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### GLOUCESTER GAS PROJECT MP08-0154 – SUBMISSIONS REPORT

The following works program is provided in response to issues raised in DECCW letter (DOC10/26796 Part 3A) dated 8 July 2010, and as a consequence of discussions with DECCW held at Newcastle on 28 July 2010.

#### 1.0 ADDITIONAL SURVEYS ALONG PIPELINE ROUTE

The following additional targeted survey work is proposed within the Gas Field Development Area and along the proposed pipeline route.

Additional targeted surveys would be focussed on species which are immobile as adults, and are likely to be found in small and distinct clusters, as these species have the greatest possibility of being potentially impacted as a consequence of the pipeline construction. The species to be targeted include:

- *Asperula asthenes* Trailing Woodruff;
- *Galium australe* Tangled Bedstraw;
- *Callistemon linearifolius* Netted Bottle Brush;
- *Cryptostylis hunteriana* Leafless Tongue Orchid;
- *Cynanchum elegans* White-flowered Wax Plant;
- *Grevillea parviflora* subsp. *parviflora* Small-flower Grevillea;
- *Persicaria elatior* Tall Knotweed;
- *Pomaderris queenslandica* Scant Pomaderris;
- *Rhizanthella slateri* Eastern Australian Underground Orchid; and
- *Tetradlea juncea* Black-eyed Susan.

The species targeted, preferred habitat of these species, timing of flowering and timing of surveys are provided in Tables 1 and 2.

**Table 1 Species to be targeted during additional surveys**

Scientific Name / Common Name	Conservation Rating	Habitat Requirements / Survey Timing	Potential Habitat Along Pipeline
<p><i>Asperula asthenes</i> Trailing Woodruff</p>	<p>V-EPBC V-TSC ROTAP-3VC-</p>	<p>It is a low, trailing perennial herb which grows in damp soils often along river banks. It is found in scattered locations from Bulahdelah north to near Kempsey, with several records from the Port Stephens/Wallis Lakes area.</p> <p><b>All year, but best when flowering (Spring).</b></p>	<ul style="list-style-type: none"> <li>• Damp areas, soaks and creeks (including ephemeral streams).</li> <li>• Riparian areas.</li> <li>• Coastal Narrabeen Moist Forest.</li> </ul>
<p><i>Galium australe</i> Tangled Bedstraw</p>	<p>V-TSC</p>	<p>Tangled Bedstraw is widespread in Victoria and is also found in South Australia and Tasmania. Once regarded as presumed extinct in NSW, this species is now known from the Towamba Valley near Bega, Lake Yarrunga near Kangaroo Valley, Cullendulla Creek Nature Reserve near Batemans Bay, Conjola National Park, Swan Lake near Swanhaven, and the Big Hole in Deua National Park. It was recorded historically from the Clyde River near Batemans Bay and the Mongarlowe area near Braidwood. The species also occurs beside Lake Windemere in the ACT at Jervis Bay. In NSW Tangled Bedstraw has been found in moist gullies of tall forest, <i>Eucalyptus tereticornis</i> forest, coastal Banksia shrubland, and <i>Allocasuarina nana</i> heathland.</p> <p><b>Most flowering collections have been made in late spring to early autumn.</b></p>	<ul style="list-style-type: none"> <li>• Swamp Oak swamp forest of the coastal lowlands of the North Coast.</li> <li>• River Oak riparian woodland of the North Coast.</li> <li>• Water bodies, rivers, lakes, streams (not wetlands)</li> </ul>

Scientific Name / Common Name	Conservation Rating	Habitat Requirements / Survey Timing	Potential Habitat Along Pipeline
<i>Callistemon linearifolius</i> Netted Bottle Brush	V-TSC ROTAP-2RCi	It grows in dry sclerophyll forest on the coast and adjacent ranges and is recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW.  In Lower Hunter National Park near Cessnock, this species occurs in the understorey of Spotted Gum / Ironbark forest, often within dense stands of <i>Melaleuca nodosa</i> .  <b>Best detected when in flower between September and March.</b>	<ul style="list-style-type: none"> <li>Spotted Gum - Grey Ironbark open forest on the foothills of the Central Coast, Sydney Basin.</li> <li>Derived grasslands in Coastal Valleys (incl. Hunter, Manning Valleys).</li> </ul>
<i>Cryptostylis hunteriana</i> Leafless Tongue Orchid	V-EPBC V-TSC ROTAP-3VC-	It does not have a particularly well defined habitat preference although it is known from swampy heath environments and dry sclerophyll grassy woodlands, mostly in coastal areas. This species was not recorded during the surveys and there are no past records within a 5 km buffer of the site.  Only when in flower between November and February. May not flower every year depending on climatic conditions.  <b>Known to flower in November in the Central Coast.</b>	<ul style="list-style-type: none"> <li>Grey Ironbark - Spotted Gum - Grey Box open forest on hills of the Hunter Valley, Sydney Basin.</li> <li>Forest Red Gum - Rough-barked Apple open forest on poorly drained lowlands of the Central Coast, Sydney Basin.</li> <li>Swamp Oak swamp forest fringing estuaries, Sydney Basin and South East Corner.</li> <li>River Oak riparian woodland of the North Coast and northern Sydney Basin.</li> </ul>
<i>Cynanchum elegans</i> White-flowered Wax Plant	E-EPBC E-TSC	A climber or twiner with a highly variable form. The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; Coastal Tea-tree – Coastal Banksia coastal scrub; Forest Red Gum aligned open forest and woodland; Spotted Gum aligned open forest and woodland; and Bracelet Honeymyrtle scrub to	<ul style="list-style-type: none"> <li>Spotted Gum - Grey Ironbark open forest on the foothills of the Central Coast, Sydney Basin.</li> <li>Forest Red Gum.</li> </ul>

Scientific Name / Common Name	Conservation Rating	Habitat Requirements / Survey Timing	Potential Habitat Along Pipeline
		<p>open scrub.</p> <p>Flowering occurs between August and May, with a peak in November. Flower abundance on individual plants varies from sparse to prolific.</p> <p><b>Easiest when flowering (August to May with a peak in November).</b></p>	
<p><i>Grevillea parviflora</i> subsp. <i>parviflora</i> Small-flower Grevillea</p>	<p>E-TSC</p>	<p>It is distributed sporadically within the central NSW coastal region from south of Sydney to the lower Hunter. It occurs in a range of vegetation types from heath and shrubby woodland to open forest. It generally grows in sandy or light clay soils, usually over thin shales. It often occurs in open, slightly disturbed sites such as along tracks and infrastructure easements. Recorded by AECOM 2009 near to Wallaroo National Park, Seaham. Revisit site and confirm species presence.</p> <p><b>Best when flowering between July and December.</b></p>	<ul style="list-style-type: none"> <li>• Recorded by AECOM 2009 near to Wallaroo National Park, Seaham.</li> <li>• Grey Ironbark - Spotted Gum - Grey Box open forest on hills of the Hunter Valley, Sydney Basin.</li> <li>• Spotted Gum - Grey Ironbark open forest on the foothills of the Central Coast, Sydney Basin.</li> <li>• Grey Box - Narrow-leaved Ironbark shrubby woodland on hills of the Hunter Valley, North Coast and Sydney Basin.</li> <li>• Coastal Foothills Spotted Gum – Ironbark Forest.</li> </ul>
<p><i>Persicaria elatior</i> Tall Knotweed</p>	<p>V-EPBC V-TSC ROTAP-3V</p>	<p>It grows in damp sites, especially beside streams and lakes and occasionally in swamp forest. Possible <i>Persicaria</i> recorded at <b>FL20</b> by AECOM 2009. The pipeline has been moved to the west approximately 2 km west.</p> <p><b>Flowers required (summer autumn).</b></p>	<ul style="list-style-type: none"> <li>• Swamp Oak forest of the central Hunter Valley, Sydney Basin.</li> <li>• <i>Phragmites australis</i> and <i>Typha orientalis</i> coastal freshwater wetlands of the Sydney Basin.</li> <li>• Water bodies, rivers, lakes, streams (not wetlands).</li> </ul>

Scientific Name / Common Name	Conservation Rating	Habitat Requirements / Survey Timing	Potential Habitat Along Pipeline
<i>Pomaderris queenslandica</i> Scant Pomaderris	E-TSC	It grows in moist eucalypt forest or sheltered woodlands with a shrubby understorey, and occasionally along creeks. Scant Pomaderris is widely scattered but not common in north-east NSW but is known from several locations on the NSW north coast.  <b>All year, flowers desirable for confirmation (spring-summer).</b>	<ul style="list-style-type: none"> <li>Narrow-leaved Ironbark shrubby open forest on hills of the central Hunter Valley, Sydney Basin.</li> </ul>
<i>Rhizanthella slateri</i> Eastern Australian Underground Orchid	V-TSC ROTAP-3KC-	Habitat requirements are not well understood but it is known to grow in sclerophyll forest in shallow to deep loams with a reasonably deep layer of organic litter although little else is known about the habitat of this species.  Highly cryptic as grows almost entirely below soil- rarely identifiable.  <b>Flowers September to November.</b>	<ul style="list-style-type: none"> <li>Spotted Gum - Grey Ironbark open forest on the foothills of the Central Coast, Sydney Basin.</li> </ul>
<i>Tetratheca juncea</i> Black-eyed Susan	V-EPBC V-TSC ROTAP-3VCa	It grows in sandy, occasionally swampy heath and in dry sclerophyll forest; mostly in coastal districts. <i>Tetratheca juncea</i> is confined to the northern portion of the Sydney Basin bioregion and the southern portion of the North Coast bioregion in the local government areas of Wyong, Lake Macquarie, Newcastle, Port Stephens, Great Lakes and Cessnock.  <b>Cryptic, only detectable when in flower generally July to December but may be irregular due to prevailing climatic conditions.</b>	<ul style="list-style-type: none"> <li>Likely restricted to southern section of the proposed pipeline.</li> <li>Spotted Gum - Grey Ironbark open forest on the foothills of the Central Coast, Sydney Basin</li> </ul>

**Table 2 Survey method and timing of surveys**

Scientific Name / Common Name	Survey Methods	Timing
<i>Asperula asthenes</i> Trailing Woodruff	Random meander surveys along moist gullies of tall forest, Swamp Oak forest and Forest Red Gum forest.	November
<i>Galium australe</i> Tangled Bedstraw	Random meander surveys along moist gullies of tall forest, Swamp Oak forest and Forest Red Gum forest.	November
<i>Callistemon linearifolius</i> Netted Bottle Brush	Random meanders in Spotted Gum – Grey Ironbark open forest.	November
<i>Cryptostylis hunteriana</i> Leafless Tongue Orchid	Random meanders in Forest Red Gum open grassy woodland and Grey Ironbark – Spotted Gum open grassy woodlands.	November
<i>Cynanchum elegans</i> White-flowered Wax Plant	Random meanders in moist gullies or where Spotted Gum – Grey Ironbark communities border wetter areas.	November
<i>Grevillea parviflora</i> subsp. <i>parviflora</i> Small-flower Grevillea	Random meanders in areas of sandy clay soils in woodland habitat, especially along cleared powerline easements. AECOM 2009 recorded site will be revisited to collect specimen for species confirmation (i.e. <i>G. parviflora</i> or <i>G. humilis</i> as these two species are very similar. Specimen will be sent to Hunter Region Botanic Gardens – Raymond Terrace).	November
<i>Persicaria elatior</i> Tall Knotweed	Random meanders, especially west of FL20 @ KP 73 (Rev C) (AECOM 2009). Pipeline has been moved west. Other 'wet' areas would also be targeted.	November

Scientific Name / Common Name	Survey Methods	Timing
<i>Pomaderris queenslandica</i> Scant Pomaderris	Random meanders in wetter eucalypt forest and sheltered woodlands especially those with a shrubby understorey.	November
<i>Rhizanthella slateri</i> Eastern Australian Underground Orchid	This species will be surveyed by raking litter from the base of Spotted Gums along a 100 m transect within Spotted Gum woodland.	November
<i>Tetradthea juncea</i> Black-eyed Susan	Random meander surveys in Spotted Gum - Grey Ironbark open forest in the southern sections of the route at a range of slopes and elevations.	November
<p><b>Note:</b> Location of survey sites are provided on maps 1 – 12.</p> <p><b>Source</b> Cropper 1993, Murray <i>et al.</i> 2002, DECC 2005, DEC 2004, NPWS 2000, DECCW 2010.</p>		

## Additional Notes

- Random meander surveys would be undertaken in line with DECC (2004) and BioBanking (Seidel & Briggs 2008) methodology. These would be stratified to available habitat (i.e. 30 minutes < 2 ha; 60 minutes 2 – 50 ha);
- Random meander positions would be marked on map;
- Weather conditions would be noted;
- GPS locations taken;
- Samples collected that were not easily identifiable in the field would be sent to the Janet Cosh Herbarium, University of Wollongong for confirmation; and
- *Grevillea parviflora* specimens would be sent to Hunter Region Botanic Gardens for confirmation.

## 2.0 SEAHAM PROPERTY - OFFSETS

An Ecological Values Study (Alison Hunt & Associates Pty Ltd 2010) undertaken across a 160 ha site at 750 East Seaham Road, Seaham (see attached as Figure 2 showing the site location and LHHCREMS mapping), identified sections of the property as having potential to provide valuable biodiversity offsets should these be required to offset impacts associated with the GFDA and pipeline. After provision of this report to DECCW and subsequent discussions with DECCW, it was confirmed that this site may have the potential to provide offsets. Consequently, it is proposed to undertake surveys across the Seaham property in line with the requirements of the Biobanking methodology. This methodology would allow the biodiversity values of the site to be determined and quantitatively compared to the potential loss of biodiversity values as a consequence of construction and operation of the GFDA and pipeline.

The Ecological Values Report (Alison Hunt & Associates Pty Ltd 2010) describes nine vegetation associations and potential habitat for four threatened flora species previously recorded within 10 km of the property and these are Slaty Red Gum, Small-flower Grevillea, Tall Knotweed and Black-eyed Susan. The additional species targeted along the pipeline route would also be targeted across this property and these include; Trailing Woodruff, Tangled Bedstraw, Nettle Bottle Brush, Leafless Tongue Orchid, White-flowered Wax Plant, Scant Pomaderris and Eastern Australian Underground Orchid. Survey methodology for these species would be as outlined in Tables 1 and 2 and these surveys would be timed to coincide with the November pipeline surveys. Vegetation communities would also be mapped and values assessed in line with the Biobanking methodology.

It was also noted that thirty three fauna species have been recorded within a 10 km radius and there are records for Koala, Little Bentwing-bat, Eastern Bentwing-bat, Powerful Owl, Spotted-tailed Quoll, Grey-crowned Babbler and Glossy Black-cockatoo on or near to the property. There is potential habitat available for another 16 species, and these include Bush Stone-Curlew, Eastern Pygmy-possum, Brown Treecreeper, Eastern False Pipistrelle, Golden-tipped Bat, Swift Parrot, Eastern Freetail-bat, Southern Myotis, Barking Owl, Yellow-bellied Glider, Squirrel Glider, Brush-tailed Phascogale, Grey-headed Flying-fox, Speckled Warbler, Greater Broad-nosed Bat and Regent Honeyeater. Additional species may be identified using the Biobanking assessment methodology and if appropriate these would be included in the assessment. Assessments of these species would be in line with DEC (2004) *Threatened Species Survey and Assessment: Guidelines for developments and activities (working draft)*. These surveys are proposed to be undertaken in November – December 2010.



### 3.0 REFERENCES

AECOM 2009 **Gloucester Coal Seam Gas Project. Ecological Assessment. Gloucester to Hexham.** Report prepared for Lucas Energy, Gloucester NSW.

Alison Hunt and Associates Pty Ltd 2010 **Seaham Property. Potential Land Acquisition. Ecological Values Report.** A report prepared for AGL Gloucester L E Pty Ltd.

Alison Hunt and Associates Pty Ltd 2009 **Gloucester Coal Seam Gas Project. Addendum Ecological Assessment. Gloucester to Hexham Amended Sections.** Prepared for AECOM, Pymble.

Cropper S 1993 **Management of Endangered Plants.** CSIRO, Australia.

DEC 2004 **Threatened Species Survey and Assessment: Guidelines for developments and activities (working draft),** New South Wales Department of Environment and Conservation, Hurstville, NSW.

NPWS 1999 **Forest ecosystem Classification and Mapping of the Upper and Lower North East Comprehensive Regional Assessment (CRA) regions.** CRA Unit, Northern Zone National Parks and Wildlife Service.

NPWS 2000 **Vegetation Survey, Classification and Mapping - Lower Hunter and Central Coast Region.** Undertaken for the Lower Hunter and Central Coast Regional Environment Management Strategy by NSW National Parks and Wildlife Service, Hurstville, NSW.

DEC 2005 **Threatened Species Profiles.** NSW Department of Environment and Climate Change, Hurstville. <http://www.threatenedspecies.environment.nsw.gov.au/index.aspx>

Murray M, Bell, S & Hoyer G 2002 **Flora and fauna survey Guidelines: Lower Hunter Central Coast Region 2002.** Volumes 1 & 2. Lower Hunter & Central Coast Regional Environmental Management Strategy, NSW.

NPWS 2000 **Environmental Impact Guidelines: *Tetratheca juncea*.** NSW National Parks & Wildlife Service, Hurstville.

Seidel J & Briggs S 2008 **Biobanking Operation Manual.** NSW Department of Environment and Climate Change, Sydney