5.5 ROAD UPGRADES AND PIPELINES

5.5.1 Road upgrades at Ntabelanga and Lalini Dams

Some new sections of road will be constructed either to provide access to the construction sites or to replace existing roads that will be inundated. In addition to this, some existing roads will be upgraded by resurfacing and improving river crossings. The road upgrades are mostly in the Ntabelanga Dam study area. In terms of vegetation diversity, the edge effects of the existing roads has transformed the vegetation to the extent that only grass species such as *Eragrostis curvula, E. chloromelas, Hyparrhenia hirta, Sporobulus africanus* and *Cynodon dactylon*, which are associated with more disturbed areas, occur alongside the current access roads. Other areas of the road upgrade are located within the higher altitude areas. Indigenous species such as *Aloe marlothii, Aloe ferox* and *Aloe aborescence* occurred alongside the current road. These and other indigenous species could be relocated should they occur within the road upgrade footprint area.

Figure 27: Transformed grassland areas alongside the road upgrade area. Indigenous species such as *Aloe ferox* and *Aloe aborescence* located alongside the road to be upgraded entering the Ntabelanga site.

Numerous drainage lines, seeps, riparian systems and valley bottom wetland features traverse the road to be upgraded. The wetland features need to be considered when construction of the road upgrades commences to ensure that e.g. sedimentation of wetland features does not take place, wetlands that have undergone severe erosion close to the road, be reinforced to prevent further degradation and stream flow is established.

Figure 28: Riparian and wetland crossing along the road to be upgraded in the Ntabelanga Dam study area.

Podocarpus falcatus and *P. latifolius* were identified in low abundance alongside the road upgrade (roads to be resurfaced) areas within the Ntabelanga Dam, on the northern section of the dam. More *Podocarpus* species were located on the secondary pipeline route south of the town Tsolo. These species are considered protected according to the notice of the list of protected tree species under the National Forests Act, 1998 (Act No. 84 of 1998). Possible mitigation measure would be to re-align the roads to avoid the trees from being removed or permits for the removal of these protected tree species (should it occur within the construction footprint area) need to be obtained at the relevant authorities before any construction activities occur within this area.

Table 16: Coordinates of protected tree species located within the study area.

Podocarpus falcatus and P. latifolius along the road upgrade route within Ntabelanga Dam	Coordinates
GPS1	31° 4'43.25"S 28°33'30.09"E
GPS2	31° 4'42.57"S 28°33'30.27"E
GPS3	31° 4'43.96"S 28°33'20.62"E
GPS4	31° 4'45.51"S 28°33'4.57"E
Podocarpus falcatus and P. latifolius along the secondary pipeline route south of the town of Tsolo.	
GPS5	31°24'18.62"S 28°46'28.97"E
GPS6	31°24'21.15"S 28°45'1.87"E

Although most of the vegetation where the road upgrades or new roads will be constructed within the Lalini Dam has been transformed, it is possible that *Podocarpus* species, *Encephalartos* species and other protected and RDL floral species could occur along the proposed new Lalini Dam roads and the power line 1, in the vicinity of the Tsitsa Falls.

Figure 29: *Podocarpus falcatus* located on the northern section of the dam, along the road upgrade section.

5.5.2 Primary and secondary pipelines

Primary and secondary pipelines conveying water to selected areas are located within the Tsolo and Qumbu local areas. Most of the areas where the construction of these pipelines is proposed are located adjacent to main roads. This, due to the edge effects from the road, vegetation has been transformed. Very little indigenous vegetation occurred along the route. Species mostly associated with disturbance such as *Eragrostis curvula, Hyparrhenia hirta* and *Cynodon dactylon* were present. In some areas outside Qumbu current construction activities to upgrade the roads have already taken place.

Figure 30: Current construction activities to upgrade roads outside the Qumbu area.

Areas where the proposed primary and secondary pipeline will be located is crossing several riparian and wetland features, containing mostly alien invader floral species such

as *Acacia mearnsii, A. dealbata, Eucalyptus grandis, E. camaldulensis, Melia azedarach* and *Solanum mauritianum.* Several wetland and riparian system traverse the primary and secondary pipeline routes supporting a different graminoid assemblage of increased diversity.

Figure 31: Riparian crossings and drainage lines crossing the proposed pipeline infrastructure.

Sections within the proposed primary and secondary pipeline route consist of totally transformed areas through local and rural communities, where vegetation has been completely cleared. Only species such as *Cynodon dactylon, Hyparrhenia hirta, Cosmostomium natlanse, Aeollanthus parvifolius* and numerous *Aloe* species were located within these areas.

Figure 32 indicates the locations of the wetland features traversing the pipeline. The remainder of the pipeline contains transformed grasslands, which were not indicated on the maps due to the scale of the pipeline locations.

Figure 32: Transformed grassland vegetation along the proposed pipeline.

Pockets of rocky outcrops or where the pipeline traverses mountain areas were located. These areas were mapped on a desktop level to indicate where vegetation has changed. Although not all areas of the rocky outcrops contained indigenous floral vegetation, these

areas are still considered different to the remainder of the habitat units. Mitigation measures when construction of the pipeline takes places should considered these rocky areas and mountain passes and minimise the impacts within these areas.

Figure 33: Rocky outcrops located adjacent to the secondary pipeline routes.

Podocarpus species were located on the secondary pipeline route south of the town Tsolo. These species is considered protected according to the notice of the list of protected tree species under the National Forests Act, 1998 (Act No. 84 of 1998). Possible mitigation measure would be to re-align the roads to avoid the trees from being removed or permits for the removal of these protected tree species (should it occur within the construction footprint area of the associated infrastructure) need to be obtained at the relevant authorities before any construction activities occur within this area.

Table 17: Coordinates of protected tree species located within the study area.

Podocarpus falcatus and P. latifolius along the secondary pipeline route south of the town of Tsolo.	
GPS5	31°24'18.62"S 28°46'28.97"E
GPS6	31°24'21.15"S 28°45'1.87"E

Due to the severe vegetation transformation within most of the areas along the primary and secondary pipeline route, the low ecological function and state and the low diversity in floral species, the areas set out for the construction of the primary and secondary pipeline route is not considered sensitive. Since the impact of the construction will be of shorter duration and rehabilitation will be done, the severity of the impact will be lower.

5.5.3 Irrigation areas and pipelines

The irrigation pipelines are mostly situated south of the village of Tsolo. The majority of the sections for the proposed pipelines will be along existing dirt roads. Other vegetation habitat units that the pipelines traverse have been transformed due to historic and on-going small scale agricultural activities, wetland habitat and rocky areas. The northern section of the irrigation pipeline traverses a woody vegetation habitat area that most likely

has been dominated by *Acacia* species so some extent that bush encroachment has occurred. Some small scale plantation areas also occur within the woody habitat. It is possible that protected tree species, favouring afromontane habitat, could occur along the irrigation pipeline route or in the surrounding area.

The irrigation fields were briefly assessed and selected areas were investigated as examples of the condition of these areas. The proposed agricultural fields are located within old farming lands, historically used since the have the highest agricultural potential and yield the highest harvests. Field assessments indicated that these fields have been uniformly heavily disturbed due to prior farming activities, and as such provide very limited habitat to floral species within the area and region and the decommissioning of these areas as irrigated croplands is considered an insignificant impact to the regional floral ecology.

5.6 PEAK POWER GENERATION WITH HYDROPOWER TUNNELS AND POWER LINE ALTERNATIVES

Both base load and peak load hydropower generation are being considered at the Lalini Dam. Three alternative power line routes, linking the hydropower plant downstream of Lalini Dam to the grid, are being considered. The three power line routes correspond to three possible tunnel lengths from Lalini Dam to the hydropower plant.

The majority of the power lines will traverse transformed (grassland) habitat units, where grasslands and mostly *Acacia karroo* and *Acacia caffra* occurs. The transformed habitat unit has been significantly disturbed as a result of historic and on-going agricultural activities and overgrazing of veld. The floral habitat within this habitat unit is therefore largely transformed and placement of infrastructure within this habitat unit will most likely have low impact significance.

Sections of the power line closer to the Tsitsa River will traverse more sensitive habitat associated with mountain and rocky outcrop habitat. These areas are more sensitive in terms of less vegetation disturbance, increased floral diversity and suitable habitat for important and protected species such as *Podocarpus* and *Encephalartos* species. Vegetation clearance within this sensitive habitat will take place, most likely resulting in the removal of protected and important species.

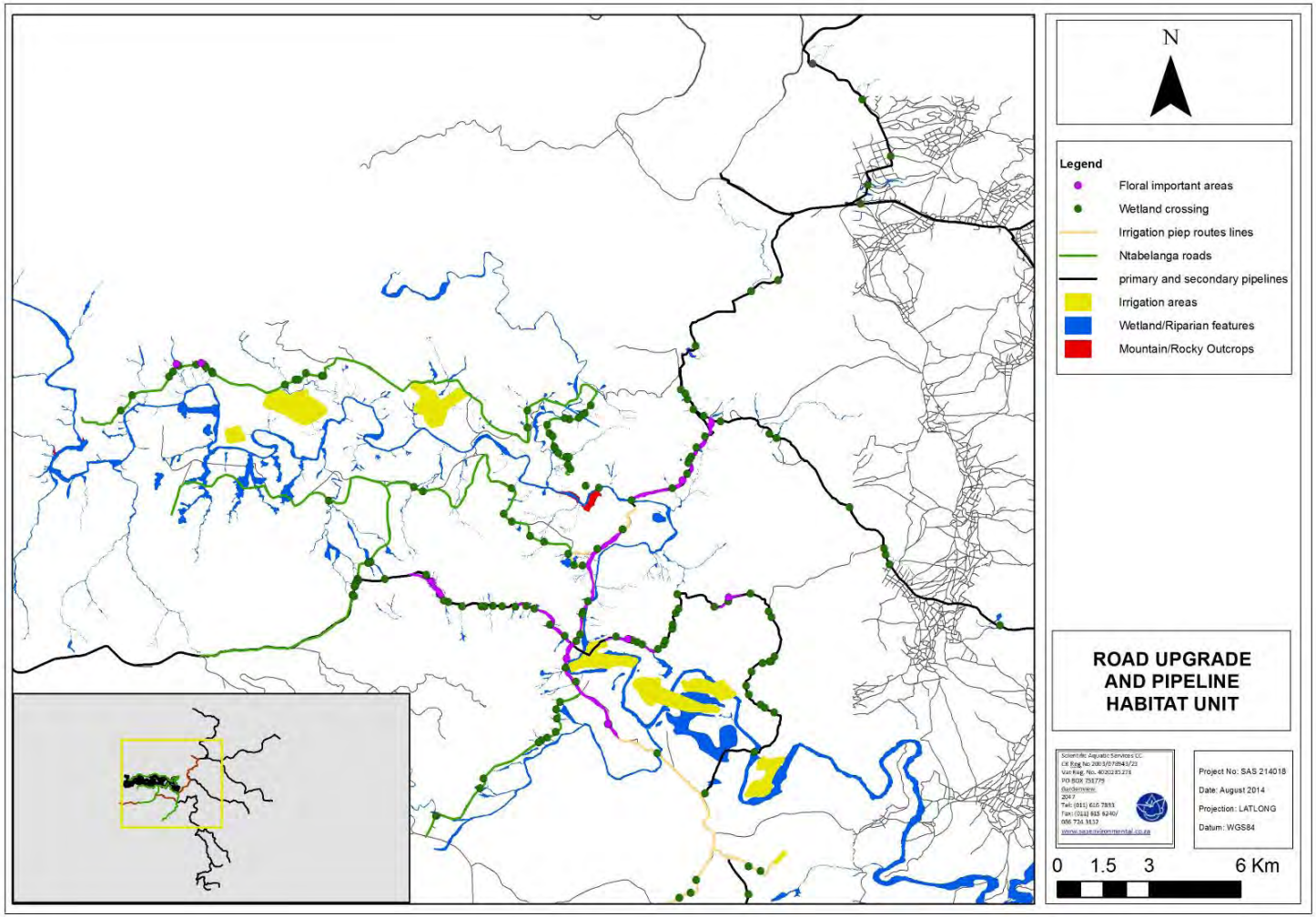

Figure 34: Wetland and riparian crossing and rocky areas along the proposed road upgrade and primary and secondary pipelines.

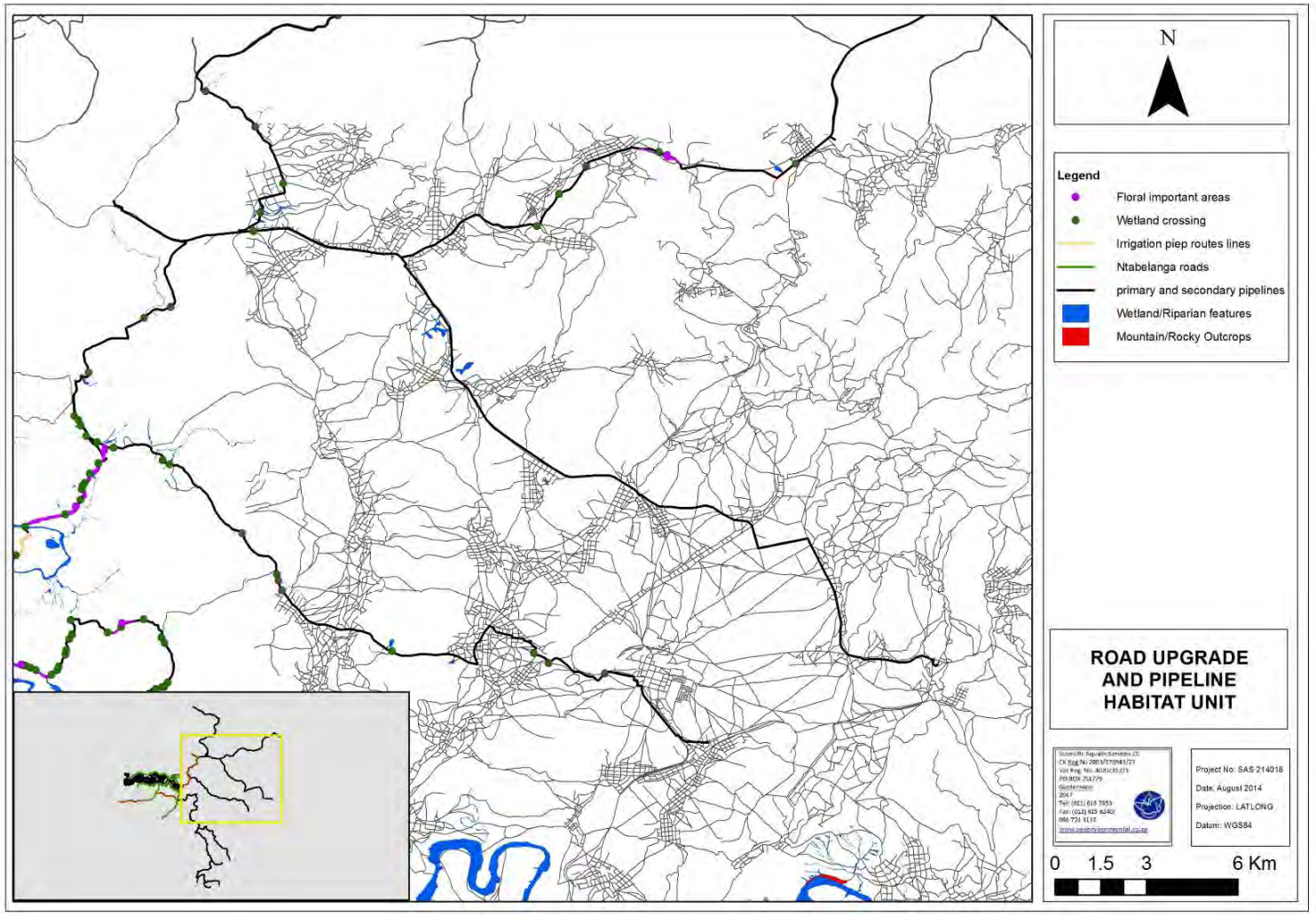

Figure 35: Wetland and riparian crossing and rocky areas along the proposed pipelines.

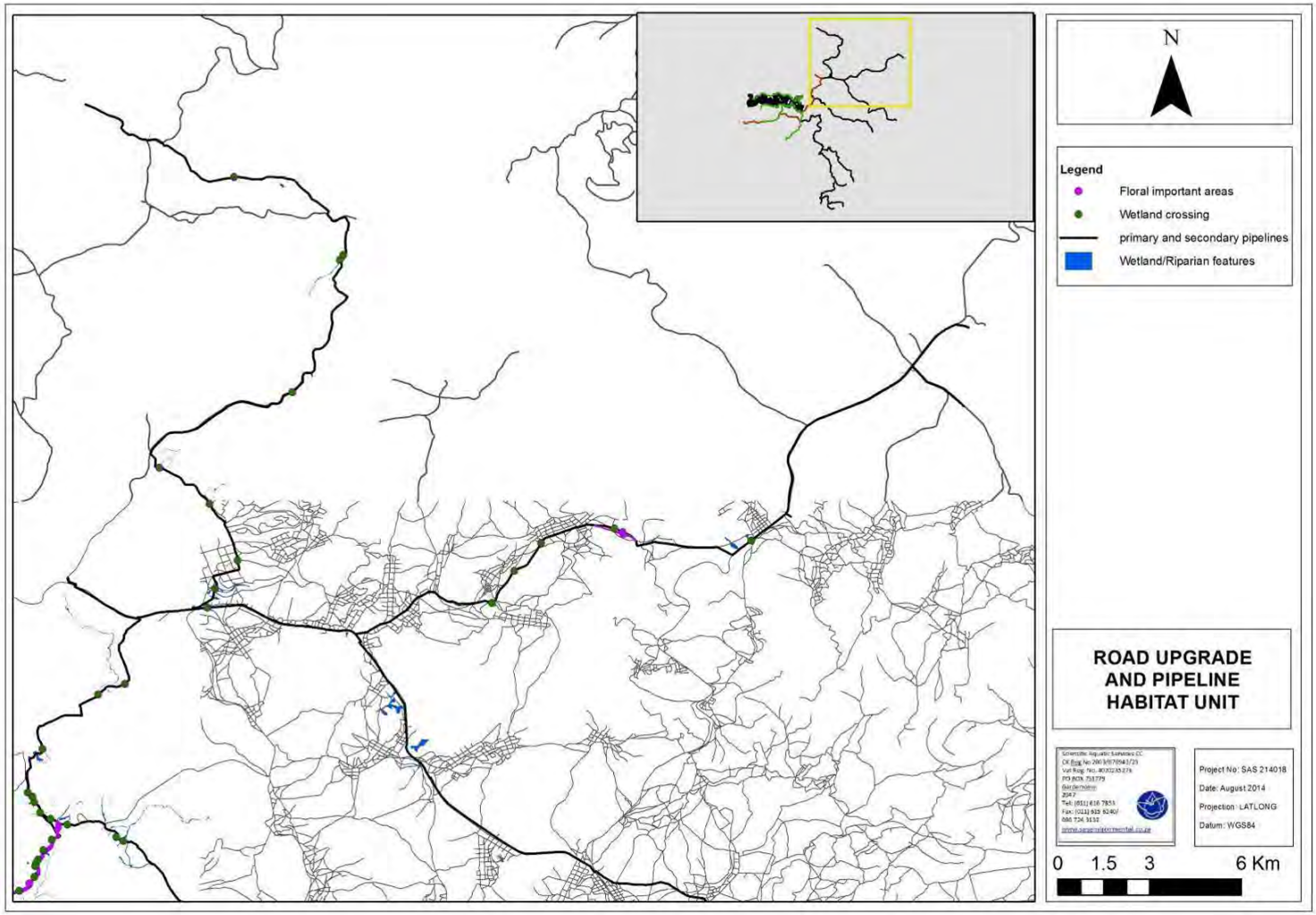

Figure 36: Wetland and riparian crossing and rocky areas along the proposed pipelines.

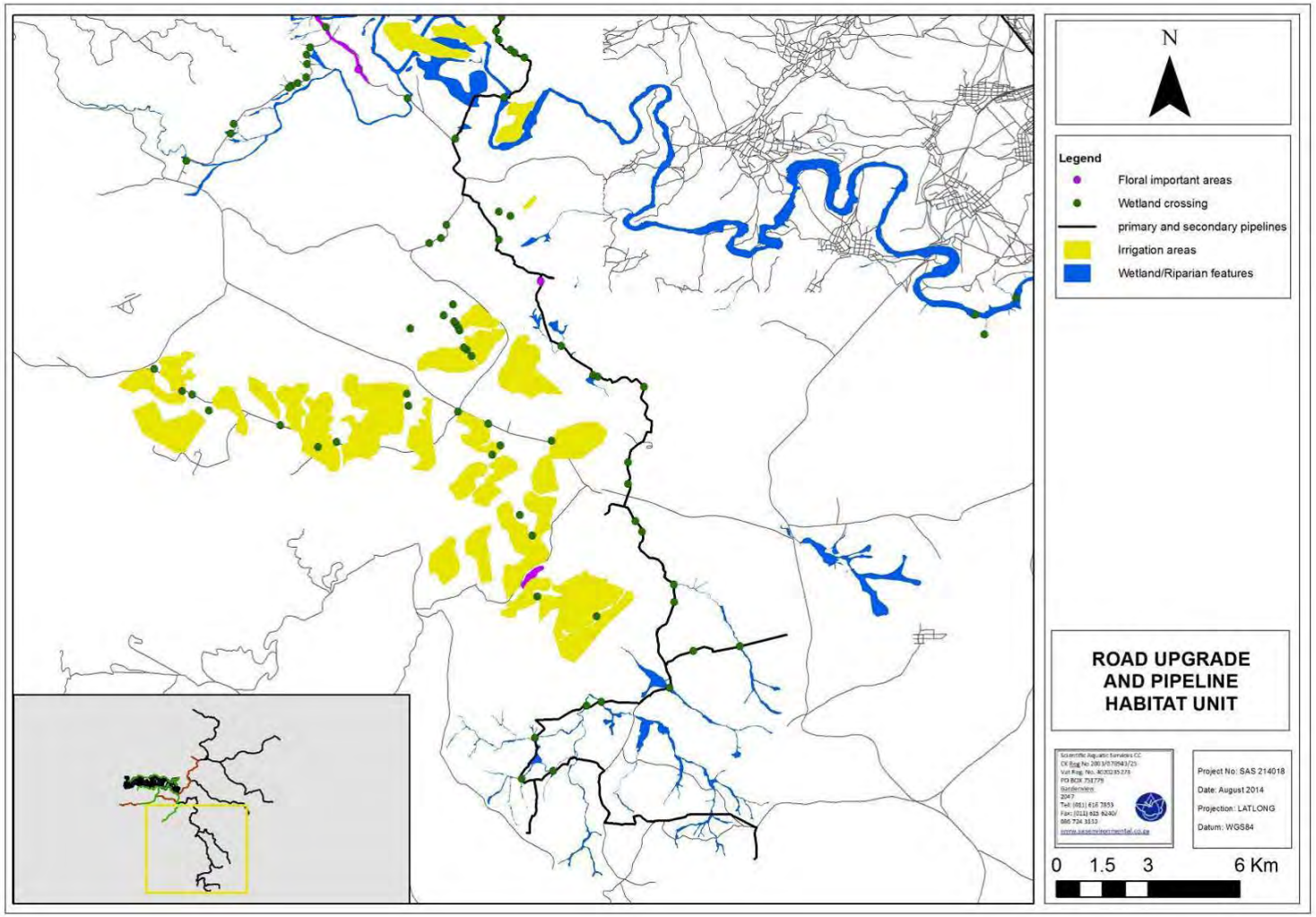

Figure 37: Wetland and riparian crossings and rocky areas along the proposed pipelines.

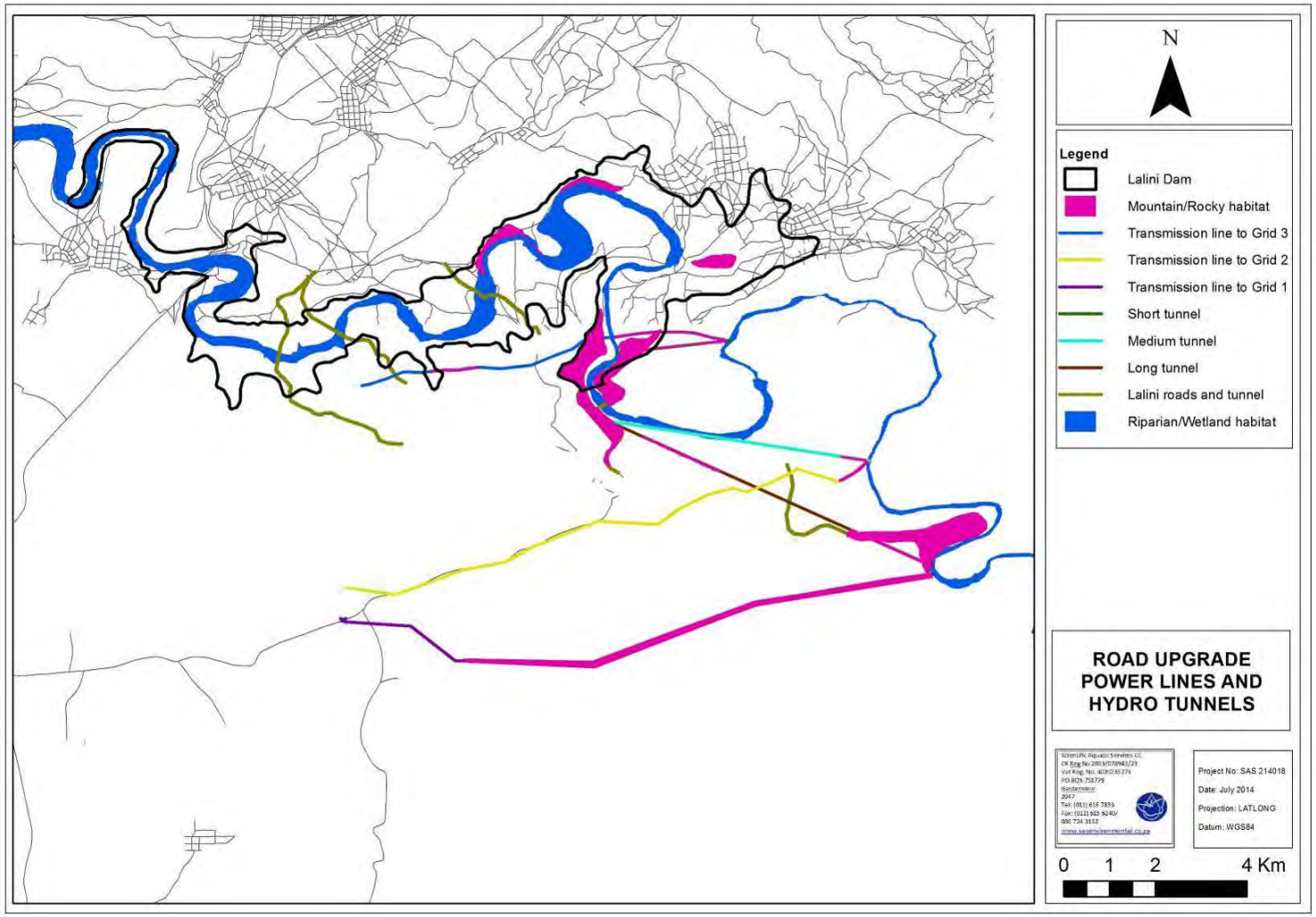

Figure 38: Mountain / Rocky Outcrop habitat located along the power lines and hydro tunnels.