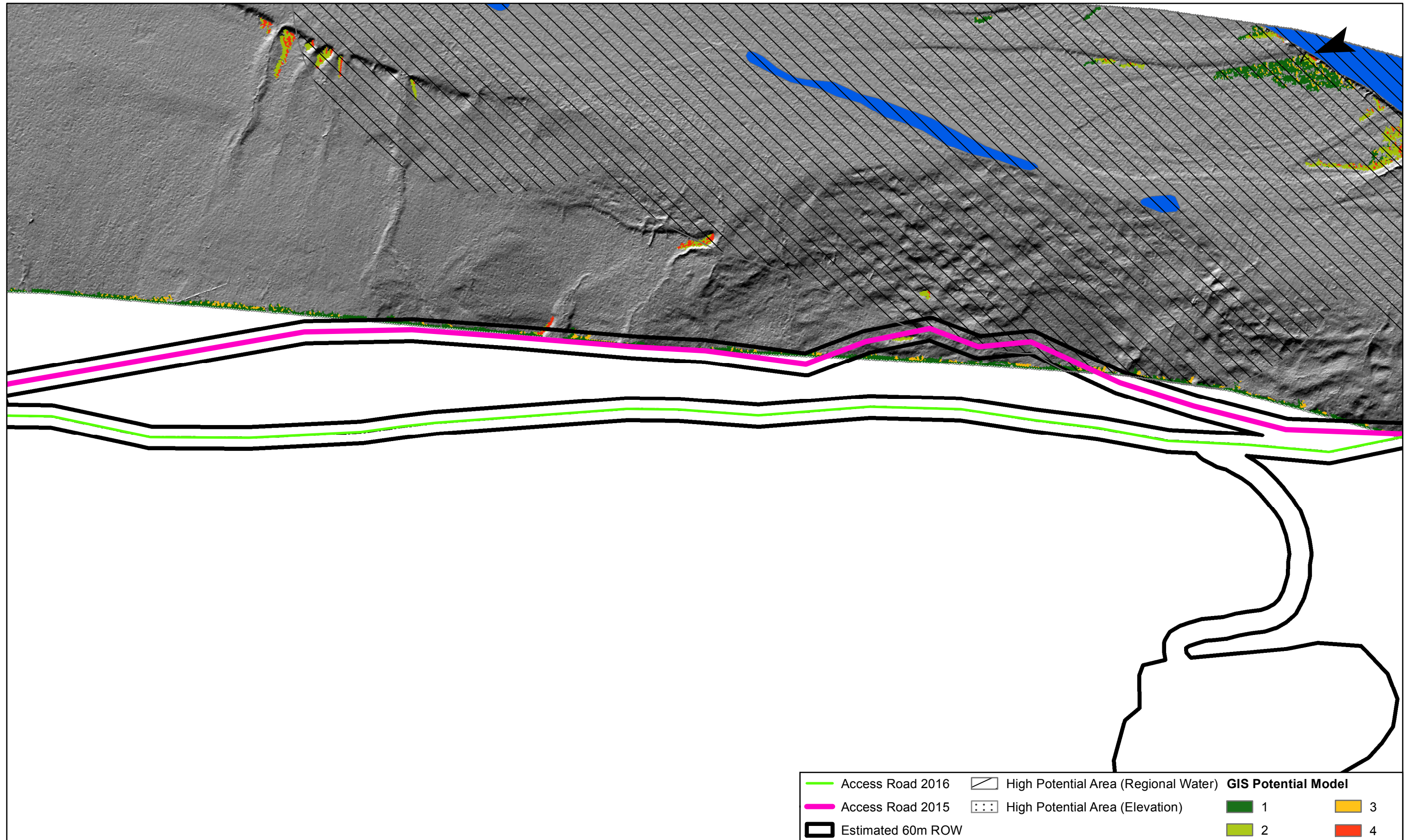


Figure 3: Potential Model, Map 10 of 61

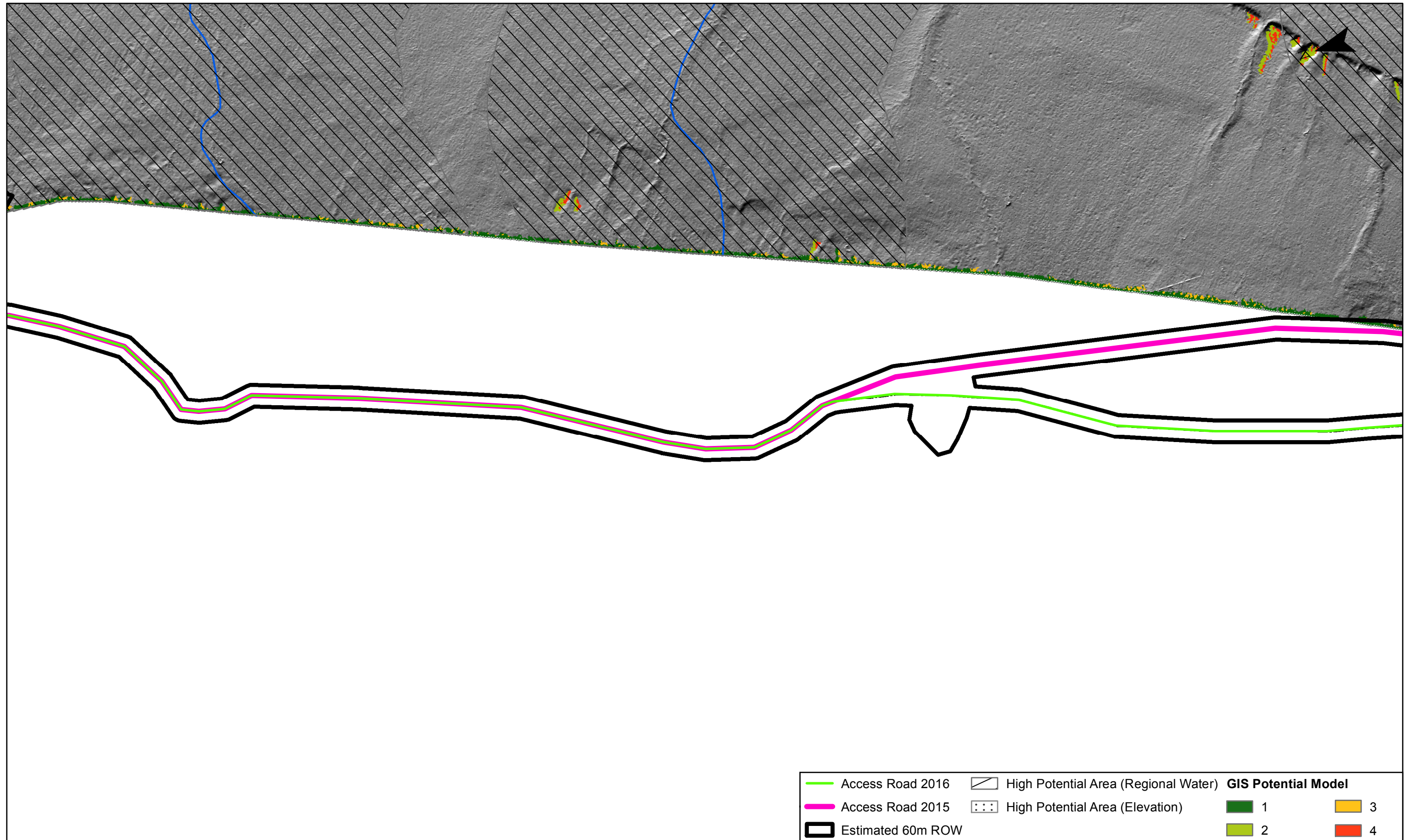


Figure 3: Potential Model, Map 11 of 61

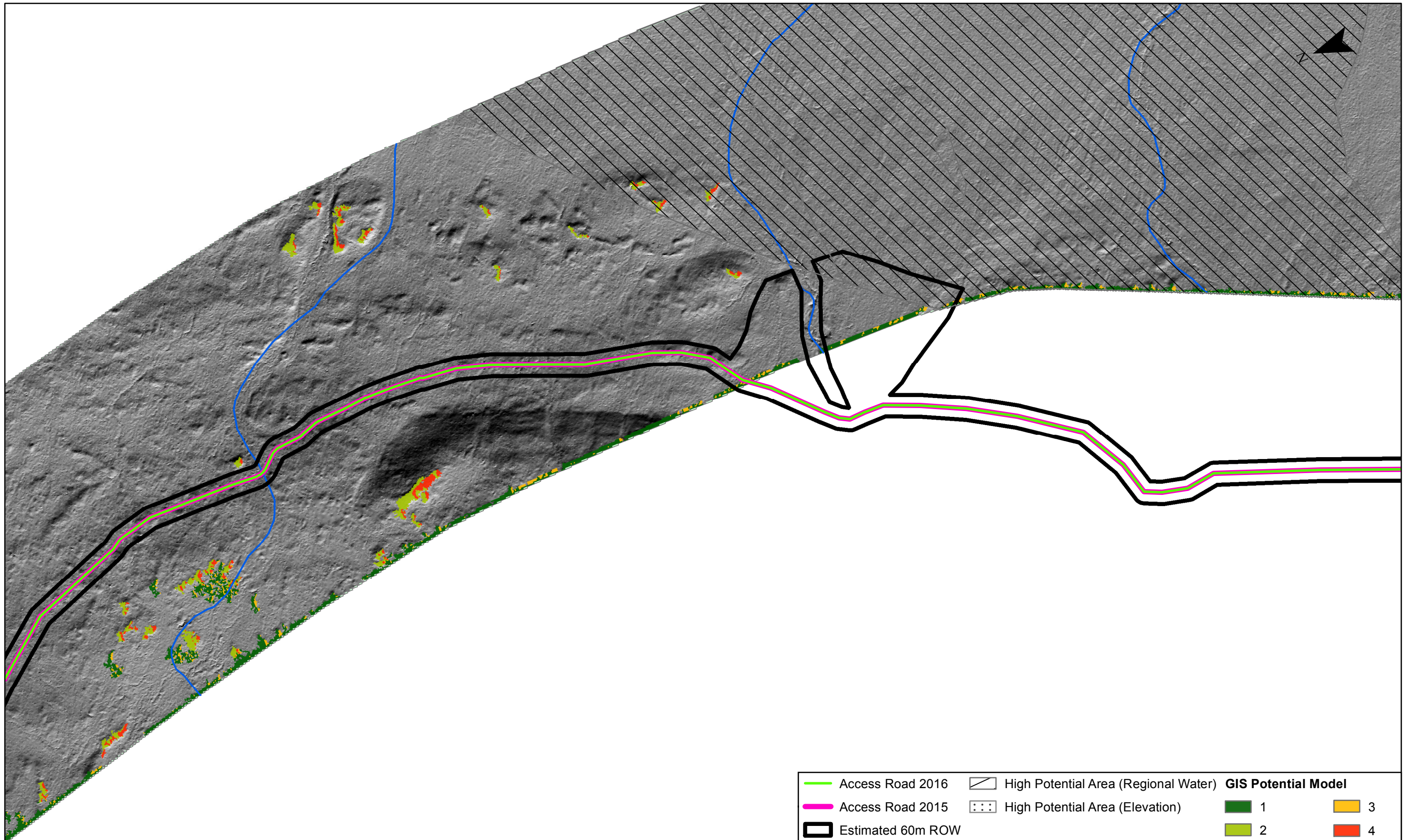


Figure 3: Potential Model, Map 12 of 61

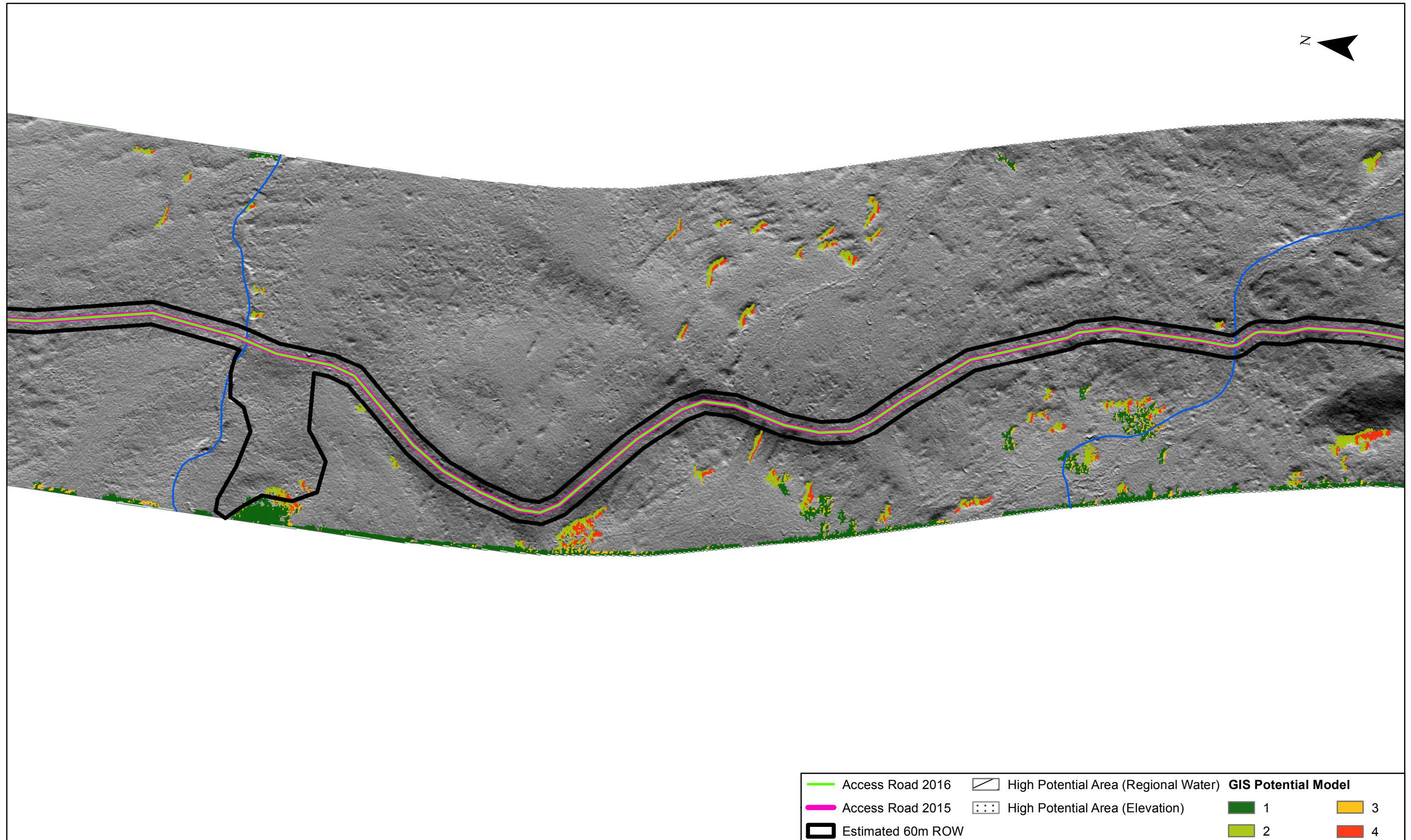


Figure 3: Potential Model, Map 13 of 61

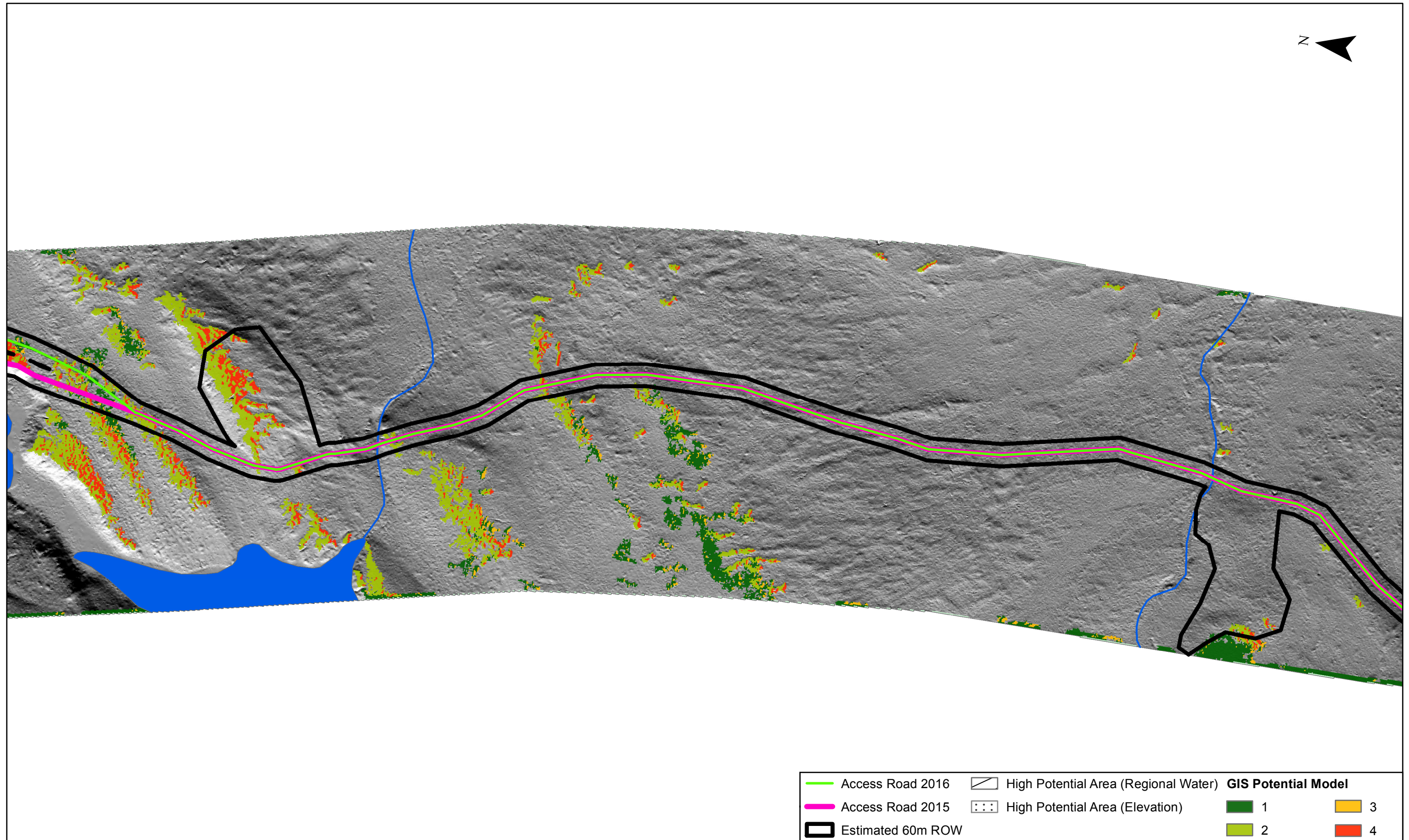


Figure 3: Potential Model, Map 14 of 61

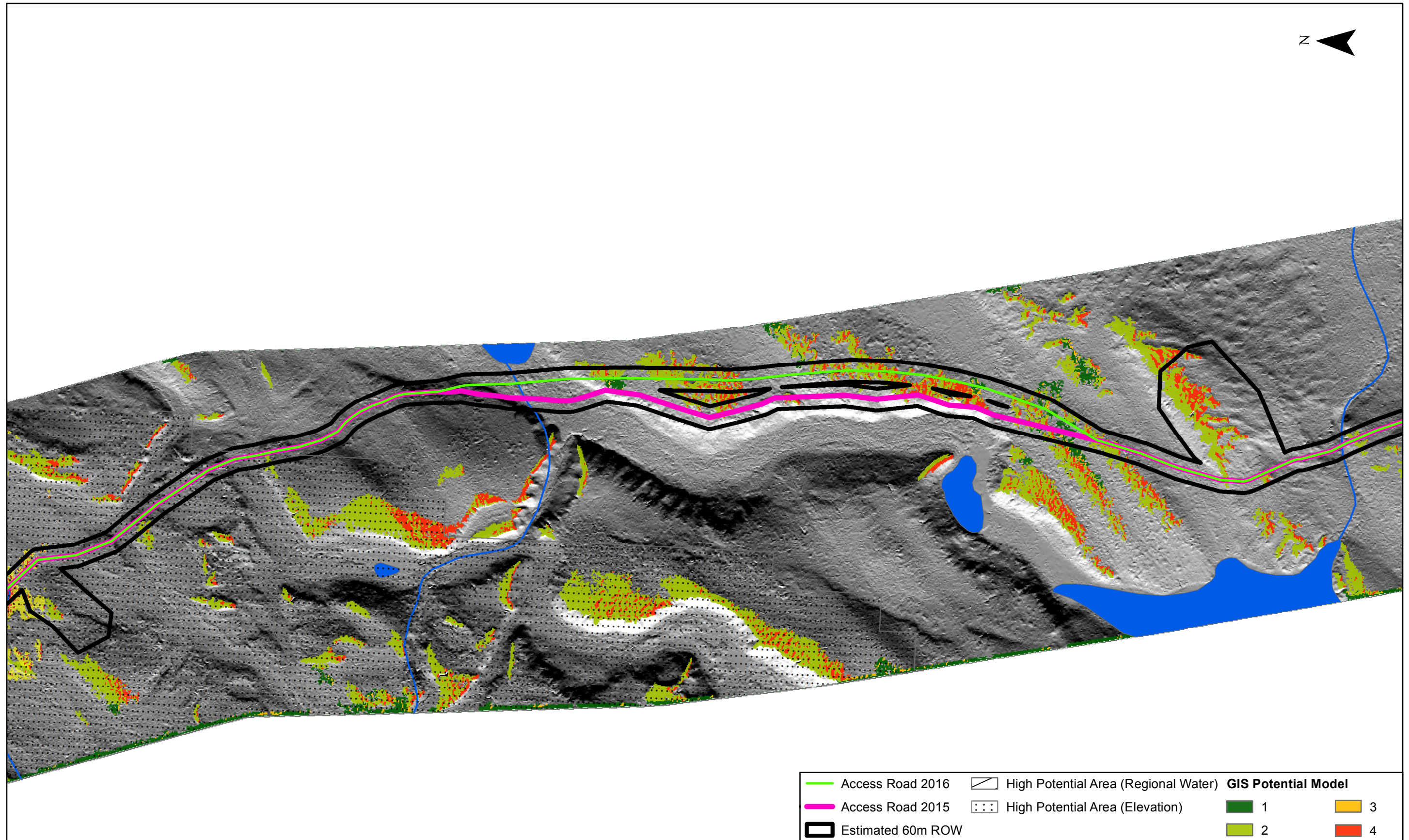


Figure 3: Potential Model, Map 15 of 61

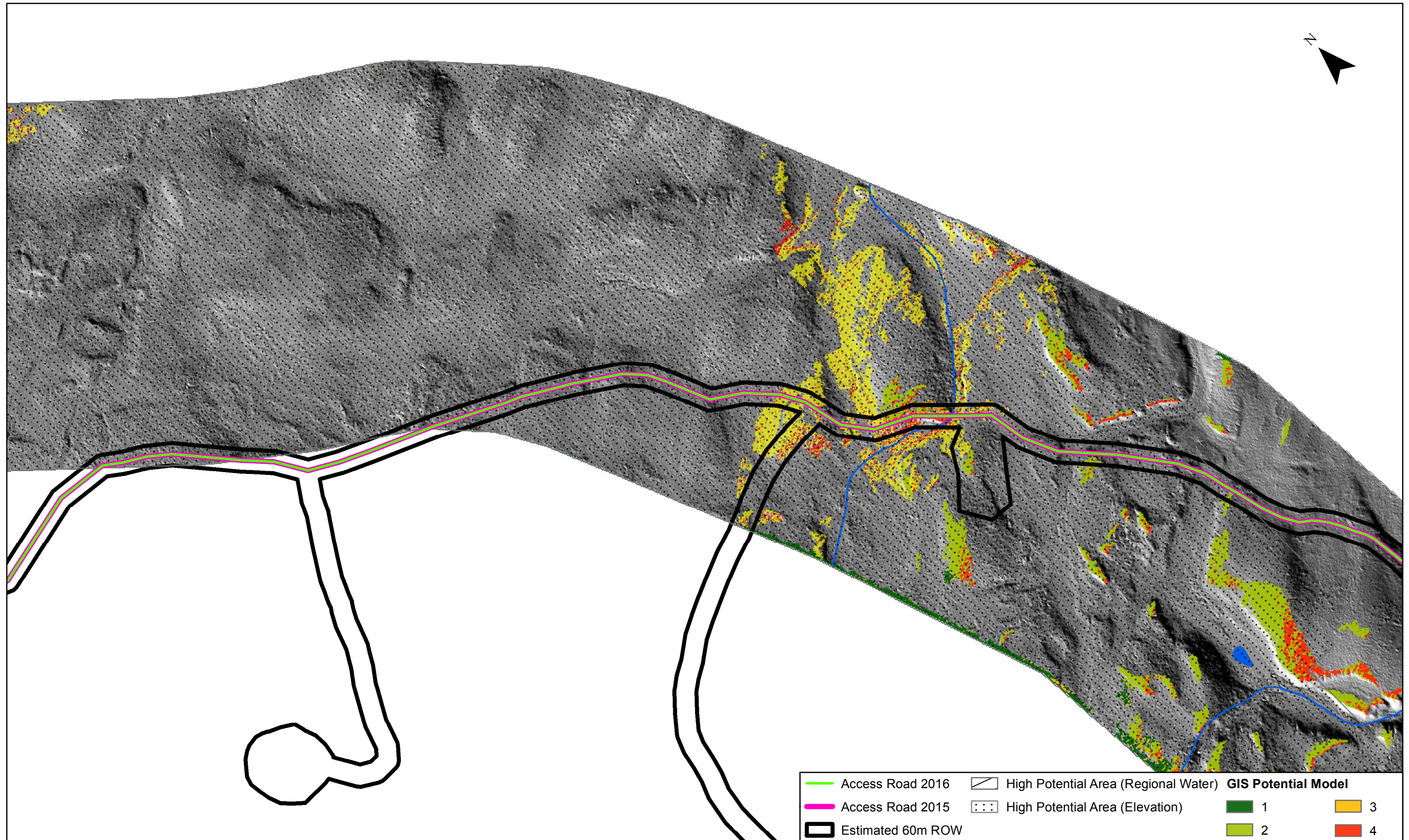


Figure 3: Potential Model, Map 16 of 61

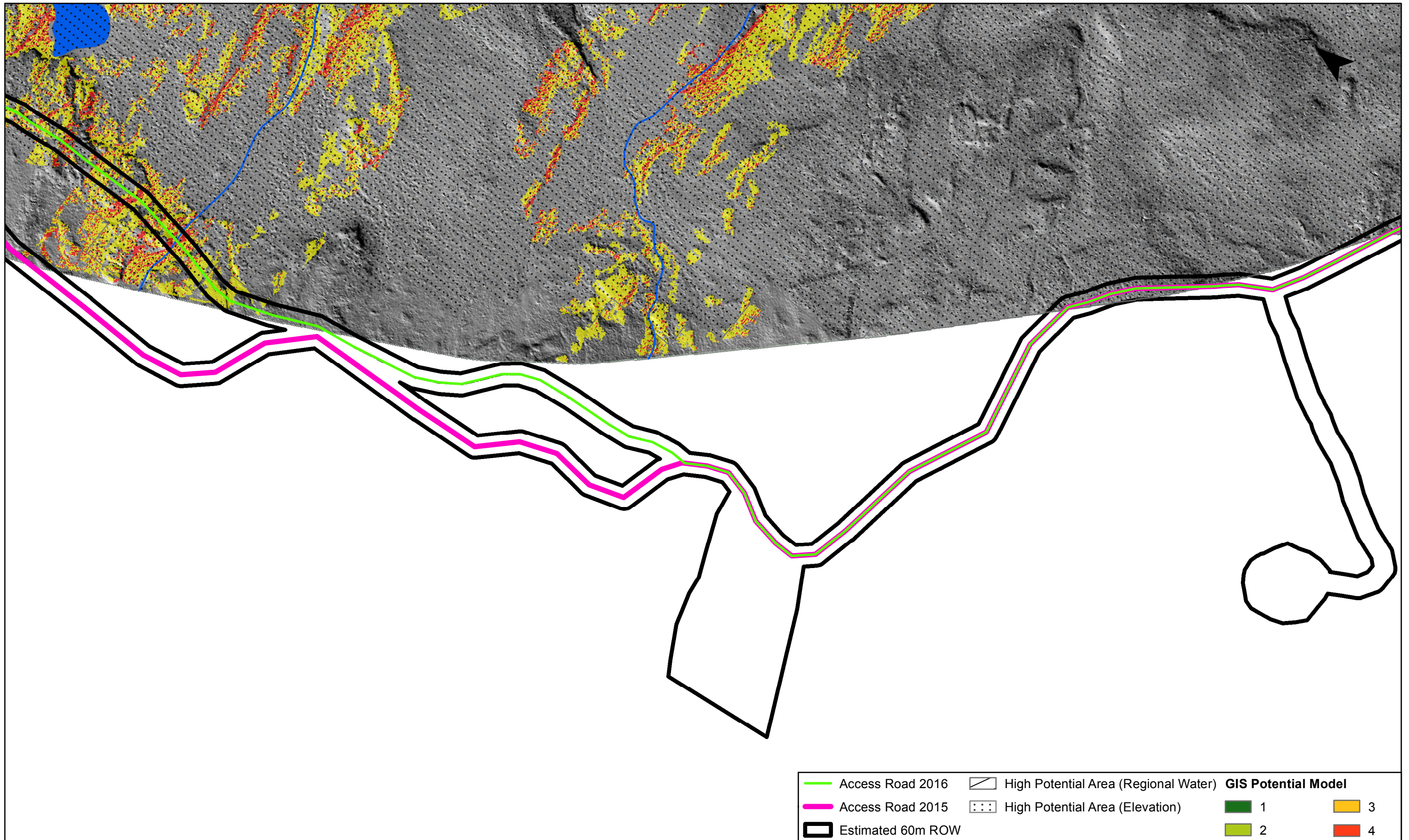


Figure 3: Potential Model, Map 17 of 61

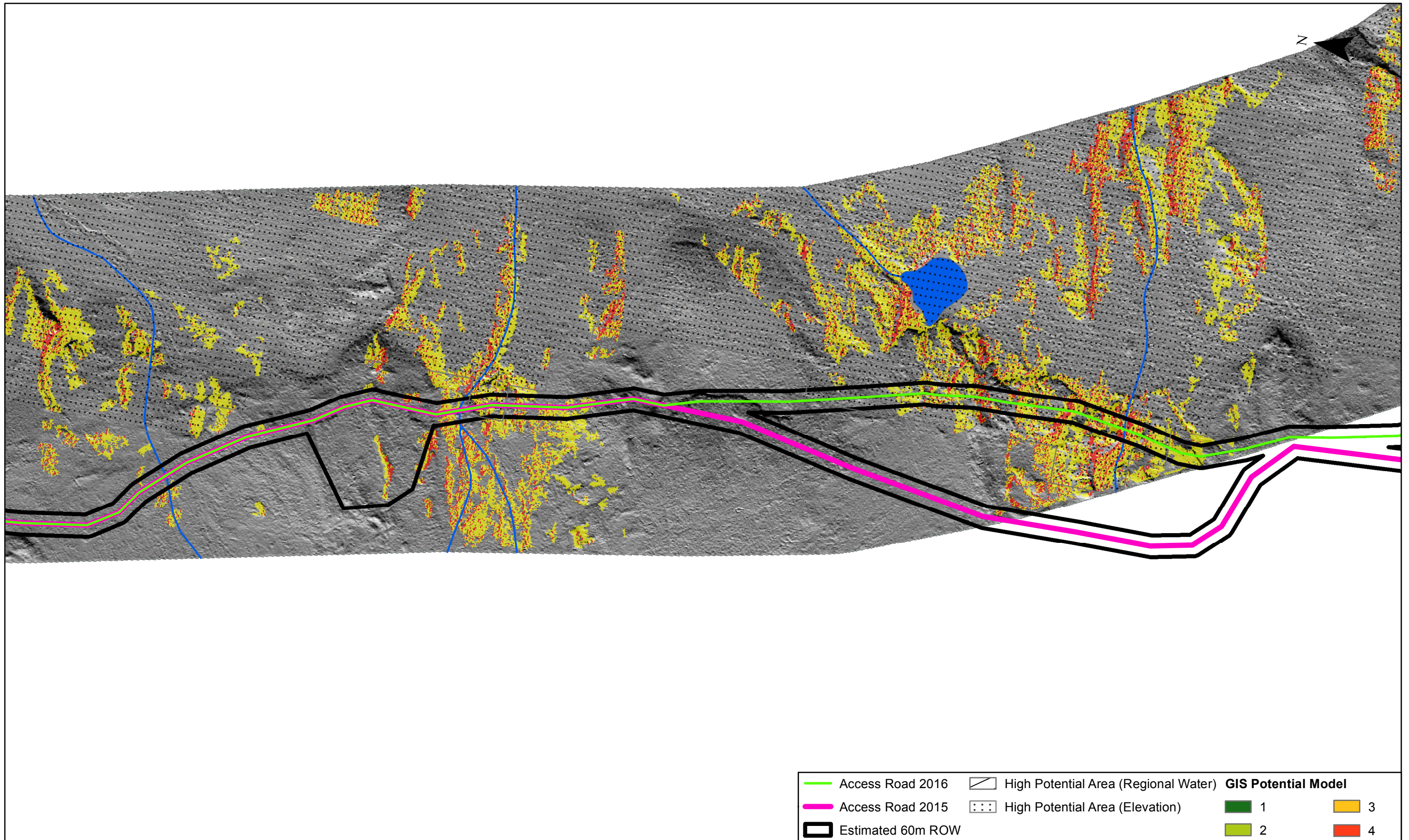


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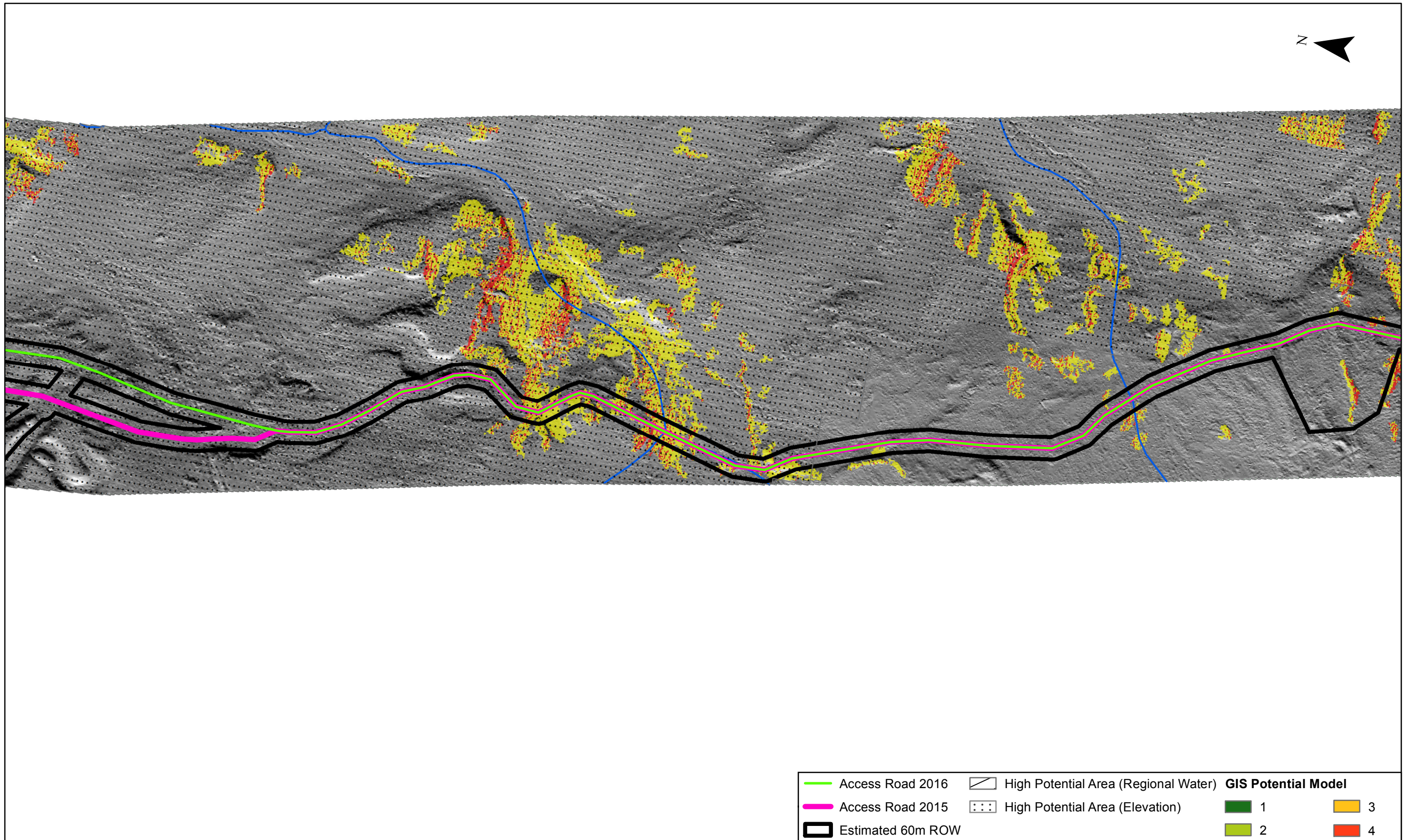


Figure 3: Potential Model, Map 19 of 61

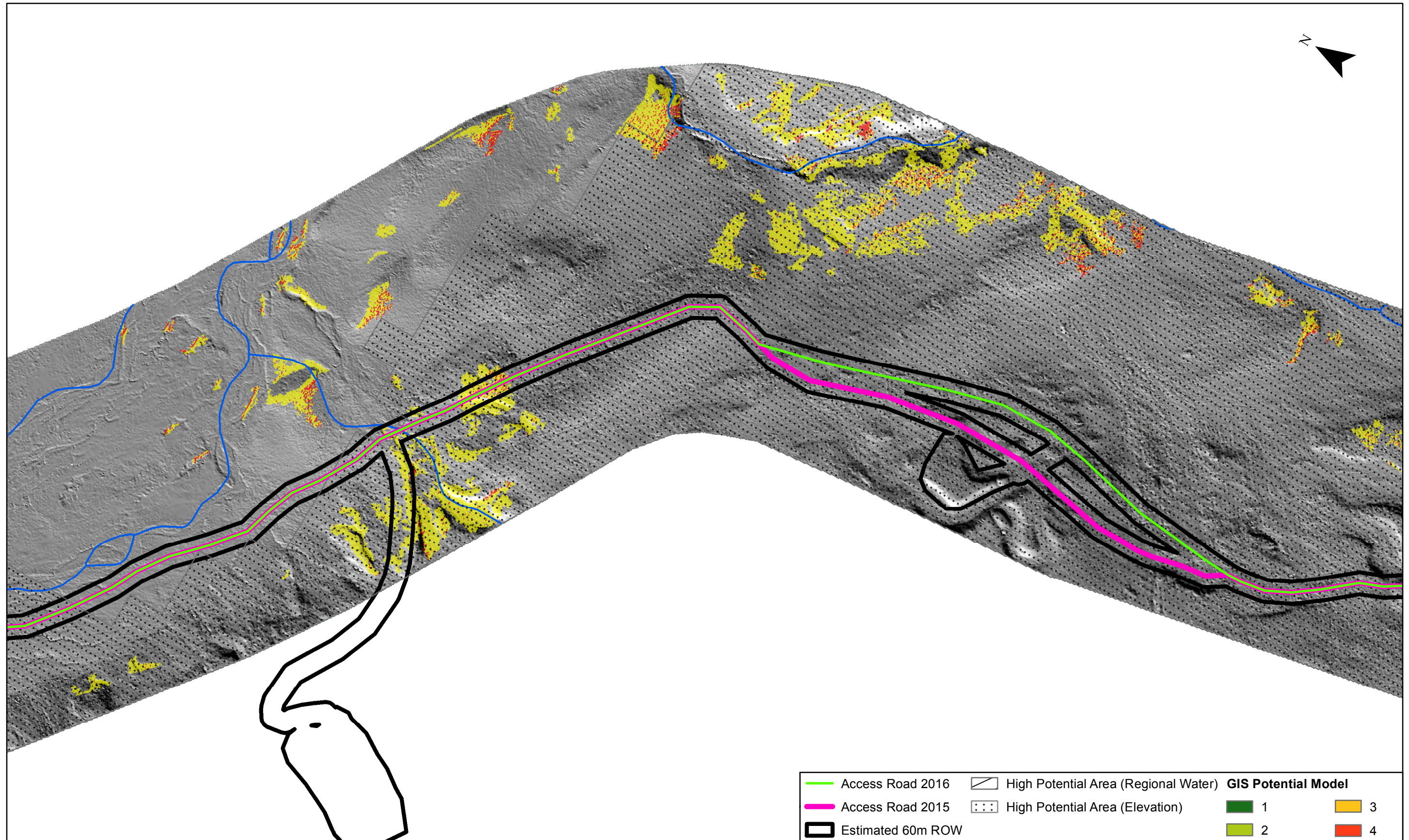


Figure 3: Potential Model, Map 20 of 61

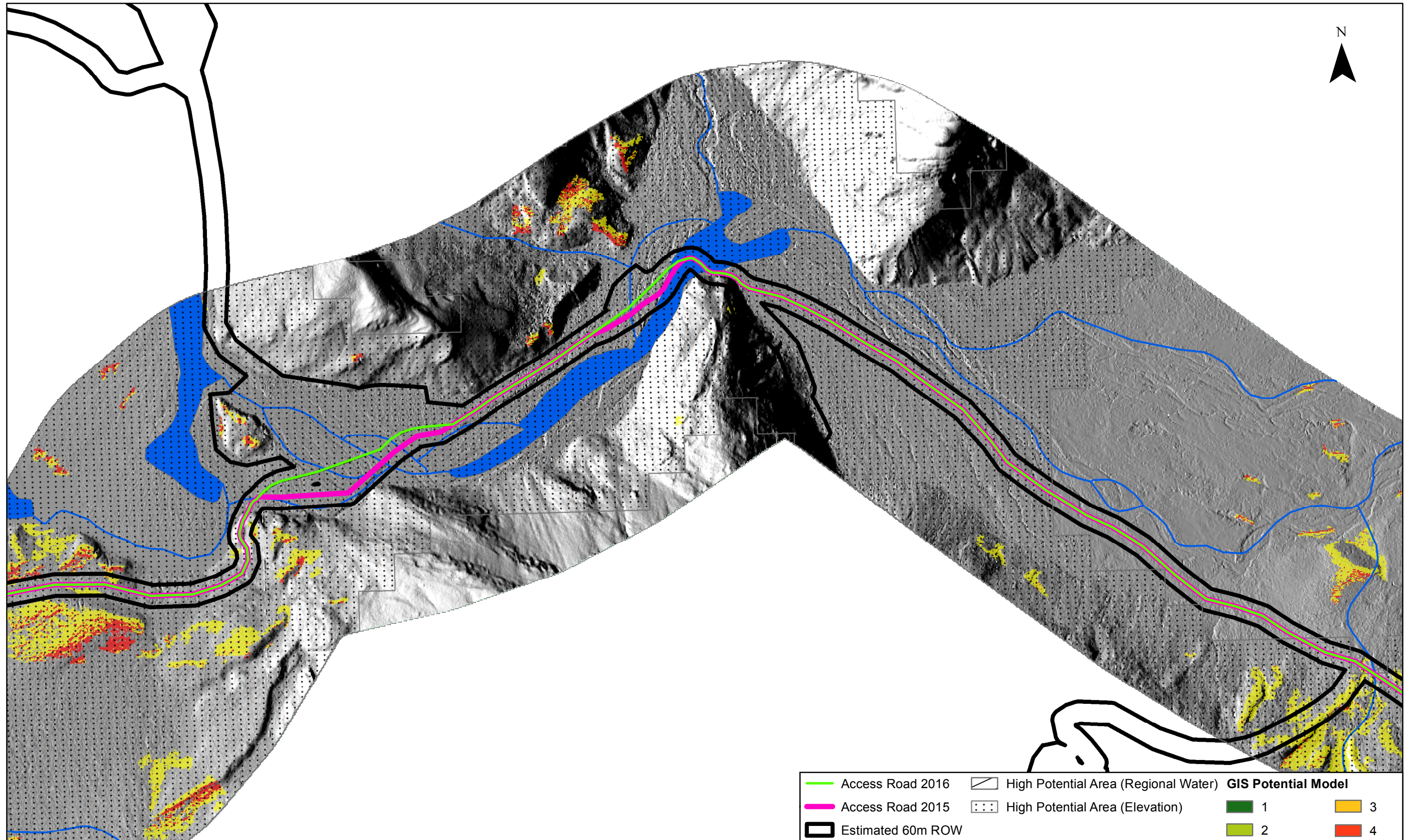


Figure 3: Potential Model, Map 21 of 61

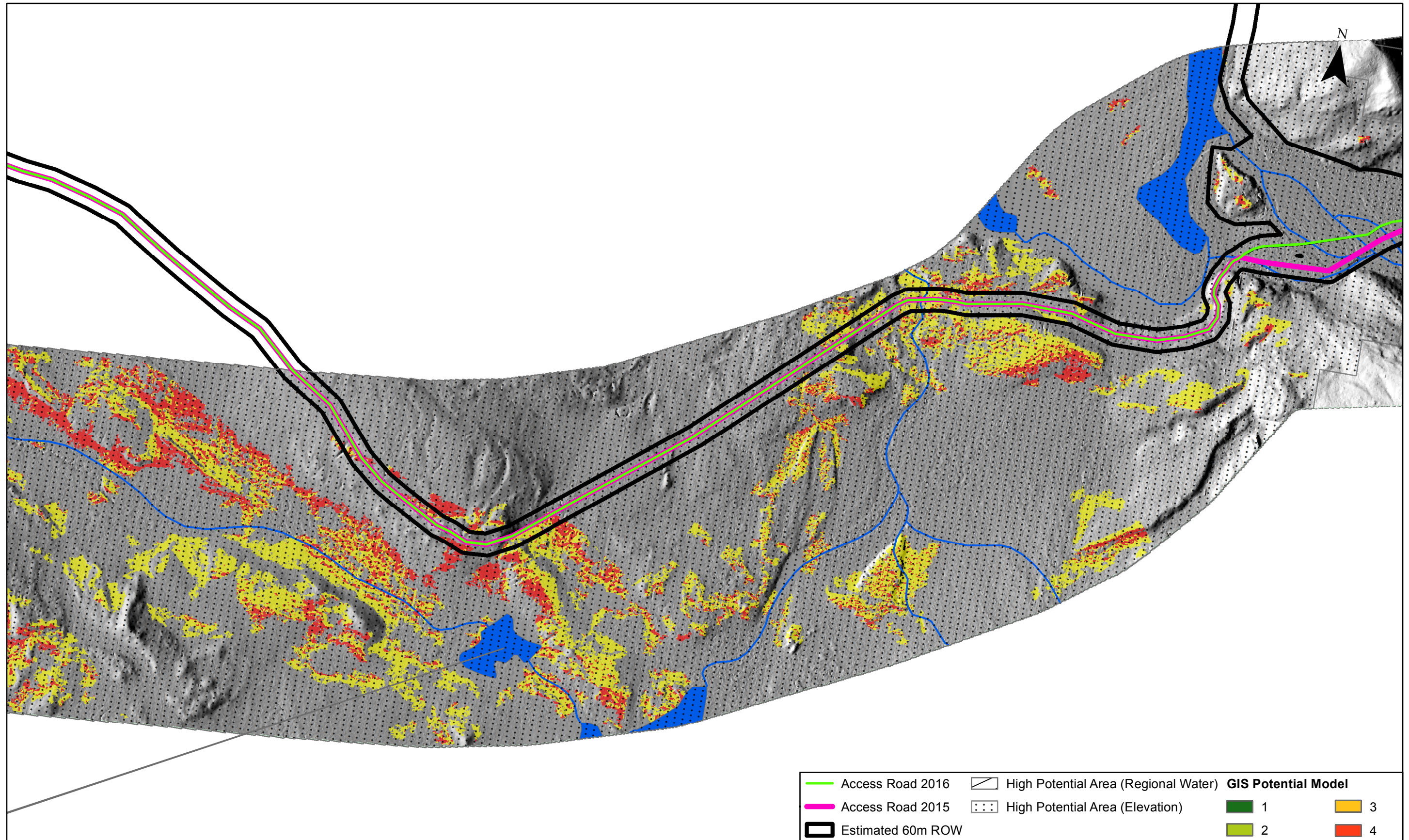


Figure 3: Potential Model, Map 22 of 61

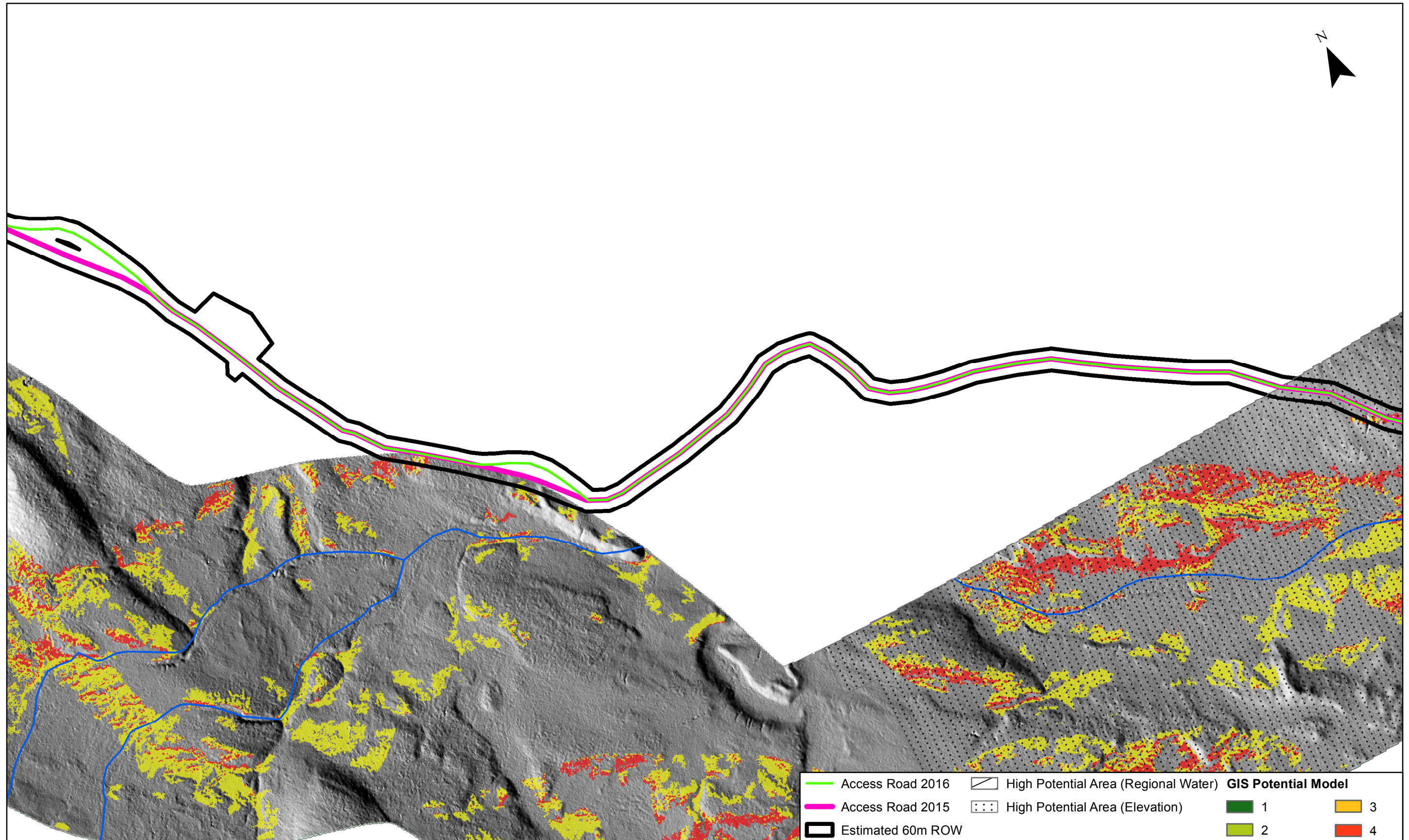


Figure 3: Potential Model, Map 23 of 61

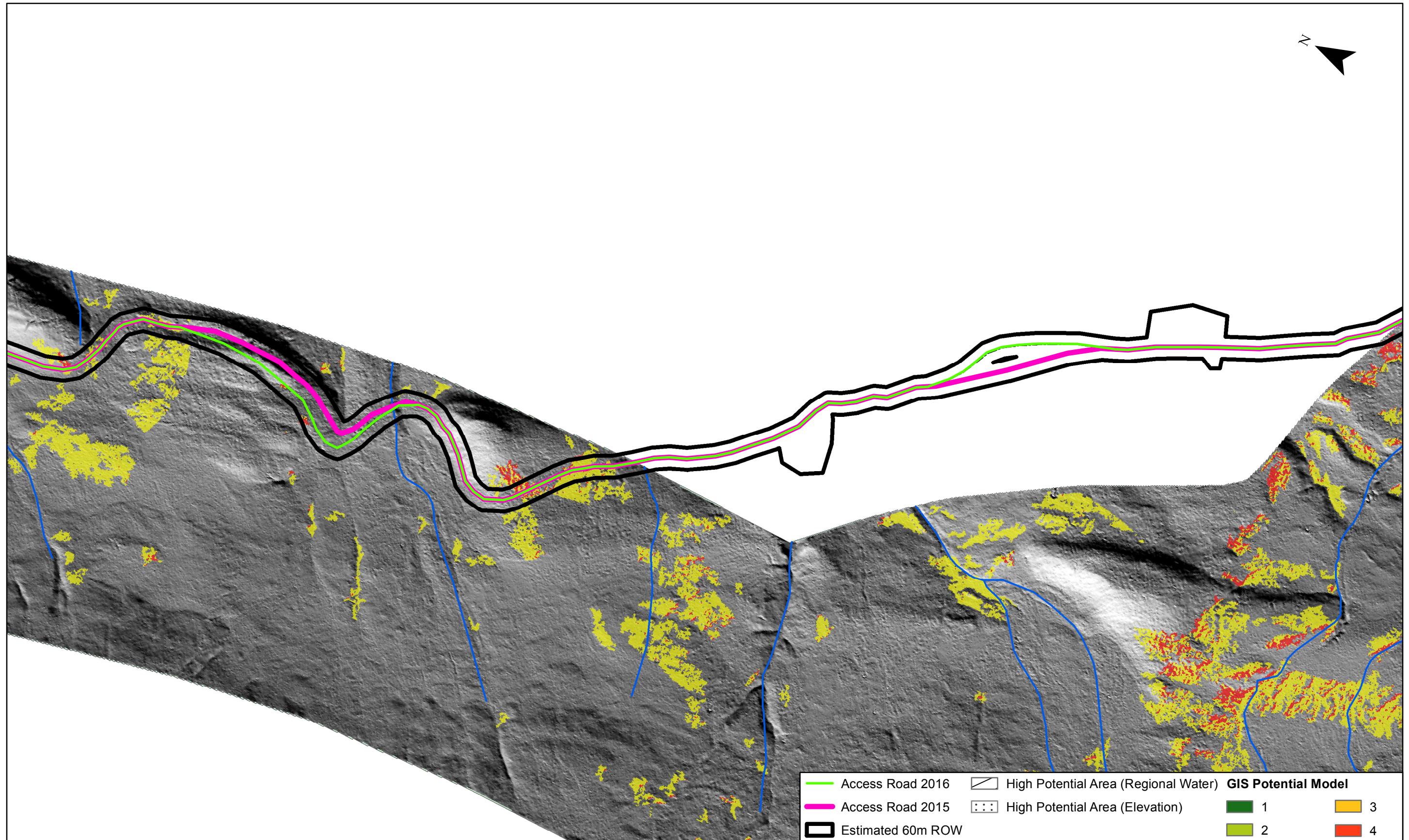


Figure 3: Potential Model, Map 24 of 61

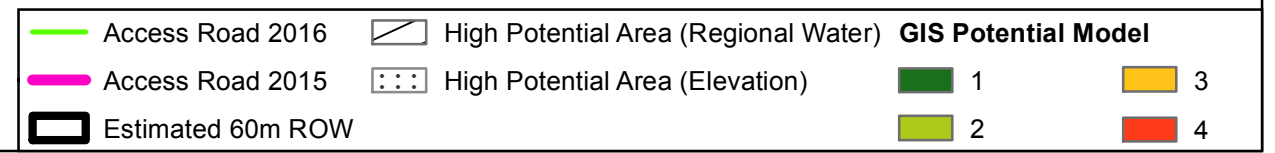
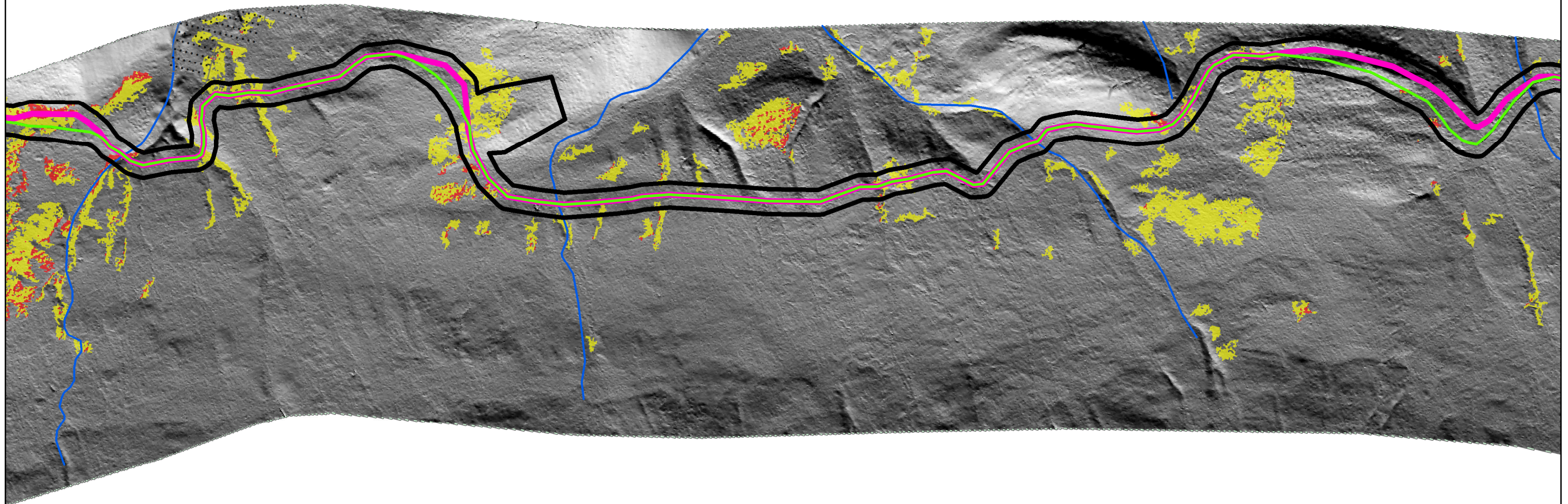


Figure 3: Potential Model, Map 25 of 61

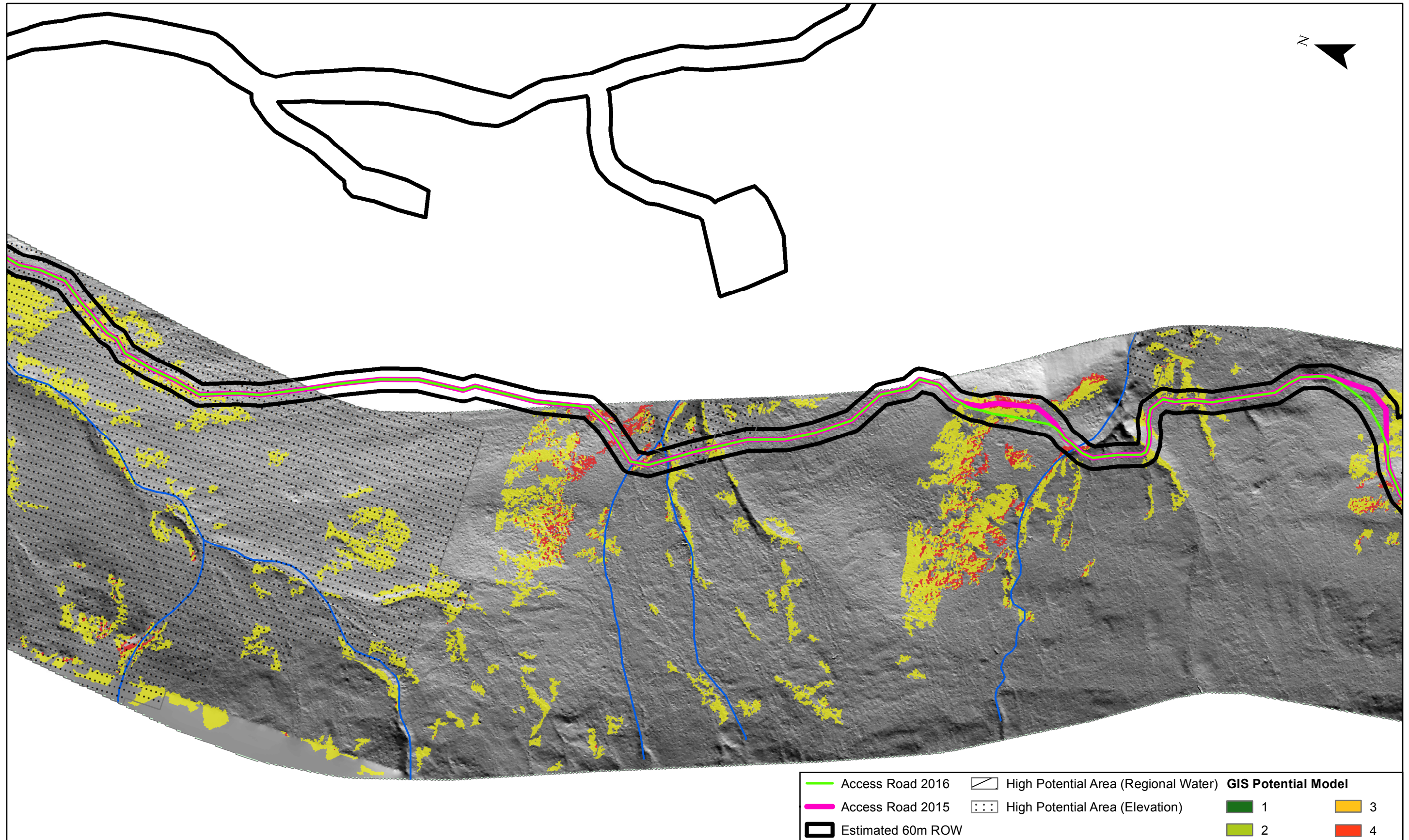


Figure 3: Potential Model, Map 26 of 61

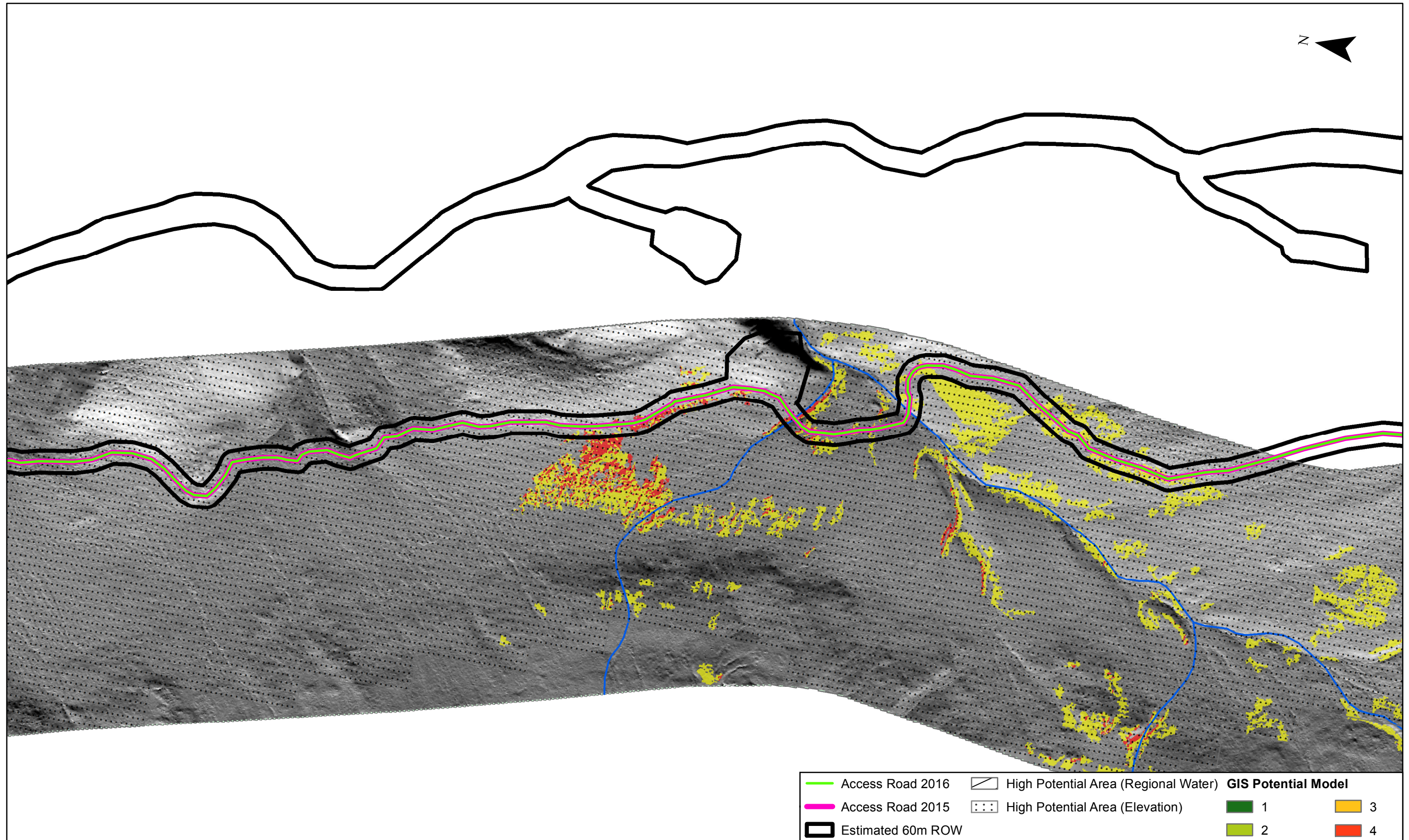


Figure 3: Potential Model, Map 27 of 61

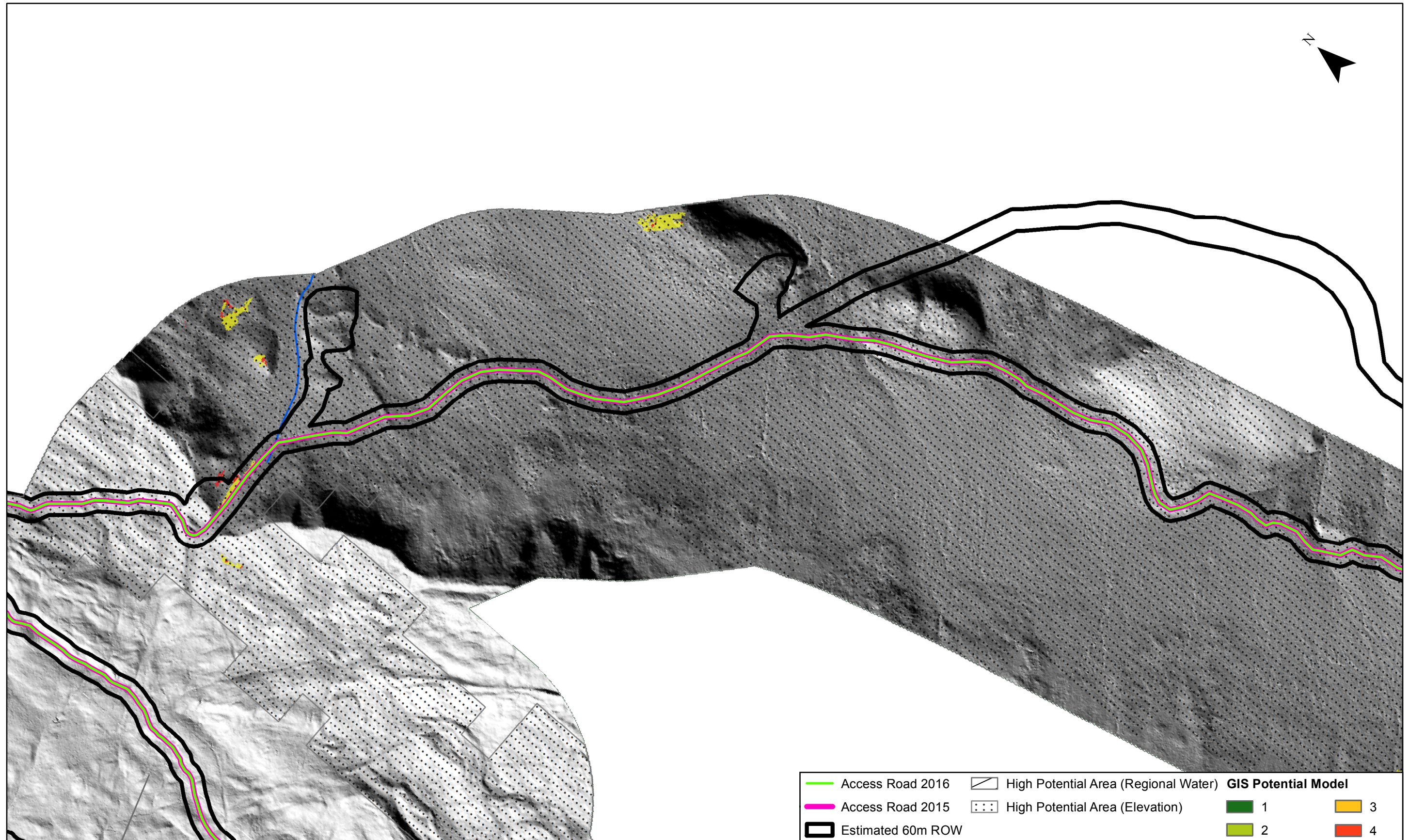


Figure 3: Potential Model, Map 28 of 61

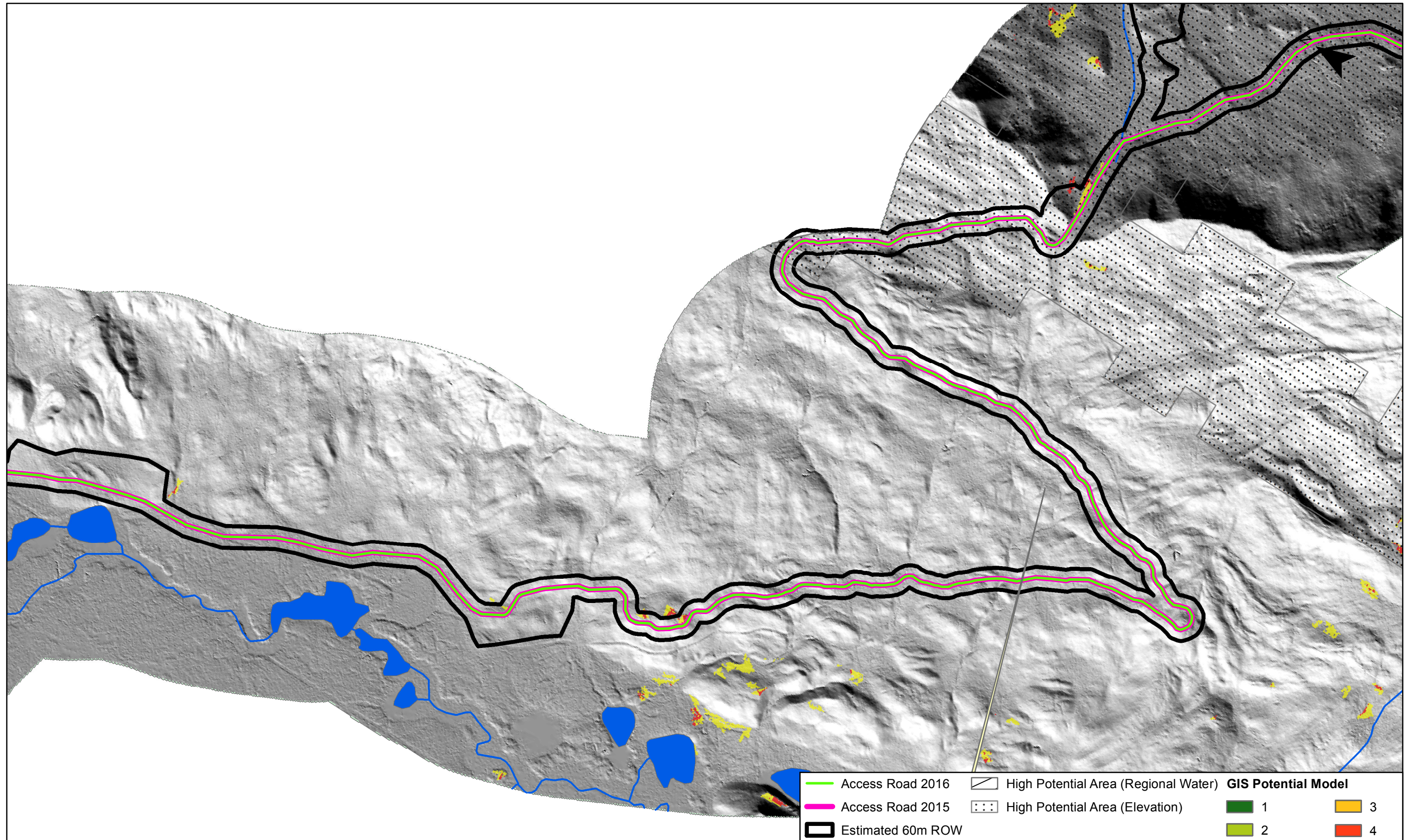


Figure 3: Potential Model, Map 29 of 61

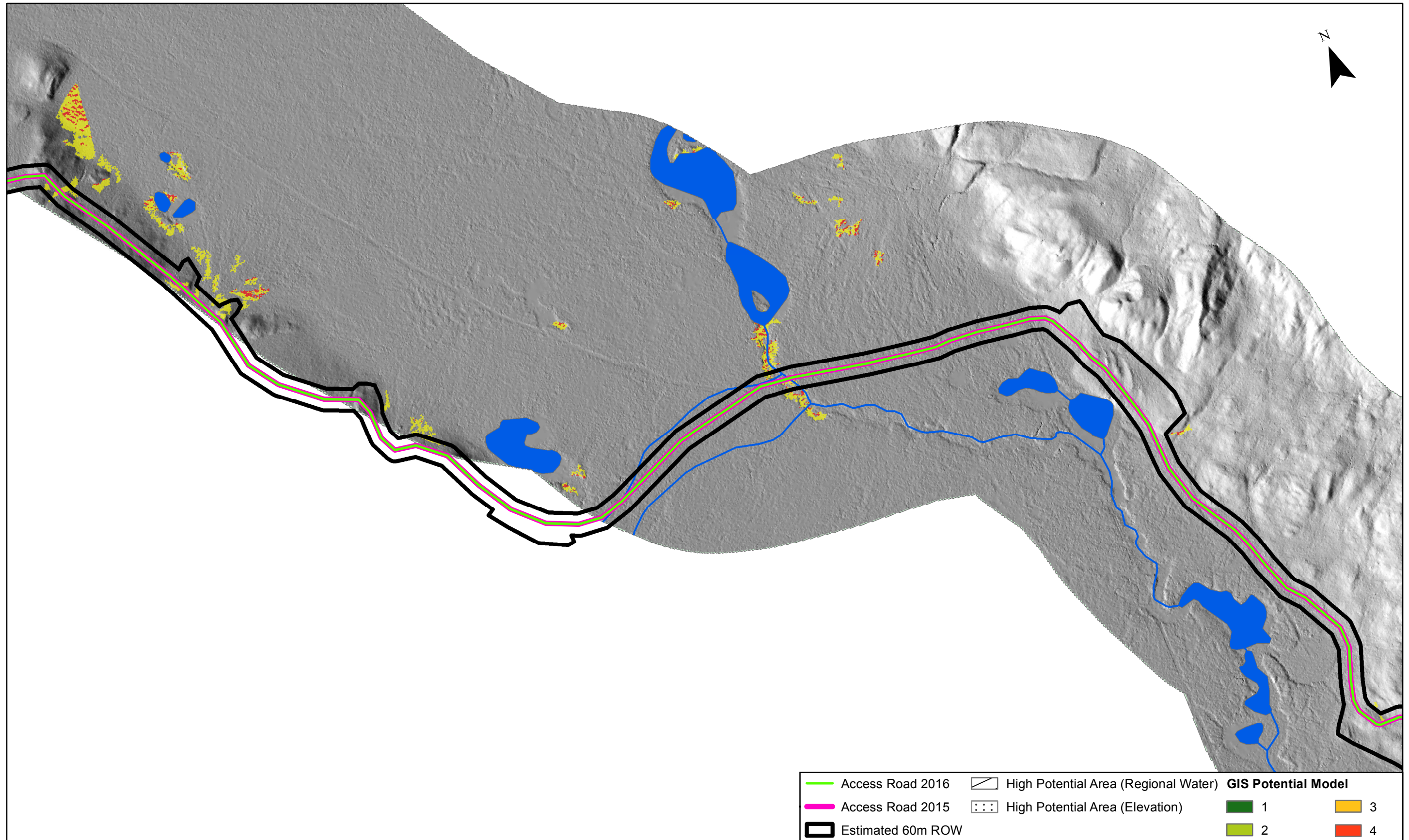
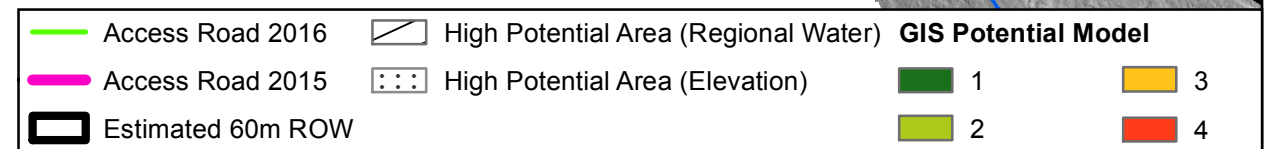


Figure 3: Potential Model, Map 30 of 61



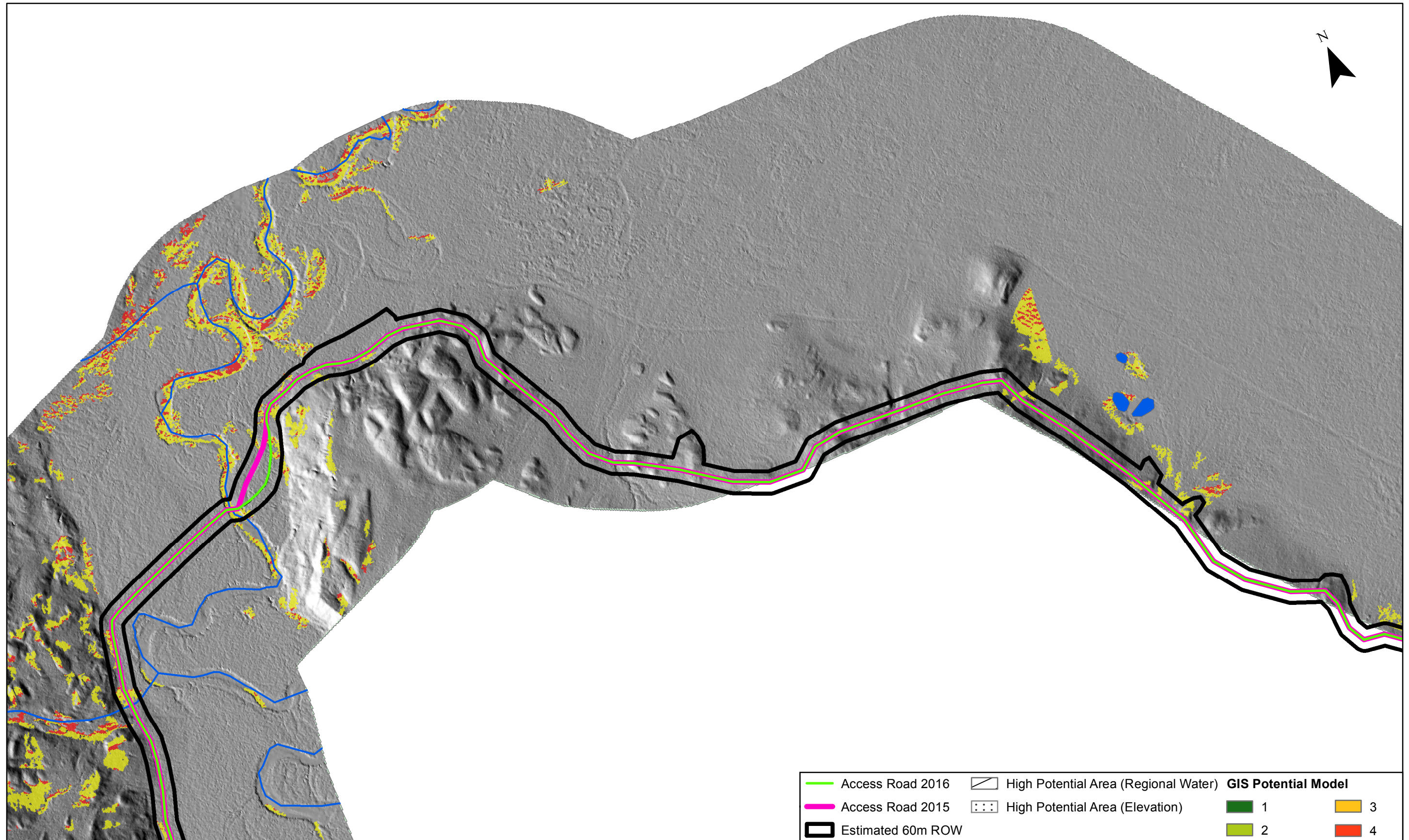


Figure 3: Potential Model, Map 31 of 61

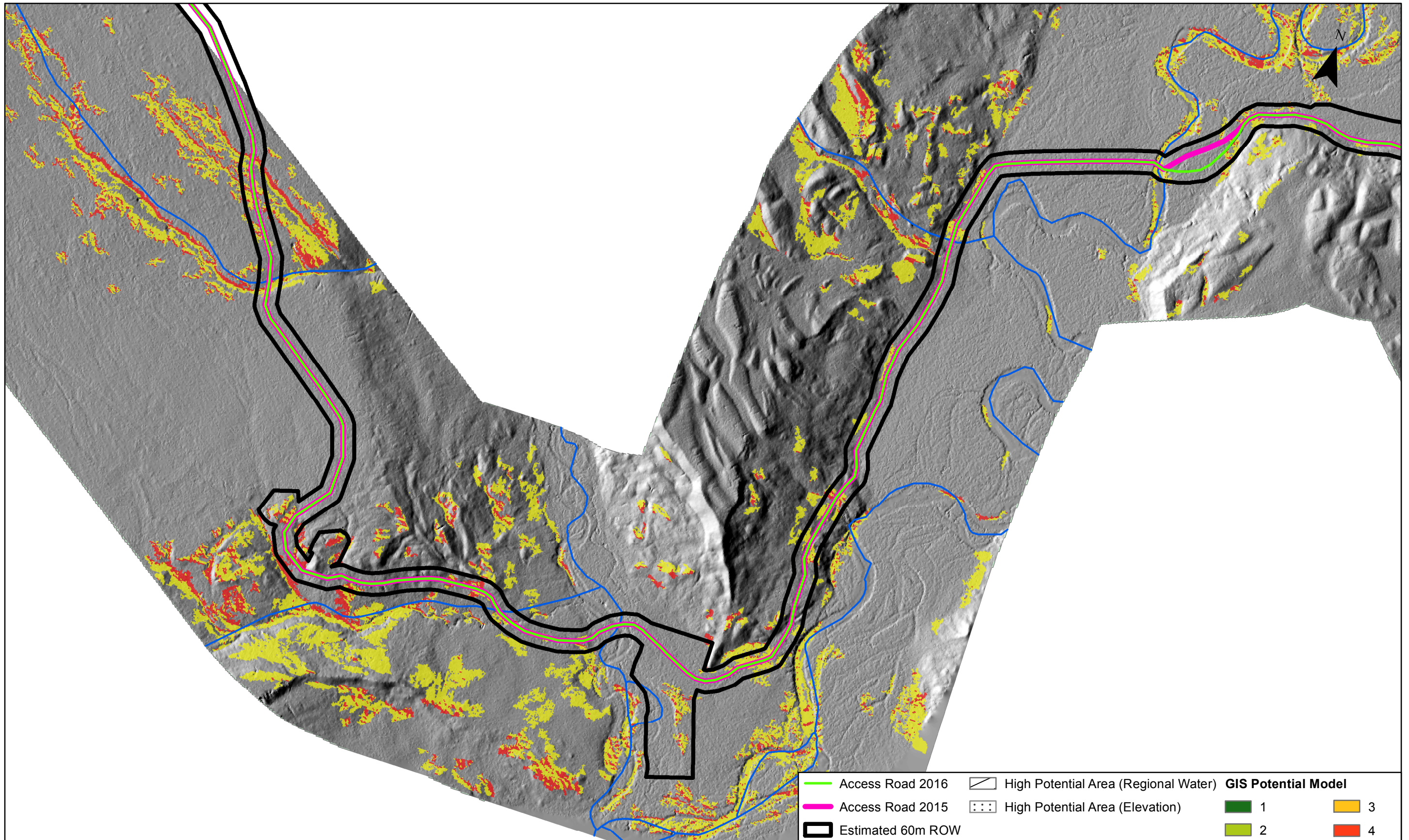


Figure 3: Potential Model, Map 32 of 61

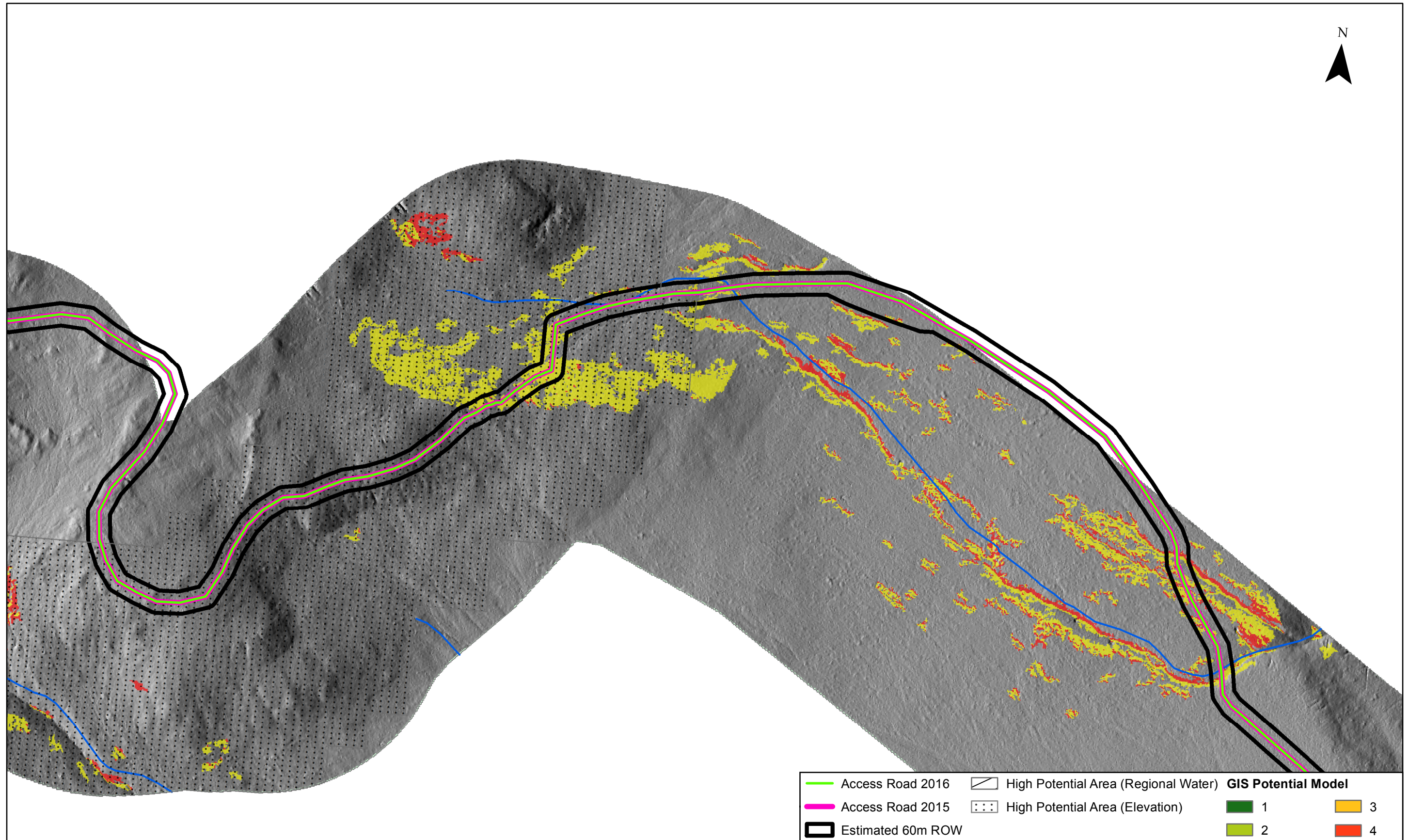


Figure 3: Potential Model, Map 33 of 61

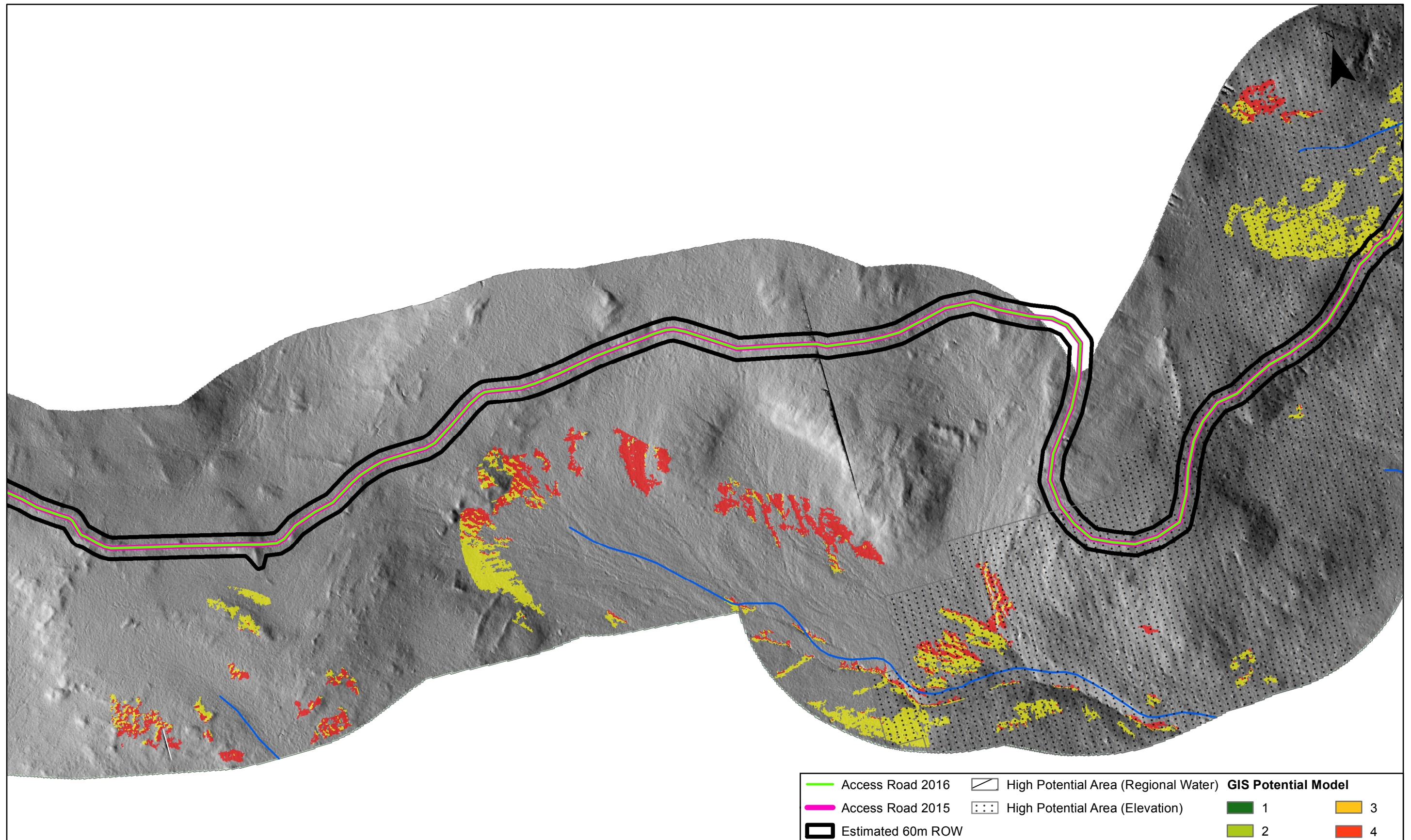


Figure 3: Potential Model, Map 34 of 61

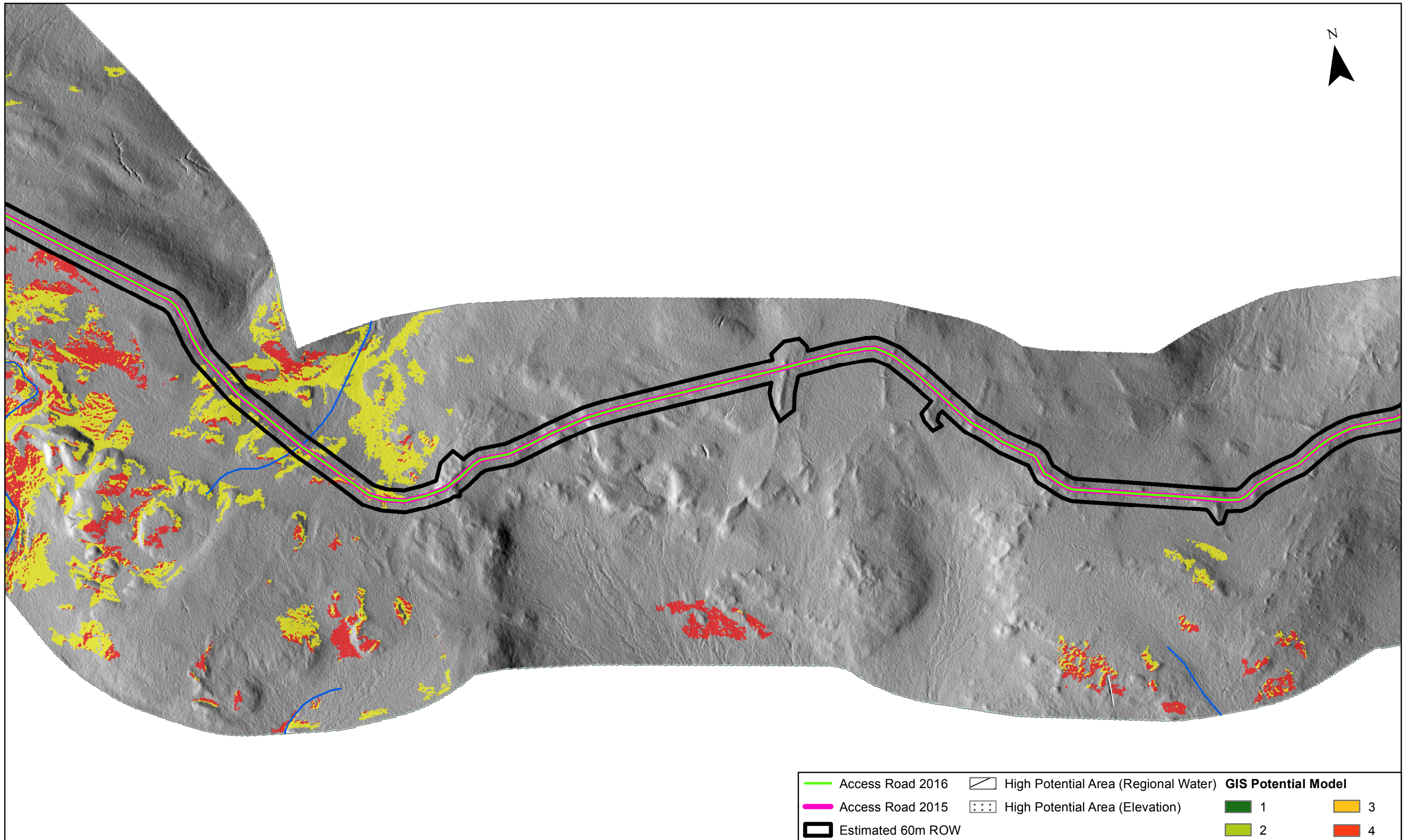


Figure 3: Potential Model, Map 35 of 61

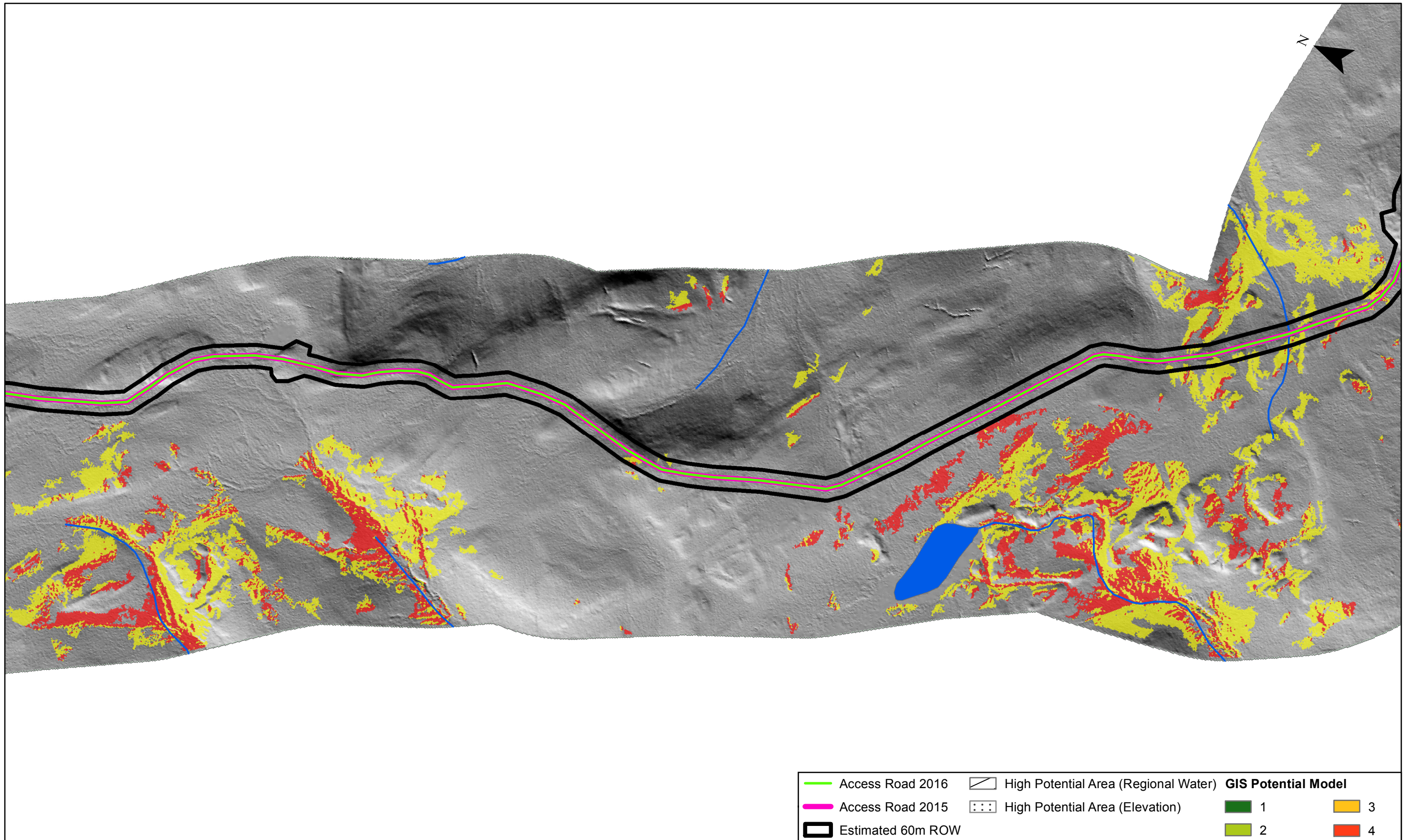


Figure 3: Potential Model, Map 36 of 61

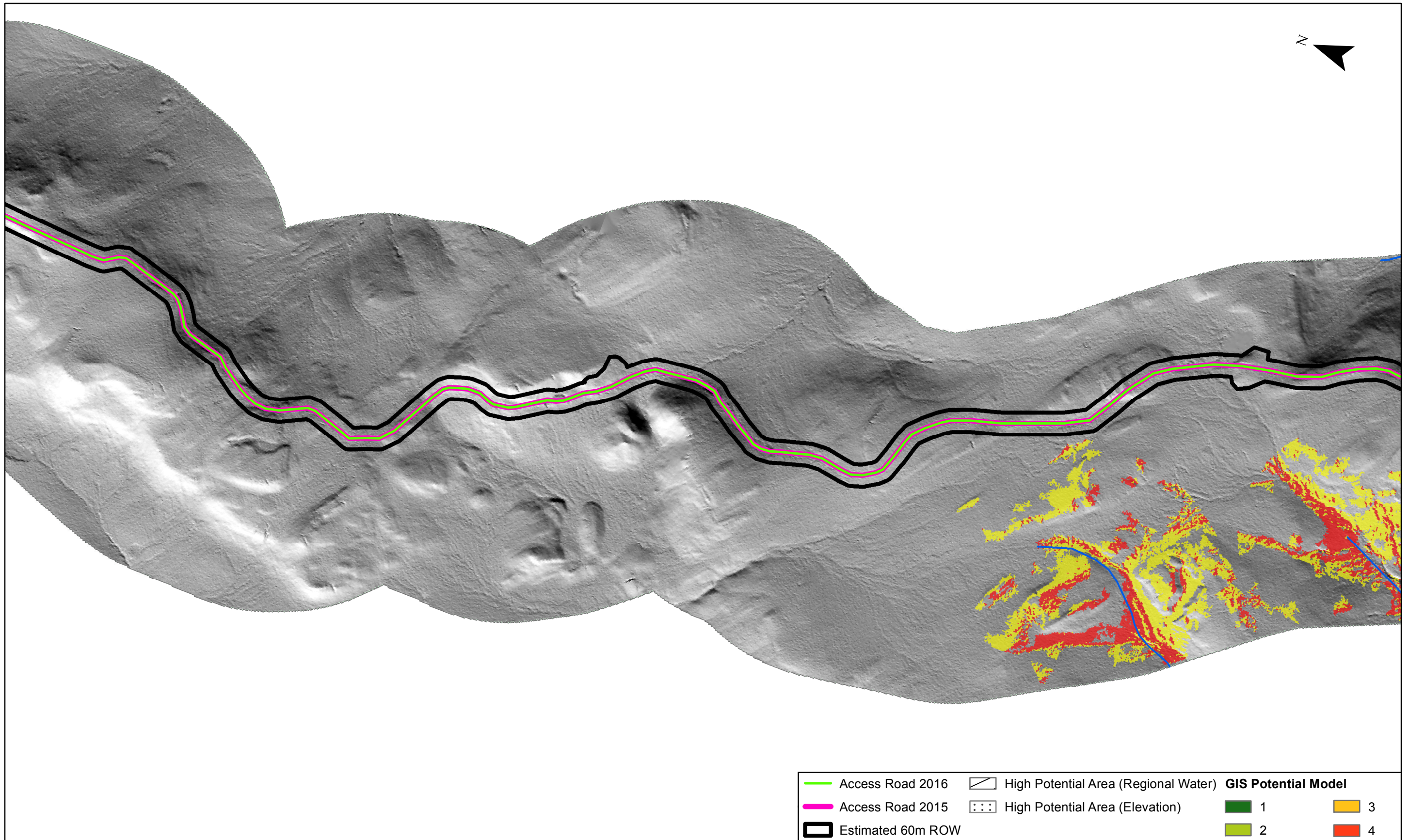


Figure 3: Potential Model, Map 37 of 61

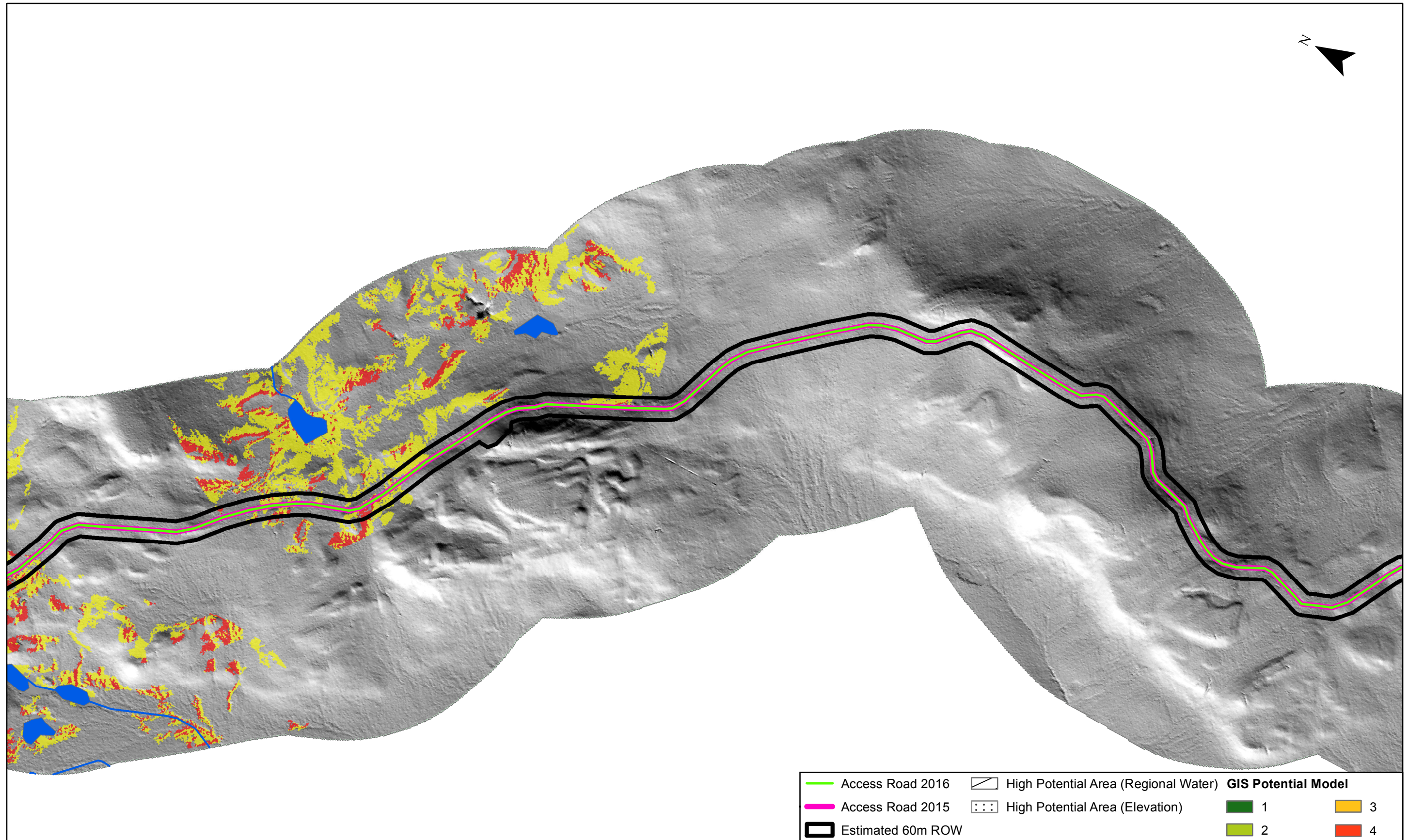


Figure 3: Potential Model, Map 38 of 61

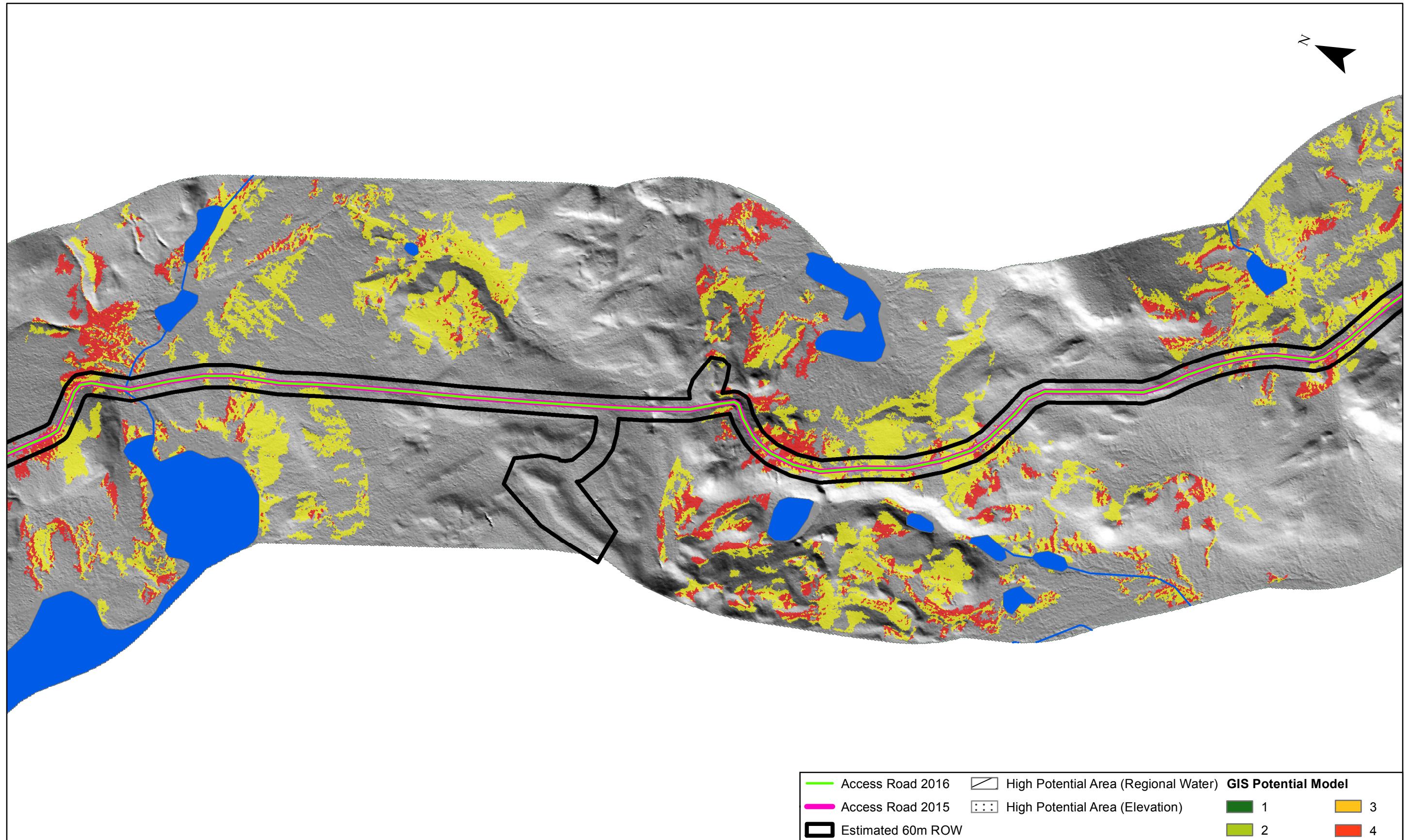


Figure 3: Potential Model, Map 39 of 61

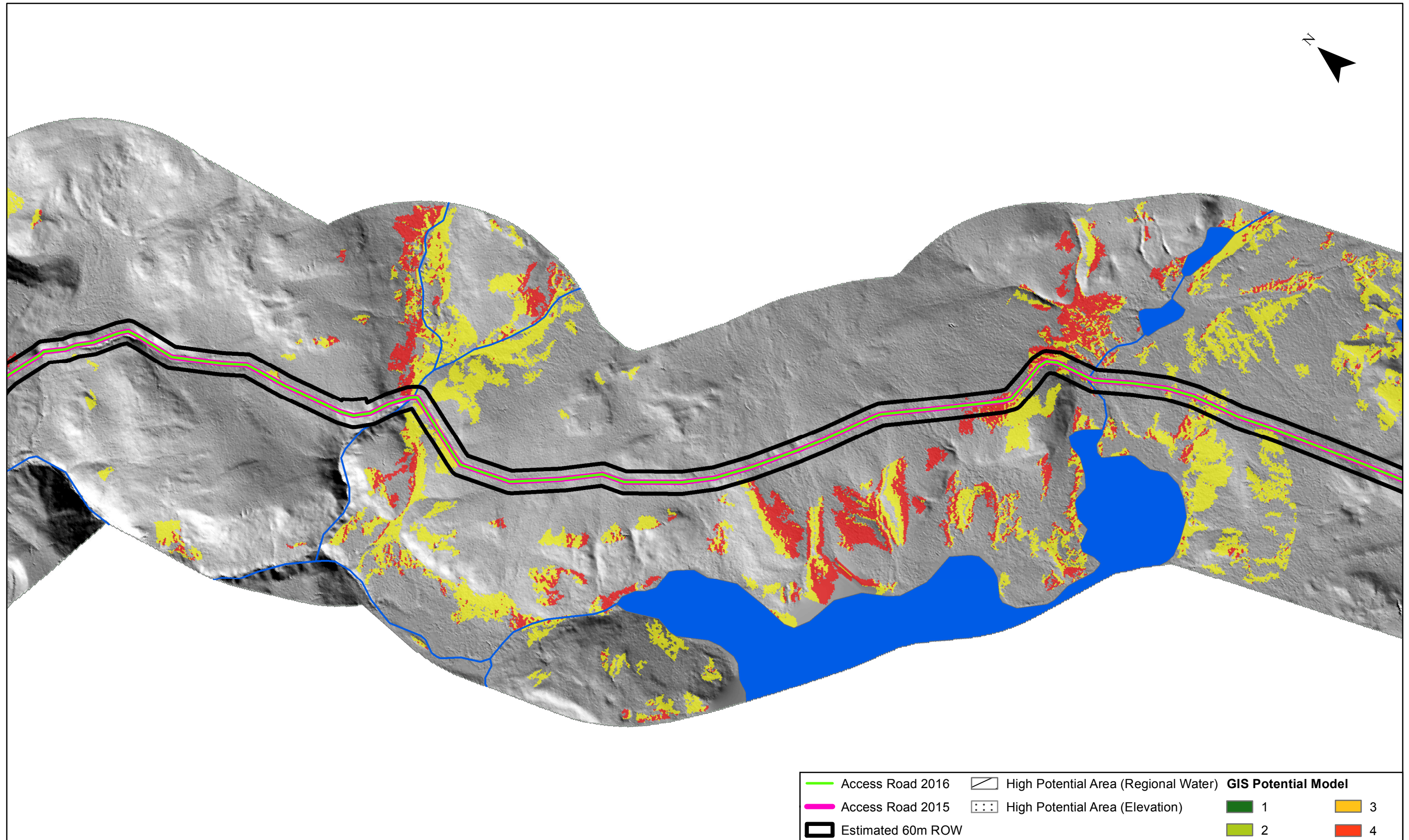


Figure 3: Potential Model, Map 40 of 61

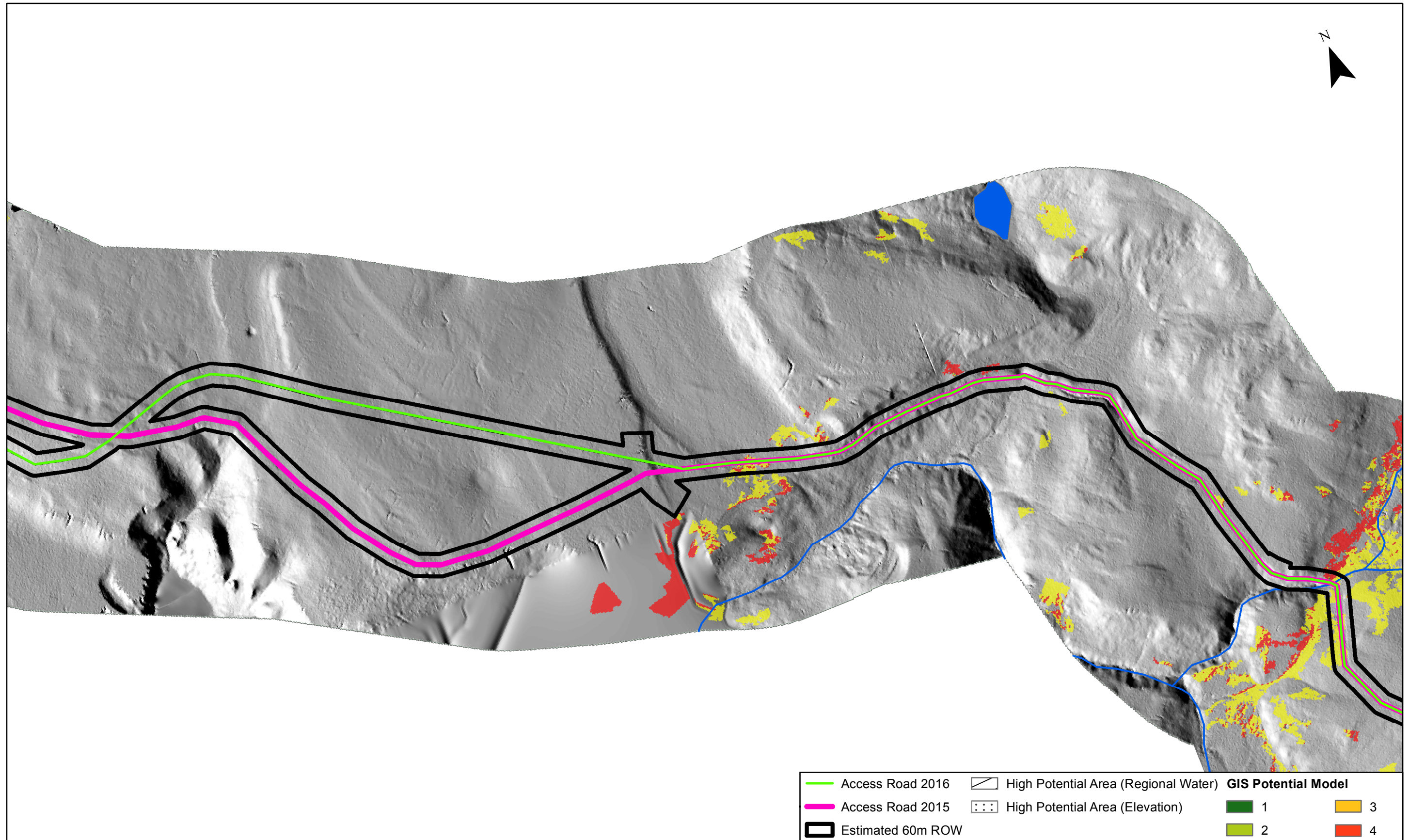


Figure 3: Potential Model, Map 41 of 61

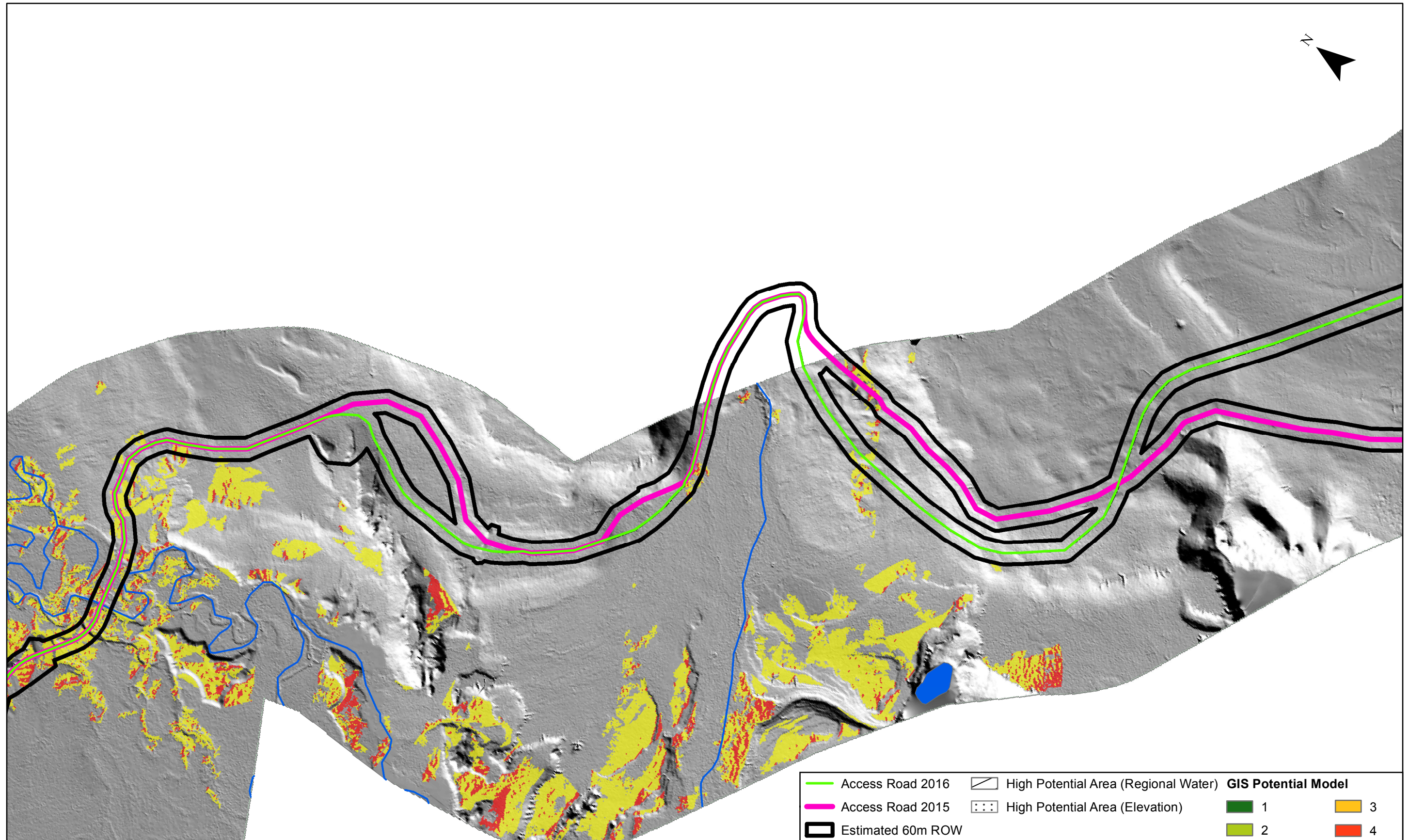


Figure 3: Potential Model, Map 42 of 61

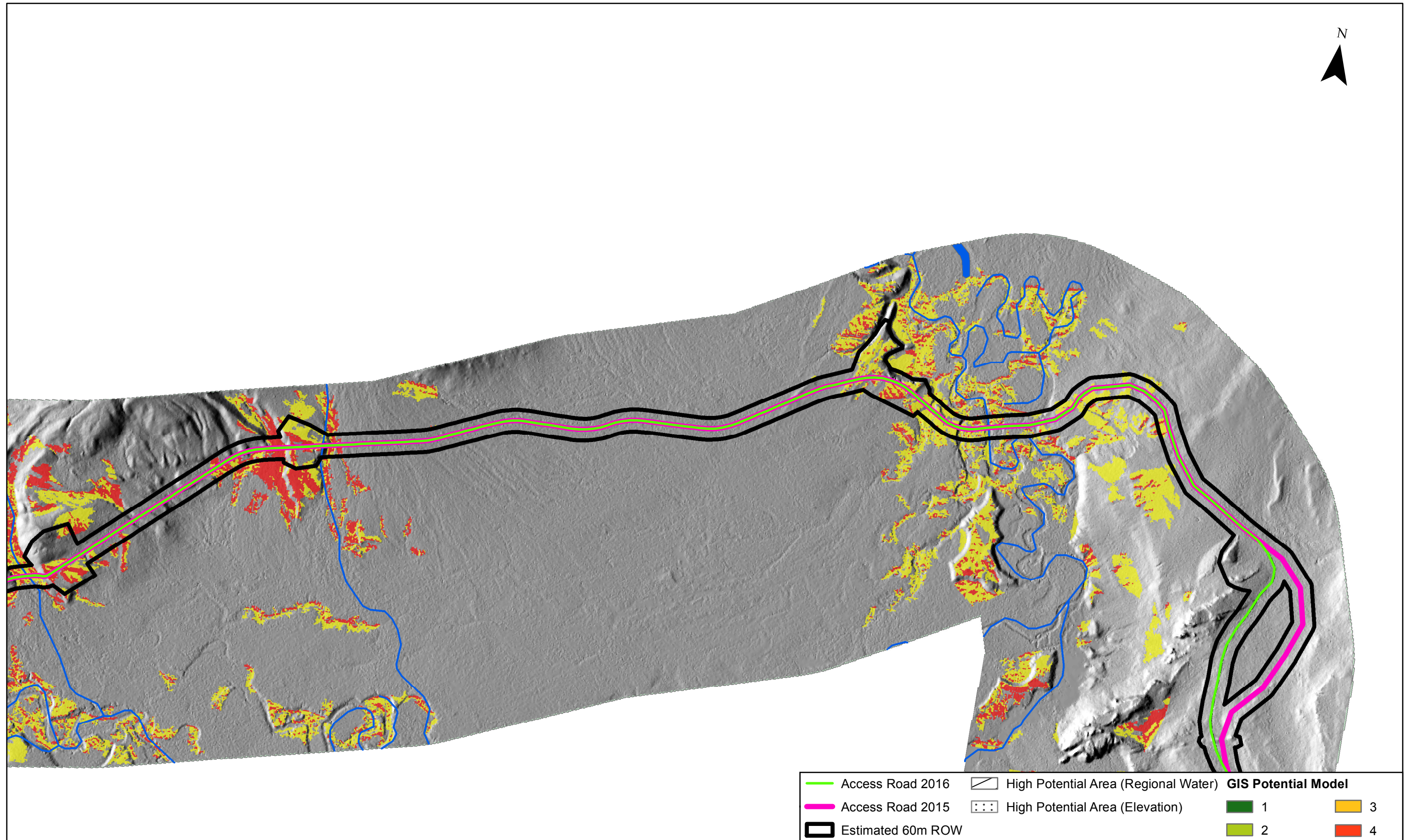


Figure 3: Potential Model, Map 43 of 61

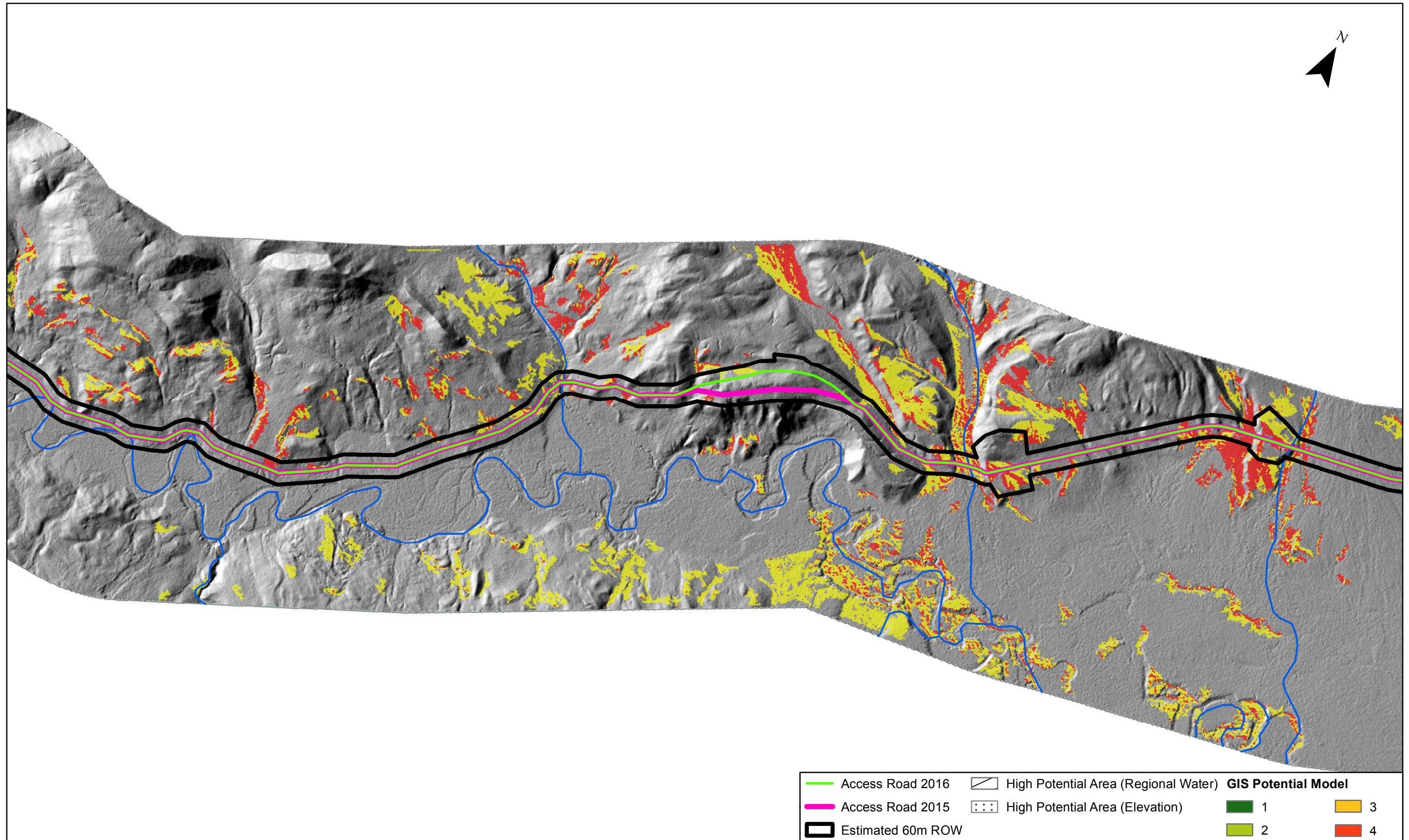


Figure 3: Potential Model, Map 44 of 61

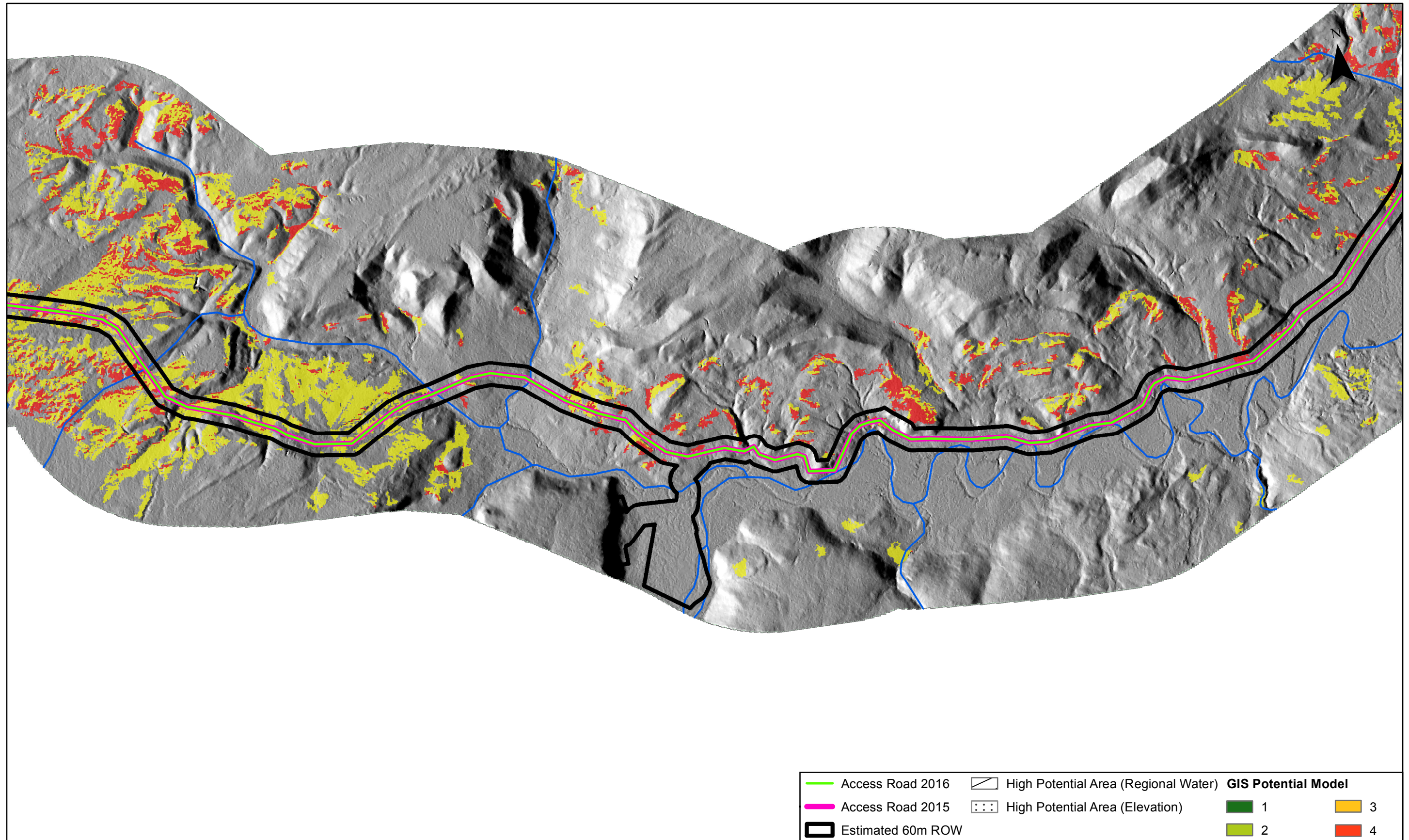


Figure 3: Potential Model, Map 45 of 61

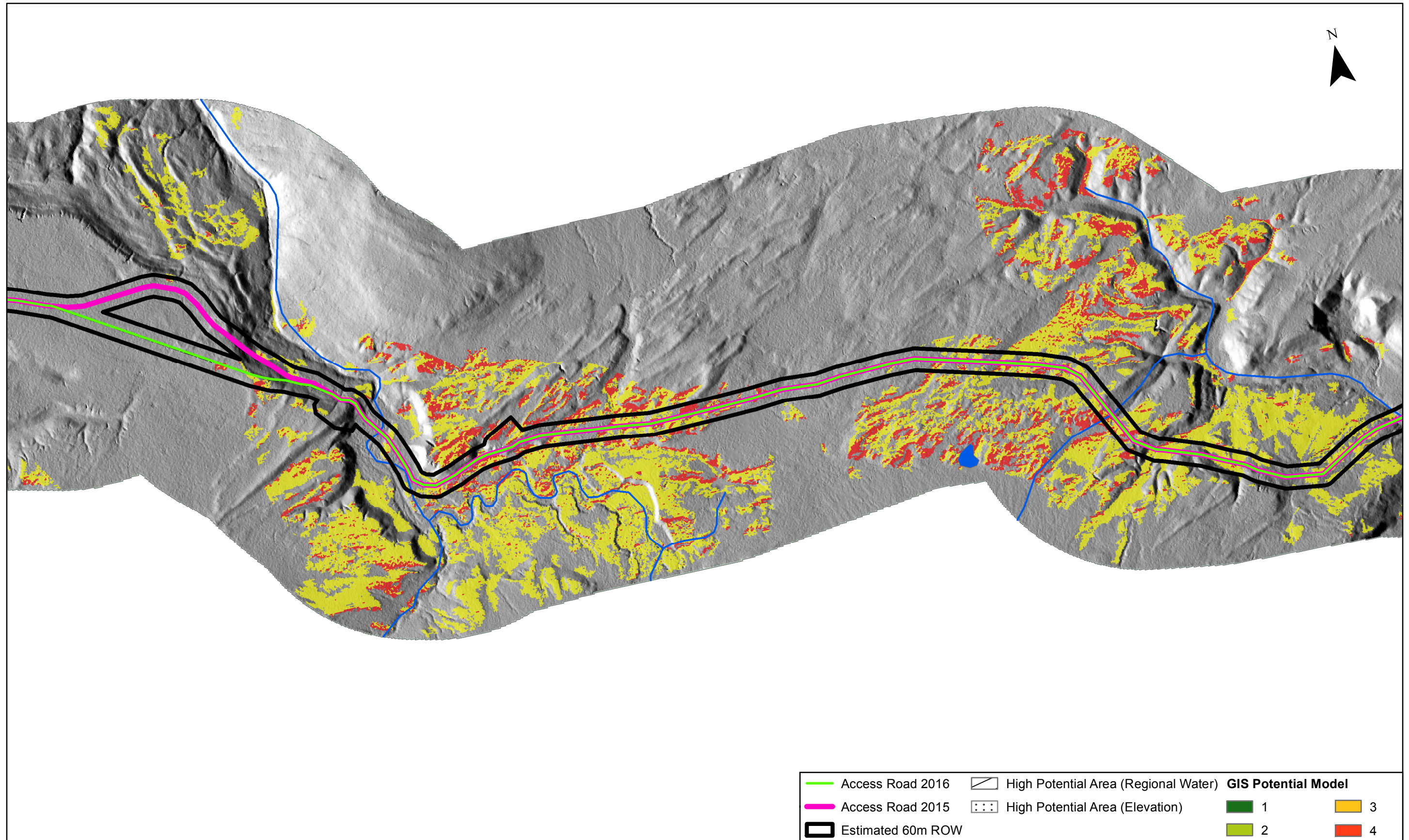


Figure 3: Potential Model, Map 46 of 61

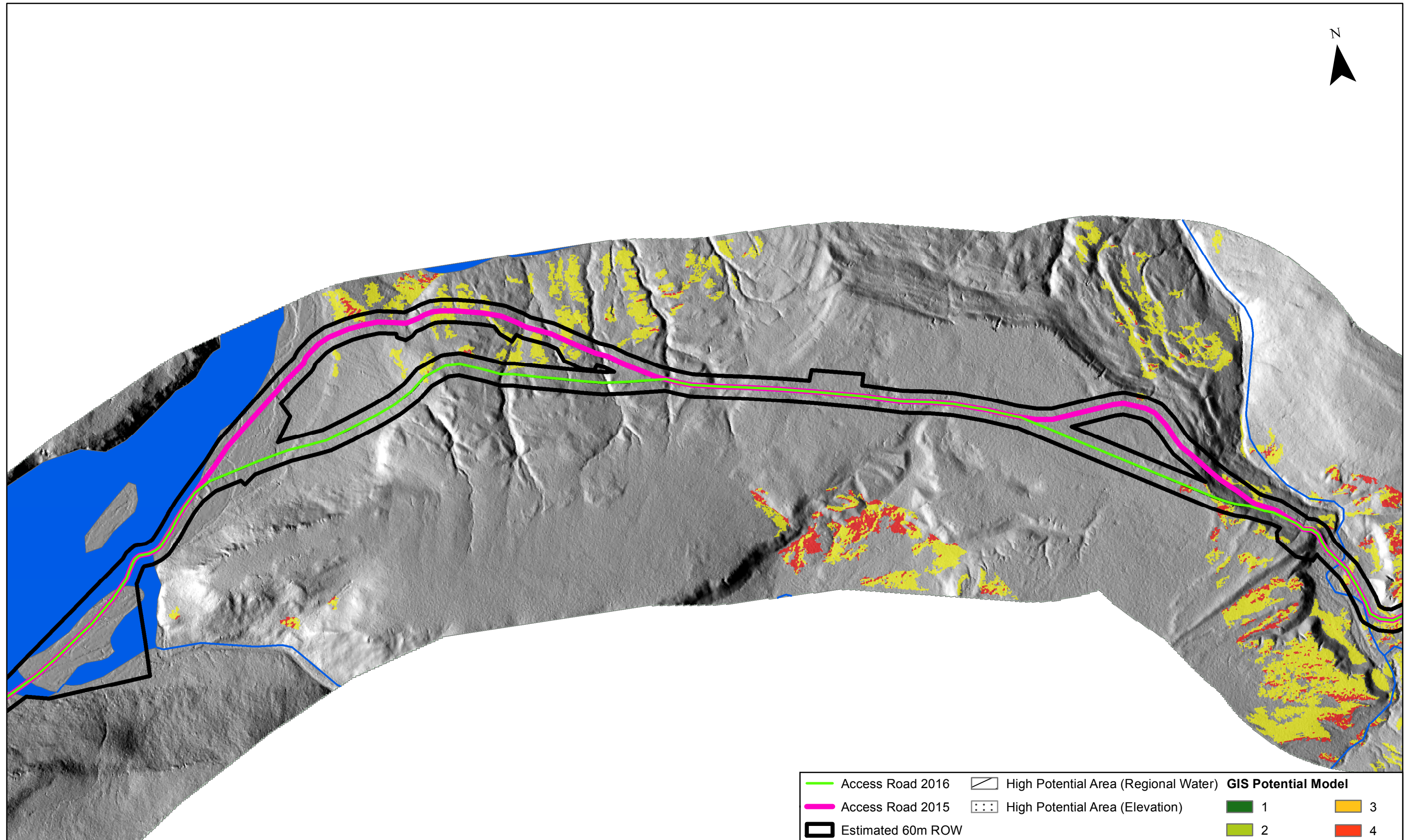


Figure 3: Potential Model, Map 47 of 61

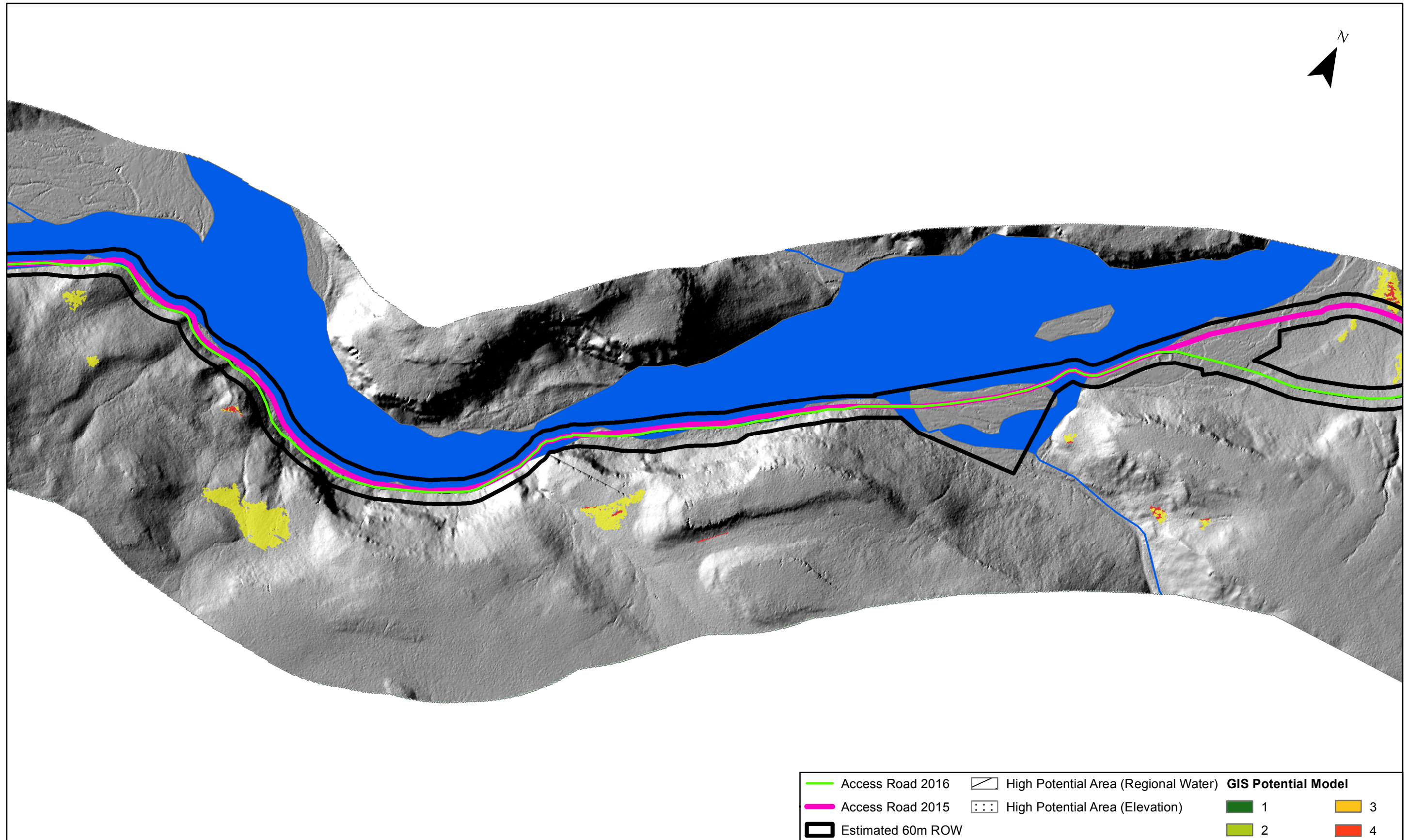


Figure 3: Potential Model, Map 48 of 61

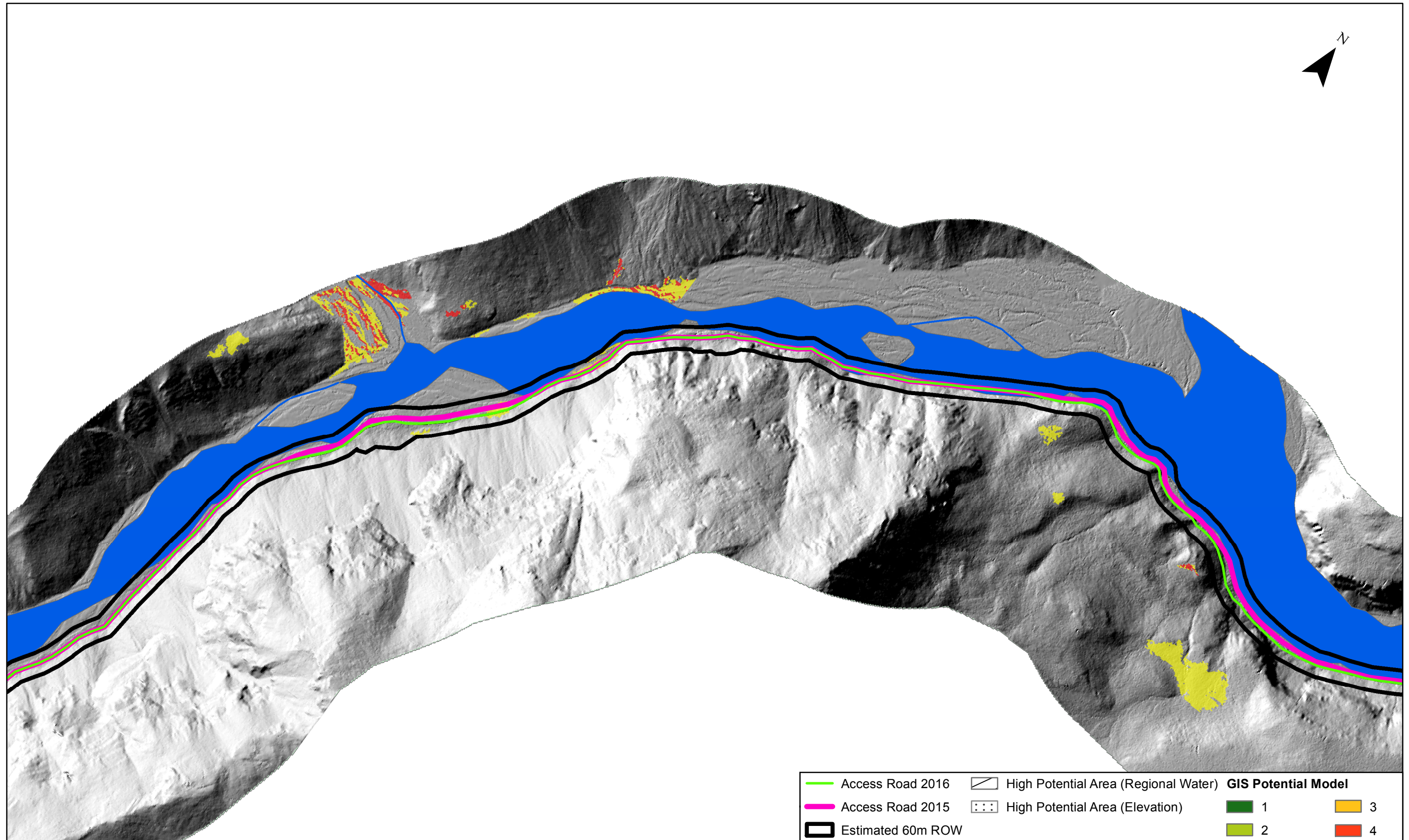


Figure 3: Potential Model, Map 49 of 61

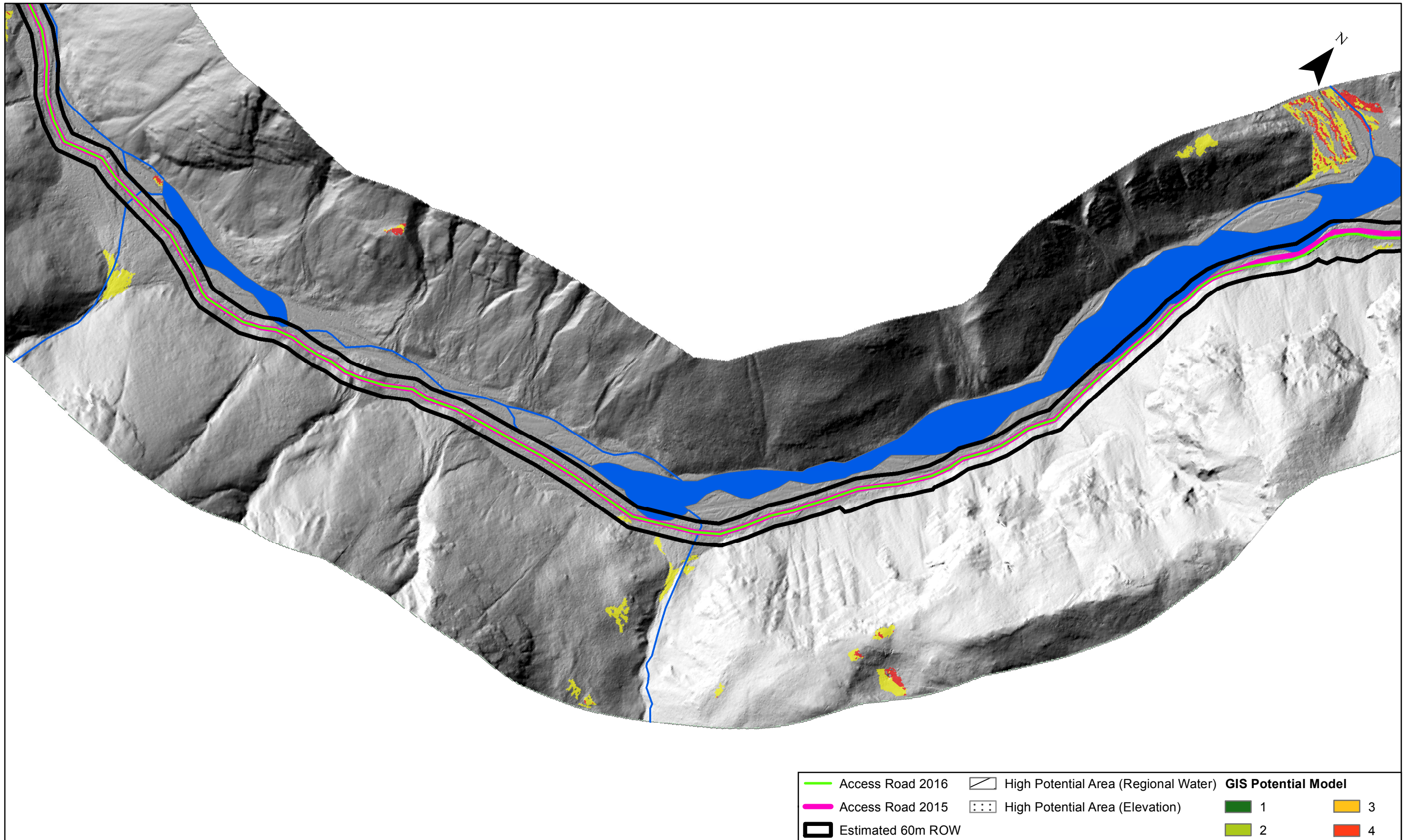


Figure 3: Potential Model, Map 50 of 61

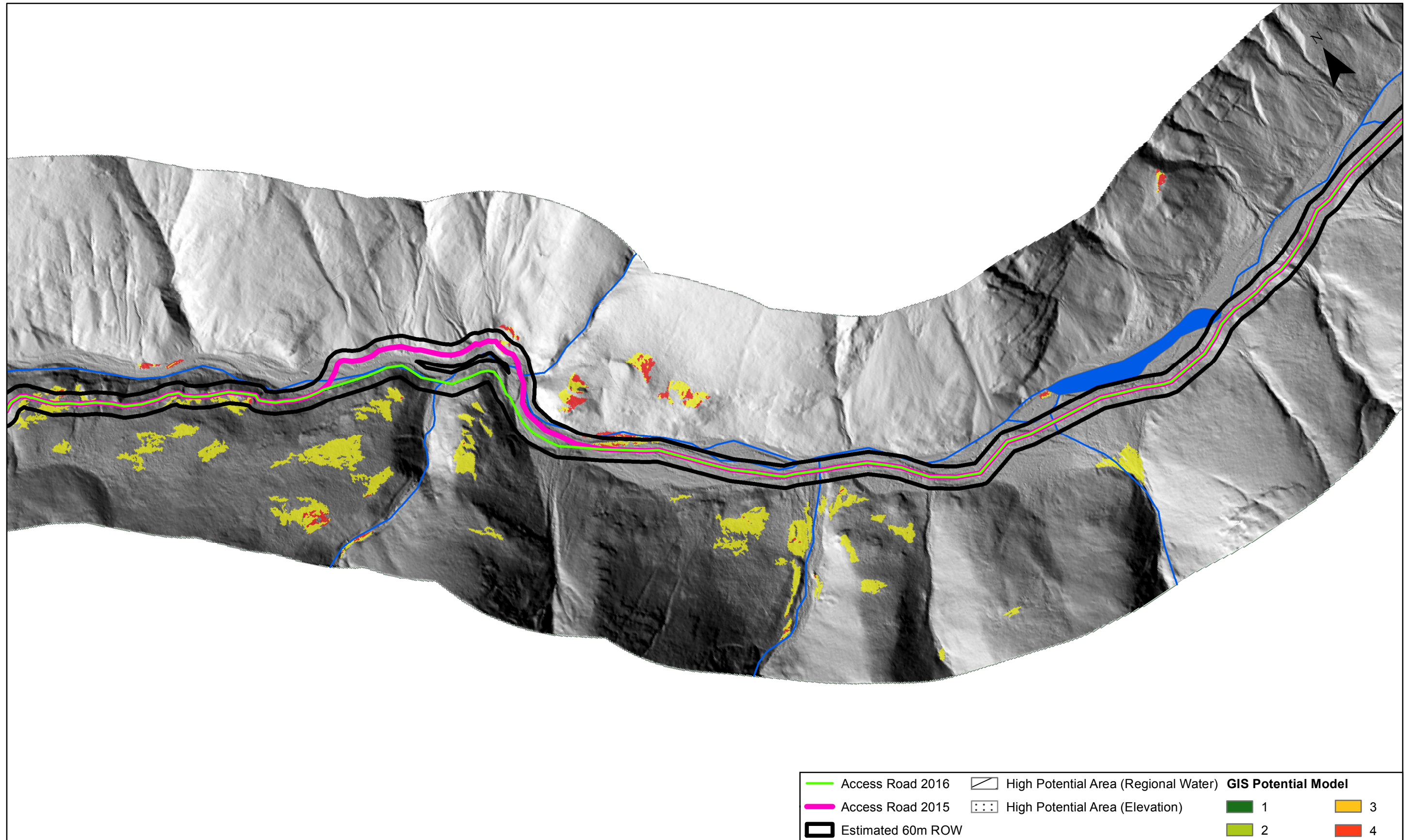


Figure 3: Potential Model, Map 51 of 61

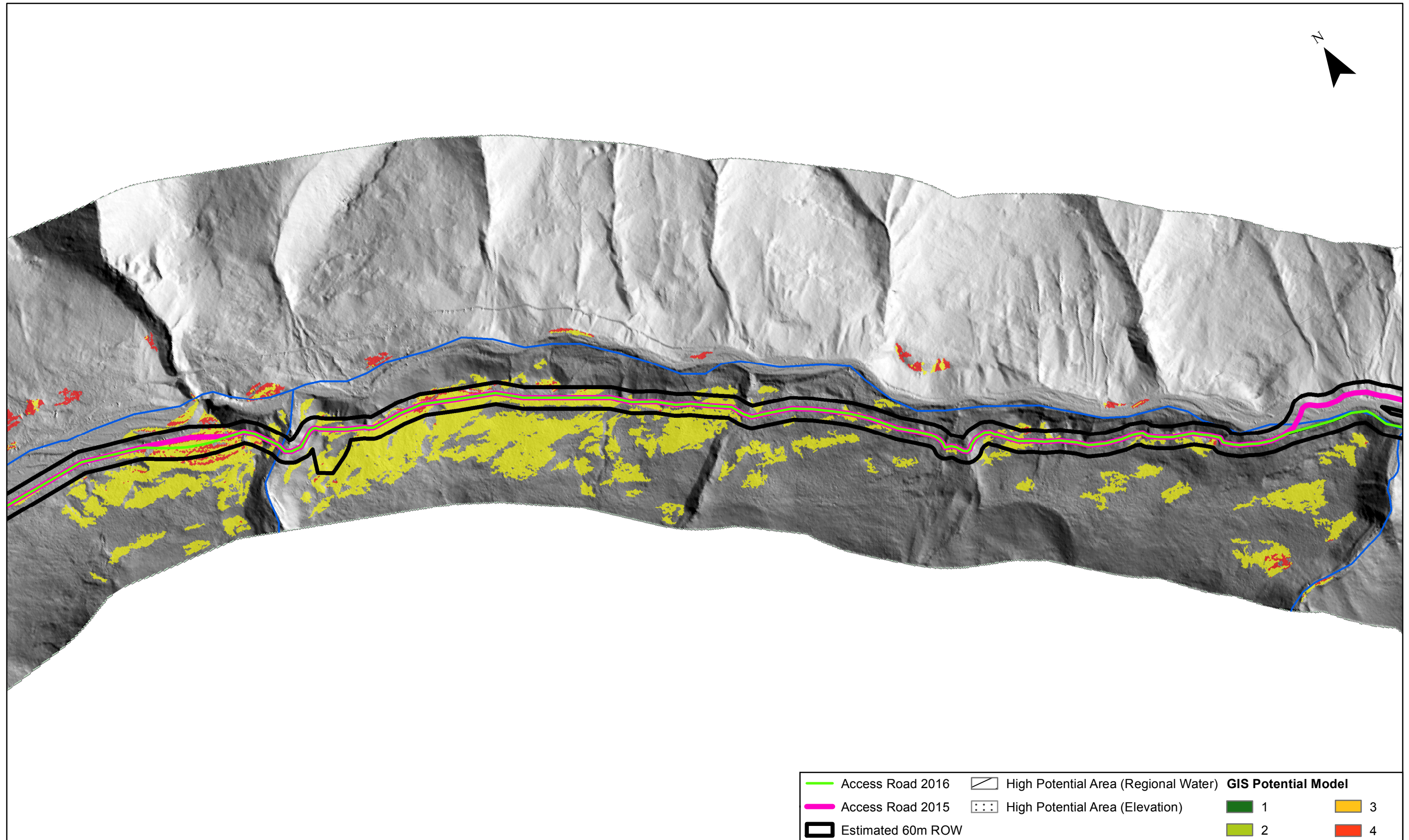


Figure 3: Potential Model, Map 52 of 61

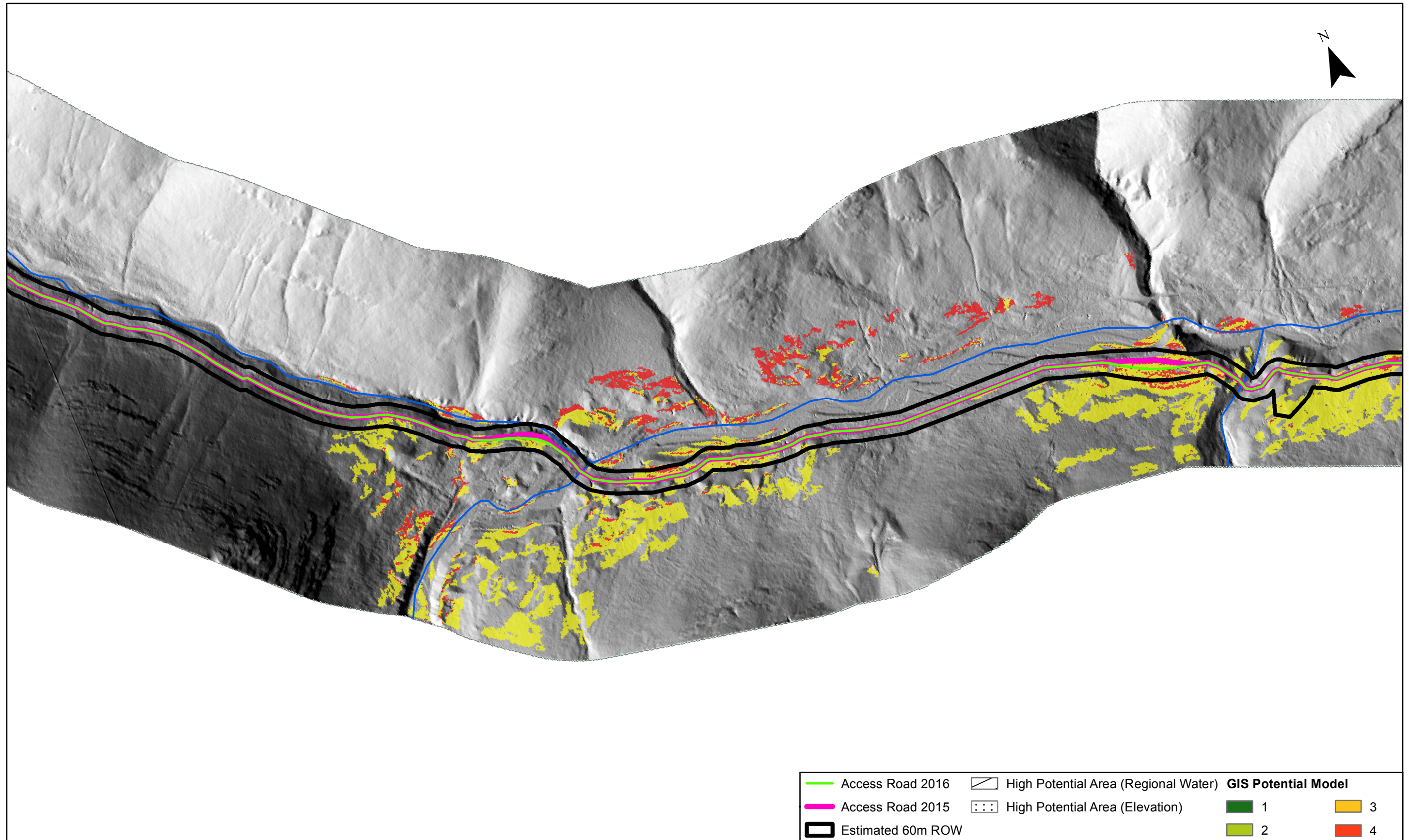
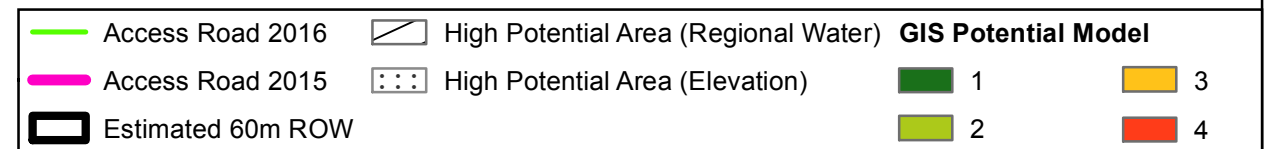


Figure 3: Potential Model, Map 53 of 61



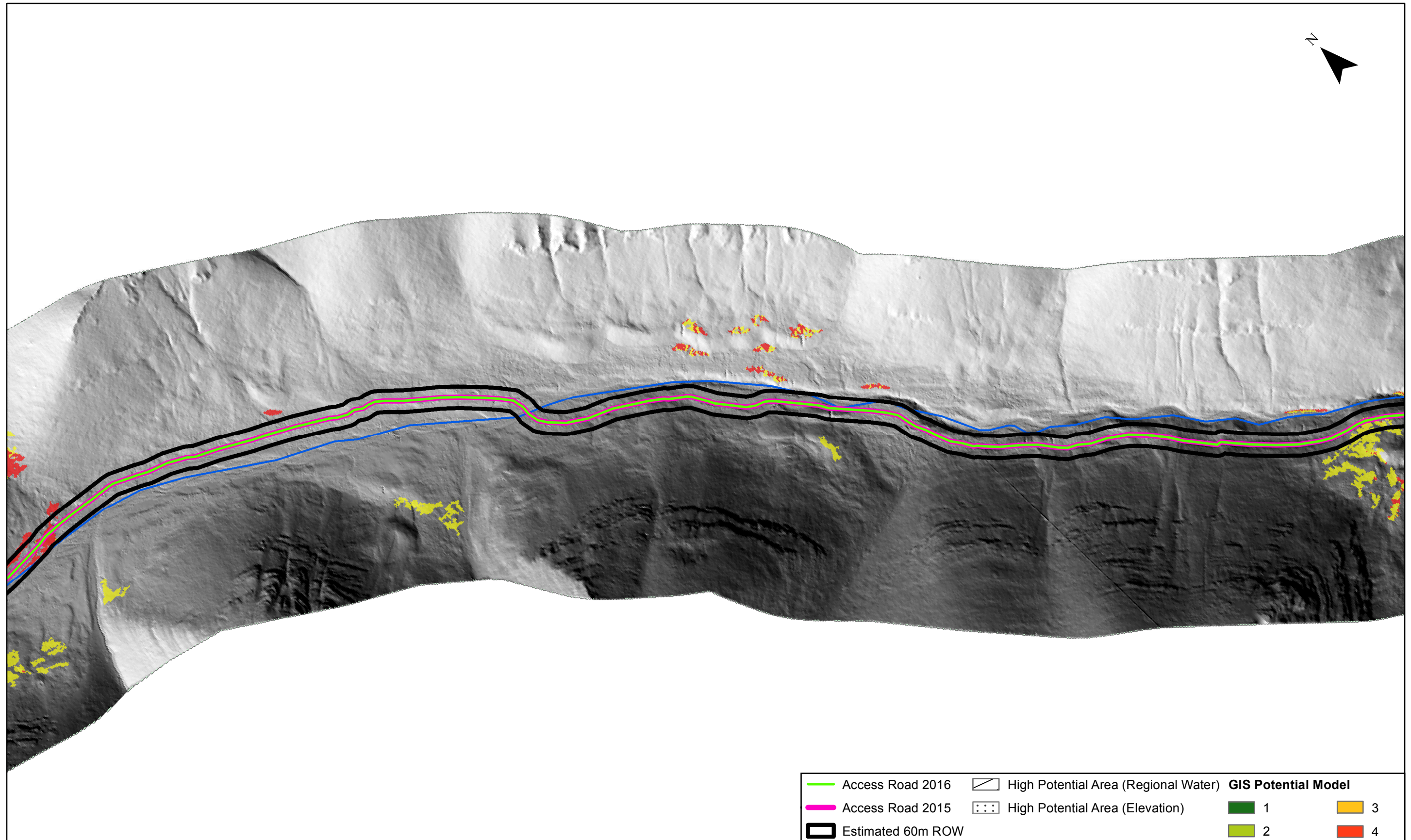


Figure 3: Potential Model, Map 54 of 61

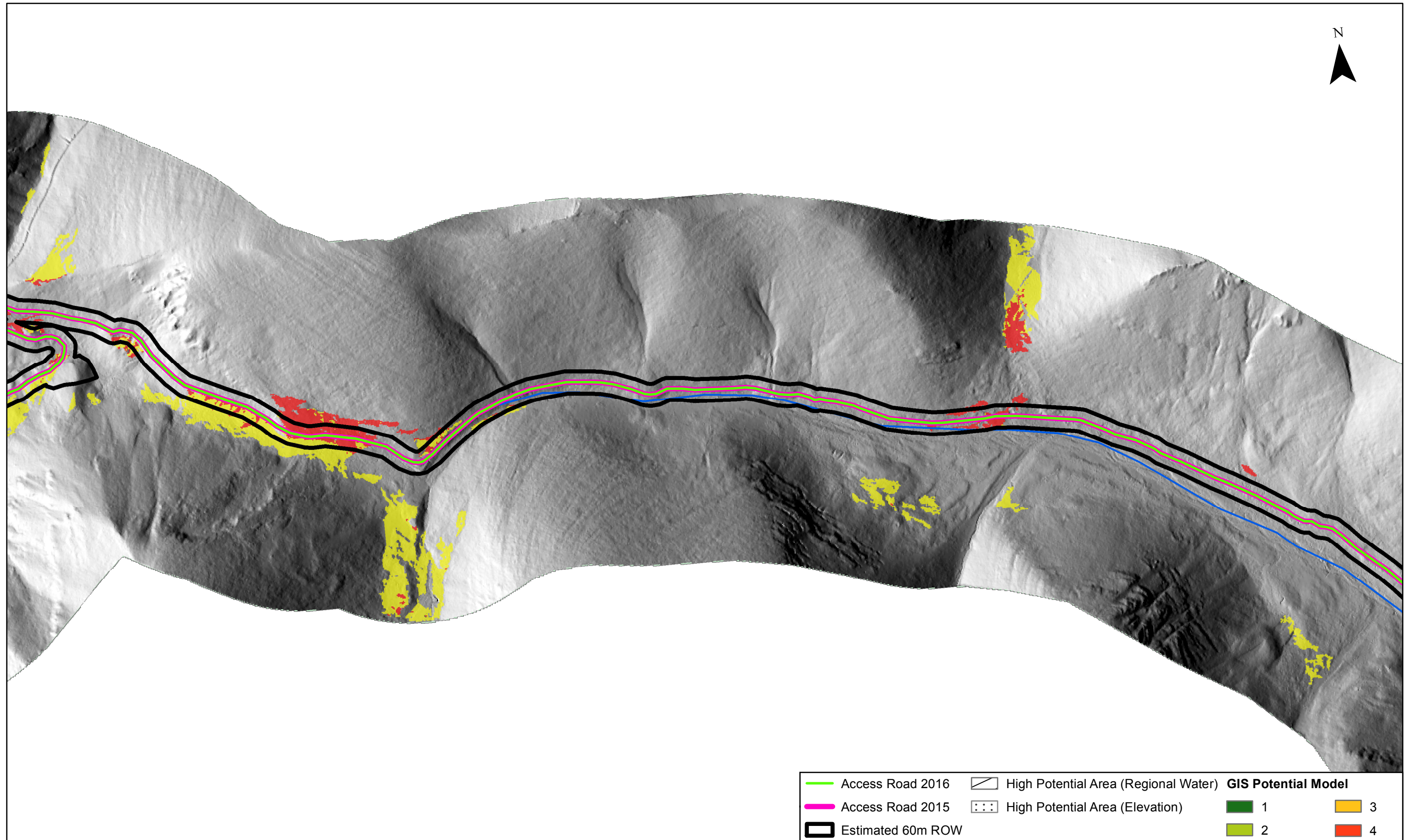


Figure 3: Potential Model, Map 55 of 61

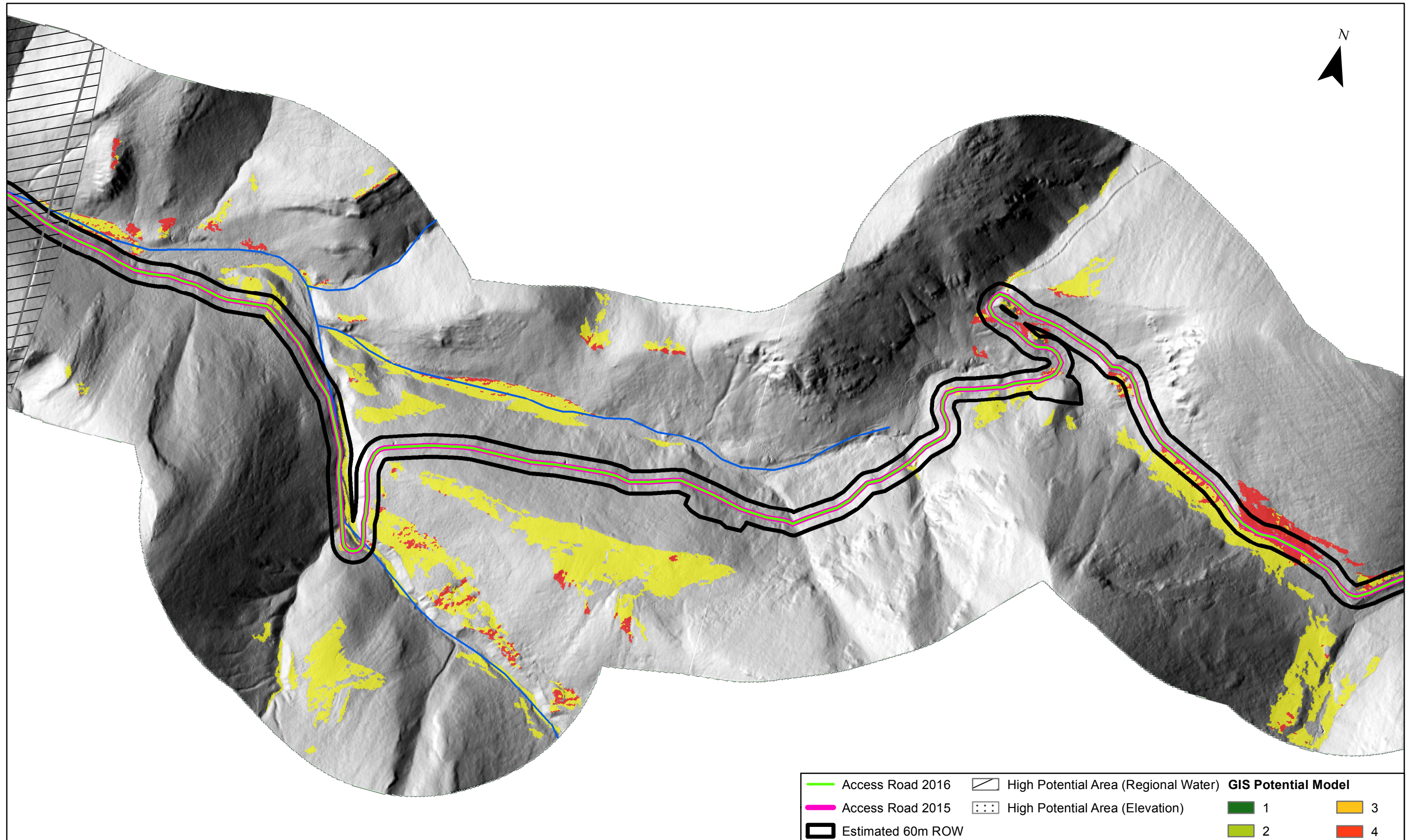


Figure 3: Potential Model, Map 56 of 61

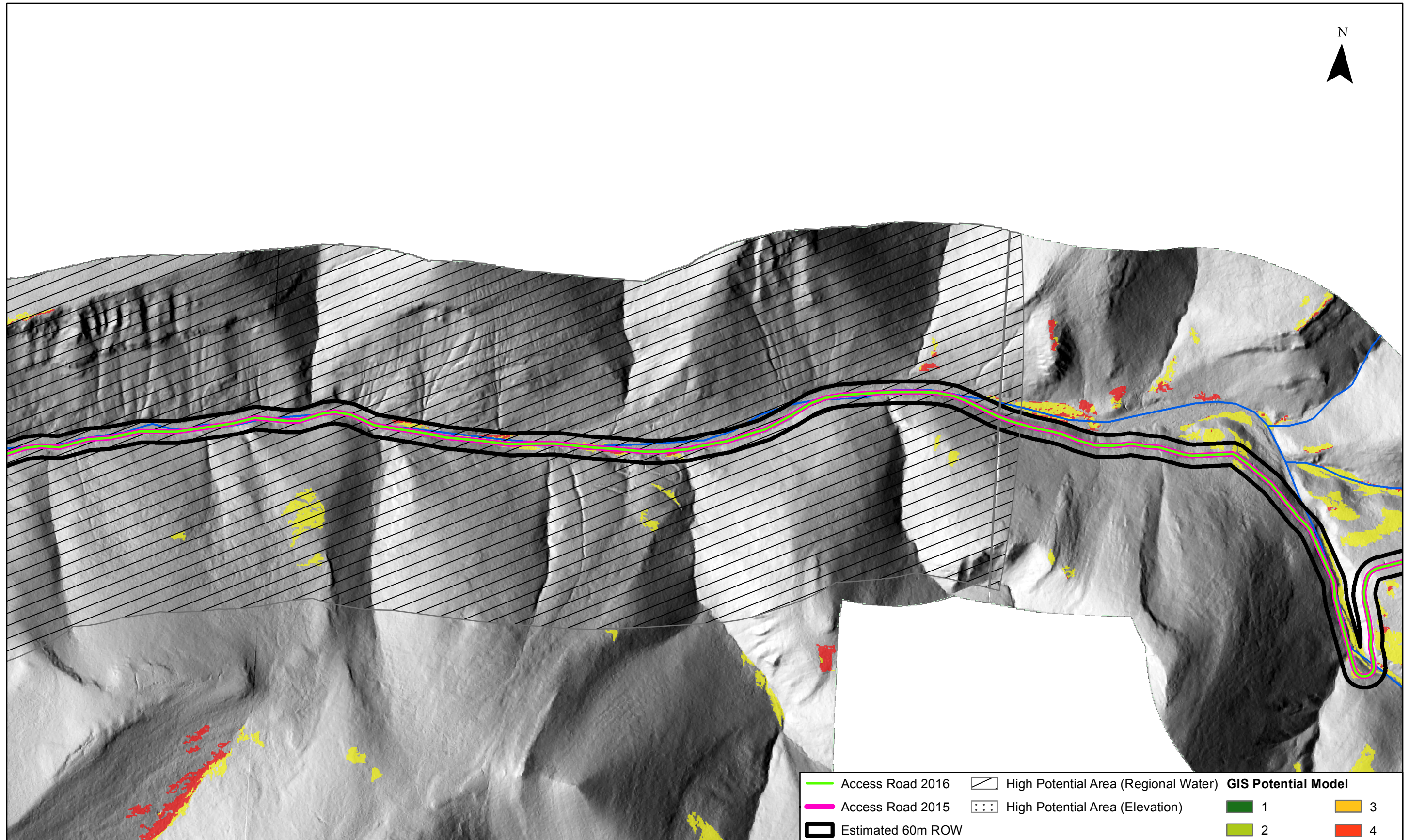


Figure 3: Potential Model, Map 57 of 61

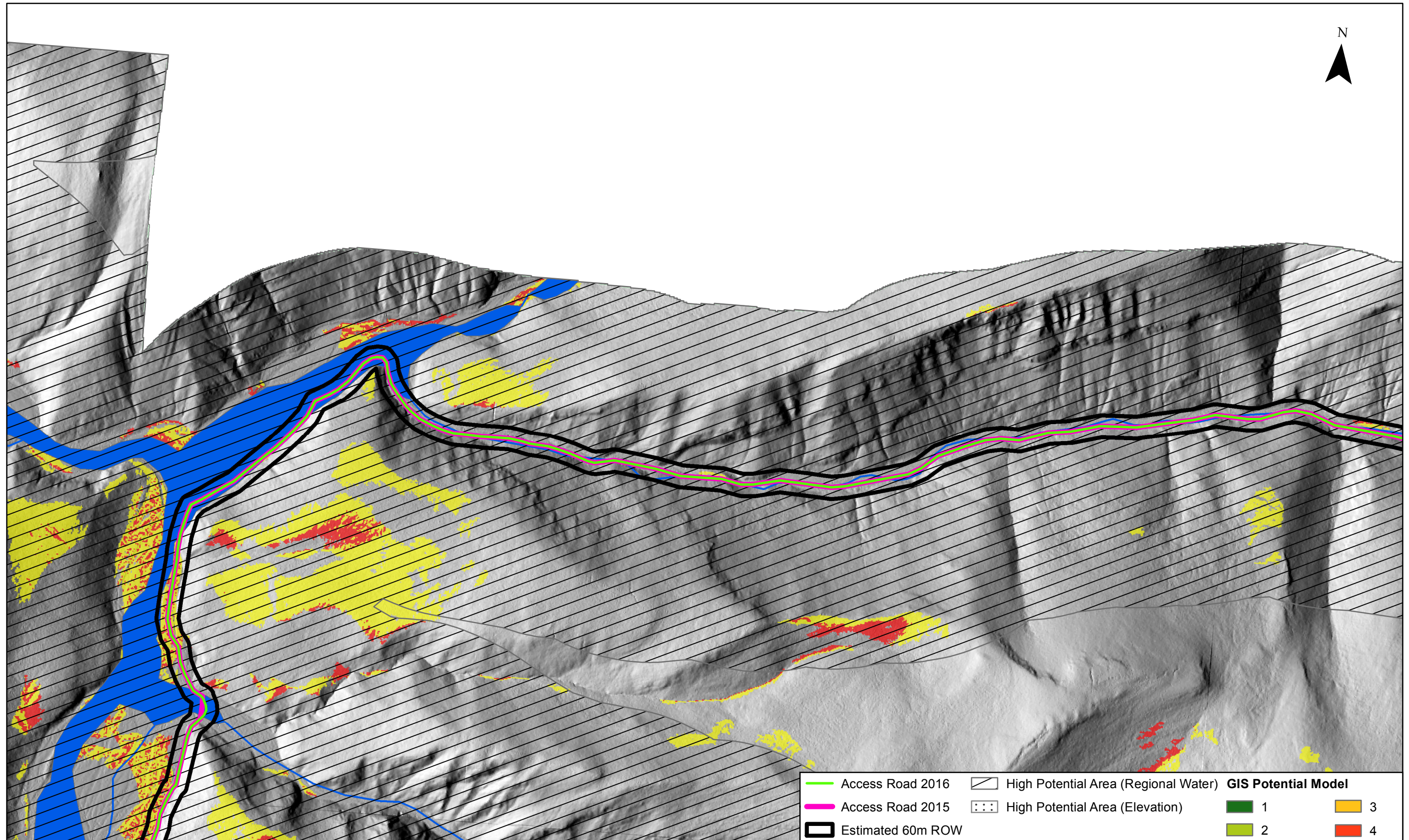


Figure 3: Potential Model, Map 58 of 61

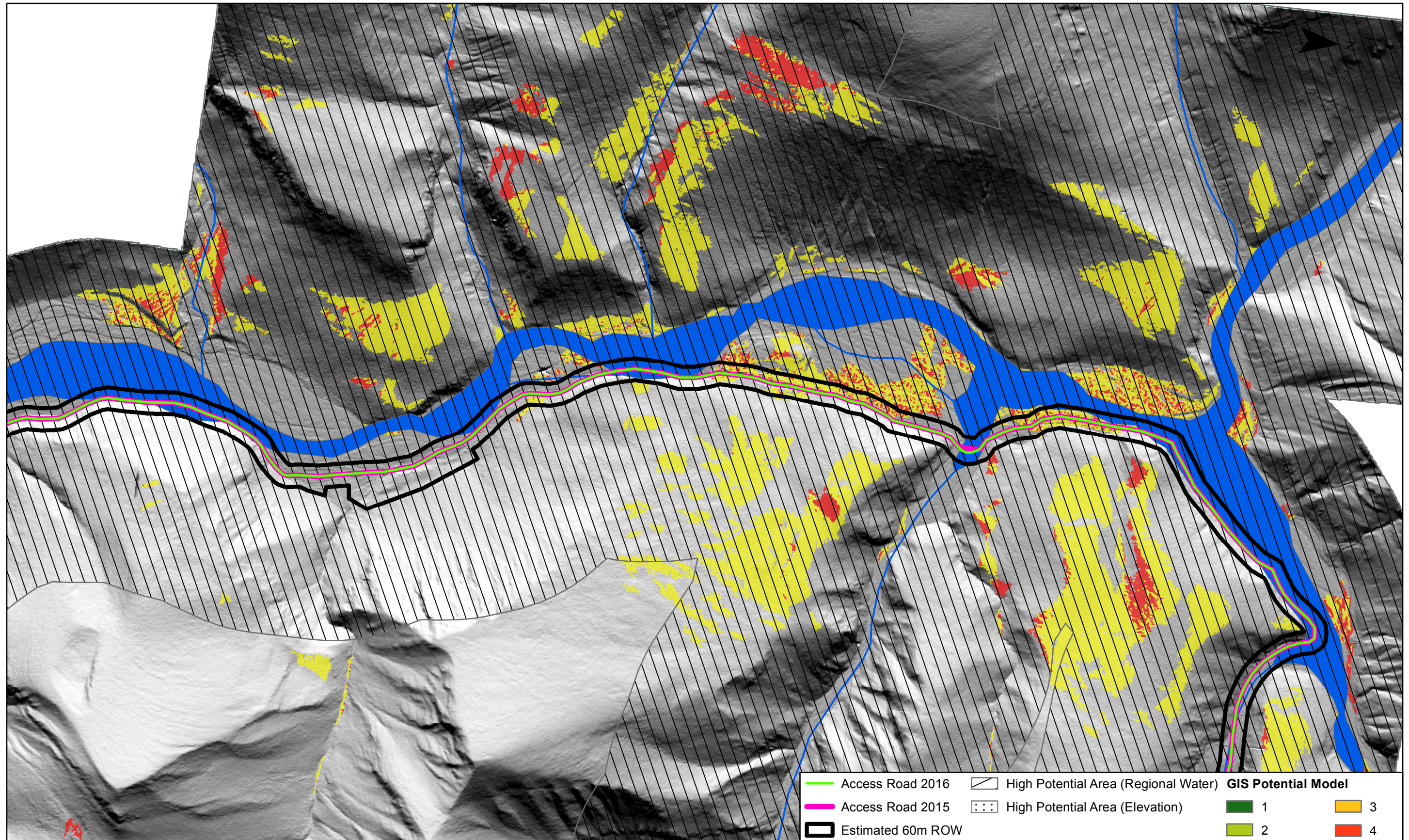


Figure 3: Potential Model, Map 59 of 61

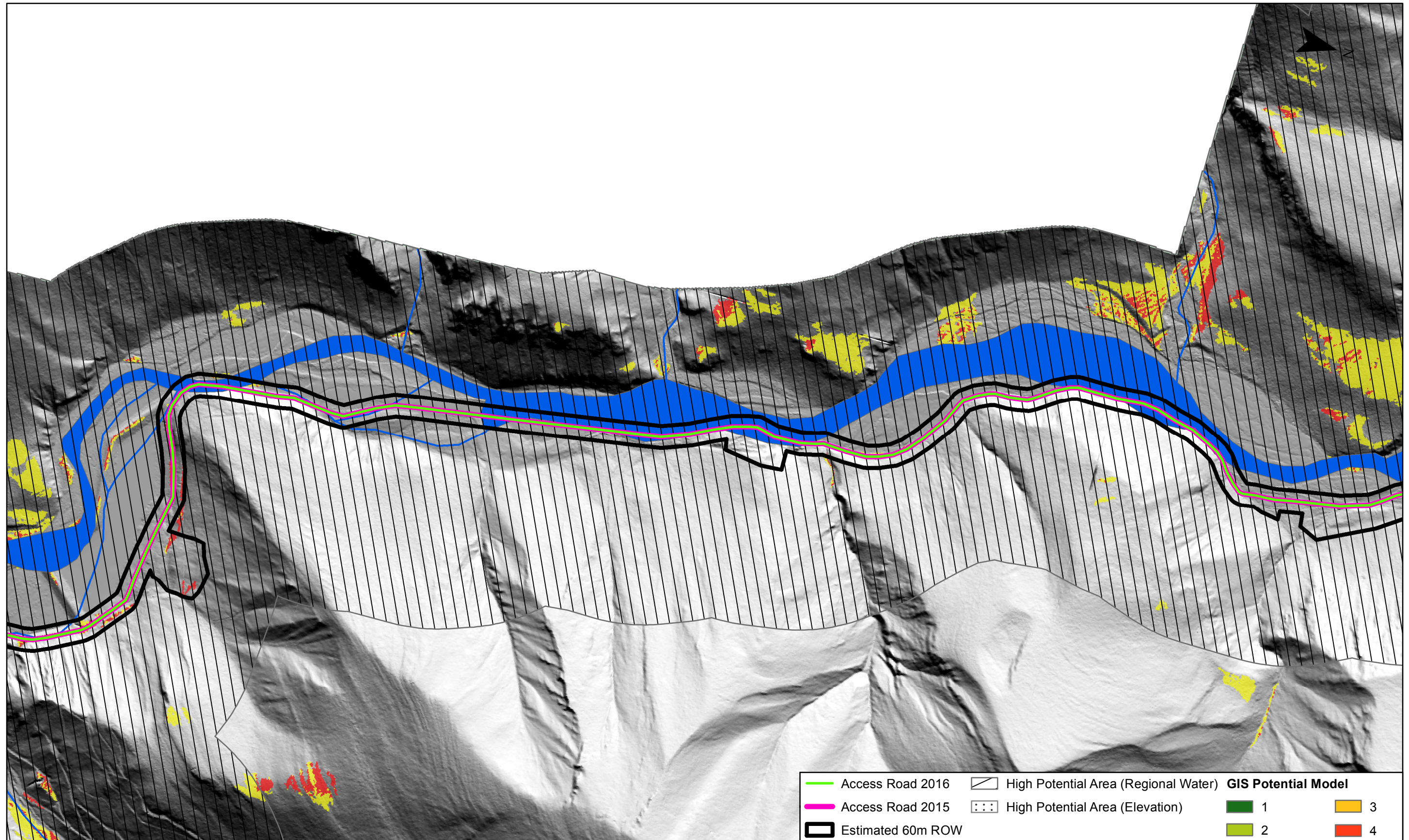


Figure 3: Potential Model, Map 60 of 61

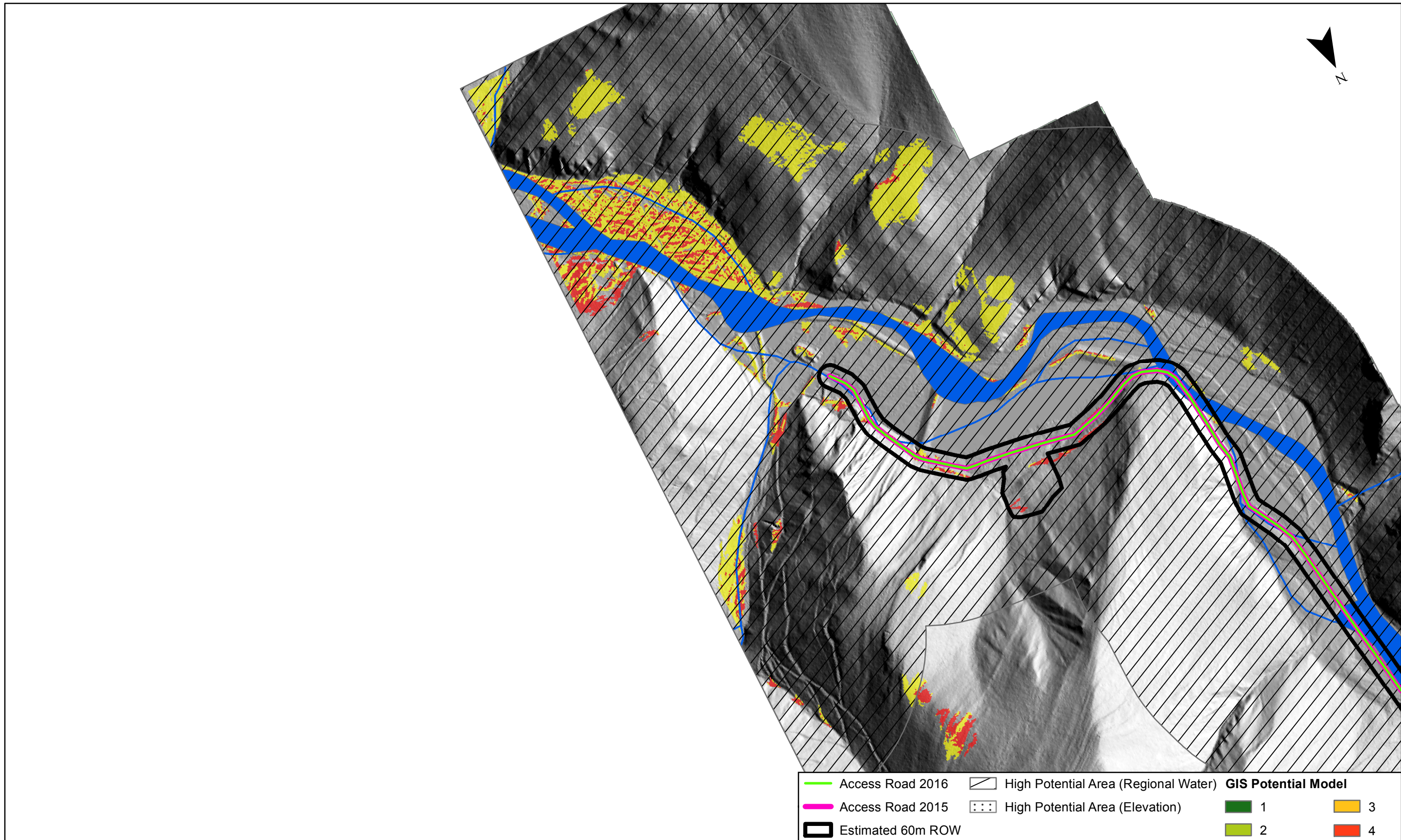


Figure 3: Potential Model, Map 61 of 61