APPENDIX C2:

AQUATIC IMPACT ASSESSMENT

PROPOSED UMKHOMAZI WATER PROJECT, KWAZULU-NATAL

RAW WATER COMPONENT

AQUATIC & WETLAND BASELINE ECOLOGICAL INTEGRITY & POTENTIAL IMPACT SURVEYS: ADDENDUM: EVALUATION OF R617 ALIGNMENT ALTERNATIVES & EVALUATION OF TUNNEL ALTERNATIVES.

Prepared for:

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DECLARATION

This report has been prepared according to the requirements of the Environmental Impact Assessments Regulations (GNR 543) in Government Gazette 33306 of 18 June 2010, as well as the Department of Water Affairs (DWA, 2005) *Guidelines for Delineating Wetland and Riparian Zones* and Department of Water Affairs (DWA, 2007) *River EcoClassification: Manual for EcoStatus Determination (vers 2)*. We (the undersigned) declare the findings of this report free from influence or prejudice.

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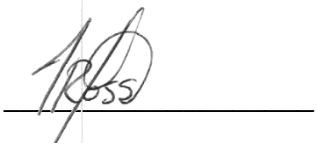

Date: 8 May 2018

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1. INTRODUCTION

The current water resources of the Integrated Mgeni Water Supply System (WSS) in KwaZulu-Natal (KZN) are insufficient to meet the long-term water requirements of the system. The uMkhomazi Water Project Phase 1 (uMWP-1) proposes the transfer of water from the undeveloped uMkhomazi River to the existing Mgeni system. This transfer scheme is deemed to be the most viable option to provide a large volume of water to fulfil the long-term water requirements of the Mgeni system.

The uMWP-1 consists of both Raw Water and Potable Water components which are being undertaken by the Department of Water and Sanitation (DWS) and Umgeni Water, respectively. Nemai Consulting was appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) for both components of the uMWP-1.

The Final EIA Reports (Raw Water and Potable Water) were submitted to the Department of Environmental Affairs (DEA) on 10 November 2016. A letter (dated 13 February 2017) was received from DEA which rejected the Final EIA Report for uMWP-1 Raw Water and requested additional information.

In response, the following additional alternatives were identified for the proposed uMWP-1 Raw Water components:

- Two additional tunnel routes (Option B and Option C) were identified, as well as a tunnel corridor; and
- The previous route for the realignment of the R617, as assessed as part of the EIA, was discarded due to its encroachment into the Impendle Nature Reserve. Four new route options (Option 1A, Option 1B, Option 2 and Option 3) were identified for the deviation of the R617, as well as a road corridor.

This document serves as an Addendum to the surface water ecosystems (aquatics and wetlands) specialist report that was compiled and attached to the Final EIA Report for uMWP-1 Raw Water. It provides an assessment of the abovementioned additional alternatives.

2. R617 ALTERNATIVES

Four route alternatives have been presented for evaluation. These are shown in Figure 1, which also highlights the extent of the surface water ecosystems associated with each alternative. All of the alternatives have associations with the wetland and riparian habitat to a greater or lesser extent

as can be seen from the figure. They are all within relatively close proximity to one another, so are all characterised by similar terrain and other natural features. Evaluation of the various alternatives showed that Option 1A is the preferred alternative, but with only a marginal preference over Option 1B. Option 2 and Option 3 both have a greater association with watercourses and would therefore impose more significant impacts on the surface water ecosystems. Erosion risks, due to there being a greater association with steep-gradient watercourses, would be greater with the development of either of these options as well.

The most significant impact associated with the development of a new road within the terrain typical of the survey area would be that of erosion at each watercourse crossing point.

Mitigation measures should include:

- Properly-designed road crossings, be it culverts or concrete arches for the smaller watercourses and a formal bridge structure for the major watercourse crossings (crossing of the Mkomazi River);
- All structures must be designed so that they will not impeded the natural flow of water, or increase the velocity of the water through constricting the flow that will increase the scouring potential and subsequent erosion at the outfall side of the structure;
- If necessary, banks should be stabilised with civil structures in order to abate erosion. Effective and long term management of erosion is readily achieved if implemented during the design phase and managed rigorously during the construction phase. Retrospective erosion management is both costly and has limited effectiveness in relation to whether erosion was controlled from the onset of the process;
- The establishment of a bridge structure at the Mkomazi River at the proposed crossing point will have an impact on the aquatic ecological integrity, which will be most significant during the construction phase;
- Limiting the construction to the low flow period, and the times outside of the active breeding periods for the aquatic biota, will reduce the significance of the impacts;
- Proper site reinstatement to restore the original substrate at the correct depth and contouring (and the correct grade/stone size of that substrate) will aid in abating the overall impacts;
- Erosion control is essential during the construction phase to ensure that silts and sediments do not enter the aquatic habitat and smother the habitat;
- Ongoing monitoring should take place throughout the construction phase and into the management phase and emerging problems dealt with timeously;
- The mitigation measures outlined in the original specialist survey report remain applicable as well;
- Mitigation measures have a high probability of success and therefore, if applied correctly and timeously, long-term significant impacts can be avoided.

3. TUNNEL ALTERNATIVES

Two additional tunnel route alternatives were offered together with the original route, together with associated service areas (dump sites, access routes, etc). A corridor area was also established that would allow for some flexibility of infrastructure localities to avoid problematic features. The vast majority of the infrastructure is below surface, with no discernible surface impacts occurring. There are three main areas of surface infrastructure, which include the ventilation shafts, spoil sites and access routes for the various alternatives. The three tunnel options are presented in Figure 2, which also shows the three focus areas for delineation of the surface water ecosystems and resources. These three areas are shown in more detail for delineation purposes in Figure 3, Figure 4, and Figure 5.

Analysis of the various tunnel route alternatives showed that the preferred option, together with the infrastructure services (adit routes, ventilation shafts and spoil sites) is that of Option A. This option will have the least overall footprint within wetland habitat, making mitigation of associated impacts more readily achievable. Ventilation shafts for both Options B and C fall within wetland habitat and therefore are not preferred. If Option A is found to be an unsuitable option, then Option B would also be supported. The ventilation shafts associated with each option are located near to or within wetlands or watercourses to a greater or lesser extent and therefore mitigation measures to abate the associated negative impacts will be applicable. It is assumed that the localities of these ventilation shafts were chosen for practical reasons – the valley is a low point in the landscape and therefore would necessitate less excavation to reach the surface from the tunnel depth – and therefore these localities are not moveable. Specific mitigation measures would therefore apply:

- No excess rubble/rock piles or sand stockpiles to be stored within the watercourse or within the conservation buffer zones;
- Destruction of habitat by indiscriminate use of earthmoving equipment must be avoided;
- Any destruction of habitat outside of the actual construction footprint area must be rehabilitated as soon as practically possible;
- Servitude or access roads that cross watercourses must be limited to single roads only and the use of multiple access roads must be avoided;
- Making use of existing roadways for site access is preferable to the establishment of new roads, although this may not be feasible in all cases;
- Mitigation measures associated with reinstatement of impacted wetland habitat will be applicable in terms of loosening soil compaction, reestablishment of vegetation, landscaping and making use of structures to abate the negative impacts of soil erosion (silt fencing, silt traps, possible use of Gabions, etc.);
- The isolated nature of the surface infrastructure as well as the perceived positive outcome of mitigation measures means that the potential for long term significant impacts persisting at the various sites is regarded as being low.

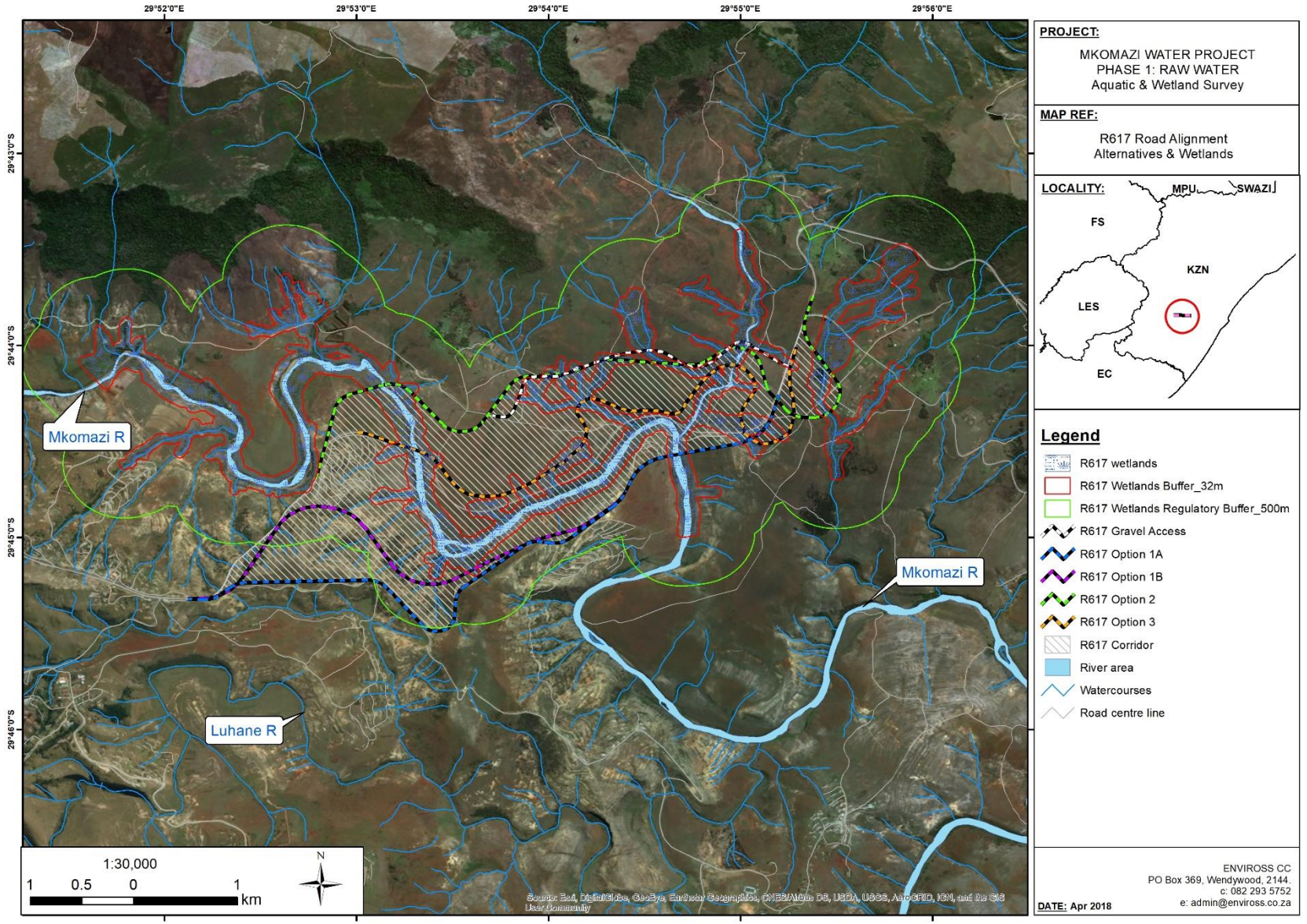

Figure 1: The various route alternatives associated with the R617 re-alignment and how each is associated with the surface water ecosystem units and buffer zones.

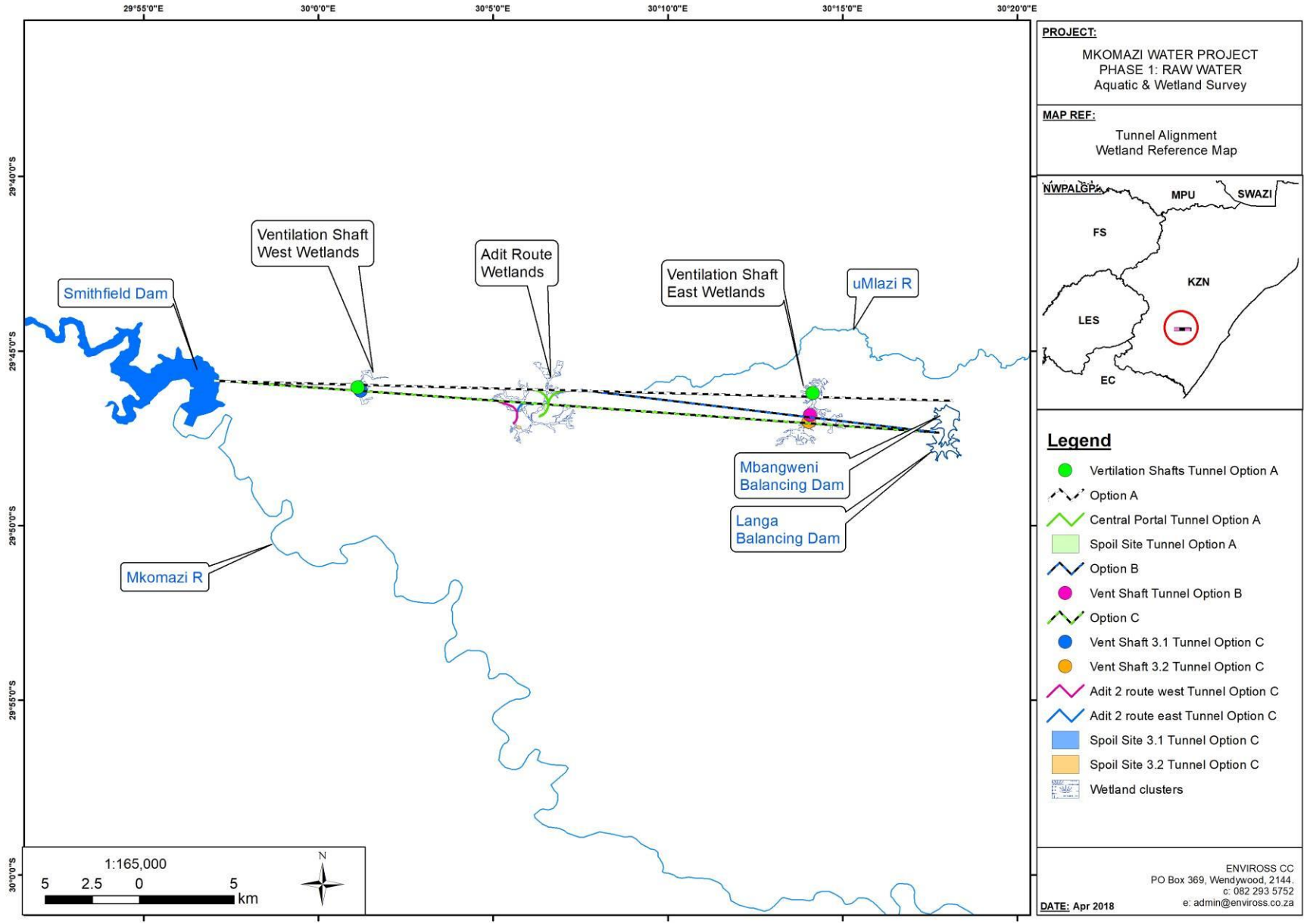

Figure 2: The various tunnel options, showing the three main areas where there will be infrastructure at the surface.

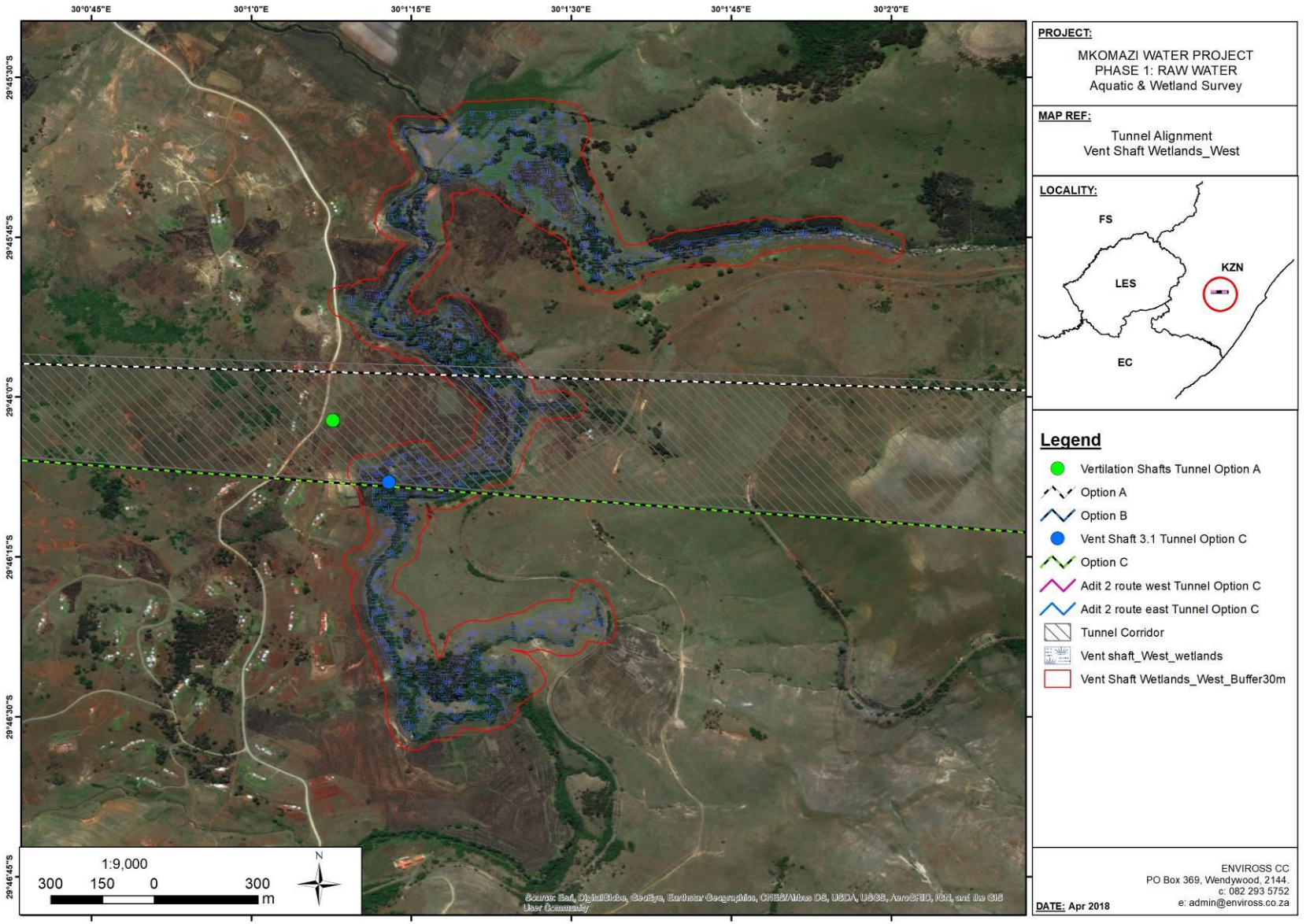

Figure 3: The various pipeline options, showing the western areas where there will be infrastructure at the surface and how it associates with surface water ecosystem features and associated buffer zones.

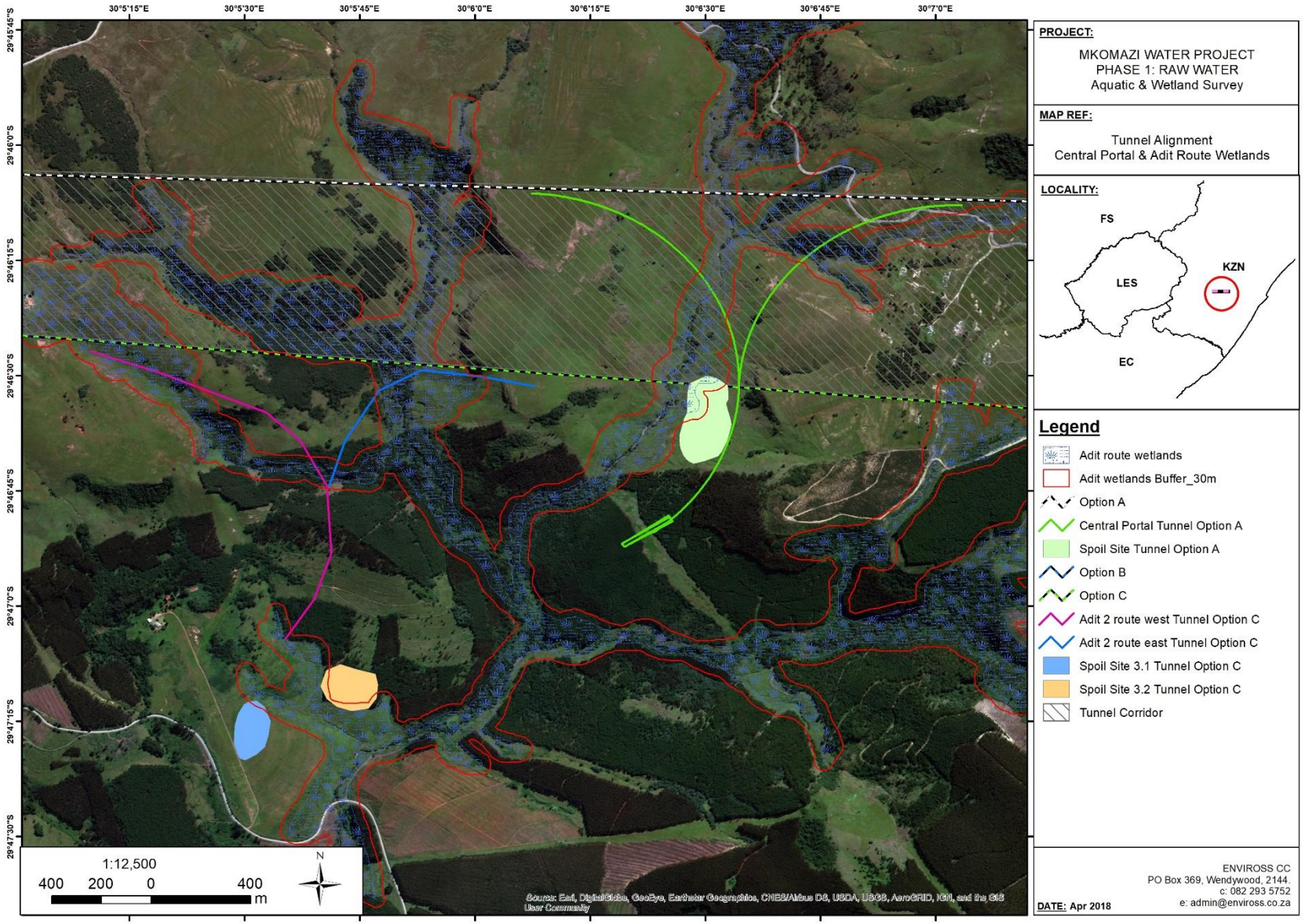

Figure 4: The various pipeline options, showing the central adit route and spoil site areas where there will be infrastructure at the surface and how it associates with surface water ecosystem features and associated buffer zones.

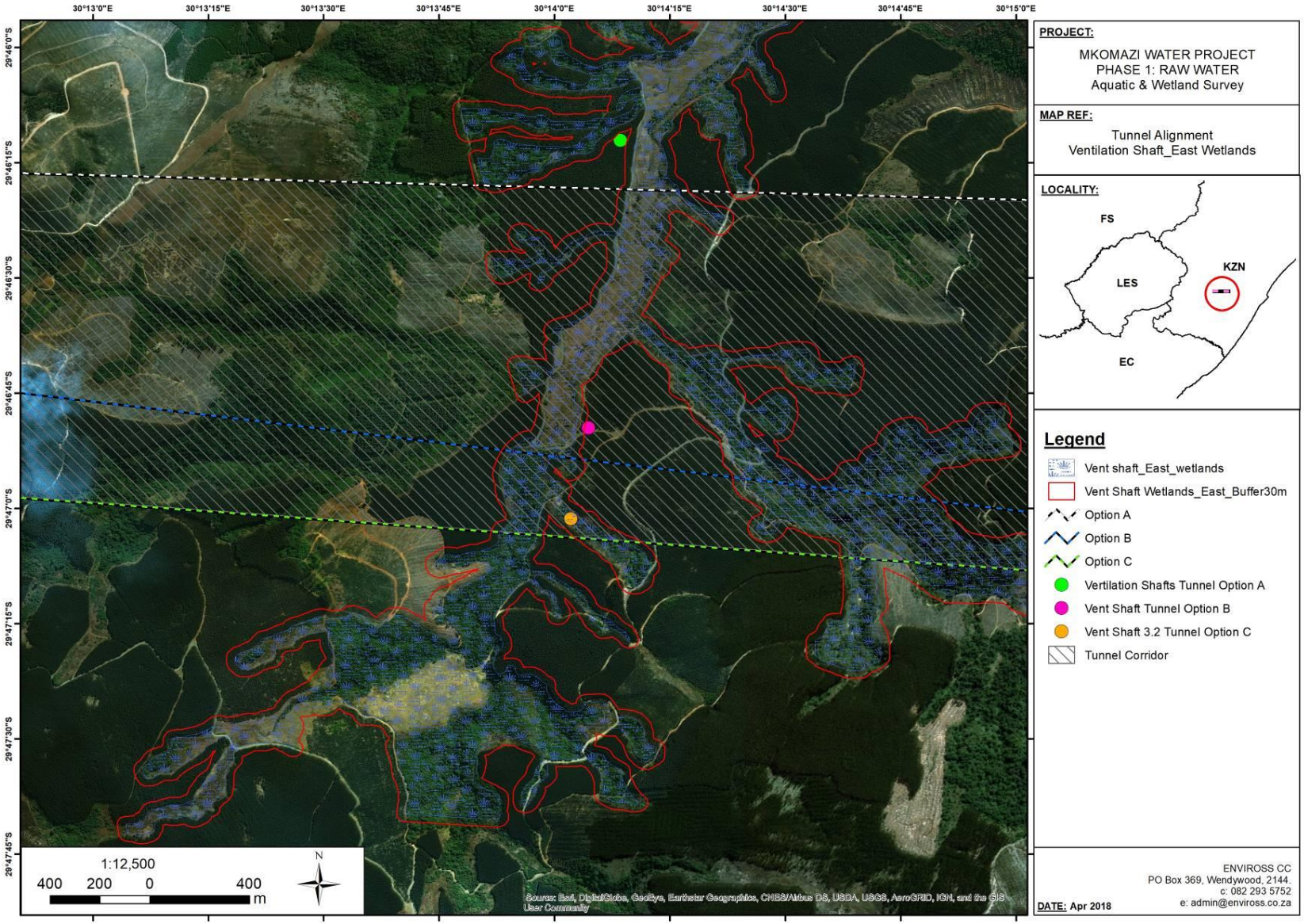

Figure 5: The various pipeline options, showing the eastern areas where there will be infrastructure at the surface and how it associates with surface water ecosystem features and associated buffer zones.