Southlands Remediation and Development Project

Environmental Assessment
Project Application (MP 06_0191)

Appendix O: Green and Golden Bell Frog Assessment

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Green and Golden Bell Frog Survey
And
Seven Part Test
Orica Southlands Site
Banksmeadow
2007

1.0 Green and Golden Bell Frog Survey

1.1 Introduction

The Southlands Site at Banksmeadow is a large, mostly disused block of industrial land. The site contains several ephemeral ponds as well as two major drainage channels, the Springvale Drain and the Springvale Bypass Drain (Figure 1). Much of the site is overgrown and contains vegetated mounds of soil, building and industrial waste.

Despite the highly disturbed nature of the site, various native animal species have been recorded there, most notably the Green and Golden Bell Frog *Litoria aurea*. The Green and Golden Bell Frog is listed as endangered under the NSW *Threatened Species Conservation Act* 1995 and listed as "vulnerable" under the Commonwealth's *Environmental Protection and Biodiversity Conservation Act* 1999.

In late 2006, Biosphere Environmental Consultants Pty Ltd were commissioned to undertake frog surveys across the entire the site, targeting in particular the Green and Golden Bell Frog.

We area aware that the site is to be developed, on a staged basis, for a new industrial/ warehouse park. An Application seeking Project Approval for Stages 1 and 2 of the Project is to be advanced to the Minister for Planning under Part 3A of the E P and A Act. Stage 3 will be lodged under separate cover. However this report deals with the

entire site and therefore deals with all stages of the project and makes recommendations for the site as a whole.

As part of this Application process the Director General has issued requirements for the preparation of an Environmental Assessment for the site. In respect of Green and Golden Bell Frogs the requirements note the following:

Ecological assessment – the Environmental Assessment must include an ecological impact assessment, in accordance with the DEC's Guidelines fro Threatened Species Assessment. The Environmental Assessment must include specific consideration of impacts on the Green and Golden Bell Frog (Litoria aurea) and consistency with the Recovery Plan for the species.

This requirement has therefore been addressed in this Report.

1.2 Methods

The site was initially visited on the 23rd of January 2007. The site was traversed on foot and areas of open water were netted using a hand-held net. Tadpoles were identified and released.

Later that night, the site was revisited and a search of the ponds and channels was carried out using spotlights. Playback recordings of the mating call of the Green and Golden Bell Frog were played at each pond and at either end of the Springvale Drain and Bypass Drain. Calls were played for 1 minute and this was followed by a listening period of 2 minutes, the calls were replayed if there was no response to the first set of calls.

January proved to be quite dry and the next opportunity to survey the site did not occur until the 1st of February 2007. Light rain fell the previous evening and the day was overcast and humid. The ponds and channels were resurveyed and a general search also took place around the grassed parts of the site.

The third survey took place on the 26th of February 2007 during rain and after heavy showers. Call playbacks around the ponds and channels and habitat searches were again employed.

1.3 Results

Weather Condition

Tuesday the 23rd of January was sunny for most of the day. Air temperatures reached 29° during the day. The sky clouded over in the afternoon and light drizzle fell during the evening. A brief shower occurred on the 26th of January but the intervening weather was generally hot and dry. The next rain shower occurred on the 1st of February and the day was overcast and warm, air temperatures ranging from 17° to 23°.

Thunderstorms produced light rain on the 24th of February but the night of the 25th had heavy showers with 20 mm of rain falling overnight. The next day was overcast again with heavy showers overnight. The frog survey took place while rain was falling. The conditions for frog surveying on this occasion could then be described as "optimal".

Frogs Detected

Only two frog species were detected in the surveys; namely Striped Marsh frog *Limnodynastes peronii* and the Common Eastern froglet *Crinia signifera.* Neither frog species is listed as threatened. Both frogs were found in the Springvale Drain and nowhere else. The pond areas were dry during the first survey, contained shallow pools during the second survey and contained larger pools of water during the third survey. The ponds had not filled despite the showers. It is understood that the water level in these ponds varies in response to rain, surface water flows and changes in groundwater level and that groundwater extraction for Orica's remediation works will impact on the groundwater level in the Southlands area over time.
The only tadpoles found were those of the Striped Marsh frog and these were found in the Springvale Drain.

1.4 Discussion

Green and Golden Bell frogs

No Green and Golden Bell frogs were detected during the survey. The methods employed during the survey followed the guidelines set down by the NSW Department of Environment and Conservation (DEC 2005).

The Southlands site was very dry after the end of spring and all of the ponds were hard and cracked. Rain did not arrive until summer and even then it took some time before water again began to collect in the ponds. The hot and dry conditions of spring would have been very unfavourable for Bell Frogs and any that may have been in the local area would have left the Southlands site in search of moister shelter and foraging sites. However, as these frogs are remarkably mobile, it is possible that following sustained rainfall, the frogs could find their way back onto the site.

Green and Golden Bell Frogs were first found in the Southlands Site in 1997 (Biosphere 1997). At that time all of the ponds were relatively full of water and there were wet hollows and depressions across the site. Bell Frogs have not been seen there since and the site has was quite dry throughout the worst drought years of 2002 to 2004. It is unknown if Bell frogs were able to survive the drought years or if these frogs are still present in the Botany area.

It should be noted that groundwater levels at the site are lower now that the Groundwater Containment lines are working on and to the north-east of the site. Water levels in the ponds have therefore dropped as they have in Springvale Drain, so that it now may be rare for surface water to collect in the ponds. In addition, the water level in the

Springvale Drain and water quality of the Drain is anticipated to change as a result of the long-term operation of the Botany Groundwater Cleanup Project.

Frog Diversity

The two frog species detected are commonly found in disturbed landscapes. Few other frog species, with the exception of the Green and Golden Bell Frog, are capable of surviving in these habitats.

1.5 Conclusion

Only two frog species are present on the Southlands Site at present; neither species being listed as threatened or endangered. Green and Golden Bell Frogs were not present despite the favourable wet weather conditions.

2.0 Seven Part Test

2.1 Green and Golden Bell Frogs on the Southland Site

Green and Golden Bell Frogs were found in the north-eastern corner of the Southlands Site in 1997. This is the only record of Bell frogs on the site although in 1992 a Bell Frog was found in the Orica Site at Matraville (Biosphere 1997). With so few records of the species being present it is not possible to carry out a detailed assessment of the habitat use by these frogs. However, based on the known biology of Green and Golden Bell Frogs (Pyke and White 2001) it is possible to extrapolate the likely or possible uses of the site by the frogs.

The low number of records of Green and Golden Bell Frogs implies that the site is not permanently colonized and may only be visited by the frogs under particular weather conditions (i.e. after sustained wet conditions). On the few occasions when the frogs venture onto the Southlands area Green and Golden Bell frogs are likely to be dispersing in search of new foraging and breeding sites. The Southlands site contains large areas of potential foraging habitat, particularly in the Springvale section where overgrown grass banks are widespread. The ponds on the site do not appear to be suitable breeding sites for Green and Golden Bell frogs despite being ephemeral. The ponds, when containing water, are usually heavily inhabited by water birds and there are no emergent reeds or sedges to provide diurnal shelter for the frogs. If breeding does occur on the site, it could occur in some of the smaller trenches and ditches that fill with water after rain.

On this evaluation of the possible use of the site by Green and Golden Bell Frogs, the more important potential role for this species would be as an occasional breeding site. Green and Golden Bell Frogs disperse and establish satellite sub-populations elsewhere. The satellite populations, should the progeny survive, provide the genetic variation that is essential to maintain the long-term integrity of the larger population (as is observed in meta-populations). Therefore, in order to prevent the loss of occasional breeding

opportunities on site, replacement ephemeral breeding habitat should be created that is easily reached by Bell Frogs dispersing from off-site during wet weather.

2.2 Development Proposal

A development Concept Plan has been prepared for the Southlands Site (Macquarie Goodman Master Plan: Figure 2) for lodgment as an Application under Part 3A of the Environmental Planning and Assessment Act, 1979. By this proposal, the Southlands Site would be developed in stages to become a warehouse site for both large and small warehouse units. The site would be greatly modified to achieve this outcome; the existing ponds would be filled in and the site would be levelled and filled to new flood levels. The Springvale Drain would remain in place. An internal road would be constructed from McPherson Street and this road would run parallel with the Nant Street Road Reserve, before crossing the Springvale Drain to service units in the western portion of the site.

A number of detention basins and open space areas will be created in the overall site concept. These basins will largely operate as detention areas but they could be planted with low grasses and ground covers in areas making them suitable as habitat for the Green and Golden Bell Frogs.

2.3 Potential Impacts on Green and Golden Bell frogs arising from the development of the Site.

The leveling and filling of the site will result in a loss of the small ephemeral potential breeding sites on the Southlands area as well as removing potential foraging habitat for the frog. These potential impacts can be offset by the creation of replacement habitat areas in the open space areas of the site. The off-set habitat would need to consist of two small, perched ponds located close to the Springvale Drain (approx. 500m^2). Figure 2 shows the site concept plan with provision of these habitat areas.

The base of the ponds would be set just above the water table so that the ponds are dry while still permitting selected emergent vegetation to survive. The ponds are connected to the Springvale Drain by an overflow: after reasonably heavy local rainfall, the water level in the Springvale Drain would rise and eventually some of the water would be diverted into the breeding ponds. These ponds should be designed to hold water for about 2 months after being filled. The ponds cannot be connected to the Springvale Drain all of the time as the water quality during low flow periods is not suitable for the breeding pond. Also, exotic fish occur in the drain and these could become permanently established in the breeding ponds if they were permanently connected to the Springvale Drain.

The frog ponds should be between 700mm and 1 m deep (Figure 3) and have ledges at the northern and southern ends so that emergent plants (e.g. *Schoenoplectus validus*) can be established to provide diurnal shelter sites as well as protection for tadpoles should the frogs breed there. The base of the pond should be made of compacted clay, or if

necessary lined with a waterproof membrane. Sandstone rocks should be used on the northern and southern walls to help prevent slumping in the sides of the ponds (which should be at about 1:2) and to provide solid cover for frogs.

To off-set the loss of potential foraging habitat, the areas around the ponds could be planted with grasses and tussocks plants that would provide feeding areas and shelter sites for dispersing Bell Frogs. In addition, Basin 3 (refer to Figure 2) should be entirely grassed and the top margins of the basins planted with tussocks plants. This will greatly extend the foraging area near the frog ponds.

These types of habitats have been created elsewhere (e.g. Woonona, Arncliffe, Greenacre) with success and the habitat areas to be established in the Southlands Site are likely to be suitable for Bell Frogs (should they venture onto the site).

The frog ponds and foraging areas need to be accessible by dispersing Bell Frogs. As it is not known where the Bell Frogs may be dispersing from, it will have to be assumed that the frogs are utilizing the Springvale Drain easement as the movement corridor. The new frog ponds and foraging areas have been located at the northern end of the Springvale Drain so that frogs moving along the drain can more easily and safely reach the breeding ponds.

SECTION 5A ASSESSMENTS
(Seven Part Tests)

The following Seven Part test is based on the potential impacts arising from the development proposal outlined in the Macquarie Goodman Master Plan and the offset measures outlined above.

1. In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

The staged re-development of the site will remove potential breeding sites for the Green and Golden Bell Frogs. These sites are presumed to be the ditches and hollows that occur in the eastern portion of the site (Figure 1). Two breeding ponds are proposed to be constructed according to previously used design criteria (White 2007) to offset the loss of the potential breeding sites. The breeding ponds are likely to be more available to dispersing Bell Frogs than the original sites and they are also likely to hold water for longer (i.e. tadpoles have a better chance of surviving to metamorphosis).

The two breeding ponds are proposed as inclusions in Stage 1 of the development proposal and are included as part of the initial Project Application.

The provision of two breeding ponds will remove any potential impact or disruption to the life cycle of the Green and Golden Bell Frogs in the Botany area as a result of the proposed development.

2. In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

The Southlands Green and Golden Bell Frogs have not been declared an endangered population.

3. In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction ,or

b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction ,or

The Southlands Green and Golden Bell Frogs are not an Endangered Ecological Community.

4. In relation to the habitat of a threatened species, population or ecological community:

a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

The re-development proposal will ultimately remove all potential breeding and foraging habitat for Green and Golden Bell Frogs on the Southlands Site. The offset measures will more than adequately replace the potential breeding habitat that will be lost; the offset area of replacement foraging habitat has not been determined but it should be at least 500 m^2 to provide adequate potential foraging area.

The provision of offset breeding and foraging habitat areas will obviate any potential adverse impacts on dispersing Green and Golden Bell Frogs.

b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

It is presumed that the Springvale Drain acts as the corridor by which Bell Frogs enter and leave the Southlands Site. This drain will be retained and landscaping alongside the drain will improve the cover for frogs moving along the drain. The new frog habitat areas will also be linked to the Springvale Drain so that dispersing Bell Frogs are not at risk when moving from the drain to the new habitat areas.

c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

It is likely that the potential breeding sites that will be lost as a result of the development of the site are only used occasionally by Green and Golden Bell Frogs, if at all; it is not known if they are successful breeding sites. On the assumption that the sites do occasionally result in the production of live young Bell Frogs, they may play an important role in the maintenance of the Botany local population (as an outlier breeding site). For this reason, two breeding ponds with greater likelihood of breeding success will be created on site. In this way, the potential contribution to the Botany Green and Golden Bell Frog gene pool will not be lost.

5. Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

No critical habitat has been recognized on the Southlands Site.

6. Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan, and:

The offset actions are consistent with the aims of the Recovery Plan (DEC 2005) and they will ensure that, if Bell Frogs still occur near the Southlands Site, they will have a better chance to breed and produce viable young than is currently the case.

7. Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed development of the Southlands Site is not a recognized threatening process. Some landscaping works will take place on site that may involve the importation of soil, compost or mulch. These materials could be a potential source of chytrid infection (a recognized threatening process). If soils, composts or mulches are to be brought on site for the ponds and foraging areas they are to be sterilized according to industry standards before they will be accepted on site.

Gambusia (another threatening process) are already on site and there are no works proposed that will result in the further spread of these exotic fish.

References

Biosphere 1997. Vertebrate Fauna of Southlands. Prepared by Biosphere Environmental Consultants Pty Ltd for ICI.

DEC. 2005. Green and Golden Bell Frog Recovery Plan. Department of the Environment and Conservation.

Pyke, G.H. and A.W. White. 2001. A Review of the Biology of the Green and Golden Bell Frog *Litoria aurea. Australian Zoologist* 31(4): 563-598.

White, A.W. 2007. Frogs on the Hop. Submitted to *Australian Zoologist.*

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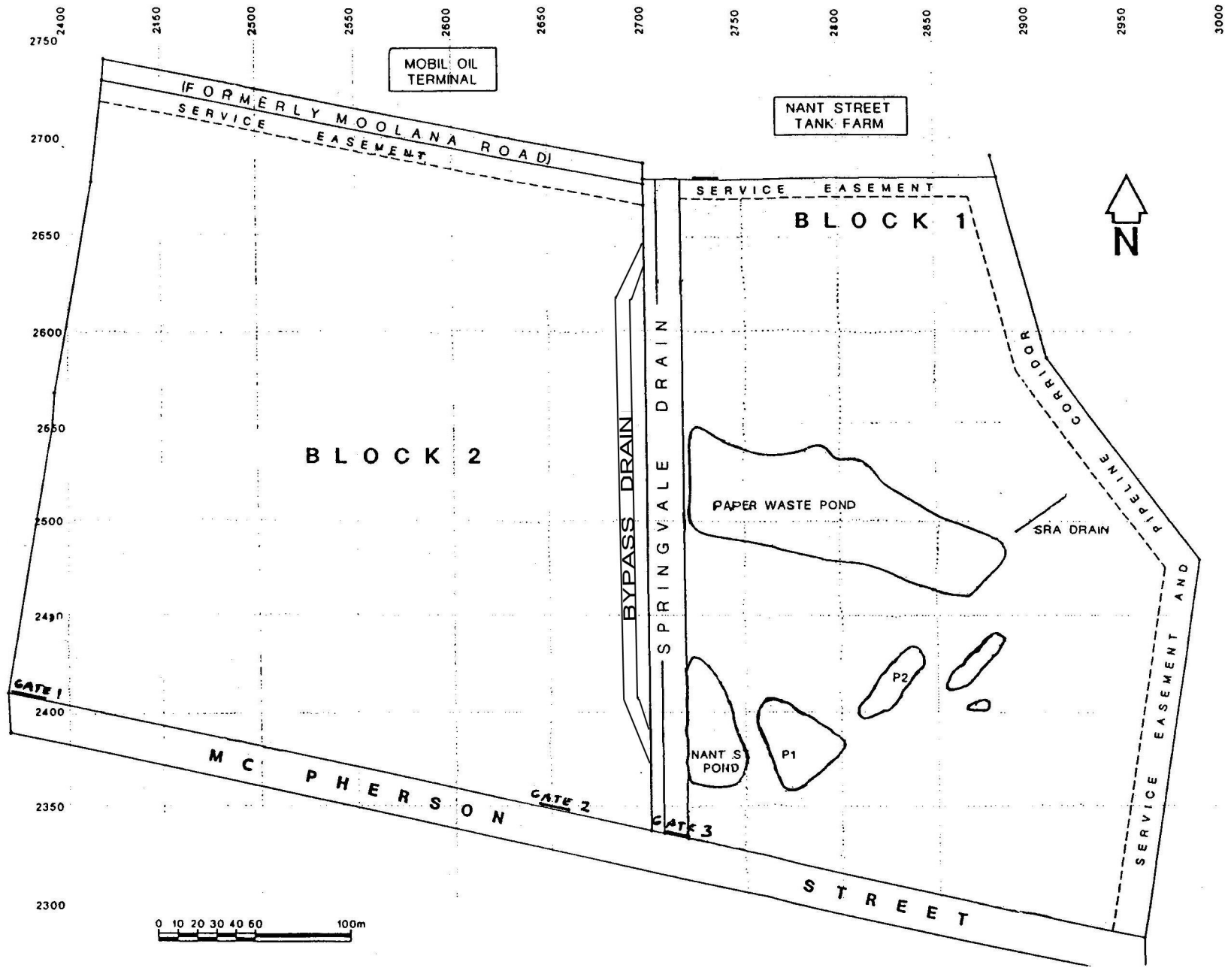
4 April 2007.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MOBIL OIL TERMINAL
NANT STREET TANK FARM
(FORMERLY MOOLANA ROAD)
SERVICE EASEMENT
SERVICE EASEMENT
BLOCK 1
BLOCK 2
N
BYPASS DRAIN
SPRINGVALE DRAIN
CORRIDOR
PIPELINE
PAPER WASTE POND
SRA DRAIN
P2
P1
NANT ST POND
SERVICE EASEMENT AND
GATE 1
GATE 2
GATE 3
MC PHERSON STREET
0 10 20 30 40 60 100m

LEGEND

DT Inground Detention Tank

Goodman

SOUTHLANDS AREA SCHEDULE

Lot 1 DP 254392	0.285 Ha
Lot 1 DP 528680	9.530 Ha
Lot 1 DP 85542	6.130 Ha
Lot 11 DP 109505	2.343 Ha
TOTAL SITE AREA	18.288 Ha
Springvale Drain	0.269 Ha
Nant Street	0.347 Ha

CONCEPT PLAN DEVELOPMENT AREA SCHEDULE

Total Site Area	18.288 Ha
less:	
Access Road	0.701 Ha
Detention Basins	1.049 Ha
TOTAL DEV. AREA	16.536 Ha
Total Warehouse	72,200 sqm
Total Office	6,750 sqm
Cafe/ Amenities	240 sqm
Total Floor Area	79,190 sqm
Total Awning	2,525 sqm
Possible Multi-deck Parking	4,655 sqm
FLOOR AREA	79,190 SQM
FOOTPRINT (Incl. awning, parking deck)	83,252 SQM
FSR	0.48:1
SITE COVER	50%
LANDSCAPE AREA	40,010 SQM (24%)
Carparking Provided -on grade	820
Possible Future Carparking (2 lev)	300
Total Carparking	1120

STAGE 1

DEV. SITE AREA	92,880 sqm
Total Warehouse	43,000 sqm
Total Office	4,000 sqm
Total Facilty	47,000 sqm
Carparking Provided -on grade	440
Possible Future Carparking (2 lev)	300
Total Carparking	740

STAGE 2

DEV. SITE AREA	40,790 sqm
Total Warehouse	14,850 sqm
Total Office	1,400 sqm
Cafe/ Amenities	240 sqm
Total Facilty	16,490 sqm
Carparking Provided -on grade	280

STAGE 3

DEV. SITE AREA	31,710 sqm
Total Warehouse	14,350 sqm
Total Office	1,400 sqm
Total Facilty	15,750 sqm
Carparking Provided -on grade	120

design+

Southlands Remediation & Development Project

McPherson Street, Botany

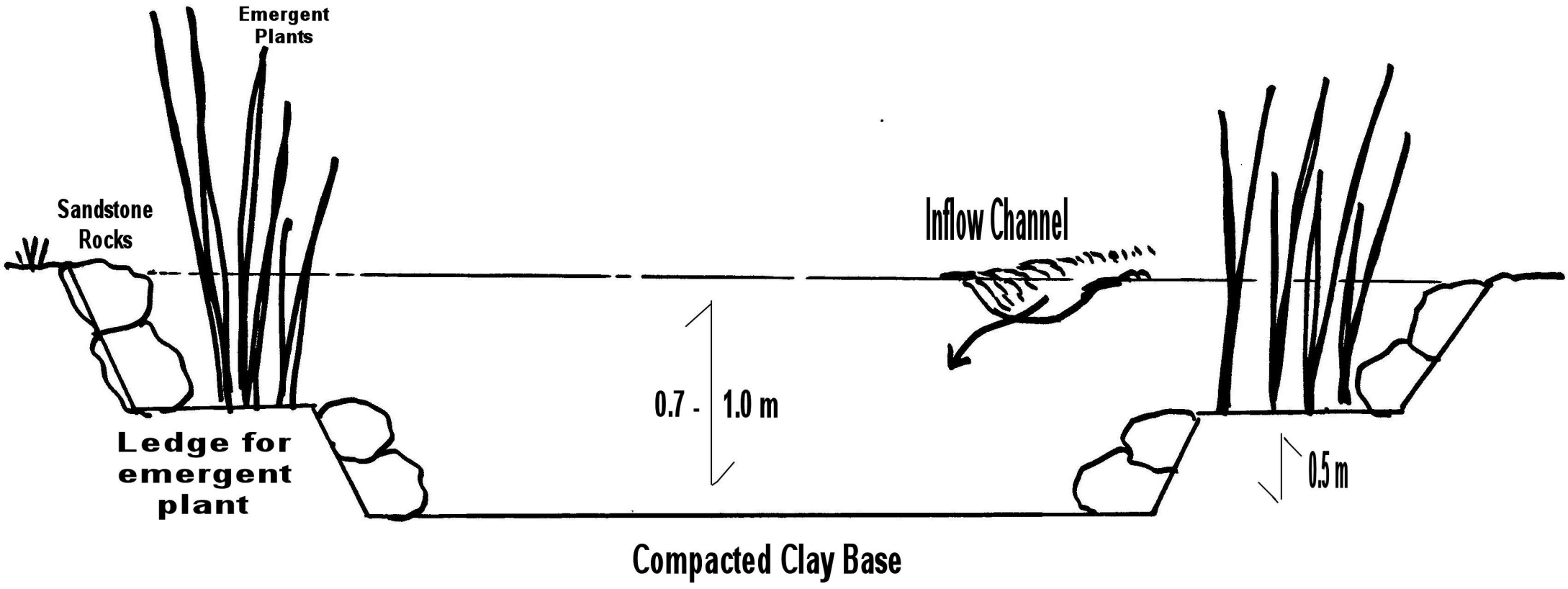
Part 3A Application - Concept Approval Plan

Concept Plan - Southlands

1:1000 @ A1
1:2000 @ A3

15 Aug 07 VK

SRD DA104 (D)


Emergent Plants
Sandstone Rocks
Inflow Channel
0.7 - 1.0 m
Ledge for emergent plant
0.5 m
Compacted Clay Base