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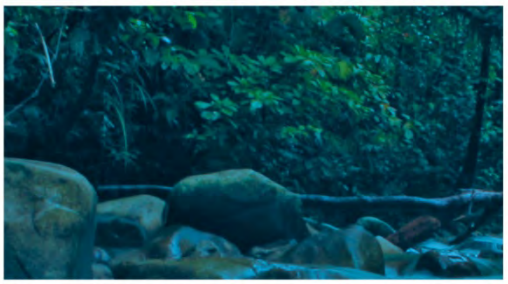
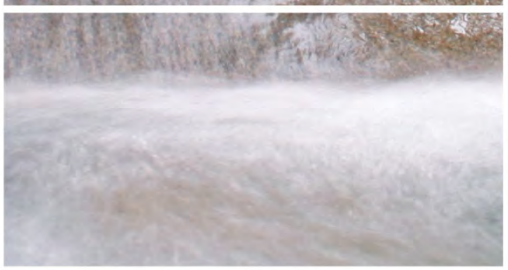
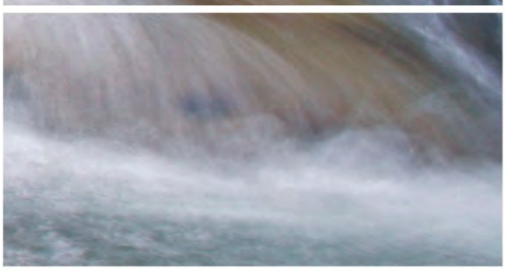
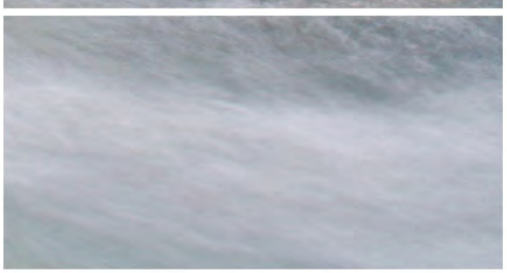
ARROW BOWEN PIPELINE

PROPOSED PIPELINE ALIGNMENT TRAVELOGUE









PROPOSED PIPELINE ALIGNMENT TRAVELOGUE

Arrow Bowen Pipeline

October 2011

CR 8875_2_v2

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Version:	**Details:**	**Approved:**	**Date:**
CR 8875_2_v1	Initial draft to client	Barton Napier	24/08/2011
CR 8875_2_v2	Final report to client	Barton Napier	31/10/2011

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1. INTRODUCTION

Arrow Energy Pty Ltd (Arrow Energy) is investigating a high pressure gas pipeline and associated header and lateral pipelines to transport gas from its Bowen Basin coal seam gas resources – which extend from north of Moranbah to south of Middlemount – to its proposed LNG plant on Curtis Island near Gladstone.

Proposed pipeline routes were identified and investigated in November 2011. The findings of those investigations and a preferred route were presented in the report Arrow Bowen Pipeline, Pipeline Route Selection Report, December 2010 prepared by Coffey Environments Australia Pty Ltd (Coffey, 2010).

Subsequent discussions with mining tenement holders resulted in several realignments being investigated in May 2011. As a consequence, the proposed gas pipeline route (December 2010) was revised. This report describes Revision D (issued 3 August 2011) of the alignment of the proposed gas pipeline, the Elphinstone Header Pipeline and Saraji and Dysart laterals. Kilometre point references are for Revision D and are quoted to the nearest 50 m. To avoid confusion they are prefixed with the following abbreviations:

- AB is the prefix for kilometre points for the Arrow Bowen Pipeline.
- EL is the prefix for kilometre points for the Elphinstone Header Pipeline.
- SL is the prefix for kilometre points for the Saraji Lateral.
- DL is the prefix for kilometre points for the Dysart Lateral.

For convenience, the pipeline routes have been broken into sections. The rationale for the alignment is described in each section, followed by a travelogue that describes in detail the features and constraints that informed the design of the alignment, indicating where they have been avoided and where not avoided, the reasons for the decision to impact on the feature. In some instances, recommendations for further investigation are noted. This report should be read in conjunction with Coffey (2010), as that report provides context for the strategic route selection constraints and decisions.

Regional ecosystem, high value regrowth and essential habitat mapping compiled by the Queensland Government was used to design the alignment. References in this report, to this information, are for:

- Vegetation Management Act regional ecosystems Version 6.
- Essential habitat mapping Version 3.
- High value regrowth mapping Version 2

Numerous other Queensland Government datasets have been used in designing the alignment and in producing the maps attached to this report. The following disclaimer is noted in relation to the use of data supplied by the Queensland Government (Department of Environment and Resource Management) and applies to all maps attached to this report, whether included or not included in the map.

> Based on or contains data provided by the State of Queensland (Department of Environment and Resource Management) 2010. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to that data (including accuracy,

reliability, completeness or suitability) and accepts no liability (including with limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.

(i) Coffey Environments accepts no responsibility for any loss or damage suffered howeverso arising to any person or corporation who may use or rely on this plan in contravention of the terms of this clause and clauses (ii) and (iii).

(ii) The dimensions, areas, number of lots, size & location of corridor information are approximate only and may vary.

(iii) This plan may not be copied unless this note is included.

Arrow Energy commissioned an ecological survey of the proposed pipeline alignment to verify the regional ecosystems and their extent (Aecom, 2011). Observations made during the site inspections in November 2010 and May 2011, and information from Aecom's survey indicate that, in some sections, there is considerable variation between mapping information and the type and extent of observed/surveyed ecosystems and regrowth. This report adopts the results of the ecological survey and notes observations made during the site inspections, where they are relevant. References to regional ecosystems are as reported by Aecom (2011) unless indicated, in which case the regional ecosystem reference is prefixed by the word mapped.

Maps showing the proposed alignments are included as an attachment to this report. The proposed alignment has been marked, as a yellow dashed line, on plates included in this report.

Section 2 describes the mainline alignment, Section 3 the Elphinstone Header Pipeline alignment, and Section 4 describes the preliminary alignments of the Saraji and Dysart laterals.

2. ARROW BOWEN PIPELINE

The proposed Arrow Bowen Pipeline (mainline) is a 478-km-long high pressure gas pipeline that starts near Eastern Creek colliery north of Moranbah and connects to the Arrow Surat Pipeline near Larcom Creek, east of the Bruce Highway and west of Gladstone.

AB0 to AB34.75 (Suttor Developmental Road)

Overview

The mainline commences immediately south of Mining Licence (ML) 10352 which protects the proposed westerly expansion of Eastern Creek colliery located approximately 3.5 km to the northwest. Located in the eastern part of Arrow's exploration permits EPP742 and 364, the mainline avoids the existing Newlands colliery including proposed eastward expansion. The proposed alignment described below is shown in maps 1 to 3.

Travelogue

Commencing 4 km south of haul road connecting Eastern Creek colliery with Newlands colliery on the broad ridge bounded by tributaries of Cerito Creek, the mainline traverses mountain coolibah open grassy woodland ('not of concern' RE 11.8.5), as it generally follows the ridge south-southeast to the bend at AB6. It follows an existing fence on an approximate 40 m offset (west) for the last 700 m.

The alignment avoids the headward erosion in gullies west of the alignment between AB1.3 and AB1.7. 'Least concern' regrowth is unavoidably traversed between AB3.65 and AB3.95. At AB4.25 and AB4.65, the headwater gullies of a tributary of Cerito Creek are crossed. Relatively intact riparian vegetation along the watercourses is avoided at the crossings.

At AB6, the mainline turns southerly to continue in mountain coolibah open grassy woodland to AB8 and then in non-remnant vegetation to the bend at AB8.35, where it turns and continues south-southwest to the bend at AB9.9. Scattered stands of regrowth (unmapped) are avoided, as are the defined channels of gullies draining the southwest face of the broad ridge. At AB9.9, the mainline turns south-southwest, then south to run through bends at AB10.15 and AB11.15 in the cleared area next to and west of the existing fence, which it follows to Newlands Access Road (AB11.55). Mapped endangered ironbark/brigalow woodland (RE 11.9.9/11.9.2/11.9.5) east of the fence is avoided.

The mainline crosses Suttor Creek at AB12.3 and continues southerly to a subtle bend at AB12.7, which is required to avoid Cabbage Tree Creek. Least concern regrowth is traversed north of Newlands Access Road between AB11.6 and AB1.95. Endangered regrowth is unavoidably traversed between Newlands Access Road and Suttor Creek (AB12.05 to AB12.15) (Plate 2.1). Riparian vegetation comprising a forest red gum woodland ('not of concern' RE 11.3.25) is traversed at the Suttor Creek crossing. Endangered regrowth comprising only scattered individuals and sporadic regrowth is traversed between AB12.9 and AB13.

From AB13 to the bend at AB16.9, the mainline traverses relatively flat terrain west of Cabbage Tree Creek. Patchy regrowth of varying density covers most of this section. Endangered regrowth is traversed between AB13.3 and AB13.7. Moderate to severely eroded side gullies of Cabbage Tree Creek are encountered between AB14.5 and AB15.6. An access track to a large dam 400 m east of the alignment is crossed at AB15.65. Two gullies draining to the dam are crossed south of the dam access track.

Plate 2.1 View east to unconfirmed brigalow regrowth adjacent to Suttor Creek

Plate 2.2 View east to existing clearing on escarpment; note brigalow (unconfirmed) at toe of escarpment east of the fence

Patchy regrowth between the gullies gives way to mountain coolibah open grassy woodland ('not of concern' RE 11.8.5) between AB16.3 and AB16.9.

Turning southeast, the mainline continues in mountain coolibah open grassy woodland (to AB17.75) and non-remnant vegetation to the bend at AB20.9. At AB17.8 it avoids adjacent mapped stands of an endangered brigalow/semi-evergreen vine thicket complex (RE 11.9.5/11.8.13). The stands appear to be degraded outliers, the result of grazing pressures. At AB19.1, the mainline passes between a machinery shed (east of the alignment) and a holding paddock and dam (west of the alignment). The alignment is located very close, if not on, a series of cattle troughs located between the dam and machinery shed. Several moderate to severely eroded side gullies are encountered north and south of the machinery shed. Relocation of this infrastructure will be necessary. Patches of silver leaf ironbark woodland (RE 11.9.2) are traversed between AB19.8 and AB20.0. The more substantial stands within these patches are avoided.

At AB20.9, the mainline turns south-southwest avoiding the intact patch of brigalow (mapped endangered RE 11.9.5/11.8.13) to the west of the alignment before traversing relatively flat terrain to the bend at AB22.6. Patchy regrowth gives way to non-remnant vegetation (pasture grasses) in this section.

At AB22.6, the mainline turns south-southeast to traverse undulating terrain to the bend at AB26.35. It takes advantage of the clearing adjacent to the fence at AB23.2 to traverse a minor escarpment and avoid the stand of intact brigalow/semi-evergreen vine thicket (mapped RE 11.9.5/11.8.13) to the east (Plate 2.2). South of the escarpment, the mainline traverses a poplar box/ironbark open woodland ('not of concern' RE 11.5.3) of moderate density between AB23.3 and AB28.1. A water supply pipeline (unconfirmed) is crossed at AB25.6.

Turning southeast, the mainline continues across a tributary of Eaglefield Creek (AB28.3) to the bend at AB28.35 where it turns southeast to the bend at AB29.9, at which point it turns south-southwest to the Suttor Developmental Road (AB34.75). 'Not of concern' poplar box/ironbark open woodland is traversed to AB27 where the pipeline crosses a water supply pipeline (Lake Eungella to Goonyella colliery). The patch of mapped lancewood ('not of concern' RE 11.7.2) traversed between AB27 and AB27.8 is avoided as regional ecosystem doesn't accurately reflect the boundary of this regional ecosystem with the adjacent poplar box/ironbark open woodland ('not of concern' RE11.5.3) which is traversed. South of AB27.8, the mainline continues to traverse poplar box/ironbark open woodland communities ('not of concern' RE 11.5.3) along the watercourses and ironbark grassy woodland ('not of concern' RE 11.9.9) on the higher ground (AB28.1 to AB28.45, AB29.2 to AB29.35, and AB29.65 to AB30). Clarkson's and grey bloodwood woodlands ('not of concern' RE 11.5.12) are interspersed with the ironbark woodlands occurring between AB31.4 and AB31.8 and again between AB33.8 and AB34.7. The woodlands are of moderate density.

AB34.75 to AB70.5 (Nebo–Moranbah 132 kV transmission line)

Overview

BHP Coal Pty Ltd's mining tenement that protects the eastward expansion of the Goonyella-Riverside colliery (ML70421) and the Burton Range constrain alignment options in this section where the mainline seeks to traverse the middle of Arrow Energy's petroleum tenements. An alignment close to the Burton Range that maximised separation to BHP Coal Pty Ltd's mining lease and addressed the topographic constraints associated with the range and adjacent

watercourses including Suttor Creek and Isaac River was adopted. Maps 3 to 5 show the proposed alignment in this section.

Travelogue

South of the Suttor Developmental Road, the mainline traverses undulating terrain between Skull Creek and the Burton Range, with bends at AB37, AB40.95, AB43.75 and AB45.35. Initially, the mainline traverses a poplar box/ironbark complex woodland ('not of concern' RE 11.5.3). At AB35.05, the mainline enters and traverses an 'of concern' bluegrass grassland (RE 11.8.11) to AB37.2, except for a small section of forest red gum woodland ('not of concern' RE 11.3.25) on the gentle rise between AB36.5 and AB36.85.

At AB37, the mainline turns south-southeast to traverse the toe of a mesa (Boveys Lookout), an outlying outcrop of the Burton Range. Patches of poplar box/forest red gum woodland ('not of concern' RE 11.5.3) are traversed between AB38.5 and AB38.85, and AB39 and AB39.35). Moderate erosion was observed in the gullies traversed in this section which extends to the bend at AB40.95. From this point, the mainline traverses predominantly cleared, gently undulating terrain to the Peak Downs Highway (AB46.65). A tributary of Skull Creek is crossed at AB44.1. A patch of poplar box woodland / brigalow shrubby open forest ('of concern' RE 11.4.2 and endangered RE 11.4.9) is traversed south of the creek between AB44.45 and AB44.55. The alignment passes within 300 m of a large dam near AB45.3, yards and tanks near AB46.2 and a large dam adjacent to the Peak Downs Highway.

The Peak Downs Highway is crossed between the entrance to the access track to the yards and a tributary of Skull Creek (Plate 2.3). The crossing is near a pole on the high voltage transmission line that runs in the road reserve on the north side of the highway. South of the highway, the

Plate 2.3 View east to proposed pipeline crossing of Peak Downs Highway

mainline traverses predominantly cleared, relatively flat terrain to the Isaac River that is crossed at AB50.2. Significant gilgai is evident in this section. Riparian vegetation along the Isaac River comprises a forest red gum woodland ('not of concern' RE 11.3.25) backed by bloodwood woodland ('not of concern' RE 11.3.7). The latter is more evident along the north bank. The crossing is at a point where the river is a single channel approximately 25 to 30 m wide.

South of Isaac River, the mainline continues southeasterly through cleared land (mapped as non-remnant) to a bend at AB52.7 which was required to avoid a fence intersection, dam and windmill, and adjacent stands of mapped poplar box woodland ('of concern' RE 11.3.2) in which brigalow outliers (unconfirmed) were observed. Patches of poplar box woodland with brigalow (unconfirmed) are avoided by the mainline, which initially runs southeast, east of Hurricane Gully, before turning south-southwest at AB53.9 to cross that watercourse to run generally parallel to a fence to the bend at AB55.15. A patch of poplar box open woodland ('of concern' RE 11.3.2) is traversed between AB54.55 and AB54.7. Hurricane Creek is actively eroding. Moderate to severe gully erosion is evident in the vicinity of AB53.9.

From AB55.15, the mainline traverses relatively flat predominantly cleared terrain to the bend at AB56.85 where it turns southerly to cross the watercourse it has run parallel to on a 100 m offset for the 600 m leading to the bend. It continues through cleared land with evidence of gilgai as it approaches the bend introduced at AB58.2 to avoid the hill that extends some 1.5 km to the east. Further bends have been introduced at AB58.9 and AB59.2 to minimise the extent of riparian vegetation traversed at the 12 Mile Creek crossing (AB59.1) which comprises forest red gum woodland ('not of concern' RE 11.3.25). Patches of brigalow/box woodland (mapped endangered RE 11.9.5/11.7.1/11.3.1) along the northern slopes of the hill are avoided.

South of 12 Mile Creek, the mainline traverses poplar box/ironbark open woodland ('not of concern' RE 11.5.3) between AB59.4 and AB60.9, and lancewood/bendee woodland ('not of concern' RE 11.7.2) between AB60.9 and AB61.9. These vegetation communities have light to moderate tree cover. Surface erosion is evident throughout this section possibly due to grazing pressures. At AB61.9, the mainline encounters a low-relief mesa. The alignment traverses the relatively gentle slopes of the northern face before running to and descending a broad ridge (AB62.8) on the southern face. Patches of intact riparian vegetation along the side gullies are avoided. A fence and associated access track is crossed at AB63.95, after which the mainline crosses a watercourse (AB64.1) and continues to the bend at AB64.6.

Ironbark/poplar box woodland ('not of concern' RE 11.5.9 and 'not of concern' RE11.5.3) extends along the watercourse and its terraces between AB61.9 and AB62.8. The woodland gives way to a patch of 'not of concern' lancewood/bendee woodland (RE 11.7.2) between AB62.8 and AB63.8 after which the mainline traverses a small patch of ironbark woodland ('not of concern' RE 11.5.9). Further patches of ironbark/poplar box woodland ('not of concern' RE 11.5.9 and 'not of concern' RE 11.5.3) are traversed between AB63.9 and AB64.3, and between AB64.5 and AB64.7. A small patch of lancewood/bendee woodland ('not of concern' RE 11.7.2) is interspersed with the poplar box/ironbark woodland and is traversed between AB64.3 and AB64.5.

From the bend at AB64.6, the mainline follows ridges and spurs as it traverses the undulating terrain to AB68.3, which is located on the south side of Teviot Brook. Bends have been introduced at AB65.4 and AB66.7 to ensure the alignment runs perpendicular to the slope and avoids intact patches within the expansive woodland. Less intact stands of lancewood/bendee woodland ('not of concern' RE 11.7.2) (AB64.7 to AB66) and ironbark/poplar box woodland ('not of concern' RE 11.5.9 and 'not of concern' RE 11.5.3) (AB66 to AB67.4) are traversed in this section. There is

evidence of brigalow outliers (unconfirmed) as the mainline approaches the terraces adjacent to Teviot Brook. Vegetation north of Teviot Brook is a complex of several ecosystems with interspersed patches of ironbark/poplar box woodland ('not of concern' RE 11.5.9 and 'not of concern' RE 11.5.3) and forest red gum woodland ('not of concern' RE 11.3.25). The small patch of least concern regrowth traversed in the vicinity of AB67.4 is evidence of previous land clearing activities. Realignment between AB67.5 and the bend south of Teviot Brook will be necessary following detailed site investigations and ecological survey to ensure adequate separation to Teviot Brook, the adjacent tributary and patches of brigalow (unconfirmed).

Teviot Brook (AB68.25) is crossed downstream of the current road crossing and upstream of the former road crossing, immediately downstream of the watercourse bend. Erosion is evident in the side gullies west of Teviot Brook and in the watercourse bend and old road crossings (Plate 2.4). Riparian vegetation along the northern bank of the watercourse comprises a mosaic of forest red gum woodland ('not of concern' RE 11.3.25) and poplar box woodland ('not of concern' RE 11.5.3). Further investigation and possible realignment is required to ensure adequate separation of the bend from the watercourse. A large dam is avoided south of Teviot Brook where the mainline runs southeast through partly cleared land (least concern regrowth) to the bend at AB70.5. Although not mapped, outliers of brigalow (unconfirmed) are evident as individuals and clumps on the terraces south of Teviot Brook. At AB70.05, the mainline crosses the double circuit Nebo–Moranbah 132 kV overhead transmission line.

Plate 2.4 View east to proposed pipeline crossing of Teviot Brook (right foreground)

AB70.5 to AB95 (Peak Downs Highway)

Overview

Coal mining licences and topographic features constrained alignment options in this section, which, in the north, were confined to the approximately 1-km-wide corridor between Peabody

Energy Australia Coal Pty Ltd's ML70257 and Vale Australia (CQ) Pty Ltd's ML70338. South of these tenements, Vale's Carborough Downs interests (MDL354 and ML70339) forced the alignment further east and into the corridor between Vale's tenements and Coppabella Coal Pty Ltd's Moorvale A development (ML70290). The proposed alignment is shown in maps 5 and 6.

Travelogue

At AB70.5, the mainline turns southeast to follow a broad ridge up the low relief escarpment that extends predominantly west of the alignment. Lancewood/bendee woodland ('not of concern' RE 11.7.2) on the face of the escarpment (AB70.25 to AB70.85) gives way to ironbark woodland ('not of concern' RE 11.5.9) (AB70.85 to AB73.45) on the undulating plateau that extends south to the eastern face of the escarpment.

The approximately 1-km-wide corridor between Peabody Energy Australia Coal Pty Ltd's ML70257 and Vale Australia (CQ) Pty Ltd's ML70338 limits alignment options south of the transmission line. A mesa straddles part of the corridor forcing the alignment to the south, adjacent to Vale's Broadlea open cut coal mine. The borrow pit adjacent to Peabody's haul road (ML70109) further constrains options in this area, forcing the alignment further south.

The bend introduced at AB73.2 provides 250 to 300 m separation to the existing quarrying operations. Turning east, the alignment traverses the face of the escarpment via a vague ridge that supports a box woodland ('not of concern' RE 11.7.1) before crossing Peabody's haul road to traverse predominantly cleared undulating terrain between the mesa and the coal mine, located 330 m to the south.

Scattered regrowth gives way to stands of mountain coolibah grassy open woodland ('not of concern' RE 11.8.5). Bends have been introduced at AB75.1 and AB75.65 to avoid the more intact stands of mountain coolibah grassy open woodland (AB74.65 to AB74.75, and AB75 to AB76.3), and the toe of the southern escarpment of the mesa. Essential habitat for the little pied bat (*Chalinolobus picatus*) is traversed between AB74.7 and AB76.3. The open grassy woodland and adjacent escarpment are key features of its foraging and roosting requirements.

East of the bend at AB75.65, the mainline turns northeast to traverse the saddle between adjacent mesas. The alignment is located in the predominantly open grassland adjacent to the toe of the northern mesa to avoid the construction site offices located in the saddle (Plate 2.5). East of the saddle, the mainline traverses the cleared, relatively flat terrain north and east of the southern mesa with bends introduced at AB76, AB76.45, AB77.1 and AB77.65 to provide adequate separation to the existing access road, single circuit 132 kV high voltage transmission line crossed at AB76.85, gullies and rocky outcrops.

At AB77.65, the mainline turns southeast to run parallel to and on an offset to a tributary of Smoky Creek before crossing that tributary at AB78.65. The 132 kV transmission line is again crossed at AB77.9. The bend introduced at AB79 ensures the rocky outcrop south of AB79.15 and the large dam located north of AB79.8 are avoided, as the mainline traverses cleared gently undulating terrain to the bend at AB81.15. The endangered regrowth mapped between AB81 and AB81.7, appears to have been cleared or incorrectly mapped, as there was no evidence of maturing regrowth (Plate 2.6).

Plate 2.5 View northeast over saddle and construction site office to mesa

Plate 2.6 View east over area mapped as endangered regrowth; not evident

From the bend at AB81.15, the mainline generally follows the rehabilitated dragline travel route southeasterly, initially on the southern side, then on the northern side and finally on the southern side to the bend at AB85.6. A subtle bend was introduced at AB82.35 to ensure the alignment avoided further crossings of the high voltage transmission line, avoided sinuous channels at the watercourse crossings and aligned with the northern edge of the dragline travel route cut into the hill slopes of the hills traversed at AB84.5. Endangered regrowth is traversed between AB81 and AB81.7 and again between AB83.3 and AB84. Observed regrowth north of the dragline travel route between AB84.1 and AB84.6 has been avoided.

Turning south-southeast at AB85.6, the mainline traverses gently undulating terrain west of North Creek to the bend (AB90.1) immediately south of the Goonyella Branch Line. Observed regrowth in this section has no conservation significance. The subtle bend at AB87.55 ensures the crossing of a side gully of North Creek avoids the more intact stands (AB87 to AB87.3) of the poplar box open woodland ('of concern' RE 11.3.2) along the watercourse. Extensive sheet and gully erosion is evident in the vicinity of AB88 where endangered regrowth is encountered and traversed between AB88 and AB88.3. Mapped endangered regrowth between AB89.7 and the Goonyella Branch Line is avoided.

Vale's MDL354 (Carborough coal field), a tributary of North Creek and the underground water supply pipeline adjacent to the Goonyella Branch Line constrain the alignment in this section. The mainline crosses the railway approximately 100 m west of railway control infrastructure (buildings) and a vehicle crossing point, and the culvert located approximately 50 m to the west (Plate 2.7).

At AB90.1, the mainline turns east to run between the tributary of North Creek and the water supply pipeline on an approximate 30 m offset to the pipeline. Bends have been introduced at AB90.6, AB91.65 and AB92.15 to ensure appropriate separation to the water supply pipeline is

Plate 2.7 View northeast to proposed pipeline crossing of Goonyella Branch Railway

maintained. Stands of forest red gum woodland ('not of concern' RE 11.3.25) (AB90.65 to AB90.75, and AB91.2 to AB91.4) and 'of concern' regrowth (AB90.75 to AB91.2) are avoidably traversed in this section due to the constraints imposed by infrastructure and the tributary of North Creek.

Between AB92.15 and the bend at AB93.1, the mainline runs east-southeast and traverses patches of ironbark/poplar box woodland ('of concern' RE 11.3.36). A patch of forest red gum woodland (RE 11.3.25) is traversed at the bend. At this bend, the mainline turns southeast to traverse recently cleared land to the Peak Downs Highway at AB95. A patch of poplar box/ironbark open woodland ('not of concern RE 11.5.3) and adjacent patch of brigalow shrubby open forest (endangered RE 11.4.9) adjacent to the subtle bend at AB93.55 are unavoidably traversed. Moderate to severe gully erosion is evident between AB93.1 and AB93.9, the likely result of recent vegetation clearing (Plate 2.8).

Plate 2.8 View northeast to endangered brigalow remnant and gully erosion

AB95 to AB119.05 (Annandale Road)

Overview

North Creek, Annandale Station, Norwich Park Branch Line, and Vale and Coppabella coal mining leases constrain alignment options south of Peak Downs Highway. The mainline adopts a southeasterly alignment through this section, as it seeks to reduce potential impacts on black coal resources by targeting the areas with deeper coal deposits. Running down the watershed between the Isaac River and Devlin Creek, the mainline is located east of existing coal mines and proposed eastward expansions. Maps 6 to 8 show the proposed alignment.

Travelogue

The mainline crosses the Peak Downs Highway approximately 200 m east of the rehabilitated dragline travel route, after which it passes through a stand of poplar box/ironbark open woodland ('not of concern' RE 11.5.3) before traversing cleared land to AB96.4, where it traverses riparian vegetation of the tributary of North Creek. Forest red gum woodland along the watercourse ('not of concern' RE 11.3.25) is bordered by narrow strips of poplar box open woodland ('of concern' RE 11.3.2). The Elphinstone Header Pipeline joins the mainline at AB95.85.

Stands of poplar box/ironbark open woodland ('not of concern' RE 11.5.3) are encountered either side of the easement containing two single circuit 132 kV transmission lines (AB96.7). South of the powerline easement, further stands of poplar box open woodland ('of concern' RE 11.3.2) are encountered along the side gullies of North Creek, which are interspersed with stands of poplar box/ironbark open woodland (/not of concern' RE 11.5.3) and cleared land. The more intact vegetation communities along North Creek and mapped patches of endangered brigalow shrubby open forest (RE 11.4.9) and mapped brigalow woodland (endangered RE 11.3.1) are avoided by the alignment.

At AB97.85, the mainline turns southerly to traverse cleared land to the bend at AB100.3. A double circuit 132 kV transmission line is crossed at AB99.35. Coppabella Coal's ML70920, the Norwich Park Branch Line and Annandale Road constrain the alignment in this section. To reduce impacts on mapped endangered brigalow communities (RE 11.3.2/11.3.1) each side of the railway and road, as well as railway control infrastructure near the road crossing, bends were introduced at AB100.75 and AB101.2. This facilitated a perpendicular crossing of the railway at AB101 (Plate 2.9). Field surveys found the vegetation community to be poplar box open woodland ('of concern' RE 11.3.2).

Alignment options east of Annandale Road were not possible due to Coppabella Coal's mining licence extending to the road reserve boundary. Consequently, an alignment west of Annandale Road was adopted. Mapped endangered brigalow woodland (RE 11.3.2/11.3.1) in the vicinity of AB102, which is traversed as the mainline runs in predominantly cleared land west of Annandale Road, southerly to the bend at AB102.55, was formerly identified as non-remnant vegetation due to the highly degraded state of the former community. A large dam and house are located 80 m and 200 m west of the alignment respectively, at AB101.7. The mainline turns southeast at this bend to continue through cleared land, parallel to and on an approximate 200 m offset (south) to Annandale Road, to the bend at AB104.65. The patch of vegetation in the vicinity of the bend (AB104.25 to AB104.75) was identified as poplar box open woodland ('of concern' RE 11.3.2).

Dams and a house on the east side of Annandale Road, and mapped endangered brigalow communities (RE 11.4.9 and RE 11.3.2/11.3.1) along either side of that road necessitated the mainline crossing North Creek to run in cleared land (mapped as non-remnant) west of the creek to the bend at AB105.8. Forest red gum woodland ('not of concern' RE 11.3.25) along the creek is traversed at the crossing which avoids the more intact stands to the north and south. The alignment avoids stockyards which are located on the east side of North Creek, 120 m east of AB105.

From the bend at AB105.8, the mainline traverses cleared relatively flat terrain west of North Creek, as it runs south-southeast between the creek and its tributary to the bend at AB108.75, near the confluence of the creek and its tributary. Mapped endangered regrowth at AB106.8 is not evident. The large granite dome southwest of the bend and its proximity to North Creek favoured an alignment that crossed back over the creek. The mainline crossing of North Creek adopts the

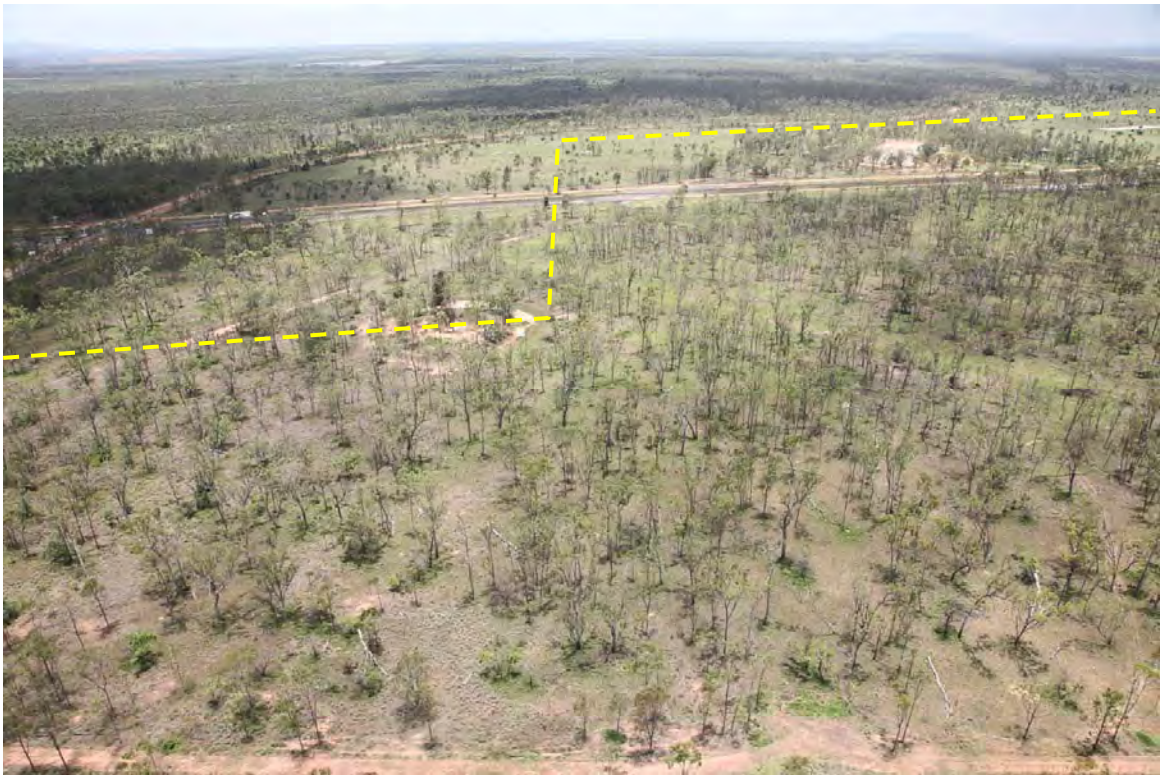

Plate 2.9 **View southeast to Norwich Park Branch Line crossing; note house top right corner in trees**

Plate 2.10 **View south to proposed pipeline crossing of North Creek at existing track**

existing stock/vehicle crossing to reduce impacts on riparian vegetation comprising forest red gum woodland ('not of concern' RE 11.3.25). Of concern regrowth is traversed west of the creek between AB109 and AB109.2). Intact stands and patches of the forest red gum woodland have been avoided at the crossing (Plate 2.10). The more intact stands of coolabah woodland ('of concern' RE 11.3.3) are also avoided at the crossing of the tributary east of North Creek where riparian vegetation exists as a narrow strip of that community. The mainline crosses North Creek at AB109.3 and Annandale Road at AB109.4, as it continues east-southeast to the bend at AB110.4, crossing the tributary of North Creek at AB110.1.

At AB110.4, the mainline turns southeast to continue through cleared land and the edge of a patch of poplar box/ironbark open woodland ('not of concern' RE 11.5.3), to the bend at AB112.15. The alignment avoids the fence intersection adjacent to Annandale Road which is crossed at AB112, as well as the more defined channels of the numerous side gullies crossed between North Creek and that road. South of Annandale Road, the mainline traverses cleared relatively flat land to the bend at AB118.8 avoiding maturing patches of regrowth in the vicinity of AB114.2. Regrowth is evident throughout this section, as is gilgai, particularly in the area adjacent to Annandale Road. A dam is located 380 m northeast of the alignment at AB117.2. Annandale Road is crossed at AB119.05.

AB119.05 to AB173 (Fitzroy Developmental Road)

Overview

Reducing potential of impacts on future coal mining was a key consideration in maintaining a southeasterly alignment for the mainline. Located where coal seams are deepest, the alignment straddles the watershed of the Isaac River and Devlin Creek before converging on the Fitzroy Developmental Road to follow that infrastructure corridor. Borrow pits adjacent to the road, and flood channels and associated riparian vegetation at the confluence of Stephens Creek and Isaac River necessitated realignment away from the Fitzroy Developmental Road. The proposed alignment is shown in maps 8 to 11.

Travelogue

Turning southeast at AB118.8, the mainline bisects two dams, one east and one west of Annandale Road, before it crosses that road (AB119.05) to continue between patches of mapped brigalow shrubby open forest/Dawson gum woodland (endangered RE 11.4.9/11.4.8) to the bend at AB121.5. This subtle bend was introduced to ensure the mainline avoids the small hill adjacent to AB122.3 and the massif comprising Mt Coxendean, Iffley Mountain and Coxens Peak adjacent to AB126. Side gullies of the ephemeral watercourse crossed at AB123.35 are avoided, as is endangered regrowth, and endangered (RE 11.5.3/11.4.9) and 'of concern' (RE 11.10.1/11.10.8) vegetation communities on the slopes of Mt Coxendean. Two dams are located approximately 200 m northeast of the alignment at AB125.3; another dam and patch of 'not of concern' regrowth are located approximately 110 m and 400 m south of the alignment respectively, at AB127.9.

At the bend at AB130.05, the mainline turns south-southeast to traverse relatively intact ironbark woodland ('not of concern' RE 11.5.9) to align with and take advantage of the cleared strip between AB133.7 and AB134.9. A large dam east of AB132 is avoided. Some clearing of the ironbark woodland ('not of concern' RE 11.5.9) and poplar box/ironbark open woodland ('not of concern' RE 11.5.3) complex may be required to provide adequate construction workspace. Emerging into cleared land, the mainline avoids large ephemeral waterholes in the vicinity of AB136, some containing remnant vegetation (unmapped) and 'not of concern' regrowth. The Iffley

Connection Road is crossed at AB136.9, before the mainline reaches the bend at AB137.15. The proposed Saraji Lateral connects to the mainline at AB137.1.

From the bend at AB137.15, the mainline continues south-southeasterly to the bend at AB138.8 which was introduced to avoid the mapped endangered patch of brigalow shrubby open forest (RE 11.4.9) located west of the alignment. The mainline assumes a more southerly alignment as it traverses cleared land to the bend at AB142.15, which is adjacent to the Fitzroy Developmental Road. Extensive gilgai is evident in this section, with many of the melon holes linked to form larger depressions. The gilgai were full of water at the time of the site inspection. The unmapped patch of degraded brigalow shrubby open forest in the vicinity of AB140.5 is avoided (Plate 2.11).

Between AB142.15 and AB152.75, the mainline runs southeasterly generally parallel to the southern boundary of the Fitzroy Developmental Road reserve. Bends were introduced at AB143.8, AB145.55 and AB146.5 to ensure adequate separation from yards, tanks, dams and Black Creek. A narrower construction right of way might be necessary in this constrained corridor that varies in width from 60 m to 100 m. 'Not of concern' poplar box/ironbark open woodland (RE 11.5.3) is traversed between AB142.6 and AB145.4, with the more intact stands along and adjacent to Black Creek avoided.

Turning southerly at AB152.75, the mainline traverses cleared cropping land to the bend at AB163.45 avoiding dams at AB153.5 (east of the alignment), AB155.9 (west of the alignment), AB157.1 (west of the alignment) and AB160.2 (east of the alignment). Extensive gilgai – full with water at the time of the site inspection – were evident throughout this section. Mapped endangered regrowth adjacent to AB158.6 was not evident at the time of the site inspection. Outliers (scattered trees) of the forest red gum woodland ('not of concern' RE 11.3.25) surrounding the dam at AB160.2 are traversed with the more intact stands avoided. Lukena crops have been established and are traversed between AB159.7 and AB161.5. A well-formed road is crossed at AB162.1. The bend at AB163.45 was introduced to reduce disturbance to the poplar box ('of concern' RE 11.3.2)/bloodwood ('not of concern' RE 11.3.7) woodland traversed between AB163.6 and AB163.9.

The mainline continues in a southerly direction crossing the Isaac River at AB164.7 (Plate 2.12) and an anabranch of that river at AB165.5. North of the river, a patch of poplar box ('of concern' RE 11.3.2)/bloodwood ('not of concern' RE 11.3.7) woodland is traversed before the mainline traverses riparian vegetation comprising forest red gum woodland ('not of concern' RE 11.3.25). South of the river the mainline traverses a bloodwood ('not of concern' RE 11.3.7)/coolabah ('of concern' RE 11.3.3) woodland punctuated by the anabranch which has been identified as non-remnant vegetation. At AB165.7, the mainline enters previously cleared land with regrowth in various states of maturity. A patch of brigalow (endangered RE 11.3.1) and adjacent strip of coolabah woodland ('not of concern' RE 11.3.3) are traversed between AB167.6 and AB167.9 before the mainline reaches the bend at AB168.1. A large (possibly permanent) waterhole is located approximately 680 m west-southwest of the alignment at the bend, in a patch of brigalow.

The mainline turns southeast at the bend at AB168.1 to initially run through predominantly cleared land. At AB170.6, the mainline enters and traverses cereal/pulse crops established north of Stephens Creek. Stephens Creek is crossed at AB171.7 upstream of a bend where the riparian vegetation reduces to scattered trees. Cleared land extends south of Stephens Creek before cereal/pulse crops are encountered adjacent to the Fitzroy Developmental Road which is crossed at AB173. The Dysart Lateral connects to the mainline on the north side of that road at AB172.9.

Plate 2.11 View northeast to endangered brigalow avoided by mainline; note gilgai

Plate 2.12 View east along the Isaac River at the proposed pipeline crossing

AB173 to AB228.1 (May Downs Road)

Overview

Alignment options south of the Isaac River are dictated by possible routes through the Broadsound Range. Pluto Creek was adopted instead of Apis Creek, as the preferred traverse of the range and consequently, alignment options north of Junee State Forest offered the most feasible alternatives. The confluence of the Isaac and Connors rivers comprises numerous channels and anabranches with endangered and 'of concern' regional ecosystems. Alignment options to the south and west of the confluence reduced potential impacts on the vegetation communities and minimised the number of watercourse crossings. Maps 11 to 15 show the proposed alignment in this section.

Travelogue

Cereal/pulse crops are encountered south of the Fitzroy Developmental Road, as the mainline continues southeasterly to the bend at AB179.3. At AB174.1 the mainline enters previously cleared land which it traverses to the bend. Mapped endangered regrowth adjacent to AB174.2 is avoided. Regrowth in various states of maturity extends throughout this section. Gilgai are evident in the vicinity of the bend.

Turning southeast at AB179.3, the mainline continues in cleared land to the bend (AB195.75) 250 m east of the May Downs–Carfax Road, which is crossed at AB195.4. A subtle bend was introduced at AB187.85 to ensure the alignment avoided the dam north of the alignment at AB180.5, the dams north and south of the alignment at AB184.6, and the 'of concern' regrowth north the alignment at AB187.7 and the endangered regrowth south of the alignment between AB194.1 and AB194.8. This resulted in unavoidable impact on the patch of 'of concern' regrowth encountered between AB189.95 and AB190.15. Extensive gilgai is traversed in this section, particularly in the vicinity of AB183 to AB186, AB188 and AB190 to AB192.

East of the May Downs–Carfax Road, the mainline avoids the dam southwest of AB197.6 and west of Sandy Gully, as it traverses cleared land to the bend at AB201.65, which was located to avoid the dam approximately 200 m to the south. Least concern regrowth is unavoidably traversed at the Sandy Gully crossing. This subtle bend and the subtle bend at AB205.8 ensure mapped endangered brigalow communities (RE 11.3.1, 11.9.1 and 11.9.5) along and adjacent to Rolf Creek and the dams north of AB203.6 and AB204.8, and southwest of the bend at AB205.8 are avoided. The mainline continues southeast, generally parallel to Rolf Creek, through predominantly cleared flat terrain to the bend at AB211.5. This bend was introduced to improve the crossing of Rolf Creek and avoid Bellarine Creek, a tributary of Rolf Creek that runs generally parallel to Rolf Creek for some 5 km south of the crossing. A feedlot is located some 550 m north of the bend (Plate 2.13).

The mainline traverses fodder crops southeast of AB211.5 before crossing an anabranch of Rolf Creek at AB212.4, and then the creek itself at AB212.8. Endangered regrowth along these watercourses is unavoidably impacted as the alignment seeks to reduce impacts on Bellarine Creek, Rolf Creek and the maze of anabranches between these watercourses (Plate 2.14). The mainline traverses fodder crops between the watercourses before crossing a flood runner that connects the creeks at AB216.35, and the flood runner at AB217.6, after which the mainline

Plate 2.13 View northeast to feedlot 550 m north of the proposed alignment

Plate 2.14 View east over Rolf Creek (right) and its anabranch (left); endangered regrowth is evident along and between the watercourses

enters and traverses cleared land to the bend at AB218.15. Extensive gilgai, full of water at the time of the site inspection, are encountered between this bend and the bend at AB221.9. This bend was introduced to ensure the alignment avoided the dam southwest of the mainline at AB222.6.

Continuing southeast, the mainline traverses cleared land to the bend at AB228.8, crossing May Downs Road at AB228.1. Scattered unmapped remnants/regrowth are avoided in the vicinity of AB223 where the mainline enters an area of extensive deep gilgai that persist to AB225.6. A house and outbuildings are located approximately 900 m northeast of the alignment at AB227. The patch of endangered regrowth south of May Downs Road is avoided as the alignment remains south of the existing fence to AB228.8 where it turns east-southeast to cross an unnamed watercourse. Endangered regrowth west of the creek between AB229.3 and AB229.4 is unavoidably traversed.

AB228.1 to AB273.4 (Pluto Creek)

Overview

May Downs and Ungle waterholes, the Mackenzie River and the Broadsound Range constrain alignment options in this section. Endangered riparian vegetation along the Isaac River forced the alignment north to the vicinity of Ungle Waterhole, where crossings of that river, its anabranch and waterholes were identified. An alignment that traversed the terraces of the Isaac and Mackenzie rivers was found preferable, as these rivers converge and run close to the Broadsound Range in the vicinity of Coppermine Creek. The proposed alignment is shown in maps 15 to 18.

Travelogue

The mainline passes 1.5 km south of May Downs Waterhole as it runs easterly to the bend at AB235.45, crossing the Isaac River at AB234.45. The mainline traverses endangered regrowth between AB232.05 and AB232.65. Extensive gilgai is encountered as the mainline approaches and crosses the Isaac River and its anabranches on an oblique angle. Arrow Energy advises that horizontal directional drilling is proposed for this crossing. Riparian vegetation along the Isaac River comprises forest red gum woodland (‘not of concern’ RE 11.3.25). The large tract of mapped endangered brigalow/coolabah woodland with blue grass (RE 11.3.3/11.3.1/11.3.21/11.3.27) along the southern bank of the Isaac River is avoided.

Turning southeast at AB235.45, the mainline traverses cleared land between the Isaac River and Ungle Waterhole located 350 m east of the alignment on the main anabranch of the Isaac River, to the bend at AB238. The mainline makes a perpendicular crossing of the anabranch 750 m south of Ungle Waterhole (Plate 2.15) to the bend at AB238.75. Riparian vegetation encountered at the crossing comprises coolabah woodland (‘of concern’ RE 11.3.3). At AB238.75, the mainline turns southeast to traverse extensive deep gilgai before crossing Stockyard Creek at AB239.55. Stockyard Creek riparian vegetation comprises forest red gum woodland (‘not of concern’ RE 11.3.25). A bend was introduced at AB241.35 to ensure the alignment avoided the large mapped remnant comprising brigalow (endangered RE 11.3.1/11.4.9/11.3.27) and forest red gum woodland (‘of concern’ RE 11.4.2/11.3.4), and associated freshwater wetlands.

From the bend at AB241.35, the mainline traverses predominantly cleared land to the bend at AB247.9, crossing Bora Creek at AB245.1. Gilgai are widespread in the area between the bend and AB243.1 where a mature patch of ‘of concern’ regrowth is encountered. The mainline traverses the southern part of the patch, which is necessary to avoid the centre-pivot irrigation paddock located immediately southwest of AB243.7. A second centre-pivot irrigation paddock is

Plate 2.15 View northeast to Ungle Waterhole; mainline crosses out of picture at bottom

Plate 2.16 View northeast to centre-pivot irrigators

unavoidably impacted between AB244 and AB244.7 (Plate 2.16). Relatively intact riparian vegetation comprising forest red gum woodland ('not of concern' RE 11.3.25) is traversed at the crossing of Bora Creek. South of Bora Creek the mainline traverses cleared relatively flat land, avoiding remnant patches and regrowth.

The subtle bend at AB247.9 ensures the crossings of Clive Creek (AB249.05) and Plumtree Creek (AB251) avoid bends in those watercourses and reduce impacts on riparian vegetation which comprises forest red gum woodland ('not of concern' RE 11.3.25) and endangered regrowth respectively. It also avoids the dam located 200 m southwest of AB250.3.

The mainline traverses extensive gilgai south of Plumtree Creek (AB251.5 to AB252.9) before crossing the Broadsound–Lilyvale 275 kV transmission line (two parallel single circuits), at AB253.4. Continuing in cleared gently undulating terrain, the mainline crosses Manly Access Road at AB254.65 and an unnamed watercourse at AB256.05 before reaching the subtle bend at AB257.35, which is located immediately west of an unnamed watercourse. An area of gilgai is encountered east of Manly Access Road. A house and outbuildings is located 600 m northeast of AB255.3. The mapped endangered regrowth south of AB256.4 was not evident at the time of the site inspection, as only gilgai and pasture grasses were observed in that area.

The mainline continues southeast along the terraces adjacent to the Mackenzie River floodplain from the bend at AB257.35 to the bend at AB265.2. Improved pasture paddocks give way to cleared land with regrowth in various states of maturity. Coppermine Creek is crossed at AB259.6. Gilgai are evident in the section between this creek and the unnamed creek at AB261.4 whose riparian vegetation comprises forest red gum woodland ('not of concern' RE 11.3.25). South of that creek, the mainline crosses an unnamed watercourse (AB262.4) to continue through immature regrowth to Tartrus Road at AB263.6. Patches of endangered brigalow open forest (RE 11.11.14) and 'of concern' Dawson gum dominated brigalow woodland (RE 11.11.16) located southwest of Tartrus Road are avoided, as is the dam located 200 m north of the road crossing. Two unnamed watercourses (side gullies) east of Tartrus Road are crossed before the mainline reaches the bend at AB265.2.

From this bend the mainline continues southeast avoiding dams at AB267 (90 m northeast of the alignment), AB269.3 (280 m southwest of the alignment) and AB270.5 (350 m southwest of the alignment) to the bend at AB272.65. Patches of remnant vegetation are also avoided. Specifically, the riparian vegetation comprising mapped endangered brigalow shrubby open forest (RE 11.11.13/11.3.1) 300 m north of the alignment on the unnamed watercourse crossed at AB266.1, and the mapped patches of the same ecosystem located 250 m north of the alignment on the unnamed watercourse crossed at AB269.15, and some 300 m south of the alignment in the vicinity of AB270. Spring Creek is crossed at AB271.4.At AB272.65, the mainline turns east-southeast to run generally parallel to the existing fence across Pluto Creek (AB273.4) to the bend at AB273.6, which is located east of the intersection of several fences. Intact patches of mapped endangered brigalow (RE 11.11.13/11.3.1) and 'of concern' poplar box woodland (RE 11.5.3/11.3.2) communities that occur along the creek are avoided, as the crossing is located close to the fence where the poplar box woodland community is represented by scattered individuals.

AB273.4 to AB310.9 (Morbank Road)

Overview

East of the Broadsound Range, alignment options are constrained in the south by the Boomer Range (parts of which are included in the Goodedulla National Park and Devlin State Forest) and

in the north by the range extending west and south of Mt Redcliffe near Marlborough, particularly the Eugene State Forest. The Devlin Creek and Ten Mile Creek valleys offer the only opportunities for alignments through this section. Maps 18 to 21 show the proposed alignment in this section.

Travelogue

East of AB273.6, the mainline generally follows existing vehicle and stock tracks up the Pluto Creek valley to its watershed, crossing over the creek, as required, to avoid the steep slopes of Broadsound Range. From the bend at AB273.6, the mainline traverses cleared land south of the existing access track along the toe of the foothills to the bend at AB274.65, which is located 140 m south of the dam on the flood runner of Pluto Creek.

Turning northeast, the mainline continues along the toe of the foothills to AB275.6, where it turns north-northeast to cross Pluto Creek adjacent to and downstream of the existing stock crossing. Riparian vegetation comprising ‘not of concern’ forest red gum woodland (RE 11.3.25) is traversed at the crossing. Maturing ‘of concern’ regrowth is encountered between AB276.6 and AB276.8, as the mainline continues north-northeast in side slope to the bend at AB276.9. The alignment passes close to stockyards at AB276.3.

Bends at AB277.5, AB277.75 and AB278.2 ensure the alignment stays north of the creek, which although exposed to side slope, is less severe terrain than that encountered south of the creek. ‘Of concern’ regrowth is traversed between AB277.7 and AB278.2 and between AB278.35 and AB278.55. At AB278.9, the mainline crosses over Pluto Creek to the bend at AB279 to avoid steep side slopes north of the creek and patches of maturing endangered and ‘not of concern’ regrowth. Crossing over a spur, the mainline crosses back over Pluto Creek (AB279.65) to the bend on the watershed at AB280.

The mainline descends the watershed to the Apis Creek valley via the spur north of the unnamed watercourse, utilising the existing access track in the lower reaches of the gully. Endangered regrowth comprising remnants of mountain coolibah, brigalow and semi-evergreen vine thicket on the face of the ridge is unavoidably traversed, as the mainline continues to the bend at AB281.35. The patch of mapped endangered brigalow/semi-evergreen vine thicket (RE 11.3.1/11.3.11) and dam south of AB281.2 are avoided.

At AB281.35, the mainline turns east-southeast to pass around the northern end of the Boomer Range. Subtle bends at AB282.65, AB285 and AB288.2 ensure the alignment avoids dams, fences and bends at watercourse crossings. Dams are located 330 m north of AB282.2, 200 m south of AB283.2, 220 m north of AB286.7 and 300 m north of AB287.5.The bend at AB288.2 is located 150 m northeast of the large dam on a tributary of Endrick Creek. Moderate to severe gully erosion is evident upstream of the dam and along the alignment to the west.

‘Of concern’ coolabah woodland (RE 11.3.3) extends along Apis Creek which is crossed at AB284.2. Unmapped patches of brigalow (unconfirmed) evident on both sides of the creek are avoided. Riparian vegetation along Endrick Creek (Plate 2.17) and its tributary crossed at AB285.4 and AB286.4 respectively, comprises forest red gum woodland (‘not of concern’ RE 11.3.25). Endangered regrowth adjacent to riparian vegetation on the east side of the tributary of Endrick Creek is unavoidably traversed. The Duaringa–Apis Creek Road is crossed at AB284.7.

Plate 2.17 Looking northeast along Endrick Creek to proposed alignment; note patches of brigalow regrowth

At AB288.2, the mainline turns southeast to cross over a tributary of Endrick Creek to the bend at AB289.2, where it turns east-northeast to follow the watercourse upstream. Turning northeast at AB289.65, the mainline crosses back over the watercourse to take advantage of a spur on the north side of the watercourse and to avoid a side gully and the steepening valley. Riparian vegetation comprising forest red gum woodland ('not of concern' RE 11.3.25) is traversed at AB289.05. The mainline traverses least concern regrowth at AB289.8 where it crosses back over the watercourse. A patch of mapped 'of concern' Mitchell grass grassland (RE 11.11.10a) with coolabah and gidgee is avoided at the tributary crossing at AB289.05. Sheet and gully erosion is evident throughout this section.

From the bend on the spur (AB289.95) the mainline traverses cleared undulating terrain to the existing access track at AB290.3 which it follows to the bend at AB290.65. Turning southeast, the mainline avoids the dam located 80 m southwest of the alignment at AB290.85, as it traverses the undulating slopes of the low range of hills to the bend at AB292.3, crossing Bluewater Creek at AB292.15. A single wire earth return (SWER) powerline is crossed at AB291.3.

After crossing Bluewater Creek, the mainline traverses undulating terrain south of the creek to the bend at AB294.1, crossing over the minor tributary of Bluewater Creek at AB294. Sheet erosion is evident throughout this section, reflecting the various stages of conversion from woodland to pasture. Unmapped regrowth is evident and exists primarily as scattered immature patches and more mature individuals identified as non-remnant vegetation in the ecological survey.

At AB294.1, the mainline turns south-southeast to climb a broad ridge in cleared land to the bend at AB294.7 where it turns southeast to traverse the face of the ridge and sparse but maturing regrowth (identified as non-remnant in the ecological survey) to the bend at AB295.55, which is

located 260 m west of the major tributary of Bluewater Creek. ‘Not of concern’ regrowth along the minor tributary of Bluewater Creek adjacent to AB294.6 is avoided.

Turning east-southeast at AB295.55, and then east-northeast at AB296.35, the mainline traverses unmapped regrowth adjacent to the southern edge of the large intact ironbark woodland remnant (‘not of concern’ RE 11.11.1), avoiding the dam located 100 m southeast of AB296.4. From the bend located at the crest of a ridge adjacent to the southeast corner of the remnant (AB297.45), the mainline traverses partially cleared undulating terrain to the bend at AB297.8 where it turns southeast to continue in similar terrain to the bend at AB298.6 which is in the vicinity of existing access tracks.

From this bend, the mainline generally follows the access track to the bend at AB300, with a bend introduced at AB299.1 to ensure the alignment avoided the mapped ‘not of concern’ regrowth immediately to the north between AB298.7 and that bend. Patches of mapped ‘not of concern’ and ‘of concern’ regrowth along a minor tributary of Sweet Water Creek, south of the alignment are also avoided. The bend at AB300.25 ensures a perpendicular crossing of the tributary of Sweet Water Creek downstream of the existing vehicle (access track) crossing.

An intact patch of silver leaf ironbark woodland (‘not of concern’ RE 11.12.2) is unavoidably traversed between AB300.6 and AB301.25, as the mainline turns east-southeast to follow the high ground between Sweet Water Creek and its major tributary to the bend at AB301.7. Bends at AB302.1 and AB303.45 ensure the mainline maintains the high ground between those watercourses as they converge and join 550 m north of the alignment at AB303.3. Ironbark woodland (‘not of concern’ RE 11.11.1) between AB302.4 and Sweet Water Creek, which is crossed at AB303.05 is unavoidably traversed as the mainline seeks perpendicular crossings of Sweet Water Creek and the side gully at AB303.3. The observed regrowth adjacent to this patch on the east side of Sweet Water Creek is mapped as ‘of concern’ regrowth.

From the bend at AB303.45, the mainline makes a perpendicular crossing of the electricity easement containing three high voltage transmission lines (two single circuit 275 kV and one double circuit 275 kV) to the bend at AB303.9 (Plate 2.18). It follows Devlin Creek downstream on an approximate 300 m offset, as it traverses partially cleared land and ‘least concern’ regrowth adjacent to the bend at AB304.5, after which it diverges away from Devlin Creek to traverse similar terrain to the bend at AB305.4. The alignment avoids the dam south of AB304 and the dam south of AB304.4.

At AB305.4, the mainline turns southeast to traverse partially cleared land as it crosses into Ten Mile Creek’s catchment. A subtle bend at AB306.85 reduces potential impacts on ‘least concern’ regrowth adjacent to that bend, and intact patches of ‘not of concern’ ironbark grassy woodland (RE 11.9.9) north and south of the alignment, and traversed between AB307.4 and AB308. Dams north and south of the alignment in the vicinity of AB306.1 are avoided, as is the dam located 200 m south of the alignment at AB308.1. A formed gravel road is crossed at AB306.35. A tributary of Ten Mile Creek is crossed at AB308.85, approximately 500 m from the bend at AB309.35 where the mainline turns south-southeast to converge on Morbank Road at the bend at AB310.9. A major tributary of Ten Mile Creek is crossed at AB310.35. This alignment largely avoids riparian vegetation, and the more intact stands and patches of remnant vegetation. ‘Of concern’ regrowth is traversed between AB309.6 and AB310.6.

Plate 2.18 Looking northeast to Sweet Water Creek (left), its side gully (right) and the transmission lines

AB310.9 to AB345.25 (Marlborough Nickel slurry pipeline)

Overview

East of the Boomer Range, the Fitzroy River and the range of hills extending southeast of Mt Salmon reduce alignment options. The proposed Marlborough Nickel slurry pipeline (ML80134) offers alignment opportunities, as its route largely avoids mining tenements to the north and south of Glenroy Road, sensitive vegetation and houses. The proposed alignment is shown in maps 21 to 23.

Travelogue

From the bend at AB310.9, the mainline runs parallel to Morbank Road on an approximate 60 m offset to avoid the major tributary of Ten Mile Creek and the numerous dams constructed on side gullies of that watercourse. Traversing predominantly cleared gently undulating terrain, the mainline avoids mapped ‘of concern’ regrowth along Ten Mile Creek, and the large remnant of ‘not of concern’ ironbark grassy woodland (RE 11.9.9) located north of the road. The subtle bend at AB312.05 ensures the mainline crosses Morbank Road a safe distance from the corner in the road, and the alignment reduces impacts on the above remnant and adjacent ‘of concern’ regrowth (AB312.55 to AB313.3), and the dam located 180 m southwest of the bend at AB313.35.

Turning east at AB313.35, the mainline generally follows the ridgeline north of Ten Mile Creek in cleared land to the bend at AB314.3 where it turns southeast to the bend at AB315, crossing Ten Mile Creek at AB314.7 and a side gully at AB314.9. Degraded remnant vegetation extends along both watercourses in the vicinity of the crossings. At AB315, the mainline turns east to traverse predominantly cleared land to the bend at AB317.2, which is located at the top of the escarpment of the Fitzroy River floodplain. Mapped ‘not of concern’ regrowth is avoided in the vicinity of

AB315.9, as is the dam located 100 m south of AB316.9. The Glenroy–Marlborough Road is crossed at AB316.6.

The mainline descends the escarpment via a narrow spur to the bend at AB317.6 where it turns east-southeast to cross the Fitzroy River floodplain to the bend at AB321.9. 'Least concern' regrowth is encountered along the flood runner at AB317.9 and in the vicinity of AB319 where the mainline traverses scattered trees, most of which are avoided by the alignment. The outbuildings east of AB318.8 and the dam west of AB319 constrained alignment options on the approach to the Fitzroy River which is crossed perpendicularly at AB319.6. Forest red gum woodland ('not of concern' RE 11.3.25) extends along the west bank of the river. Horizontal directional drilling is proposed for this crossing as the river channel is deep and wide at this location (Plate 2.19). South of the river, the mainline traverses predominantly cleared land with improved pasture.

At AB321.9, the mainline turns southeast to traverse a similar landscape to the bend at AB324.35, located north of and adjacent to Redbank Road. This alignment was adopted over other possible alignments in this area, as it maximises separation to the house located 550 m north of the bend, and the numerous flood runners and side gullies between the house and the Fitzroy River further to the north. The mainline continues parallel to and north of Redbank Road to the bend at AB328.85 where it diverges from the road to the bend at AB330.3 crossing an unnamed tributary of the Fitzroy River at AB328.2. 'Least concern' regrowth comprising remnant vegetation in and adjacent to the road reserve and riparian vegetation along side gullies of the tributary, are largely avoided where the alignment is parallel to Redbank Road. A patch of 'least concern' regrowth is unavoidably traversed between AB327.9 and AB328.75. The proposed Marlborough Nickel slurry pipeline is crossed at AB329.2.

Entering cleared land with improved pasture grasses, the mainline continues easterly to Ten Mile Creek where bends at AB332 and AB332.35 ensure a near perpendicular crossing of the creek at AB332.2. Ten Mile Creek riparian vegetation comprises endangered regrowth. After crossing Ten Mile Creek the mainline turns southeast, parallel to the creek on an approximate 300 m offset to avoid billabongs in the vicinity of AB333.3. At the bend at AB334.35, the mainline converges on a fence which it follows east to the bend at AB334.95, avoiding patches of remnant vegetation to the north including endangered regrowth. The mapped patch of brigalow/poplar box/red gum (endangered RE 11.3.1/11.3.4/11.3.2) south of AB333.8 is avoided.

Turning east-southeast at AB334.95, the mainline continues in predominantly cleared gently undulating land to the bend at AB338.1, crossing a tributary of Eight Mile Creek at AB336.25 and Fairview Road at AB337.95. A patch of 'least concern' regrowth is traversed between AB336.05 and AB336.4, as the alignment is constrained by the dam to the north and Marlborough Nickel slurry pipeline mining licence to the south of the patch.

At AB338.1, the mainline turns easterly to the bend at AB340.55 traversing predominantly cleared land. Gently undulating terrain extends to the tributary of Eight Mile Creek crossed at AB339.65, after which the mainline traverses undulating terrain. Eight Mile Creek is crossed at AB338.9. The large mapped remnant of an endangered brigalow community (RE 11.3.4/11.3.2/11.3.1) in the vicinity of AB338.7 is avoided.

Subtle bends at AB342.5, AB344.05 and AB345 ensure the mainline takes advantage of the section of relatively sparse vegetation in the linear patch of 'of concern' regrowth at AB343 and avoids the mapped 'of concern' riparian vegetation (RE 11.3.4/11.3.25/11.3.2) along Six Mile Creek. Tributaries of Six Mile Creek are crossed at AB342.6 and AB344.4, and the creek itself at AB343.9, as the mainline continues east-southeast to converge with the proposed Marlborough

Plate 2.19 View east along Fitzroy River following heavy rainfall; mainline crossing in middle of photograph

Plate 2.20 View north to contour banks in cultivated paddock

Nickel slurry pipeline at the bend at AB345.25. The alignment avoids the dam near AB342.3. Contour banks are traversed in the cultivated land between AB343.2 and AB343.8 (Plate 2.20).

AB345.25 to AB389.85 (Stanwell–Gladstone Infrastructure Corridor)

Overview

The route selection report for the Arrow Bowen Pipeline (Coffey, 2010) concluded that an alignment that followed the proposed Marlborough Nickel slurry pipeline (slurry pipeline), which is protected by ML80134, a 70 m right of way, was preferred over an alignment that adopted the corridor investigated for the proposed PNG Queensland Gas Pipeline Project. Pinch points preclude the proposed Arrow Bowen Pipeline running parallel on an offset to the proposed slurry pipeline for its entirety. This section describes the pinch points and how the proposed gas pipeline alignment has been revised to address those constraints. The proposed alignment is shown in maps 23 to 26.

Travelogue

Subtle bends at AB345.45, AB345.95 and AB346.55 were introduced to ensure the mainline maintained a 50 m offset to the proposed slurry pipeline to its bend 60 m north of the existing dam. Sinuous watercourse channels and ‘of concern’ regrowth east of the bend necessitated the mainline diverging from the slurry pipeline to the bend at AB346.9. The alignment reduces impacts on ‘of concern’ regrowth encountered adjacent to the bend between AB346.85 and AB347.2. The mainline rejoins the slurry pipeline at AB349.4, and which it continues on a parallel offset to the bend at AB350.05. The subtle bend at AB348.7 was required to ensure the mainline avoided the more intact stands of the ‘of concern’ regrowth and remnant riparian vegetation comprising ‘not of concern’ forest red gum woodland (RE 11.3.25).

South of Glenroy Road, the slurry pipeline crosses a tributary of Station Creek where the watercourse channel is parallel to the alignment. An alignment adjacent to the slurry pipeline would have resulted in the proposed gas pipeline being located in the watercourse channel. Consequently, a bend was introduced at AB351.3 to achieve a more suitable crossing of the tributary. The mainline crosses Glenroy Road at AB351 and the tributary at AB351.2 before converging on the slurry pipeline at the bend at AB352.4.

The mainline continues south-southeast and then east-southeast parallel and on a 60 m offset to the slurry pipeline through the bend at AB354 to the bend at AB355.15, crossing Station Creek at AB352.55, a tributary of that creek at AB353.7 and a single circuit 275 kV transmission line at AB354.7. A large dam north is located 120 m north of AB355.1. This section is predominantly cleared with relatively flat terrain.

Bends at AB355.65 and AB356.9 increase the separation between the proposed gas pipeline and the slurry pipeline to the bend at AB357.95, as the slurry pipeline diverts from its southeasterly alignment around a fence intersection south of Craignaught Road near AB355.75. ‘Least concern’ regrowth is unavoidably traversed at Storer Gully which is crossed at AB356.75, approximately 150 m west of the bend at AB356.9.

The mainline continues parallel and on a 60 m offset to the slurry pipeline to the bend at AB358.25 where it diverges from the slurry pipeline to traverse the toe of the hill to the bend at AB360.15. The alignment reduces disturbance to the ‘least concern’ regrowth along the watercourse at AB358.4 and the adjacent patch of ironbark woodland (‘not of concern’ RE 11.11.15). It avoids the mapped patch of brigalow (endangered RE 11.3.1) near AB359.9. The

mainline is parallel to and 150-170 m offset the 275 kV transmission line in this section. A house and outbuildings are located approximately 280 m northeast of AB358.7 (Plate 2.21).

Plate 2.21 View east to low hill, transmission line, remnant vegetation and house

At AB360.15, the mainline converges on the slurry pipeline which it follows on an approximate 70-80 m offset through the bend at AB361 to the bend at AB362.1. From this point the slurry pipeline returns to the 275 kV transmission line to run parallel to that asset for some 600 m before diverging to run north of and parallel to Faraday Road for approximately 1.2 km. The slurry pipeline makes a minor deviation around a fence intersection as it crosses Faraday Road, after which it skirts around a low ridge to pass through a broad saddle to the gently undulating terrain to the south of the range of low hills, where it adopts a southeasterly alignment. The mainline was straightened in this section to overcome the tight bends on the slurry pipeline.

From AB362.1, the mainline continues south-southeast to the bend at AB362.75 passing through patches of ‘least concern’ regrowth comprising scattered trees, and small stands that are avoided. At that bend, the mainline turns east-southeast to traverse cleared land to the bend at AB364.15, passing very close to a small dam at AB363.05. The mainline turns south-southeast to cross Faraday Road at AB364.5 and an unnamed watercourse at AB364.75 before crossing Dalma–Ridgelands Road at AB365.4 to traverse the side slopes of a low hill, and then relatively flat terrain to the bend at AB366.75. Further refinement of the alignment is required in this section to increase the distance to the small dam and to reduce the length of the mainline in side slope. Patches of mapped brigalow shrubby open forest (endangered RE 11.4.9) south of the slurry pipeline in the vicinity of the bend are avoided.

The mainline runs parallel to the slurry pipeline for approximately 1.2 km before diverging to the bend at AB369.7 which is located 40 m northeast of the small dam at that location. Continuing southeasterly, the mainline converges on the slurry pipeline at AB370.5 before diverging to the

bend at AB370.9, after which it turns south-southeast to cross the slurry pipeline (AB371.2) to the bend at AB371.6. A shed and tanks are located 120 m southwest of the alignment at AB371.5. The mainline continues south-southeast to the bend at AB372.1 crossing the Stanwell–Waroula Road at AB372. The alignment avoids the cropping land with contour banks located north of that road, and dams south of the road (150 m west of the alignment).

In this section, the mainline traverses undulating terrain and an extensive tract of ironbark woodland ('not of concern' RE 11.11.15), which extends to AB370.2 except for a small area of partially cleared land around the dam in the vicinity of AB369.8. Areas of 'least concern' regrowth exist adjacent to the tract as isolated patches. 'Not of concern' forest red gum woodland (RE 11.3.25) extends along Limestone Creek, which is crossed at AB371.25. 'Of concern' regrowth extends north of the riparian vegetation to AB371. Essential habitat for black iron box (*Eucalyptus raveretiana*) is encountered between AB370.2 and AB371.3, and along Limestone Creek (Plate 2.22). Although the nominated patches are largely avoided and the Limestone Creek crossing occurs adjacent to the slurry pipeline crossing, detailed surveys will be required to ensure, where possible, individuals of this species are avoided.

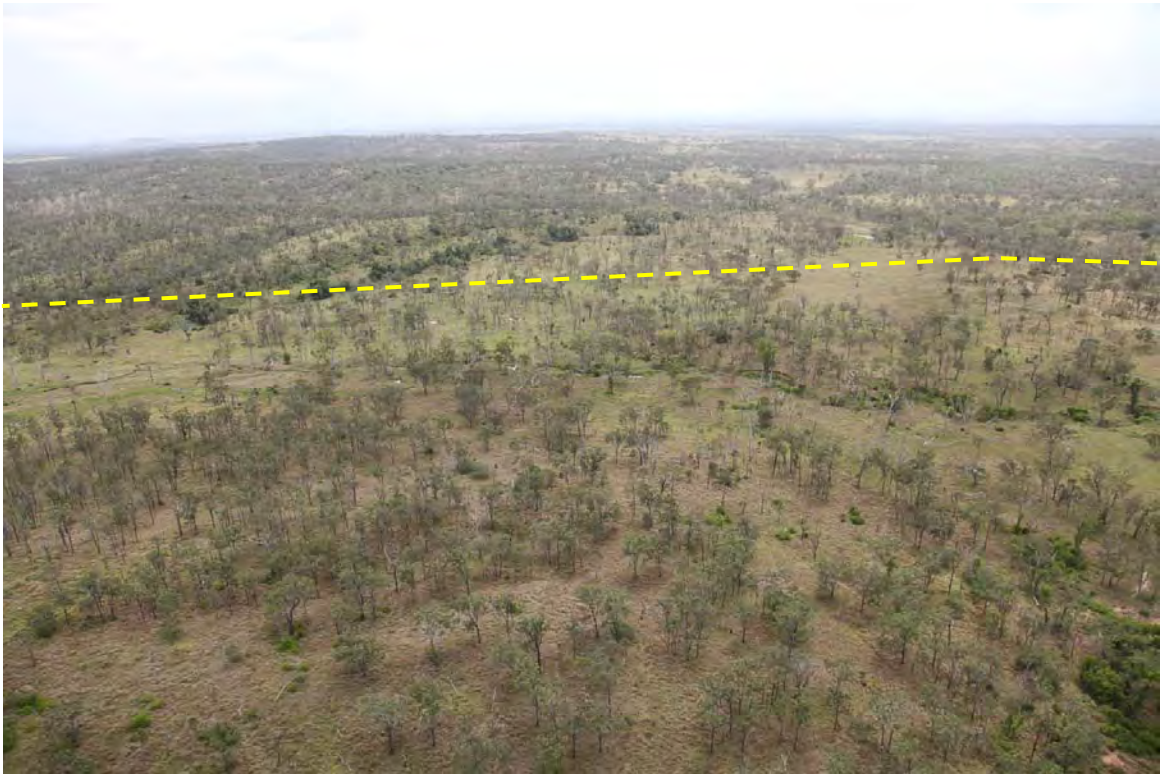

Plate 2.22 View east to essential habitat for black iron box (*Eucalyptus raveretiana*)

Turning east-southeast at AB372.1, the mainline traverses predominantly cleared land along a broad ridge to the bend at AB373, crossing back over the slurry pipeline at AB372.65. The mainline avoids severe erosion in the side gully on the south side of the ridge as it turns southeast to cross Deep Creek (AB373.35) to the bend at AB373.7, which is adjacent to the slurry pipeline. 'Not of concern' forest red gum woodland (RE 11.3.25) which extends along Deep Creek is traversed at the crossing which is located downstream of the eroding side gully. Continuing through predominantly cleared gently undulating terrain, the mainline follows the slurry pipeline on a 50 m offset through the bend at AB373.9 to the bend at AB375.05.

A dam adjacent to the slurry pipeline necessitated the introduction of bends at AB375.7, at AB376.35 which is 70-80 m northeast of the dam, and at AB377.1 where the mainline converges on the slurry pipeline. The alignment avoids the mapped ‘of concern’ regrowth east of Deep Creek Road which is crossed at AB375.15. Contour banks and cropping land established east of AB376.35 are also avoided in this section which traverses predominantly cleared land at the toe of a small hill.

South of AB377.1, the mainline follows the slurry pipeline on an approximate 50 m offset through bends at AB377.55, AB378.15, AB378.7 and AB379.45 to the close bends at AB380.25. The mainline crosses Black Gin Creek at AB377.6 and its tributary at AB378.5. Riparian vegetation comprising forest red gum woodland (‘not of concern’ RE 11.3.25) is unavoidably traversed at Black Gin Creek where the mainline crosses the watercourse immediately downstream of the confluence of the major two branches of the creek. Elsewhere the alignment traverses predominantly cleared gently undulating terrain.

South of AB380.25, the slurry line runs parallel and adjacent to the 275 kV transmission line over a low ridge, adjacent and generally parallel to a gully, between a small hill and dam to the range of low hills where it deviates from the transmission line to traverse those hills. These features, which are in close proximity to the slurry pipeline, create pinch points for the mainline, which diverges away from the slurry pipeline in this section.

Bends were introduced at AB381.05, AB382.8 and AB384 to ensure the mainline traversed the toe of the low ridge, avoided the severe gully erosion adjacent to the transmission line in the vicinity of AB381.2, avoided the small hill near AB382.2 and made near perpendicular crossings of watercourses. Lion Creek is crossed at AB382.7 and a tributary at AB383.65. A shed (possibly used for temporary accommodation) is located 120 m southwest of the alignment at AB383.1. ‘Of concern’ regrowth occurring as riparian vegetation along gullies is traversed between AB380.4 and AB380.5, as the mainline traverses the heads of those gullies.

Mapped ‘not of concern’ regrowth on the small hill is avoided, as the mainline traverses ‘of concern’ regrowth comprising scattered trees each side of Cunningham Road at AB382.45. Riparian vegetation comprising a forest red gum woodland complex (‘not of concern’ RE 11.3.25 and ‘of concern’ RE 11.3.4) is traversed at the Lion Creek crossing but avoided on the tributary where the crossing is located upstream of the intact remnant.

At AB384, the mainline converges with the slurry line and continues parallel to that pipeline through the bend at AB384.6 to the bend at AB384.8 where it diverges from the slurry pipeline to adopt a more direct route through the undulating terrain of the range of low hills. The slurry pipeline follows a series of ridges and crosses the head of a large dam in this section leaving limited space for the mainline. South of AB384.8, the mainline traverses the flanks of a low ridge before crossing a watercourse to traverse a broad ridge to the crest of a low hill (AB386.5) where it turns south to descend a short steep ridge to the watercourse valley adjacent to the 275 kV transmission line. This alignment was necessary to avoid the surge tank on the water pipeline which runs up the adjacent valley between 150 m and 200 m south of the proposed alignment.

At the foot of the hills, the slurry pipeline crosses the major tributary of Neerkol Creek on a bend which is incised into the adjacent ridge leaving no space for the mainline. To improve the crossing of this watercourse, the mainline crosses over the slurry pipeline north of the creek at AB387 to the bend at AB387.1 where it turns to run parallel to the slurry pipeline between it and the transmission line. The water supply pipeline is crossed immediately north of the creek at AB387.3 (Plate 2.23). Intact stands of remnant vegetation and regrowth are traversed in this section which range from scattered trees to more intact stands with immature shrub layers.

Plate 2.23 **View east to Neerkol Creek crossing; note transmission line and water supply pipeline easement**

Plate 2.24 **View east along Stanwell-Gladstone Infrastructure Corridor (centre of photograph); note extensive inundated areas adjacent to Rockhampton (top of photograph)**

‘Least concern’ regrowth is traversed between AB385.3 and AB386.35, after which the mainline traverses ‘not of concern’ ironbark woodland (RE 11.11.15) to AB386.9 where it enters and traverses ‘least concern’ regrowth to AB387.15.

The mainline continues parallel to the slurry pipeline and transmission line in predominantly cleared undulating terrain to the bend AB389.4, where the slurry pipeline diverges from the transmission line to skirt around a low hill intersecting the Stanwell–Gladstone Infrastructure Corridor at AB389.85 (Plate 2.24).

AB389.85 to AB417.85 (Stanwell–Gladstone Infrastructure Corridor)

Overview

The Queensland Government established Stanwell–Gladstone Infrastructure Corridor (SGIC) runs north around Gracemere crossing the Capricorn and Burnett highways in the vicinity of Yeppen, after which it generally follows the Bruce Highway southeast to Mount Larcom.

North of Gracemere and south of Rockhampton Airport, the corridor traverses lagoon systems fed by anabranches of the Fitzroy River. East of Rocklands, the corridor negotiates the extensive lagoons of the lower reaches of Gavial Creek. These areas are subject to extensive inundation from seasonal rainfall and storm events. At the time of the site inspection, the lagoons were full of water and standing water was obvious across tracts of the adjoining land, particularly in the area south of Rockhampton Airport.

In contrast, the Marlborough Nickel slurry pipeline alignment was observed to be largely unaffected by lagoons or standing water, as it traversed the more elevated land abutting the low hills south of Gracemere. An alignment along the slurry pipeline to the SGIC south of Midgee was found to be preferable as it avoided the extensive lagoon systems and was a shorter route (maps 26 to 28).

Travelogue

After crossing the SGIC, the mainline continues to follow the slurry pipeline through bends at AB390, AB390.6, and AB391.25 to the bend at AB391.75 located on the east side of Kabra–Scrubby Creek Road which is crossed at AB391.7. Hopper Road is crossed at AB390.65, a lagoon at AB390.45 (at the toe of the small hill), and Neerkol Creek at AB391.3. Predominantly cleared undulating land is traversed in this section. Riparian vegetation along the tributary of Neerkol Creek crossed at AB387.4 is mapped as ‘of concern’ regrowth, whereas the reasonably intact riparian vegetation of Neerkol Creek is not mapped. The ecological survey identified the riparian vegetation at these watercourse crossings as non-remnant. The mainline makes an acute crossing of the 275 kV transmission line at AB390.7 on the south side of Hopper Road. Houses are located 170 m southwest, and 320 m northeast of the alignment in the vicinity of Neerkol Creek.

The slurry pipeline follows Kabra–Scrubby creek Road south to the Capricorn Highway after which it turns south-southeast to traverse hobby farms between Kabra and Gracemere. A laydown area/machinery storage area has been established on the alignment south of Capricorn Highway. This development, and the limited space between houses adjacent to Kabra–Scrubby Creek Road necessitated the mainline adopting a different alignment in this section.

At AB391.75, the mainline diverges from the slurry pipeline crossing it at AB391.8 as it continues southeast to the bend at AB392.7, which is on the south side of the Bouldercombe–Broadsound

275 kV transmission line. This subtle bend was introduced to improve the angle of the crossing. From this bend the mainline continues to the bend at AB393.15, crossing the Capricorn Highway (AB393) and adjacent Central Railway at AB393.05, after which it continues to the bend at AB393.45. The mainline is parallel to two 275 kV transmission lines between the latter bends. The Central Railway is electrified (Plate 2.25).

Plate 2.25 View southeast to crossing of Capricorn Highway and Central Railway

Turning south the mainline straddles a watercourse (minor tributary of Neerkol Creek) to the bend at AB394.15, at which it turns southeast to align with and adopt a parallel offset to property boundaries to the bend at AB399 where it converges back to the slurry pipeline. The mainline continues to straddle the minor watercourse from the bend at AB394.15 to Boongary Road which it crosses at AB395.05. Houses are located 200 m southwest of the alignment on either side of Boongary Road, and a dam is located 30 m southwest of the alignment on the south side of Boongary Road. Several houses are located within 300 m of the alignment in this section with the closest houses 50 m (AB397.3) and 70 m (AB398.25) to the northeast of the proposed gas pipeline; a reflection of the density of settlement on these predominantly small-acre allotments. The alignment avoids several dams located within 80 m of the mainline, as it traverses the back boundary of several properties.

The mainline traverses cleared relatively flat land to Gracemere Creek which is crossed at AB395.8, after which it traverses predominantly cleared land with scattered trees. Patches of more intact remnant vegetation mapped as ‘not of concern’ regrowth are avoided in the vicinity of AB396.4 and AB398. A minor watercourse is crossed at AB397.45. Disturbance to the ‘least concern’ regrowth in the unmade road reserve (AB398.3) is limited to a few individual trees, as the remnant woodland degrades to the north of the alignment.

From the bend at AB399, the mainline continues parallel to the slurry pipeline (on offsets that vary from 50 m to 80 m) through the bend at AB402.85 to the bend at AB403.8 where it diverges

slightly to the bend at AB405, after which it further diverges to the bend at AB407.6 which is opposite the end of the slurry pipeline. Between AB402.1 and AB402.4, the mainline makes an accurate crossing of three high voltage (275 kV) transmission lines, where two of the lines turn towards Rockhampton. This area is very congested (Plate 2.26), as in addition to being very close to an existing transmission line tower, the alignment makes several crossings of an anabranch of Four Mile Creek. Further investigation and refinement of the alignment will be required in this section.

Plate 2.26 View east to proposed pipeline traverse of high voltage transmission line

The mainline crosses unnamed watercourses at AB397.2, AB397.5, AB398.8 and AB399.05. It crosses Teatree Creek at AB400.1, its tributary at AB400.4, Four Mile Creek at AB402.7, an unnamed watercourse at AB404.2, Gavial Creek at AB406.45, its tributary at AB406.65, and the Burnett Highway at AB404.9. This relatively flat section has been predominantly cleared with remnant vegetation existing as scattered trees, patches and riparian vegetation. 'Not of concern' forest red gum woodland (RE 11.3.25) occurs along the unnamed watercourse at AB399.05. Stands of ironbark woodland ('not of concern' RE 11.12.1) are traversed between AB399.15 and AB399.3, and between AB399.6 and AB399.9. Riparian vegetation comprising a forest red gum woodland complex ('of concern' RE 11.3.4 and 'not of concern' RE 11.3.25) is traversed atTeatree Creek and again at Four Mile Creek. It is expected the 'of concern' regrowth along the tributary crossed at AB404.2 would comprise the same or a similar ecosystem. Riparian vegetation of Gavial Creek and its tributary comprises forest red gum woodland ('not of concern' RE 11.3.25). The patch of ironbark woodland ('not of concern' RE 11.11.15) east of the tributary of Gavial Creek (AB406.7 to AB407.05) is traversed by the mainline, after which the mainline traverses non-remnant vegetation to the bend at AB407.6.

Turning east-northeast at AB407.6, the mainline traverses ironbark woodland ('not of concern' RE 11.11.15) to AB408 and then partially cleared land (surveyed as non-remnant) to the bend at AB408.55 where it turns easterly to join and run parallel to and south of the Queensland Gas

Pipeline before crossing that pipeline to the bend at AB409.5. An alignment north of the pipeline was not possible due to its proximity to a side gully of Midgee Creek. At AB409.5, the mainline turns south-southeast to run generally parallel to the Queensland Gas Pipeline, diverging slightly to cross Mogilno Road to the bend at AB410.7, which is located at the edge of a stockpile area for the gravel scrape located on the north side of that road.

The mainline traverses an extensive tract of ironbark woodland ('not of concern' RE 11.11.15) between AB408.75 and AB410.05, after which it traverses a forest red gum community ('of concern' RE 11.3.4 and 'not of concern' RE 11.3.25) to AB410.2 before traversing 'of concern' regrowth to AB410.5 west of Mogilno Road. There is no riparian vegetation on the unnamed watercourse crossed at AB408.55, and riparian vegetation associated with Midgee Creek, which is crossed at AB410.45, is patchy 'of concern' regrowth.

Turning southeasterly at Mogilno Road, the mainline traverses predominantly cleared, gently undulating terrain to near the Bruce Highway. Bends at AB411.3 and AB411.7 ensure a perpendicular crossing of the unnamed watercourse crossed at AB411.55, after which the mainline continues across McLean Road (AB412.5) to the close bends at AB412.8 and AB412.85, which are 500 m west of the Bruce Highway. A house is located 500 m southwest of the alignment at AB412.35.

At AB412.85, the mainline turns south-southeast to run in cleared land generally parallel to the Bruce Highway through the subtle bend at AB414.35 to the bend at AB416.05 where it turns easterly to cross the Bruce Highway (AB416.35) and North Coast Line (AB416.45) to the bend at AB416.85, which in on a projection of the SGIC. The mainline crosses Dingo Creek at AB413.65, Bobs Creek Road at AB413.95 and an unnamed watercourse at AB415.25. Riparian vegetation at Dingo Creek comprises forest red gum woodland ('not of concern' RE 11.3.25). At AB416.85, the mainline turns south-southeast to join and enter the SGIC at AB417.85, avoiding the dam 120 m southwest of AB417.5.

AB417.85 to AB477.25 (Arrow Surat Pipeline)

Overview

The Stanwell–Gladstone Infrastructure Corridor (SGIC) was established to provide and protect a viable route for linear infrastructure in the congested corridor between Rockhampton and Gladstone. Running east of the Bruce Highway the corridor traverses the coastal plain where numerous watercourses discharge through a series of lagoons, waterholes and interconnecting channels to the sea.

The mainline adopts the westernmost slot in the corridor which is nominally 100 m wide, although the width of the corridor has been increased at major watercourse crossings to provide adequate separation for pipeline crossings and to account for proximity to bends.

Notwithstanding the design intent of the corridor, several pinch points exit, with the most significant being the lagoon system on Eight Mile Creek. The extensive lagoons straddle the corridor necessitating realignment of the proposed gas pipeline outside the corridor in this section. Unless otherwise indicated, the following description of the mainline alignment assumes the proposed gas pipeline is located in the westernmost slot of the SGIC. The proposed alignment is shown in maps 28 to 32.

Travelogue

The mainline traverses cleared relatively flat land with improved pastures east of the Bruce Highway as it converges slightly on the highway to the bend at AB422.6, avoiding dams constructed adjacent to Station and Oakey creeks, and the tributary of Station Creek. The mainline crosses an unnamed watercourse at AB418.1, Station Creek at AB419.15, a lagoon at AB419.45, Oakey Creek at AB419.7, and a tributary of Station Creek at AB422.5. Patchy remnant vegetation extends along Station and Oakey creeks to the patch of 'of concern' regrowth east of the SGIC, which is avoided. Riparian vegetation along Oakey Creek was surveyed as forest red gum woodland ('not of concern' RE 11.3.25) and non-remnant along Station Creek.

Between AB426 and AB430.15, the mainline encounters the extensive lagoons of Eight Mile Creek. The SGIC takes a direct route through the lagoons, widening only for the crossing of Eight Mile Creek. The westernmost slot of the SGIC encroaches on Eight Mile Creek leaving limited or no workspace, which is undesirable as it increases the risk of adverse impacts to this watercourse. An alternative alignment that adopts the high ground between the lagoons and anabranches was identified and is the preferred route through this area despite it extending outside the SGIC.

Turn southeast at AB422.6, the mainline traverses cleared land with improved pasture to the bend at AB426, where it turns easterly to cross the SGIC to generally follow an existing fence past the mapped patch of 'of concern' regrowth to the bend at AB427.35. Turning south-southeast the mainline traverses the high ground to the east of the lagoons crossing back over the SGIC to the bend at AB427.95, which is just outside the corridor (Plate 2.27).

Plate 2.27 View west to proposed alignment around Eight Mile Creek lagoons

Turning southeast, the mainline crosses an anabranch of Eight Mile Creek to the high ground and bend at AB428.7 (inside the corridor), where it turns east to follow the high ground (inside the anabranch) to the bend outside the corridor at AB429.2. Turning south-southeast, the mainline

crosses back over the anabranch to traverse the high ground to Eight Mile Creek (AB430.05) where it makes a perpendicular crossing of the watercourse to the bend at AB430.15, which is located in the westernmost slot of the SGIC. The alignment traverses mangroves along Eight Mile Creek ('least concern' RE 11.1.4) and endangered regrowth adjacent to, and east of the creek (Plate 2.28).

Plate 2.28 View northeast to crossing of Eight Mile Creek; creek tidal at this point

Resuming its place in the westernmost slot of the SGIC, the mainline continues through bends at AB430.6 and AB431.15 as it skirts around an unmapped stand of trees to cross Bajool–Port Alma Road at AB431.4 to the bend at AB434.1, which is located approximately 70 m northeast of a large dam. Numerous drainage lines are traversed in this section. Patches of 'of concern' Dawson gum woodland with brigalow (RE 11.11.16) are traversed between AB433.05 and AB433.15, and between AB433.5 and AB433.85.

Turning south-southeast at AB434.1, the mainline continues generally parallel on an approximate 400 m offset to Toonda–Port Alma Road as it traverses cleared flat coastal land to the bend at AB435.55, avoiding dams at AB434.75 and adjacent to the bend. Gilgai are evident in the section AB434.6 to AB435.3. Continuing on a similar offset to Toonda–Port Alma Road, the mainline traverses predominantly cleared land to the bend at AB437.45, crossing numerous drainage lines and scattered trees as it approaches that bend. A quarry is located 600 m southwest of the alignment at AB437.1.

The mainline skirts around intertidal inlets and remnant vegetation as it traverses predominantly cleared land through bends at AB438.15, AB440.2, AB441.3, AB442.3, AB443.5, AB444.75, and the bend at AB444.9 which is adjacent to the North Coast Line Railway. It crosses Twelve Mile Creek at AB438.8, which is adjacent to Twelve Mile Road (AB438.85). A tributary of Twelve Mile Creek is crossed three times between AB439.75 and AB440.05. The mainline crosses back over Twelve Mile Road at AB442.35. Pelican Creek is crossed at AB442.4. The more intact stands of

'of concern' regrowth along Twelve Mile Creek and 'least concern' regrowth between the creek and AB439.35 are avoided, as is most of the patch of 'of concern' regrowth located in and along the Twelve Mile Road reserve between Pelican Creek and its tributary. Standing water (from seasonal rainfall) was obvious in the vicinity of AB439. A house, sheds and a large dam are located 80 m south of the alignment at AB439.9. Dams are avoided at AB440.4 (40 m southwest of alignment), and at the bend at AB442.3 (40 m south of the alignment). Stockyards are located 40 m south of the alignment at AB443.4.

On reaching the North Coast Line Railway, the mainline continues parallel to the railway through a series of chords and bends to the bend at AB445.45. Diverging from the railway, the mainline crosses Horrigan Creek at AB445.55 to traverse 'least concern' regrowth and partially cleared land to the bend at AB446.35, passing through a laydown/disposal area between AB446.2 and AB446.3 (Plate 2.29). This site should be investigated for possible contamination, as fuel drums were evident at the time of the site inspection.

Plate 2.29 View northeast to disposal area adjacent to Raglan Creek

Turning easterly at AB446.35, the mainline crosses Raglan Creek (AB446.65) to the bend at AB447.05 where it turns northeast to the bend at AB447.35. The bends are necessary to ensure the alignment avoids the large crescent shaped lagoon north of Raglan Creek and the adjacent dam. East of the access track to the laydown area, the mainline traverses 'least concern' regrowth before traversing alternating patches of salt couch grassland ('least concern' RE 11.1.1) and mangroves ('least concern' RE 11.1.4) to Raglan Creek. 'Of concern' regrowth flanks the riparian vegetation which comprises mangroves ('least concern' RE 11.1.4) Turning southeast, the mainline continues through subtle bends at AB448 and AB448.7 to the bend at AB449.45. Patches of 'of concern' regrowth – mainly scattered trees – are traversed between AB447.55 and AB447.85, and between AB448.4 and AB448.65 where the mainline emerges into cleared land.

Turning east-southeast, the mainline continues through subtle bends at AB450.05 and AB452.35 to the bend at AB453.5. The mainline traverses undulating terrain in this section, as it negotiates the ridges and valleys of a range of low hills. 'Of concern' regrowth is traversed between AB451.55 and AB451.8. The drainage line, on which the dam located 140 m south of the alignment at AB452 has been built, is crossed at AB452.3.

At AB453.5, the mainline turns southeast to pass between two dams (100 m southwest of the alignment, and 360 m northeast of the alignment) to cross the drainage lines feeding those dams to the bend at AB455.1, passing through subtle bends at AB454.8 and AB455.05. Reedy Creek Road is crossed at AB455. The mainline traverses a small dam at AB454.95 (immediately west of Reedy Creek Road) which may need to be relocated.

From the bend at AB455.1, the mainline runs parallel to the Raglan Station Road reserve boundary fence in predominantly cleared land through bends at AB455.9, AB456.6, and AB457.5 to the bend at AB458.65 where it avoids the large dam complex constructed on the drainage line at that location. This complex encumbers the northern part of the SGIC (Plate 2.30). The patch of grey box woodland ('not of concern' RE 11.3.26) abutting the dams is traversed.

Plate 2.30 View southwest to dam complex encumbering part of SGIC

After continuing parallel to Raglan Station Road reserve for some 700 m, the mainline diverges away from this road to the bend at AB461.25. At AB460.6 it avoids adjacent mapped patches of 'of concern' regrowth. A dam is located approximately 40 m northeast of the alignment at AB460.65. Turning southeast, the mainline traverses partially cleared land to the bend at AB462.95, crossing Darts Creek Road at AB462. A patch of 'least concern' regrowth is traversed north of Darts Creek Road. South of the road, the mainline traverses a relatively intact grey box woodland ('not of concern' RE 11.3.26) between AB462.2 and the transmission line easement at AB462.75. A poorly defined drainage line – a tributary of Larcom Vale Creek – is crossed in the vicinity of AB461.8, adjacent to the irregular shaped dam west of Darts Creek Road. The single

circuit Gladstone–Bouldercombe 275 kV transmission line is crossed at AB462.8. The proposed Central Queensland Pipeline (PPL121) is crossed at AB462.9 where it is located adjacent to the transmission line easement. The mainline crosses back over the proposed Central Queensland Pipeline at AB463.1. Further investigation of this crossing is required to avoid multiple crossings and to provide adequate separation of the proposed pipelines.

The mainline runs parallel to the transmission line through partially cleared land – avoiding a dam and contour banks – to the bend at AB463.75, where it diverges from the transmission line to the bend at AB465.55 which is located 30 m east of Popenia Road. 'Least concern' regrowth is traversed in the vicinity of AB463.1 and again at the tributary of Larcom Vale Creek crossed at AB463.6. Between AB463.8 and AB464.6, the mainline traverses an intact grey box/forest red gum woodland remnant ('not of concern' RE 11.3.26 / 'of concern' RE 11.3.4). 'Least concern' regrowth adjacent to that remnant is traversed to AB464.75 where the mainline emerges into cleared land. 'Least concern' regrowth extends along the Larcom Vale Creek tributary crossed at AB465.2. The proposed Central Queensland Pipeline enters the SGIC at AB464.3, and adopts the westernmost slot, forcing the mainline into the adjoining slot.

From the bend at AB465.55, the mainline continues east-southeast generally parallel to, and on an approximate 200 m offset, to Popenia Road, through partially cleared land to the bend at AB467.45, which is adjacent to the western edge of Gostevsky Road. Large patches of 'least concern' regrowth are traversed in this section. Turning southeast, the mainline crosses back over the proposed Central Queensland Pipeline (AB467.5) which continues east-southeast out of the SGIC to follow a valley between low hills. The mainline continues through partially cleared land (surveyed as non-remnant vegetation) to AB468.25 where it enters ironbark woodland ('least concern' RE 11.11.4) which it traverses to the bend at AB468.35. It turns east-southeast at the bend to traverse ironbark woodland ('least concern' RE 11.11.4) to the bend at AB469.6, which is adjacent to The Narrows Road and at the end of the SGIC. Numerous poorly defined drainage lines – tributaries of Larcom Vale Creek – are crossed in this section. The bend at AB468.35 is located adjacent to the Mount Larcom showground and sports complex. Stockyards, possibly disused, are unavoidably traversed at AB468.05.

On leaving the SGIC, the mainline continues southeast in partially cleared, and then cleared land to the bend at AB470.45, crossing the proposed Central Queensland Pipeline at AB469.8 and the proposed Northern Infrastructure Corridor between AB470.05 and AB470.25. The partially cleared vegetation adjacent to The Narrows Road comprising stands of trees is 'least concern' regrowth. Turning southerly, the mainline traverses scattered trees (surveyed as non-remnant vegetation) and cleared land to the bend at AB471.1, crossing the North Coast Line Railway and Gladstone–Mount Larcom Road at AB471 and AB471.05 respectively (Plate 2.31).

The mainline traverses the relatively flat cleared land adjacent to the low hills, running parallel on a 150 m to 200 m offset to the proposed Northern Infrastructure Corridor through bends at AB472.2, AB472.5 and AB472.9 to the bend at AB474.2 where it diverges from the proposed infrastructure corridor to cross the East End Mine Branch Railway at AB474.7 to the bend at AB476, which is located on the west side of Larcom Creek. Stands of trees comprising the mapped 'of concern' regrowth adjacent to the Gladstone–Mount Larcom Road are avoided, as are the other patches of 'of concern' regrowth found north of the East End Mine Branch Railway. South of that railway, the mainline traverses undulating terrain with patches of 'least concern' regrowth, possibly related to the intact patch of mapped grey box/red gum woodland ('of concern' RE 11.3.26/11.3.4) avoided in the vicinity of AB475.8.

Plate 2.31 View east to crossing of Gladstone–Mount Larcom Road and North Coast Railway

Plate 2.32 View east (upstream) to crossing of Larcom Creek at large waterhole

At AB476, the mainline turns southeast to cross Larcom Creek (AB476.2) to track along the western side of an eroding drainage line through bends at AB476.5 and AB476.85 to its intersection with the Arrow Surat Pipeline at AB477.25. The Wallumbilla–Gladstone Pipeline is crossed at AB477.2. Intact regrowth along the adjacent drainage lines is avoided. The mainline crosses Larcom Creek at the upstream end of a large waterhole (Plate 2.32).

3. ELPHINSTONE HEADER

To access coal seam gas tenements east of the Carborough Range, a pipeline that traversed the Walker Creek valley to the mainline near Coppabella was found necessary, as east-west connections were infeasible due to that range and the adjacent Kerlong and Burton ranges. The 52-km-long Elphinstone Header starts in the headwaters of Walker Creek near Lake Elphinstone and traverses that creek valley, passing west of Coppabella to the mainline in the vicinity of Annandale Station.

EL0 to EL28.4 (Carborough Creek)

Overview

The proposed gas pipeline alignment is constrained by severe gully erosion in the watercourses draining the eastern slopes of the Carborough Range, endangered remnant vegetation, the sinuous Walker Creek and BHP Mitsui Coal Pty Ltd's mining lease (ML4750) in this section.

Existing access tracks and fence lines, and elevated ground have been targeted in designing an alignment through the open woodland of the Walker Creek valley that avoids endangered brigalow communities, dams and the worst of the erosion. The proposed alignment is shown in maps 1 and 2 of the Elphinstone Header Pipeline map series.

Travelogue

The proposed Elphinstone Header Pipeline (header pipeline) commences approximately 2 km east of Lake Elphinstone, approximately 800 m south of the Suttor Developmental Road, and approximately 1.5 km west of ML4750 at the watershed of Walker Creek. Commencing at EL1, the header pipeline traverses ironbark grassy/poplar box shrubby woodland ('not of concern' RE 11.9.9/'of concern' RE 11.9.7) as it runs south down the high ground between two gullies, following the approximate alignment of an access track to the bend at EL0.75. Turning southeast, the header pipeline crosses over one of the gullies (EL0.95) to gain the high ground to the east, and continues to follow the access track in ironbark grassy/poplar box shrubby woodland to the bend at EL1.5. Headward erosion is evident in the side gullies adjacent to this bend.

From this bend, the header pipeline turns to continue south-southeast in ironbark grassy/poplar box shrubby woodland on the high ground between the adjacent tributaries of Walker Creek, straddling the access track to the bend at EL2.5, which is located 150 m northwest of a dam. The header pipeline passes within 50 m of the dam embankment (Plate 3.1) as it continues to track along the high ground south-southeasterly to the bend at EL3.95. Severe headward erosion is evident in the side gullies in this section, where the alignment is located between the access track (60 m to the east) and the gullies.

Turning south at EL3.95, the header pipeline traverses stable ground between adjacent eroding drainage lines to cross Walker Creek (EL4.6) to the bend at EL4.95. Walker Creek is crossed on a bend where the watercourse appears stable. The header pipeline traverses ironbark grassy/poplar box shrubby woodland ('not of concern' RE 11.9.9/'of concern' RE 11.9.7) north of Walker Creek, forest red gum woodland ('not of concern' RE 11.3.25) along the creek, and poplar box open woodland ('of concern' RE 11.3.2) south of the creek.

Turning south-southeast, the header pipeline continues to traverse poplar box open woodland in relatively stable terrain to the bend at bend EL6.8. A patch of ironbark grassy

Plate 3.1 View east to dam avoided by the proposed alignment; note gully erosion

woodland ('not of concern' RE 11.9.9) is traversed between EL5.45 and EL5.7. Drainage lines are crossed at EL5 and EL5.95, and the close branches of an actively eroding side gully at EL6.6 and EL6.7.

Turning southerly at EL6.8, the header pipeline tracks down the western side of Walker Creek to the bend at EL8.1 where it turns easterly to make a near perpendicular crossing of that creek to the bend at EL8.55. Several actively eroding side gullies of Walker Creek are traversed in this section at EL7, EL7.25, EL7.6, and in the vicinity of the bend at AL8.1. Poplar box open woodland ('of concern' RE 11.3.2) is traversed in this section, with a patch of forest red gum woodland ('not of concern' RE 11.3.25) encountered between EL7.05 and EL7.25. Riparian vegetation along Walker Creek comprises forest red gum woodland ('not of concern' RE 11.3.25). The Walker Creek crossing occurs near the junction of the creek with a side gully due to the constraints imposed by the sinuous side gully at EL8.8 that limited crossing options of that drainage line.

The header pipeline turns southerly at EL8.55, to traverse sparsely timbered – ironbark grassy/poplar box shrubby woodland ('not of concern' RE 11.9.9/'of concern' RE 11.9.7) – relatively stable terrain to the bend at EL10.4, crossing a tributary of Walker Creek at EL10.15. Turning south-southeasterly, the header pipeline continues through gently undulating terrain to the bend at EL12.55, crossing Walker Creek at EL11.8, and a tributary at EL12.5. Ironbark grassy/poplar box shrubby woodland ('not of concern' RE 11.9.9/'of concern' RE 11.9.7) is traversed in this section, except along Walker Creek where riparian vegetation comprises forest red gum woodland ('not of concern' RE 11.3.25).

Turning southerly at EL12.55, the header pipeline continues to traverse ironbark grassy/poplar box shrubby woodland ('not of concern' RE 11.9.9/'of concern' RE 11.9.7) along the western side of Walker Creek through bends at EL14.1 and EL14.95 to the bend at EL16.05 where the header pipeline diverges from Walker Creek to traverse relatively flat to undulating terrain adjacent to the

Carborough Range. The bend at EL14.1 is very close to an eroding watercourse and will need to be relocated to provide adequate separation. Between EL15.6 and EL15.7, the alignment is very close to bends in the tributary of Walker Creek. Realignment in this section is required to increase the distance to the watercourse. At EL13, the header pipeline crosses the double circuit Nebo–Moranbah 132 kV transmission line. Numerous side gullies are crossed in this section with the more significant gullies crossed at EL13.15, EL14.75 and EL15.6. Ironbark grassy/poplar box shrubby woodland (‘not of concern’ RE 11.9.9/’of concern’ RE 11.9.7) is traversed throughout this section, with a patch of poplar box open woodland (‘of concern’ RE 11.3.2) encountered between EL15.8 and EL16.4.

The header pipeline passes close to the confluence of Walker Creek and two eroding side gullies (EL16.4) as it runs parallel to the creek to EL16.5 where it diverges from the creek to traverse the creek’s flood plain to EL17 where it enters the undulating terrain adjacent to the Carborough Range to traverse that ground to the bend at EL18.1. Tributaries of Walker Creek are crossed at EL16.2, EL16.4 and EL16.85. Ironbark grassy/poplar box shrubby woodland (‘not of concern’ RE 11.9.9/’of concern’ RE 11.9.7) is traversed to EL17.7 where the mainline enters and traverses ironbark grassy woodland (‘not of concern’ RE 11.9.9) to the bend at EL18.1.

At EL18.1, the header pipeline turns south-southeast to traverse poplar box shrubby woodland (‘of concern’ RE 11.9.7) to EL18.3 where it enters and traverses a patch of ironbark grassy woodland (‘not of concern’ RE 11.9.9). At EL18.6 it enters and traverses a patch of melaleuca/bloodwood woodland (‘not of concern’ RE 11.5.8) to EL19.4 after which it traverses a patch of poplar box shrubby woodland (‘of concern’ RE 11.9.7) between EL19.4 and EL19.9 and a patch of ironbark grassy woodland (‘not of concern’ RE 11.9.9) between EL19.9 and EL20.3. The mainline continues through a patch of poplar box shrubby woodland (‘of concern’ RE 11.9.7) to the bend at EL20.4. The alignment runs close and parallel to an eroding watercourse between EL18.1 and EL18.35 where it crosses that side gully. Two branches of a side gully are crossed at EL18.85 and EL19. The header pipeline is located close to a tributary of Walker Creek either side of the crossing at EL19.85.

From the subtle bend at EL20.4, the header pipeline continues south-southeast in gently undulating terrain to the bend at EL22.3, crossing a tributary of Walker Creek at EL20.6. This section is characterised by sparse vegetation (ironbark grassy/poplar box shrubby woodland (‘not of concern’ RE 11.9.9/‘of concern’ RE 11.9.7)) with evidence of minor to moderate sheet erosion, particularly in the section from EL21 to EL21.5. Severe sheet erosion east of the bend at EL22.3 is avoided. A large patch of mapped brigalow woodland (endangered RE 11.9.5) is avoided as the header pipeline makes a subtle bend at EL22.3 to traverse light, then moderately timbered country to the bend at EL25.4. A tributary of Walker Creek is crossed at EL24. Ironbark grassy/poplar box shrubby woodland (‘not of concern’ RE 11.9.9/‘of concern’ RE 11.9.7) is traversed in this section.

The header pipeline continues through a series of subtle bends at EL26.6 and EL27.3 to cross and track down the western side of a major tributary of Carborough Creek, avoiding the dam east of EL26.1. The tributary is crossed at EL26.3, and side gullies of that tributary are crossed at EL26.5 and EL26.8.The header pipeline crosses Carborough Creek at EL28.4. The Carborough Creek crossing occurs adjacent to a bend in that creek and a side gully, near an area of active sheet erosion. A patch of melaleuca/bloodwood woodland (‘not of concern’ RE 11.5.8) is traversed between the bend at EL25.4 and EL25.8, after which the header pipeline traverses ironbark grassy/poplar box shrubby woodland (‘not of concern’ RE 11.9.9/‘of concern’ RE 11.9.7) to EL28.1. A patch of forest red gum/poplar box open woodland (‘of concern’ RE 11.3.4 and ‘of

concern' RE 11.3.2) is encountered in the approach to Carborough Creek. Riparian vegetation comprises forest red gum woodland ('not of concern' RE 11.3.25).

EL28.4 to EL51.9 (Arrow Bowen Pipeline)

Overview

Connection to the Arrow Bowen Pipeline is constrained by the Carborough Range, the Coppabella and Moorvale collieries, Goonyella Branch Railway and Coppabella. Land adjacent to the Carborough Range while offering the most feasible route is constrained by the railway, a water supply pipeline, the Peak Downs Highway, rural residential properties, rocky outcrops and borrow pits. The proposed alignment is shown in maps 2 and 3 of the Elphinstone Header Pipeline map series.

Travelogue

After crossing Carborough Creek, the header pipeline traverses cleared land before crossing a tributary of that creek to the bend at EL29.5, located south of another tributary. The proposed alignment runs along the channel of the watercourse between EL29.2 and EL29.4, where moderate to severe sheet erosion extends to the watercourse. The header pipeline alignment needs further investigation in the vicinity of the Carborough Creek crossing to address these issues. Poplar box/ironbark open woodland ('not of concern' RE 11.5.3) with lancewood and bendee ('not of concern' RE 11.7.2) along the tributary of Carborough Creek is traversed between EL29 and the bend at EL29.5.

Turning southeasterly at that bend, the header pipeline traverses relatively flat terrain and partially cleared land to the bend at EL33.6, crossing drainage lines at EL30.15 and EL33.2. Remnant vegetation traversed in this section includes melaleuca/bloodwood woodland ('not of concern' RE 11.5.8), the patch of melaleuca/bloodwood woodland and associated wetland ('not of concern' RE 11.5.8 and 'not of concern' RE 11.3.27) traversed between EL31.4 and EL31.8, and 'least concern' regrowth between EL32.3 and the bend.

The header pipeline continues in predominantly cleared relatively flat terrain to the bend at EL35.5, crossing a tributary of Thirty Mile Creek at EL34.6, at the existing vehicle/stock crossing. Patches of 'least concern' regrowth are encountered north of the tributary. Riparian vegetation of the tributary comprises forest red gum woodland ('not of concern' RE 11.3.25) after which the mainline traverses non-remnant vegetation. Turning southerly at EL35.5, the header pipeline traverses non-remnant vegetation (sporadic regrowth) to EL35.8 where it enters cleared land to follow a fence to the bend at EL38.9, crossing a side gully of the above tributary at EL35.6, Thirty Mile Creek at EL36.9 and the branches of a tributary at EL37.75 and EL38.15. Riparian vegetation traversed at the Thirty Mile Creek crossing comprises forest red gum woodland ('not of concern' RE 11.3.25) which is also traversed at the tributary crossings at EL37.75 and EL38.15. The mainline enters and traverses poplar box/ironbark open woodland ('not of concern' RE 11.5.3) with lancewood and bendee ('not of concern' RE 11.7.2) between EL38.75 and the bend at EL38.9.

South of EL38.9, the header pipeline makes a series of bends to ensure perpendicular crossings of the numerous watercourses that drain the eastern face of the Carborough Range. The header pipeline traverses poplar box/ironbark open woodland ('not of concern' RE 11.5.3) with lancewood and bendee ('not of concern' RE 11.7.2) through bends at EL39.5, EL40.6, EL42.15, EL43.25, EL44.7 and EL45.75 to the bend at EL46.65. The more significant watercourses are crossed at EL40.95, EL41.1, EL41.4, EL42.6 and EL43.5. The alignment passes very close to bends as it

approaches and crosses the latter watercourse. Realignment options should be investigated in this section to increase the distance to the watercourse bends.

Topsoil stripping to facilitate the possible development of borrow pits is evident in the vicinity of the bend at EL42.15 (Plate 3.2). This observation is based on the existing borrow pits located 1.2 km east of the proposed alignment. Small stands of brigalow (unconfirmed) were observed to the north and west of Coppabella where the alignment traverses the toe of the Carborough Range to avoid a small hill on which a borrow pit has been established. Stands in the vicinity of the bend at EL44.7 have been avoided.

Plate 3.2 View northwest to possible future borrow pit showing topsoil stripping

At EL46.65, the header pipeline turns south to cross a 132 kV transmission line (EL46.75), the Goonyella Branch Railway (EL47) and the Peak Downs Highway (EL47.7), as options north of the railway are constrained by the precipitous faces of the bluff – at the southern end of the Carborough Range – that extend to the railway. This alignment makes near perpendicular crossings of the above infrastructure as it avoids culverts, and bends of the watercourses located between the railway and highway, and south of the highway (Plate 3.3). Severe headward erosion is evident in the side gully that extends to within 20 m of the alignment in the vicinity of EL46.5.

The watercourse and side gullies south of the highway constrain alignment options in this area. Options adjacent to the highway are precluded by the water supply pipeline that runs parallel to the highway. From the bend at EL47.8 on the south side of the highway, the header pipeline turns west-southwest to straddle a watercourse to the broad spur which it follows to the bend at EL48.4, where it turns southwest to run onto the ridge, which it then follows to the bend at EL50.2. At the crest of the ridge the header pipeline traverses the edges of cleared areas, possibly former borrow pits or laydown areas. Isolated stands of brigalow (unconfirmed) are evident in the poplar box/ironbark open woodland (‘not of concern’ RE 11.5.3) with lancewood and bendee (‘not of concern’ RE 11.7.2) traversed in this section.

Plate 3.3 **View east to proposed crossing of transmission line and Goonyella Branch Railway**

Plate 3.4 **View north to watercourse crossing; note brigalow and bluff at southern end of Carborough Range (top of photograph)**

Turning west-southwest at EL50.2, the header pipeline avoids patches of brigalow (unconfirmed) as it emerges from the poplar box/ironbark open woodland (‘not of concern’ RE 11.5.3) with lancewood and bendee (‘not of concern’ RE 11.7.2) to cross a distribution power line to traverse predominantly cleared land to its junction with the mainline (AB95.85) at EL52. The alignment avoids the mapped patch of brigalow shrubby open forest (endangered RE 11.4.9) adjacent to EL51.3 after which it traverses riparian vegetation comprising forest red gum woodland (‘not of concern’ RE 11.3.25) flanked by poplar box/ironbark open woodland (‘not of concern’ RE 11.5.3) on each side of the along the watercourse.. The oblique watercourse crossing (EL51.3) was sited to avoid the observed intact patches of brigalow (unconfirmed), and intact poplar box and forest red gum stands within the riparian vegetation complex (Plate 3.4).

4. LATERALS

Two lateral pipelines are proposed to connect the Arrow Bowen Pipeline with possible future gas processing facilities in the vicinity of the Peak Downs colliery (Saraji Lateral) and the Norwich Park collieries located southeast of Dysart (Dysart Lateral).

The alignments for the laterals are conceptual, as the ultimate locations of gas processing facilities have not been confirmed. The following sections describe the conceptual alignments, and recommended revised alignments that address the constraints and issues identified with the conceptual alignments.

4.1 Saraji Lateral

Overview

The 25.8-km-long Saraji Lateral (lateral pipeline) commences approximately 5 km east of the Peak Downs colliery in the vicinity of the proposed Central Queensland Pipeline (Petroleum Pipeline Licence 121) and connects to the Arrow Bowen Pipeline (mainline) at AB137.1, adjacent to the Iffley Connection Road. It traverses partially cleared brigalow woodland, paddocks, the Isaac River and Ripstone Creek. The proposed alignment of the lateral pipeline is shown in maps 1 to 3 of the Saraji Lateral map series.

Travelogue

Commencing at SL0, approximately 500 m west of the proposed Central Queensland Pipeline, the lateral pipeline runs east to the bend at SL18 where it turns northeast to connect to the mainline at AB137.1. This alignment traverses numerous patches of brigalow, and crosses Ripstone Creek at a point where there is a mosaic of channels, flood runners and wetlands. A revised alignment that addresses these constraints and reduces overall impacts is proposed and described below.

The lateral pipeline commences in poplar box/ironbark open woodland (‘not of concern’ RE 11.5.3) before traversing alternating patches of that vegetation community and cleared land to Ripstone Creek. A revised alignment that avoids the patches of remnant vegetation and improves the crossing of Ripstone Creek is proposed.

The revised alignment commences at the proposed Central Queensland Pipeline (Plate 4.1) in cleared land 500 m south of the conceptual alignment crossing of that proposed pipeline. It traverses cleared land avoiding the patches of poplar box/ironbark open woodland (‘not of concern’ RE 11.5.3) to SL2.6 where it crosses the conceptual alignment to continue in cleared land and then poplar box/ironbark open woodland to the revised crossing of Ripstone Creek, approximately 650 m north of SL5.6.

Continuing to the bend approximately 800 m north of SL6.4, the alignment avoids the lagoons, dams and flood runners adjacent to the original crossing point. Riparian vegetation along Ripstone Creek, the flood runners and lagoons comprises poplar box/forest red gum woodland (‘of concern’ RE 11.3.2 and ‘not of concern’ RE 11.3.25). Several relatively intact stands of poplar box are unavoidably traversed east of Ripstone Creek, as the alignment seeks to reduce overall impacts on these communities by avoiding the lagoons and, where possible, making use of cleared land. Forest red gum woodland (‘not of concern’ RE 11.3.25) is traversed on the flood runner that extends north of SL7.9.

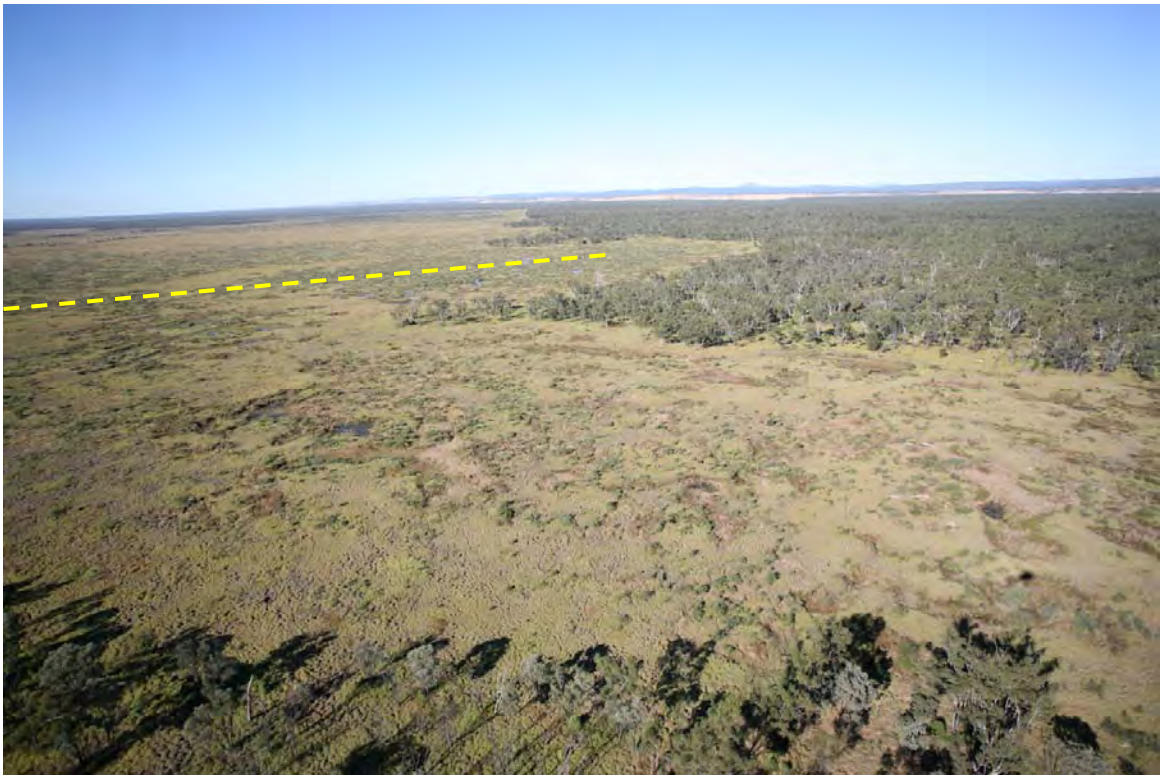

Plate 4.1 View southwest to starting point of Saraji Lateral; note Peak Downs colliery in background

East of Ripstone Creek, the conceptual alignment traverses poplar box/ironbark open woodland ('not of concern' RE 11.5.3) and a freshwater wetland ('not of concern' RE 11.3.27) at SL11. The mapped patch of endangered brigalow shrubby open forest RE 11.4.9 in the vicinity of SL13.1, where it passes close to a dam was not identified in the ecological survey. To reduce impacts on these communities, in particular the more intact stands, the revised alignment turns east-southeast from the bend north of EL6.4 to cross the conceptual alignment at SL9.8 to continue to the bend some 900 m south of SL13.5.

The revised alignment traverses cleared land before traversing the large tract of poplar box/ironbark open woodland ('not of concern' RE 11.5.3) to the bend south of EL13.5. It avoids the more intact stands of poplar box and reduces impacts on the wetlands (crossing near or at the edge of the ephemeral waterbodies).

Turning east-northeast from the bend south of EL13.5, the revised alignment of the lateral pipeline traverses cleared land (for approximately 1.8 km) and then 'of concern' regrowth and a poplar box open woodland/bloodwood woodland ('of concern' RE 11.3.2 and 'not of concern' RE 11.3.7) to cross the Isaac River, 150 m south of the original crossing at SL19, to the bend 250 m east of the river and 240 m south of SL19.3. Palaeochannels of the Isaac River are traversed on the western side of the river where extensive gilgai were observed in the cleared land. The Isaac River comprises a single channel approximately 60 m wide at the crossing (Plate 4.2). Riparian vegetation is forest red gum woodland ('not of concern' RE 11.3.25).

The bend located between the river and a side gully ensures the revised alignment avoids the endangered regrowth east of the river, and the patch of poplar box open woodland ('of concern' RE 11.3.2) located between SL19.8 and SL20.3. Turning northeast at the bend, the revised alignment traverses the southern edge of endangered regrowth to cross a local road (SL19.65)

Plate 4.2 View south to proposed pipeline crossing of Isaac River

where it enters cleared land – avoiding the abovementioned patch of poplar box open woodland – to traverse that land to the mainline, staying south of the fence. This alignment is further into the paddock than the conceptual alignment which followed the fence on a 60 m offset. Extensive large gilgai, full of water at the time of the site inspection, are evident between the local road and the mainline.

4.2 Dysart Lateral

Overview

The Dysart Lateral (lateral pipeline) commences approximately 13 km southeast of Norwich Park collieries and 14 km northeast of Dysart adjacent to Golden Mile Road which it follows to the Fitzroy Developmental Road before following that road to the mainline at AB172.9. The 25.7-km-long lateral pipeline traverses cropping land and scattered patches of regrowth. Borrow pits and dams impose constraints on the alignment, as it tries to stay close to the road reserves. The conceptual alignment has been revised to address these constraints. Limiting road crossings was a key consideration in addressing these constraints. Maps 1 and 2 of the Dysart Lateral map series show the proposed alignment of the lateral pipeline.

Travelogue

The conceptual alignment commences north of Golden Mile Road in cultivated cropping land. Constraints imposed by the endangered regrowth (DL1.5 to DL1.85), borrow pit traversed by the conceptual alignment at DL16.2, and the aim to reduce road crossings were the reason the revised alignment was moved to the southern side of the road.

The revised alignment traverses cropping land on a 50 m offset to the road reserve boundary, as it follows Golden Mile Road east towards the Fitzroy Developmental Road. It passes between a

patch of vegetation and dam opposite DL1, crosses a drainage line opposite DL3.35, traverses the edge of a plantation opposite DL3.6, and passes through the edge of a mosaic of mapped endangered, 'of concern' and 'not of concern' regrowth associated with the drainage line crossed opposite DL5.5. Two dams located in the regrowth are avoided, with the closest dam 30 m south of the alignment (Plate 4.3).

Plate 4.3 View south to dams amongst remnant vegetation on south side of Golden Mile Road

At DL10, the revised alignment and the conceptual alignment coincide. The revised alignment continues southeast on a 50 m offset to Golden Mile Road through bends in the vicinity of DL11.2, DL11.65, and DL14.5 to the bend at DL15.3, where it diverges slightly away from the boundary fence to the bend opposite DL15.9. The lateral pipeline traverses cropping land throughout this section, avoiding the dam located 200 m southeast of the alignment opposite DL14.85.

From the bend opposite DL15.9, the lateral pipeline continues generally parallel to Golden Mile Road in endangered regrowth before crossing that road at DL17.1, thereby avoiding the borrow pit located in regrowth north of the road (Plate 4.4), and alignment at DL16.2. Stephens Creek, an ephemeral watercourse with a relatively poorly defined channel is crossed immediately before the Golden Mile Road crossing, potentially necessitating an extended horizontal bore or horizontal directional drilled crossing.

Tracking parallel to and on a 50 m offset to the road reserve boundary, the revised alignment of the lateral pipeline traverses cropping land east of Golden Mile Road before crossing Blackburn Creek (DL18.3) whose riparian vegetation is forest red gum woodland ('not of concern' RE 11.3.25). Adjacent vegetation to the north of the creek comprises poplar box open woodland ('of concern' RE 11.3.2).

Plate 4.4 View south to borrow pit adjacent to Golden Mile Road; proposed alignment is located on the opposite side of the road

Continuing southeast through cleared land, the revised alignment crosses an anabranch of Blackburn Creek at DL19.5 before turning northeasterly through a splayed bend to follow the Fitzroy Developmental Road on an 80 m offset to the road reserve boundary to the mainline at DL25.75 (AB172.9). Riparian vegetation along the anabranch was identified as non-remnant vegetation in the ecological survey. A large area of standing water to the east of the alignment between DL18.6 and DL19 was observed at the time of the site inspection. The lateral pipeline traverses cropping land adjacent to the Fitzroy Developmental Road.

5. REFERENCES

Aecom. 2011. Environmental Assessment Report (Flora) for the Proposed Arrow-Bowen Gas Pipeline. Aecom Australia Pty Ltd. August 2011.

Coffey. 2010. Arrow Bowen Pipeline, Pipeline Route Selection Report, December 2010. Coffey Environments Australia Pty Ltd.

Proposed pipeline alignment travelogue
Arrow Bowen Pipeline Maps 1 to 32

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

147°58'0"E 148°0'0"E 148°2'0"E

21°14'0"S 21°16'0"S 21°18'0"S 21°20'0"S

ML4755
EASTERN CREEK SOUTH
XSTRATA COAL QUEENSLAND PTY LTD

ML10352
EASTERN CREEK EXTENDED
XSTRATA COAL QUEENSLAND PTY LTD

Locality Plan

Newlands Nature Refuge

Newlands Nature Refuge

ROAD

NEWLANDS ACCESS ROAD

ROAD

AB0
AB1
AB2
AB3
AB4
AB5
AB6
AB7
AB8
AB9
AB10
AB11
AB12
AB13
AB14

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 1 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

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Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

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NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°0'0"E 148°2'0"E 148°4'0"E

21°22'0"S 21°24'0"S 21°26'0"S 21°28'0"S 21°30'0"S

AB14 AB15 AB16 AB17 AB18 AB19 AB20 AB21 AB22 AB23 AB24 AB25 AB26 AB27 AB28 AB29 AB30 AB31 AB32

ROAD

Locality Plan

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 2 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

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ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°0'0"E 148°2'0"E 148°4'0"E 148°6'0"E

21°30'0"S 21°32'0"S 21°34'0"S 21°36'0"S 21°38'0"S

AB32 AB33 AB34 AB35 AB36 AB37 AB38 AB39 AB40 AB41 AB42 AB43 AB44 AB45 AB46 AB47 AB48

SUTTOR DEVELOPMENTAL ROAD

ROAD

ROAD

ROAD

ROAD

ROAD

ML70421
RED HILL
BHP COAL PTY LTD

RED HILL ROAD

RED HILL ROAD

Locality Plan

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 3 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

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ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°2'0"E 148°4'0"E 148°6'0"E 148°8'0"E

21°40'0"S 21°42'0"S 21°44'0"S 21°46'0"S

AB48 AB49 AB50 AB51 AB52 AB53 AB54 AB55 AB56 AB57 AB58 AB59 AB60 AB61 AB62 AB63 AB64 AB65 AB66

RED HILL ROAD

ROAD

ROAD

ML70421
RED HILL
BHP COAL PTY LTD

Locality Plan

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 4 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

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ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°6'0"E 148°8'0"E 148°10'0"E 148°12'0"E

21°46'0"S 21°48'0"S 21°50'0"S 21°52'0"S 21°54'0"S

AB62 AB63 AB64 AB65 AB66 AB67 AB68 AB69 AB70 AB71 AB72 AB73 AB74 AB75 AB76 AB77 AB78 AB79 AB80 AB81

ROAD

ML70393
ELLENSFIELD EAST
VALE AUSTRALIA (CQ) PTY L

ML70345
BROADLEA NORTH
VALE AUSTRALIA (CQ) PTY LTD

Locality Plan

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 5 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

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ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°14'0"E 148°16'0"E 148°18'0"E

21°52'0"S 21°54'0"S 21°56'0"S 21°58'0"S

AB81 AB82 AB83 AB84 AB85 AB86 AB87 AB88 AB89 AB90 AB91 AB92 AB93 AB94 AB95 AB96 AB97 AB98 AB99 AB100 AB101

EL51 EL52

Locality Plan

ML70374
ANNANDALE EAST
VALE AUSTRALIA (CQ) PTY LTD

ML70340
ANNANDALE
VALE AUSTRALIA (CQ) PTY LTD

ML70339
CARBOROUGH DOWNS
VALE AUSTRALIA (CQ) PTY LTD

PEAK DOWNS HIGHWAY
POITREL ROAD
DAUNIA ROAD

148°14'0"E 148°16'0"E 148°18'0"E

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 6 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Proposed Elphinstone Header Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

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ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

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21°58'0"S 22°0'0"S 22°2'0"S 22°4'0"S 22°6'0"S

AB98 AB99 AB100 AB101 AB102 AB103 AB104 AB105 AB106 AB107 AB108 AB109 AB110 AB111 AB112 AB113 AB114 AB115 AB116 AB117 AB118

DAUNIA ROAD

ROAD

ML70290
MOORVALE A
COPPABELLA COAL PTY LTD

ML70115
DAUNIA EAST
BHP COAL PTY LTD

ML1781
DAUNIA
BHP COAL PTY LTD

ML70354
OLIVE DOWNS A
COPPABELLA COAL PTY LTD

ANNANDALE ROAD

Locality Plan

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 7 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

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ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°24'0"E 148°26'0"E 148°28'0"E 148°30'0"E

22°6'0"S 22°8'0"S 22°10'0"S 22°12'0"S 22°14'0"S

AB117 AB118 AB119 AB120 AB121 AB122 AB123 AB124 AB125 AB126 AB127 AB128 AB129 AB130 AB131 AB132 AB133 AB134

ANNANDALE ROAD

ISAACS RIVER

IFFLEY CONNECTION ROAD

ROAD

Locality Plan

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 8 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

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ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°30'0"E 148°32'0"E 148°34'0"E 148°36'0"E

22°12'0"S 22°14'0"S 22°16'0"S 22°18'0"S 22°20'0"S

AB131 AB132 AB133 AB134 AB135 AB136 AB137 SL25.8 SL25 SL24 SL23 SL22 AB138 AB139 AB140 AB141 AB142 AB143 AB144 AB145 AB146 AB147 AB148 AB149 AB150

FITZROY DEVELOPMENT ROAD

JEFFLEY CONNECTION ROAD

Locality Plan

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 9 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Proposed Saraji Lateral alignment
- Revised alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

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ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°36'0"E 148°38'0"E 148°40'0"E 148°42'0"E

22°20'0"S 22°22'0"S 22°24'0"S 22°26'0"S

AB148 AB149 AB150 AB151 AB152 AB153 AB154 AB155 AB156 AB157 AB158 AB159 AB160 AB161 AB162 AB163 AB164 AB165 AB166

FITZROY DEVELOPMENT ROAD

ISAAC RIVER

CARFAX ROAD

ROAD

Locality Plan

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 10 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

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ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°40'0"E 148°42'0"E 148°44'0"E

22°26'0"S 22°28'0"S 22°30'0"S 22°32'0"S 22°34'0"S

AB164 AB165 AB166 AB167 AB168 AB169 AB170 AB171 AB172 AB173 AB174 AB175 AB176 AB177 AB178 AB179 AB180 AB181

DL19 DL20 DL21 DL22 DL23 DL24 DL25 DL25.7

ISAAC RIVER

CARFAX ROAD

MAY DOWNS CARFAX

DINGO MOUNT FLORA ROAD

Locality Plan

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 11 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Proposed Dysart Lateral alignment
- Revised alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

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arrow energy
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Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

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NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°46'0"E 148°48'0"E 148°50'0"E 148°52'0"E

22°30'0"S 22°32'0"S 22°34'0"S 22°36'0"S 22°38'0"S

MAY DOWNS CARFAX ROAD

ROAD

AB181 AB182 AB183 AB184 AB185 AB186 AB187 AB188 AB189 AB190 AB191 AB192 AB193 AB194

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 12 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

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Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

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NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°54'0"E 148°56'0"E 148°58'0"E

22°32'0"S 22°34'0"S 22°36'0"S 22°38'0"S 22°40'0"S

MAY DOWNS CARFAX ROAD

ROAD

ISAAC RIVER

MAY DOWNS ROAD

AB194 AB195 AB196 AB197 AB198 AB199 AB200 AB201 AB202 AB203 AB204 AB205 AB206

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 13 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
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Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

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ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

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22°36'0"S 22°38'0"S 22°40'0"S 22°42'0"S 22°44'0"S

AB206 AB207 AB208 AB209 AB210 AB211 AB212 AB213 AB214 AB215 AB216 AB217 AB218 AB219 AB220

ISAAC RIVER

CONNORS RIVER

MAY DOWNS ROAD

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 14 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

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Coordinate System: GCS GDA 1994

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NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

149°6'0"E 149°8'0"E 149°10'0"E 149°12'0"E

22°40'0"S 22°42'0"S 22°44'0"S 22°46'0"S

ISAAC RIVER

AB220 AB221 AB222 AB223 AB224 AB225 AB226 AB227 AB228 AB229 AB230 AB231 AB232 AB233

MAY DOWNS ROAD

149°6'0"E 149°8'0"E 149°10'0"E 149°12'0"E

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 15 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

Document: \\Abfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

149°14'0"E 149°16'0"E 149°18'0"E

22°42'0"S 22°44'0"S 22°46'0"S 22°48'0"S 22°50'0"S

MARLBOROUGH SARINA ROAD

ISAAC RIVER

AB234 AB235 AB236 AB237 AB238 AB239 AB240 AB241 AB242 AB243 AB244 AB245 AB246 AB247 AB248

Locality Plan

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 16 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

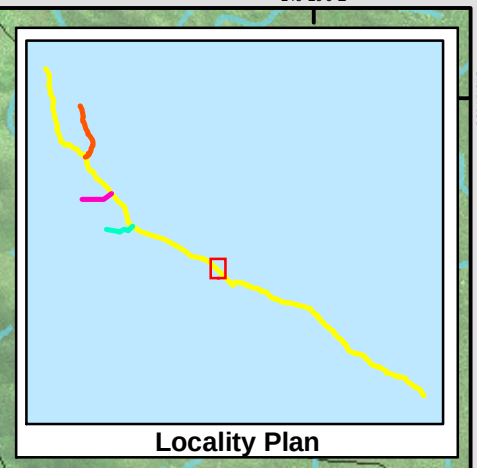
Document: \\Abtfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

149°20'0"E 149°22'0"E 149°24'0"E 149°26'0"E

22°46'0"S 22°48'0"S 22°50'0"S 22°52'0"S 22°54'0"S



AB247 AB248 AB249 AB250 AB251 AB252 AB253 AB254 AB255 AB256 AB257 AB258 AB259 AB260 AB261 AB262 AB263 AB264

MARLBOROUGH SARINA ROAD

MANLY ACCESS ROAD

ISAAC RIVER

MACKENZIE RIVER

149°20'0"E 149°22'0"E 149°24'0"E 149°26'0"E

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 17 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

Document: \\Abtfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

149°26'0"E 149°28'0"E 149°30'0"E 149°32'0"E

22°52'0"S 22°54'0"S 22°56'0"S 22°58'0"S 23°0'0"S

AB263 AB264 AB265 AB266 AB267 AB268 AB269 AB270 AB271 AB272 AB273 AB274 AB275 AB276 AB277 AB278 AB279 AB280 ROAD

MACKENZIE RIVER

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 18 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

Document: \\Abtfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrowEIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

149°34'0"E 149°36'0"E 149°38'0"E

22°54'0"S 22°56'0"S 22°58'0"S 23°0'0"S 23°2'0"S

MARLBOROUGH ROAD

APIS CREEK ROAD

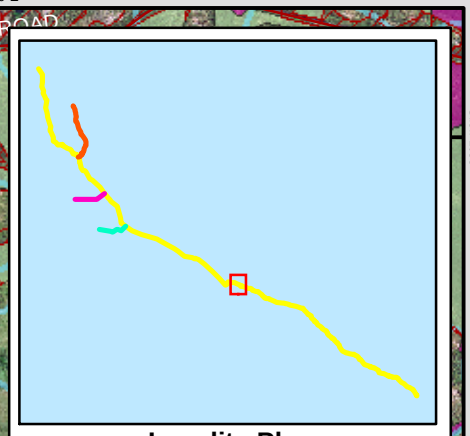
ROAD

CLIFTON ROAD

ROAD

Redcliffe Creek

AB280 AB281 AB282 AB283 AB284 AB285 AB286 AB287 AB288 AB289 AB290 AB291 AB292 AB293



Locality Plan

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 19 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

Document: \\brfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrowEIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

149°40'0"E 149°42'0"E 149°44'0"E 149°46'0"E

22°58'0"S 23°0'0"S 23°2'0"S 23°4'0"S

Redcliffe Creek

CLIFTON ROAD

AB293 AB294 AB295 AB296 AB297 AB298 AB299 AB300 AB301 AB302 AB303 AB304 AB305 AB306 AB307

MORBANK ROAD

Develin Creek

Locality Plan

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 20 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

Document: \\Abtfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

149°48'0"E 149°50'0"E 149°52'0"E

23°0'0"S 23°2'0"S 23°4'0"S 23°6'0"S 23°8'0"S

Develin Creek

ML80065
MARLBOROUGH NO 9
MARLBOROUGH NICKEL PTY LTD

Locality Plan

MORBANK ROAD

SCHOOL ROAD

ROAD

GLENROY MARLBOROUGH ROAD

ROAD

AB307 AB308 AB309 AB310 AB311 AB312 AB313 AB314 AB315 AB316 AB317 AB318 AB319 AB320 AB321

Ten Mile Creek

ROAD

FITZROY RIVER

ROAD

149°48'0"E 149°50'0"E 149°52'0"E

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 21 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

Document: \\Abfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

149°54'0"E 149°56'0"E 149°58'0"E 150°0'0"E

23°4'0"S 23°6'0"S 23°8'0"S 23°10'0"S

ML80074
M2
MARLBOROUGH NICKEL PTY LTD

Locality Plan

EXPLORERS STREET
ROAD
Marlborough Creek
ROAD
Ten Mile Creek
FITZROY RIVER
AB321
AB322
AB323
AB324
AB325
AB326
AB327
AB328
AB329
AB330
AB331
AB332
AB333
AB334
ROAD
REDBANK ROAD
ROAD
ROAD
ROAD
ROAD
ROAD
FITZROY RIVER
GLENROY ROAD
GLENROY MARLBOROUGH ROAD
ROAD
ROAD

149°54'0"E 149°56'0"E 149°58'0"E 150°0'0"E

Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 22 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Marlborough Nickel Slurry Line
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

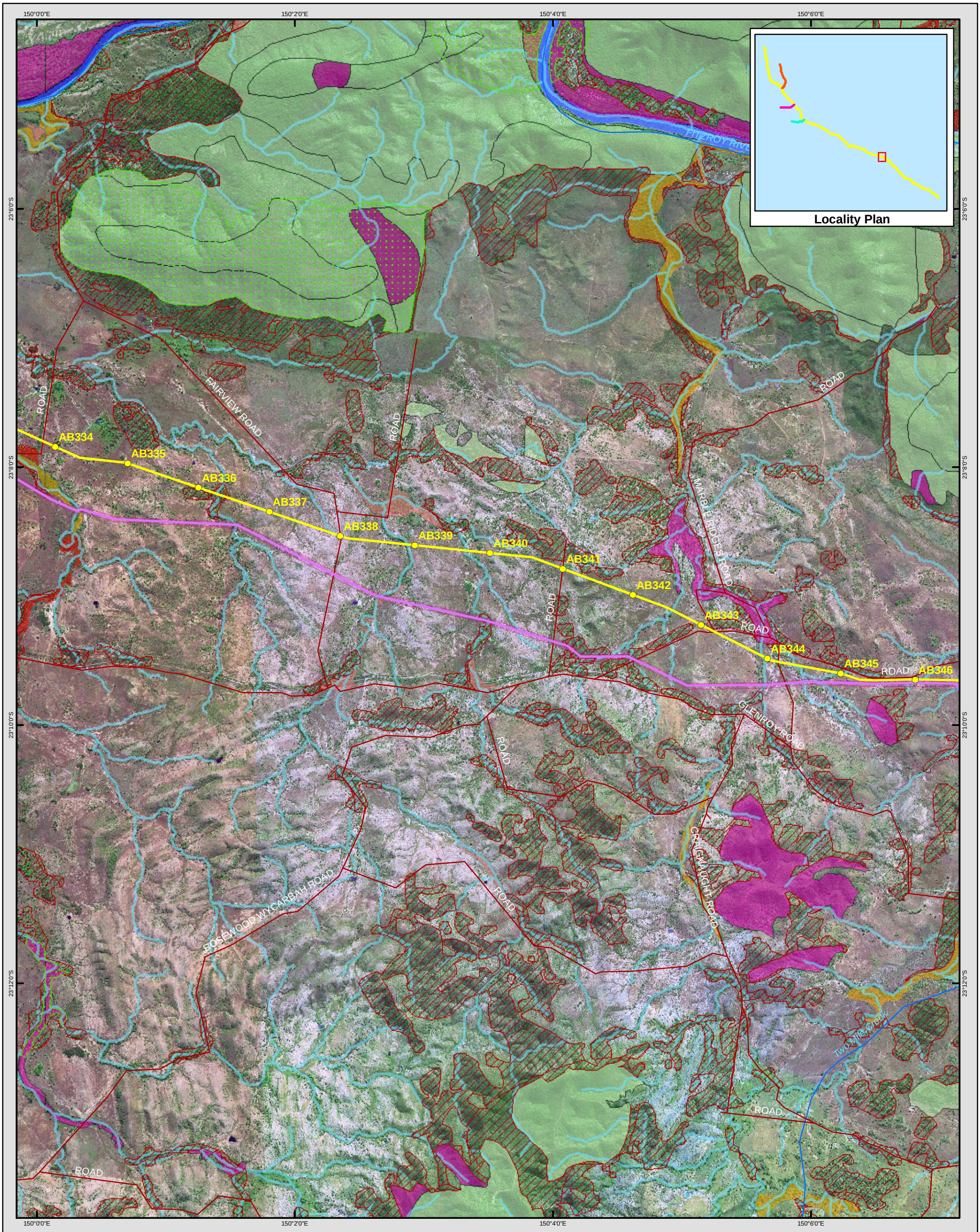
0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

Document: \\Abtfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)



Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 23 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Marlborough Nickel Slurry Line
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

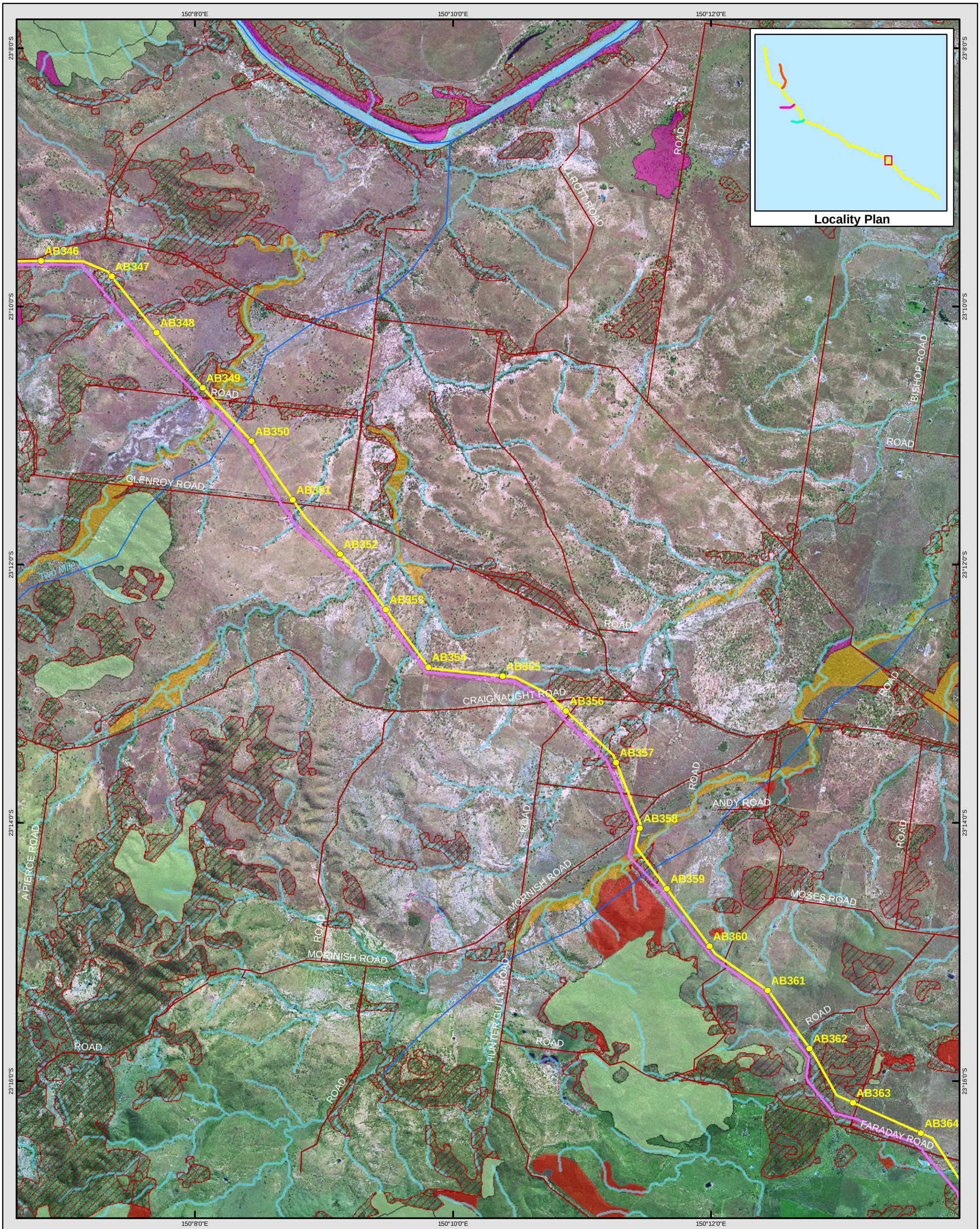
0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

Document: \\Abtfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)



Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 24 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Marlborough Nickel Slurry Line
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

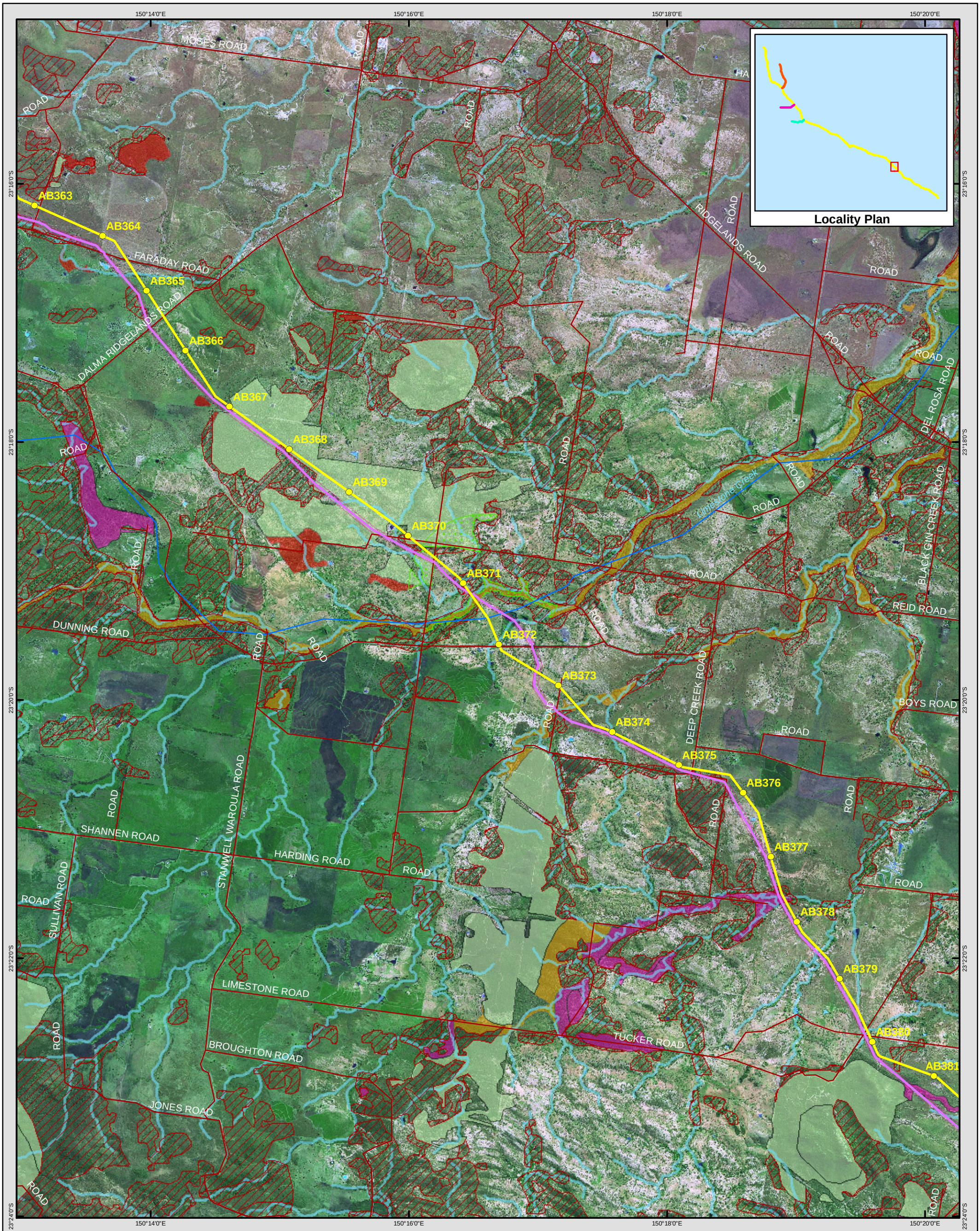
0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

NOT FOR CONSTRUCTION

Document: \\Abfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)



Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 25 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Marlborough Nickel Slurry Line
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

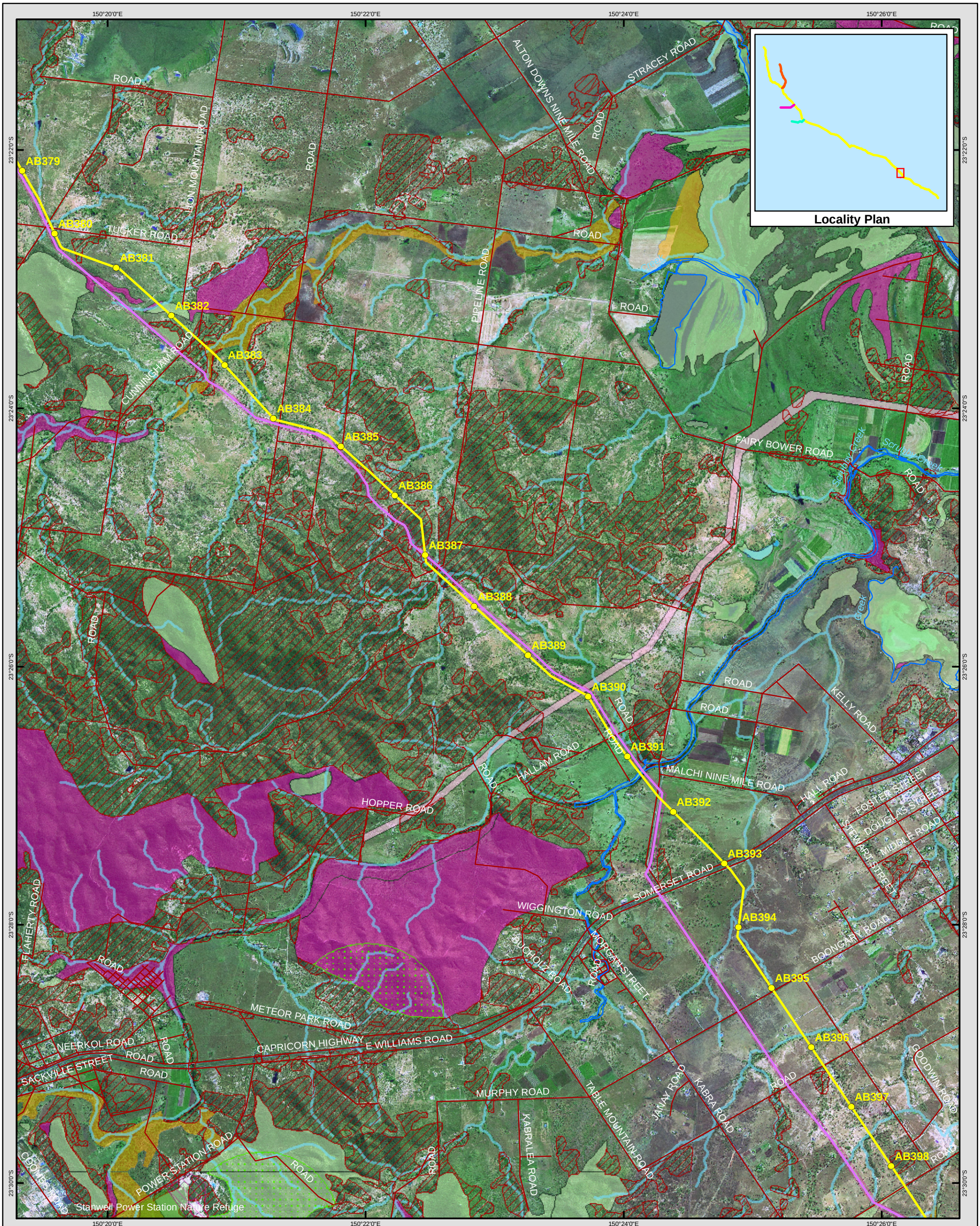
0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

Document: \\Abtfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)



Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 26 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Marlborough Nickel Slurry Line
- Road
- Major watercourse
- Mining lease
- Stanwell-Gladstone Infrastructure Corridor
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

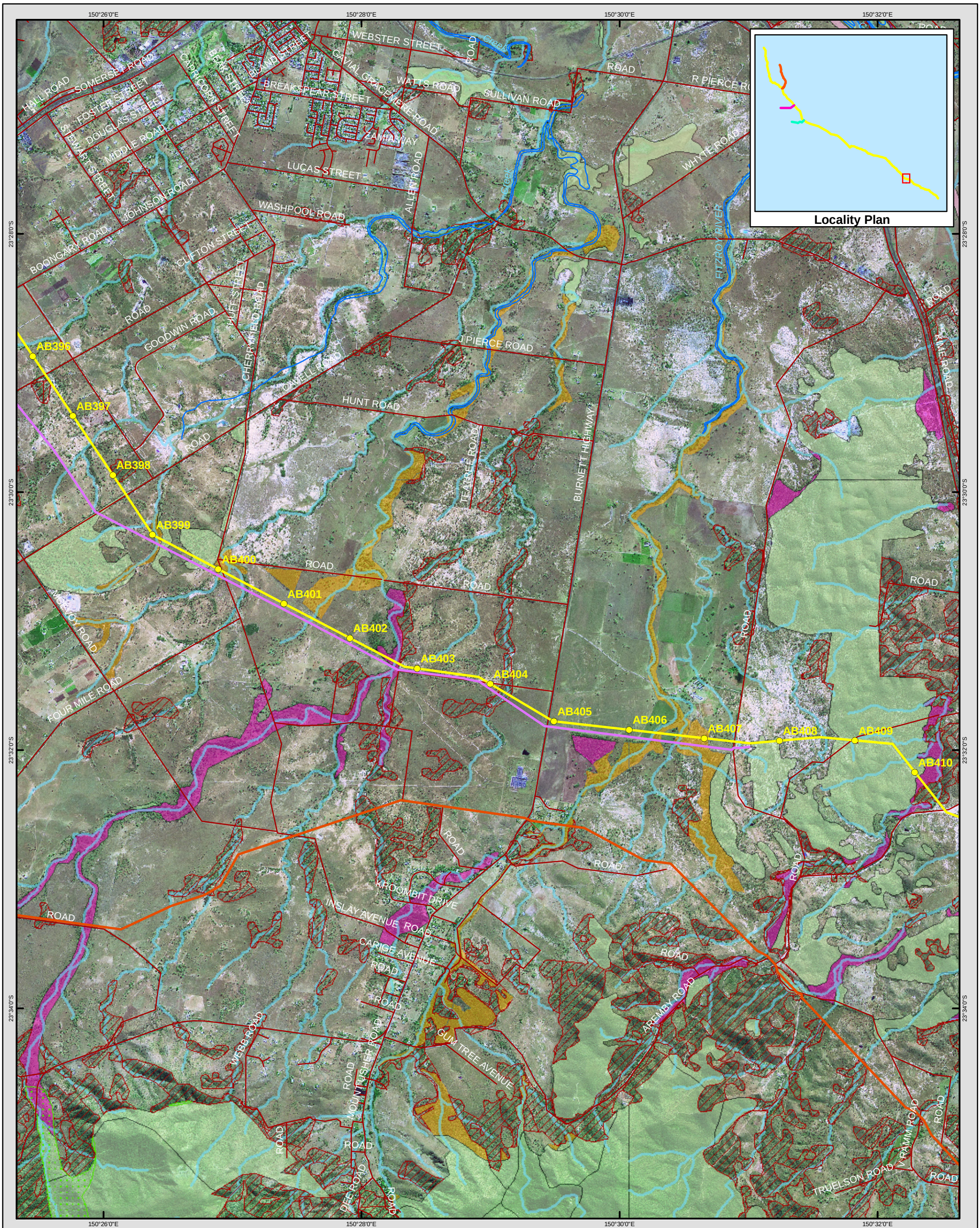
arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)



Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 27 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Marlborough Nickel Slurry Line
- Central Queensland Pipeline
- Road
- Major watercourse
- Stanwell-Gladstone Infrastructure Corridor
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

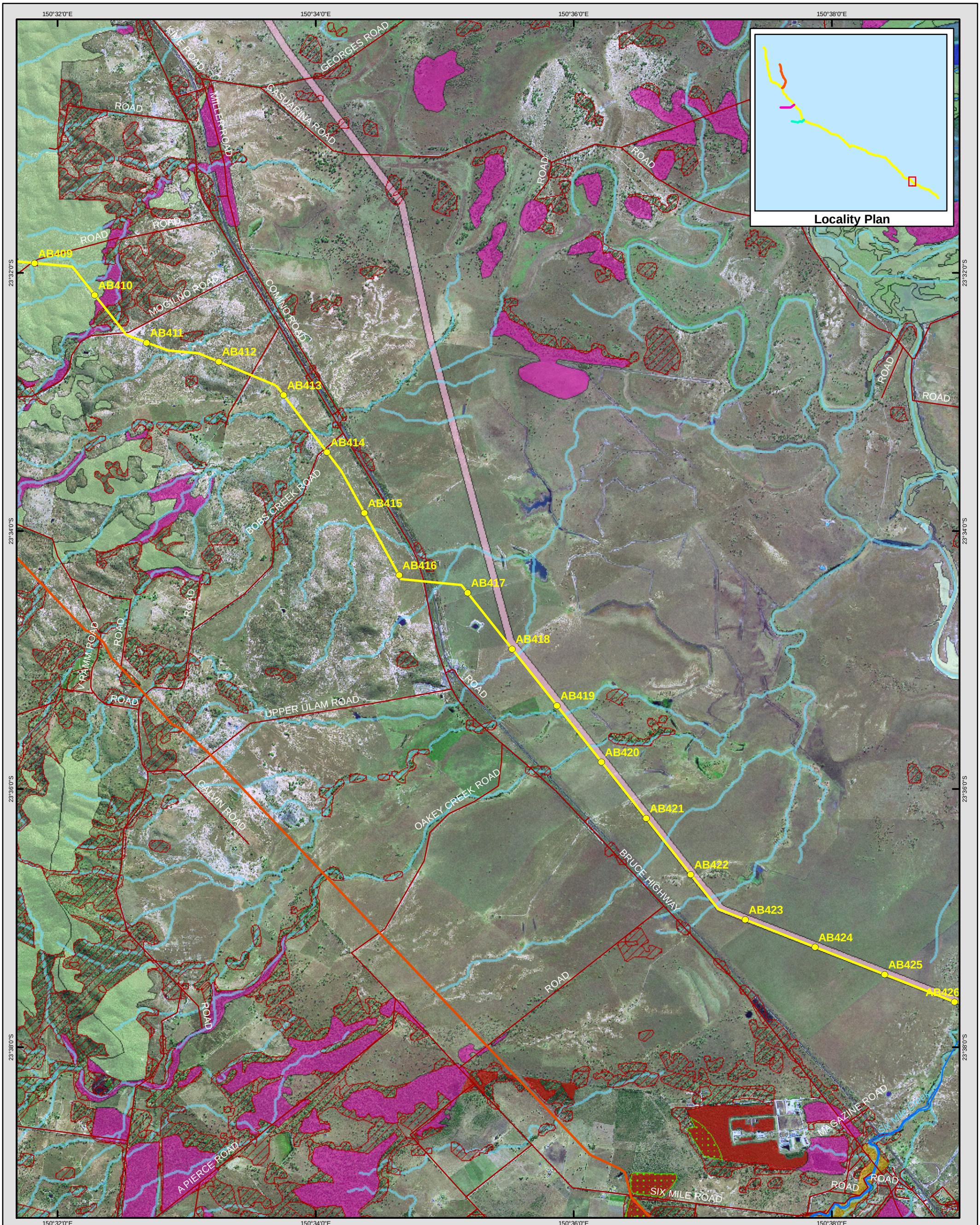
0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

NOT FOR CONSTRUCTION

Document: \\Abfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)



Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 28 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Central Queensland Pipeline
- Road
- Major watercourse
- Stanwell-Gladstone Infrastructure Corridor
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

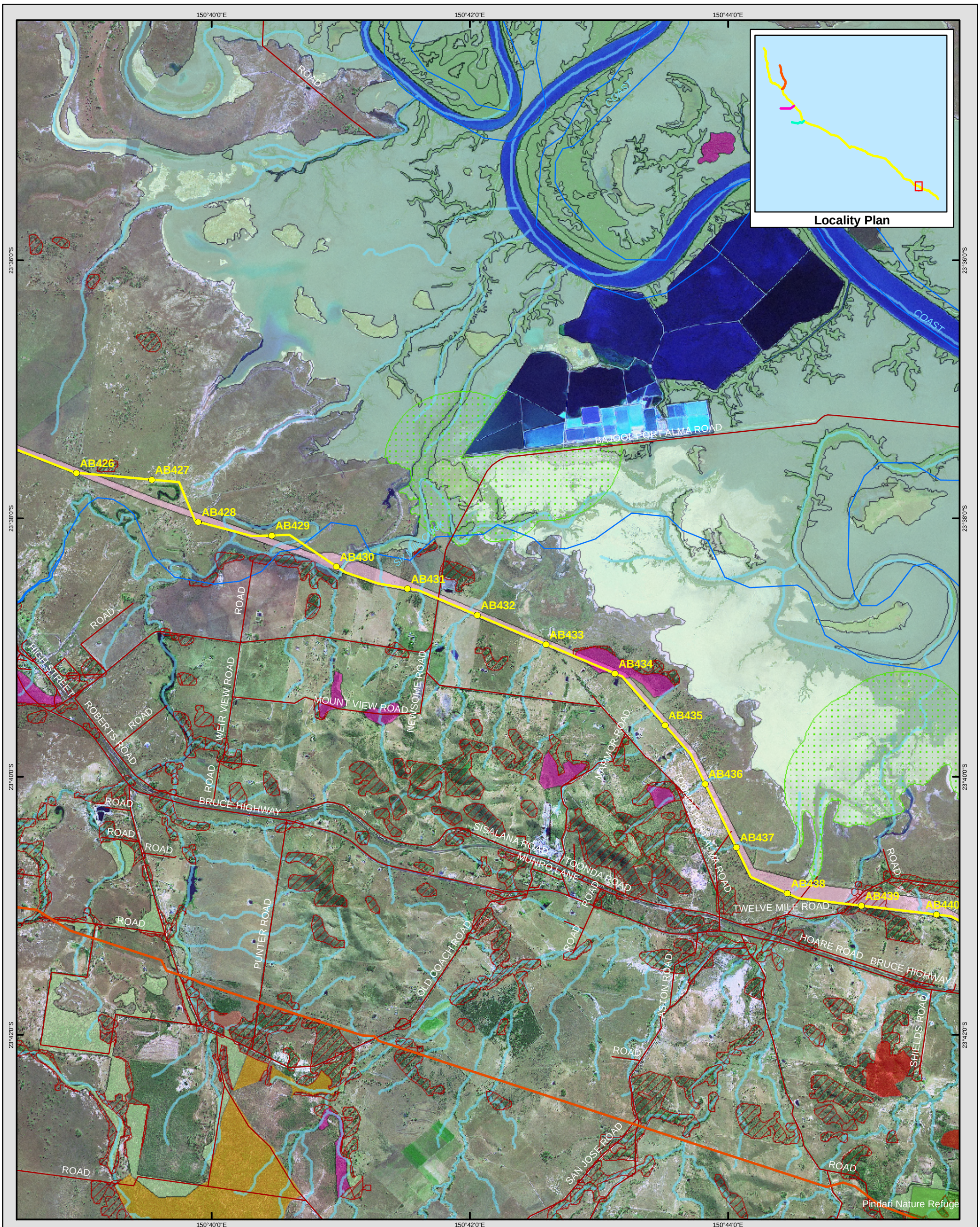
0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

Document: \\Abtfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)



Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 29 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Central Queensland Pipeline
- Road
- Major watercourse
- Stanwell-Gladstone Infrastructure Corridor
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

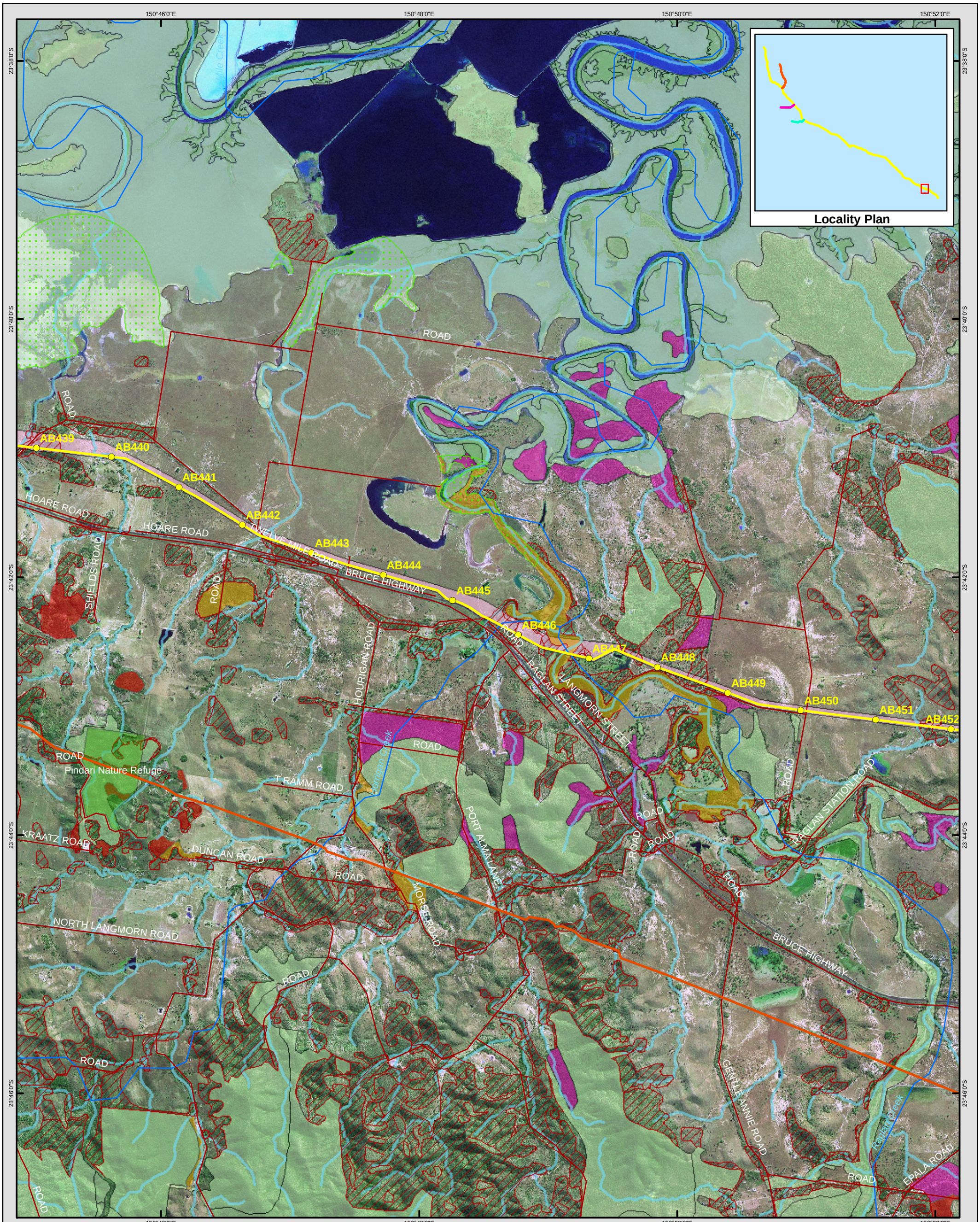
0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

Document: \\Abtfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)



Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 30 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Central Queensland Pipeline
- Road
- Major watercourse
- Stanwell-Gladstone Infrastructure Corridor
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

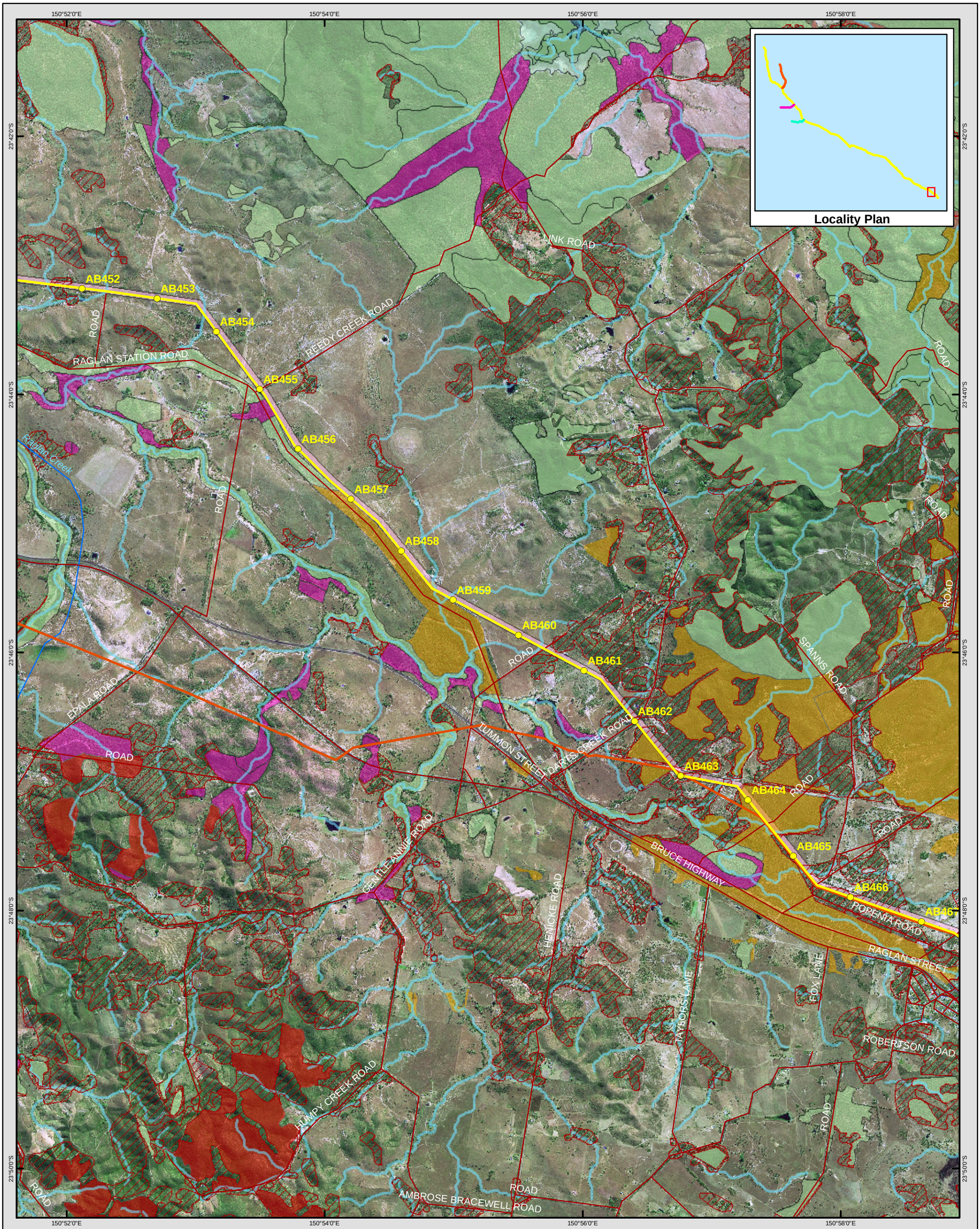
0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

Document: \\Abfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)



Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 31 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Central Queensland Pipeline
- Road
- Major watercourse
- Stanwell-Gladstone Infrastructure Corridor
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

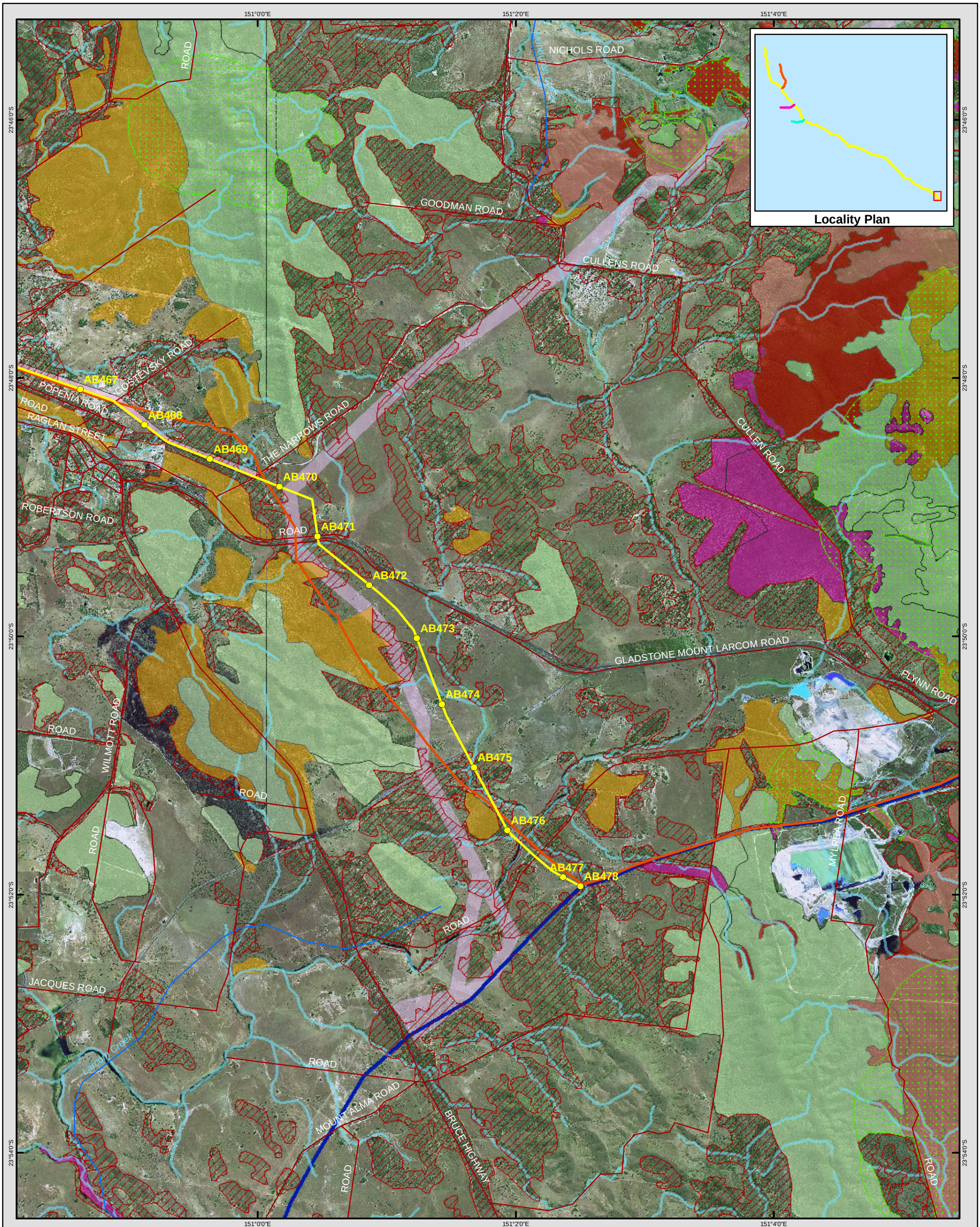
0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

Document: \\Abfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)



Proposed pipeline alignment travelogue - Arrow Bowen Pipeline

Map 32 of 32

Legend

- Proposed Arrow Bowen Pipeline alignment
- Central Queensland Pipeline
- SGP_Route_RevH_LLGA94_polyline
- Road
- Major watercourse
- Stanwell-Gladstone Infrastructure Corridor
- Proposed Northern Infrastructure Corridor
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

Document: \\Abfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

Proposed pipeline alignment travelogue
Elphinstone Header Pipeline Maps 1 to 3

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°14'0"E 148°16'0"E 148°18'0"E 148°20'0"E

21°32'0"S 21°34'0"S 21°36'0"S 21°38'0"S 21°40'0"S

ROAD
SUTTOR DEVELOPMENTAL ROAD
Lake Elphinstone
ROAD
QUEENSLA
SU

EL0 EL1 EL2 EL3 EL4 EL5 EL6 EL7 EL8 EL9 EL10 EL11 EL12 EL13 EL14 EL15 EL16 EL17

Locality Plan

ML70199
BURTON
PEABODY ENERGY AUSTRALIA COAL PTY LIMITED

ML4750
KEMMIS-WALKER
BHP MITSUI COAL PTY LTD

ROAD

148°14'0"E 148°16'0"E 148°18'0"E 148°20'0"E

Proposed pipeline alignment travelogue - Elphinstone Header Pipeline

Map 1 of 3

Legend

- Proposed Elphinstone Header Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

Document: \\Abfarcv01\data$\GIS\107033_ENAUBRIS_ArrowEnergy_LNG\ArrowEnergy_LNG_GIS\MXD\MapLayoutTemplates\FromArrow\EIS Template.mxd Date: 19/08/2011

NOT FOR CONSTRUCTION

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°18'0"E 148°20'0"E 148°22'0"E

21°40'0"S 21°42'0"S 21°44'0"S 21°46'0"S 21°48'0"S

EL16 EL17 EL18 EL19 EL20 EL21 EL22 EL23 EL24 EL25 EL26 EL27 EL28 EL29 EL30 EL31 EL32 EL33 EL34

ROAD

ROAD

ML4750
KEMMIS-WALKER
BHP MITSUI COAL PTY LTD

Locality Plan

Proposed pipeline alignment travelogue - Elphinstone Header Pipeline

Map 2 of 3

Legend

- Proposed Elphinstone Header Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

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ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°18'0"E
148°20'0"E
148°22'0"E
21°50'0"S
21°52'0"S
21°54'0"S
21°56'0"S

Locality Plan

EL37
EL38
EL39
EL40
EL41
EL42
EL43
EL44
EL45
EL46
EL47
EL48
EL49
EL50
EL51
EL52

AB91
AB92
AB93
AB94
AB95
AB96
AB97

ML70161
JOHNSON
COPPABELLA COAL PTY LTD

ML70290
MOORVALE A
COPPABELLA COAL PTY LTD

ML70291
MOORVALE B
COPPABELLA COAL PTY LTD

ML70339
CARBOROUGH DOWNS
VALE AUSTRALIA (CQ) PTY LTD

MALONEY STREET
PEAK DOWNS HIGHWAY
ROAD
DAUNIA ROAD
POITREL ROAD

Proposed pipeline alignment travelogue - Elphinstone Header Pipeline

Map 3 of 3

Legend

- Proposed Arrow Bowen Pipeline alignment
- Proposed Elphinstone Header Pipeline alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

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Proposed pipeline alignment travelogue
Saraji Lateral Maps 1 to 3

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°16'0"E 148°18'0"E 148°20'0"E 148°22'0"E

22°14'0"S 22°16'0"S 22°18'0"S 22°20'0"S

Locality Plan

ML70411
PEAK DOWNS EAST
BHP COAL PTY LTD

ML1885
HARROW CREEK EXTENDED
BHP COAL PTY LTD

SL0 SL1 SL2 SL3 SL4 SL5 SL6 SL7 SL8 SL9

ML1775
PEAK DOWNS
BHP COAL PTY LTD

ML70383
NEW SARAJI
BHP COAL PTY LTD

ML70142
BOOMERANG CREEK
BHP COAL PTY LTD

Proposed pipeline alignment travelogue - Saraji Lateral

Map 1 of 3

Legend

- Proposed Saraji Lateral alignment
- Revised alignment
- Central Queensland Pipeline
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

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ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°22'0"E 148°24'0"E 148°26'0"E 148°28'0"E

22°14'0"S 22°16'0"S 22°18'0"S 22°20'0"S

FIELDY CONNECTION ROAD

VERMONT PARK ROAD

ISAAC RIVER

SL7 SL8 SL9 SL10 SL11 SL12 SL13 SL14 SL15 SL16 SL17 SL18 SL19

148°22'0"E 148°24'0"E 148°26'0"E 148°28'0"E

Proposed pipeline alignment travelogue - Saraji Lateral

Map 2 of 3

Legend

- Proposed Saraji Lateral alignment
- Revised alignment
- Road
- Major watercourse
- Mining lease
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

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ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°28'0"E 148°30'0"E 148°32'0"E

22°12'0"S 22°14'0"S 22°16'0"S 22°18'0"S 22°20'0"S

AB130 AB131 AB132 AB133 AB134 AB135 AB136 AB137 AB138 AB139 AB140 AB141 AB142

SL16 SL17 SL18 SL19 SL20 SL21 SL22 SL23 SL24 SL25 SL25.8

ANNANDALE ROAD

IFFLEY CONNECTION ROAD

FITZROY DEVELOPMENT

ISAAC RIVER

Locality Plan

Proposed pipeline alignment travelogue - Saraji Lateral

Map 3 of 3

Legend

- Proposed Arrow Bowen Pipeline alignment
- Proposed Saraji Lateral alignment
- Revised alignment
- Road
- Major watercourse
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

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Proposed pipeline alignment travelogue
Dysart Lateral Maps 1 to 2

ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°30'0"E 148°32'0"E 148°34'0"E

22°28'0"S 22°30'0"S 22°32'0"S 22°34'0"S 22°36'0"S

CARFAX ROAD

DL0 DL1 DL2 DL3 DL4 DL5 DL6 DL7 DL8 DL9 DL10 DL11

GOLDEN MILE ROAD

Coolibah Nature Refuge

PICARDY ROAD

Locality Plan

Proposed pipeline alignment travelogue - Dysart Lateral

Map 1 of 2

Legend

- Proposed Dysart Lateral alignment
- Revised alignment
- Central Queensland Pipeline
- Road
- Major watercourse
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

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ARROW BOWEN PIPELINE PRELIMINARY ROUTE (REV D)

148°36'0"E 148°38'0"E 148°40'0"E 148°42'0"E

22°28'0"S 22°30'0"S 22°32'0"S 22°34'0"S 22°36'0"S

ROAD

AB167 AB168 AB169 AB170 AB171 AB172 AB173 AB174

DL25.7 DL25 DL24 DL23 DL22 DL21 DL20 DL19 DL18 DL17 DL16 DL15 DL14 DL13 DL12

GOLDEN MILE ROAD

DINGO MOUNT FLORA ROAD

Locality Plan

Proposed pipeline alignment travelogue - Dysart Lateral

Map 2 of 2

Legend

- Proposed Arrow Bowen Pipeline alignment
- Proposed Dysart Lateral alignment
- Revised alignment
- Road
- Major watercourse
- Nature refuges
- Essential habitat
- High value regrowth
- Watercourse regrowth
- Endangered dominant RE
- Endangered subdominant RE
- Of concern dominant RE
- Of concern subdominant RE
- Not of concern RE

N

arrow energy
go further

0 1 2
Kilometres

Scale: 1:50,000 @ A3
Coordinate System: GCS GDA 1994

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