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Landholder Compensation Scheme
Narrabri Shire CCC

11 December 2012

Overview - compensation

- Santos' compensates landholders at both the exploration and production stages of our work. The key benefits are:
- Landholders will now be compensated according to the value of the land Santos is accessing – rather than being paid a flat fee
- Landholders will be compensated for their time and paid an annual fee for service of $30,000 for as long as operations remain on their land
- Once the project reaches production landholders will be compensated with a share in the success of the project. The Landholder Incentive Fund will be established and will be shared out proportionally to landholders involved in this stage of our work. The greater the amount of your land Santos to utilising, the greater your share of the Fund.
- The amount of the fund will be calculated as 5% or the royalties paid on production on private land so the more successful the project, the more money is allocated to the Fund

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Overview – stages of work

- Santos' development of natural gas resources has two distinct stages; exploration and production
- Exploration involves the drilling of core holes and pilot wells
- Core holes:
  - assess the geology and coals of a specific area
  - short-term phase usually lasting 6-8 weeks
  - no gas or water removed
  - site completely rehabilitated
- Pilot or appraisal wells:
  - constructed to demonstrate gas and water flow rates
  - usually in operation for between 3-18 months
  - may then be converted to a production well
- The production stage occurs once exploration and appraisal are complete and additional regulatory approvals have been granted. A production well has an average life of 20-30 years

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Exploration compensation – core hole

Landholder A agrees to work with Santos and have one **core hole** drilled on their property. Their property is valued on the Lands Rate Notice at **$1000 per ha.** Santos pays **1.2** times the value on the notice. The total area utilised including existing roads, access tracks and core pad site is **2ha**.

Calculation:

- 2 hectares = amount of land utilised by Santos
- $1000 x 1.2 = $1200 per ha = land use fee per hectare paid by Santos
- $1200 per ha x 2 = **$2,400** = payment for amount of land utilised
- Fee for service **$30,000** = payment for landholder's time/site upkeep
- **Total paid for the core hole is $32,400**

It usually takes between 6-8 for work on a core hole to be completed. The site will then be fully rehabilitated and returned to its original use. As exploration activity is only for a short period of time, Landholder A will receive no further ongoing payments.

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Exploration compensation – pilot well

Landholder B agrees to work with Santos and have a **pilot** on their property. Their property is valued on the Lands Rate Notice at **$1000 per ha**. Santos pays **1.2** times the value on the notice in the first year and **0.6** times the value on the notice for subsequent years. The total area including existing roads, access tracks and the pilot well site is **4ha for the first year**. The pilot well is in operation for **18 months**.

Calculation – Year One:

- 4 hectares = amount of land utilised by Santos
- $1000 x 1.2 = $1200 per ha = land use fee per hectare paid by Santos
- $1200 per ha x 4 = **$4,800** = payment for amount of land utilised
- Fee for service **$30,000** = payment for landholder's time/site upkeep
- **Total paid for the pilot in the first year is $34,800**

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Exploration compensation – pilot well

Calculation – Year Two (and each additional year of operation):

- The footprint in the second year is reduced to 2 hectares = amount of land utilised by Santos
- $1000 x 0.6 = $600 per ha = land use fee per hectare paid by Santos
- $600 per ha x 2 = **$1,200** = payment for amount of land utilised
- Fee for service **$30,000** = payment for landholder's time/site upkeep
- **Total Paid for the pilot in the second year is $31,200**
- **Total amount received By Landholder B for 18 months is**

  Year One **$34,800** plus Year Two **$31,200 = $66,000**

In the event the pilot operated for more than two years, Landholder B would receive the Year Two amount of $31,300pa for each subsequent year.

Calculation for pilot operating for three years:

Yr One **$34,800 +** Yr Two **$31,200 +** Yr Three **$31,200 = $97,200**

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Compensation – production well

Landholder C agrees to work with Santos and have a production well on their property. The property is valued on the Lands Rate Notice at **$1000 per ha**. Santos pays 1.2 times the value on the notice. The total area including existing roads, access tracks and the pilot well site is **2ha.** Production wells can be in operation for 20-30 years.

Calculation – Year One:

- 2 hectares = amount of land utilised by Santos
- $1000 x 1.2 = $1200 per ha = land use fee per hectare paid by Santos
- $1200 per ha x 2 = **$2,400** = payment for amount of land utilised
- Fee for service **$30,000** = payment for landholder's time/site upkeep
- **Total paid for the production well in the first year is $32,400**

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Compensation – production well

Calculation: Year Two and each additional year of operation

- Fee for service **$30,000** paid annually for landholder's time/site upkeep
- Annual share of the Landholder Incentive Fund.
- This Fund will be an annual amount equal to 5% of Santos' royalty payments associated with private land within a production licence area. We currently estimate this will equal about $150 million over twenty years. Each landholder's share will be dependent on the amount of land Santos is utilising on each property. For example, a landholder who is allowing Santos to utilise 4ha of land will receive double the share of a landholder where Santos is using 2ha of land.
- We estimate the share of the fund paid annually to a landholder would be between **$20,000 - $40,000**
- This means from **Year Two** onwards the landholder would receive:
- **$30,000** fee for service + share of fund **$20,000 – $40,000 =**
- **$50,000 - $70,000 in total per annum**

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Leewood – Project Overview
Narrabri Shire CCC

11 December 2012

Background – Leewood

- Sustainable management of produced water from exploration and appraisal program
- Replaces Bibblewindi water storage and treatment facility (approved under previous Review of Environmental Factors (REF) submitted by ESG)
- Bibblewindi reverse osmosis plant decommissioned and removed from site
- Existing ponds at Bibblewindi will be decommissioned and rehabilitated

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Overview

- Leewood Phase 1 (Pt 5 REF)
  - 2 x 300ML ponds (produced water and brine)
  - Balance tank and pump set at Bibblewindi
  - Flow line along existing right of way to Leewood
  - Best practice design – fit for purpose
  - Submission – est. December 12
- Phase 2 – Leewood Water Treatment Plant (Pt 4 – EIS)
  - Water treatment plant (membrane)
  - Brine concentrator (pilot), Brine crystalliser (pilot)
  - Ancillary (supporting services and utilities)
  - Permeate options
    - Irrigation
    - Managed Aquifer Recharge (MAR)
    - Dust suppression
  - Submission – PEA 21 December

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Design requirements

- NSW Dams Safety Committee (DSC)
  - The NSW Dams Safety Committee is a statutory Corporation of the NSW Government
  - Function – ensure safe dams in NSW.
  - Provides guidelines on how to design dam
  - Provides surveillance and monitoring of State dams
  - Approves dam risk assessment and design
- Department of Environment and Resource Management (DERM) dam design guidelines
  - DERM also provides guidance on dam design requirement
  - Design considerations include liner containment requirements
  - Hazard and risk assessment processes
- Most conservative conditions applied

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DSC approval processes

- **Investigation** - The DSC seeks initial information on the proposal to determine the need for dam prescription and feedback on DSC requirements.
- **Concept Design** - The DSC seeks specific details of the dam, and provides comments.
- **Environmental Assessment** - The DSC ensures its requirements are addressed in the statutory environmental assessment documentation. We have included in the REF.
- **Detailed Design** - The DSC has a regulatory role to ensure its safety requirements are covered by reviewing the design before proceeding to construction (current stage).
- **Construction** - The DSC requires close oversight of construction by the designer (Golder Associates) to ensure it is constructed in accordance with the designer's intentions.
- **Commissioning** - The DSC requires a Construction Report (including certificate, and Work-as-Executed drawings), Operation and Maintenance Manual and a Dam Safety Emergency Plan is also required at this stage.
- **In-Service** - The DSC requires submission of Surveillance Reports for all prescribed dams on commissioning and then at five yearly intervals. Intermediate Surveillance Reports are also required for ash and tailings dams.
- **Decommissioning** - When decommissioned, the DSC will deprescribe the dam and then has no further requirements.

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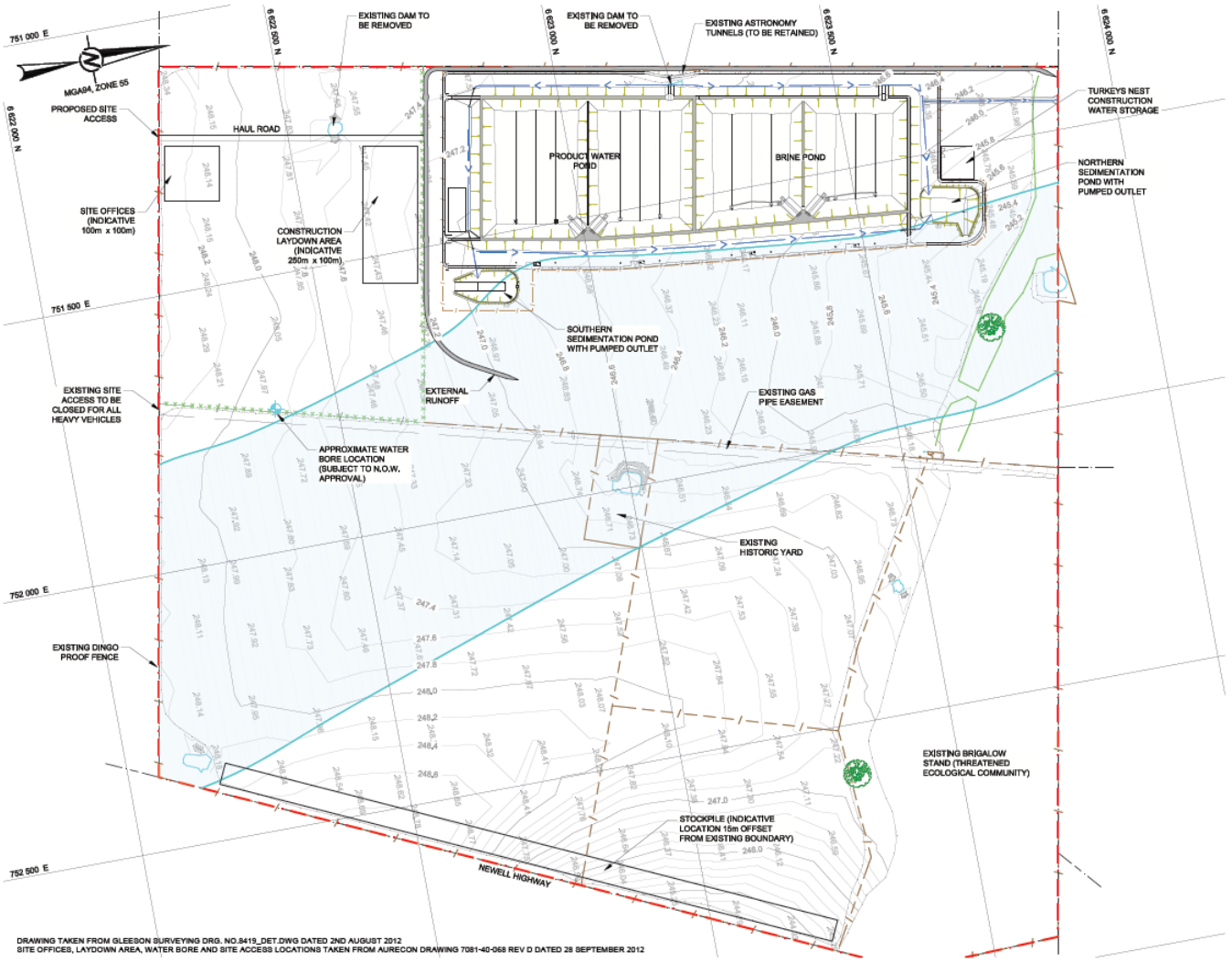
Design overview – layout



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Design Overview – Base, liner and embankments

- The ponds are designed to comprise geosynthetic lined fully engineered embankments in accordance with the requirements of the NSW Dams Safety Committee (DSC) for dams of Significance consequence category.
- The lining systems are designed in accordance with industry best practice such that potential liner leakage is collected by an underliner depressurisation system and returned to the pond by a seepage extraction system constructed within the pond embankments
- Pond embankments are to be constructed using selected fill that is assessed by a qualified and experienced Dams Engineer as suitable for dam embankment construction. Safety factors as recommended by the Australian National Committee on Large Dams and the DSC have been adopted in the embankment design. The dam construction is to be carried out under full time supervision of an experienced geotechnical and geosynthetics engineer
- Over 60 test pits have been made and a full geotechnical analysis undertaken of the site.

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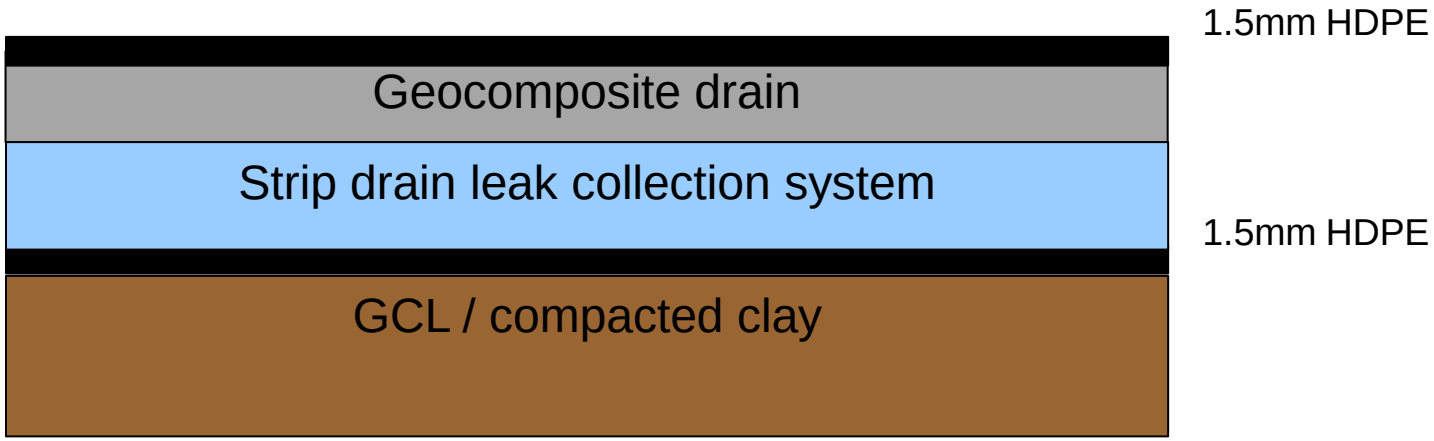
Design overview – lining system

Brine Pond Lining System	
A liner system consisting of a primary liner underlain by a leak collection system underlain by a secondary liner. The proposed lining system for the floor and the slopes are presented below:	
Floor	**Side**
Primary geomembrane (1.5mm HDPE)	Primary geomembrane
Geocomposite drain (7mm HDPE planar geonet)	Geocomposite drain along embankment teo only
Secondary geomembrane (1.5mm HDPE)	Laminated GCL
Geosynthetic clay liner (GCL) or compacted clay rich layer	Compacted clay rich layer and embankment



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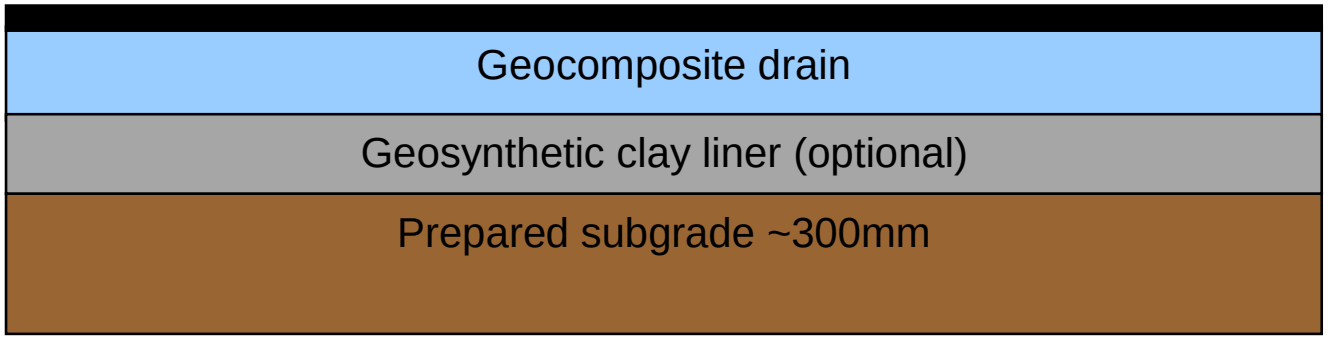
Design overview – lining system example of what is used in QLD

Produce CSG Water Pond Lining System	
A liner system consisting of a primary liner underlain by a leak collection system above a prepared clay rich subgrade free from obstructions and obstructsion. The proposed lining system for the floor and the slopes are presented below:	
Floor	**Side**
Primary geomembrane (1.5mm HDPE)	Primary geomembrane
Geocomposite drain (7mm HDPE planar geonet)	Geocomposite drain along embankment tow only
Compacted clay rich layer	Compacted clay rich layer and embankment



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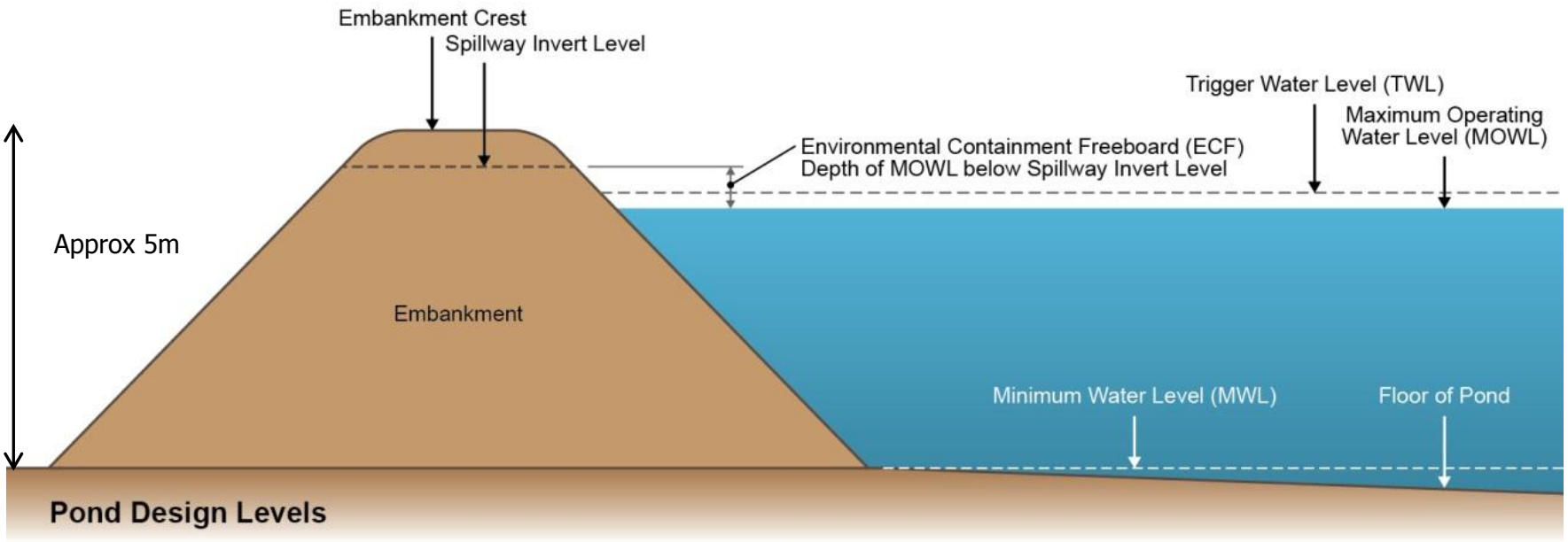
Design overview – storage levels



- **Maximum operating water level (MOWL)** – The maximum storage level allowed under normal operation.
- **Environmental Containment Freeboard (ECF)** – The ECF is the difference between the spillway and the MOWL.
- **Trigger Water Level (TWL)** – The TWL is an action trigger level point that is reached requires reporting.
- **Minimum Water Level (MWL)** – The minimum water level required in the pond to ensure there is enough ballast to hold the liner system down.

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Design overview – rainfall

Design rainfall depths for the Leewood site generated from local historical rainfall records are presented in Table 2 together with a design intensity duration frequency chart.

It is noted that the ECF's for the Leewood ponds are sufficient to provide storage in excess of the 48 hour 1:20 000 year ARI rainfall event (estimated to be 650.5 mm) or approximately three 48 hour 1:100 ARI events based upon the rainfall data generated. The maximum daily rainfall event interpolated from historical records for the Leewood ponds location for the past 100 years was 134.2 mm recorded on 10 December 2004.

Table 2: Design Rainfall Depth Values (mm)

Duration (hours)	Average Recurrence Interval (years)					
	100	500	1 000	5 000	10 000	20 000
0.5	52.5	73.0	84.2	110.4	121.7	134.2
1	69.8	97.6	112.8	149.9	166.6	185.2
6	126.0	178.2	206.9	277.5	309.6	345.3
12	157.2	224.4	261.5	350.3	389.2	432.4
24	197.8	280.3	325.7	350.3	389.2	432.4
48	242.4	343.0	398.3	529.7	587.0	650.5

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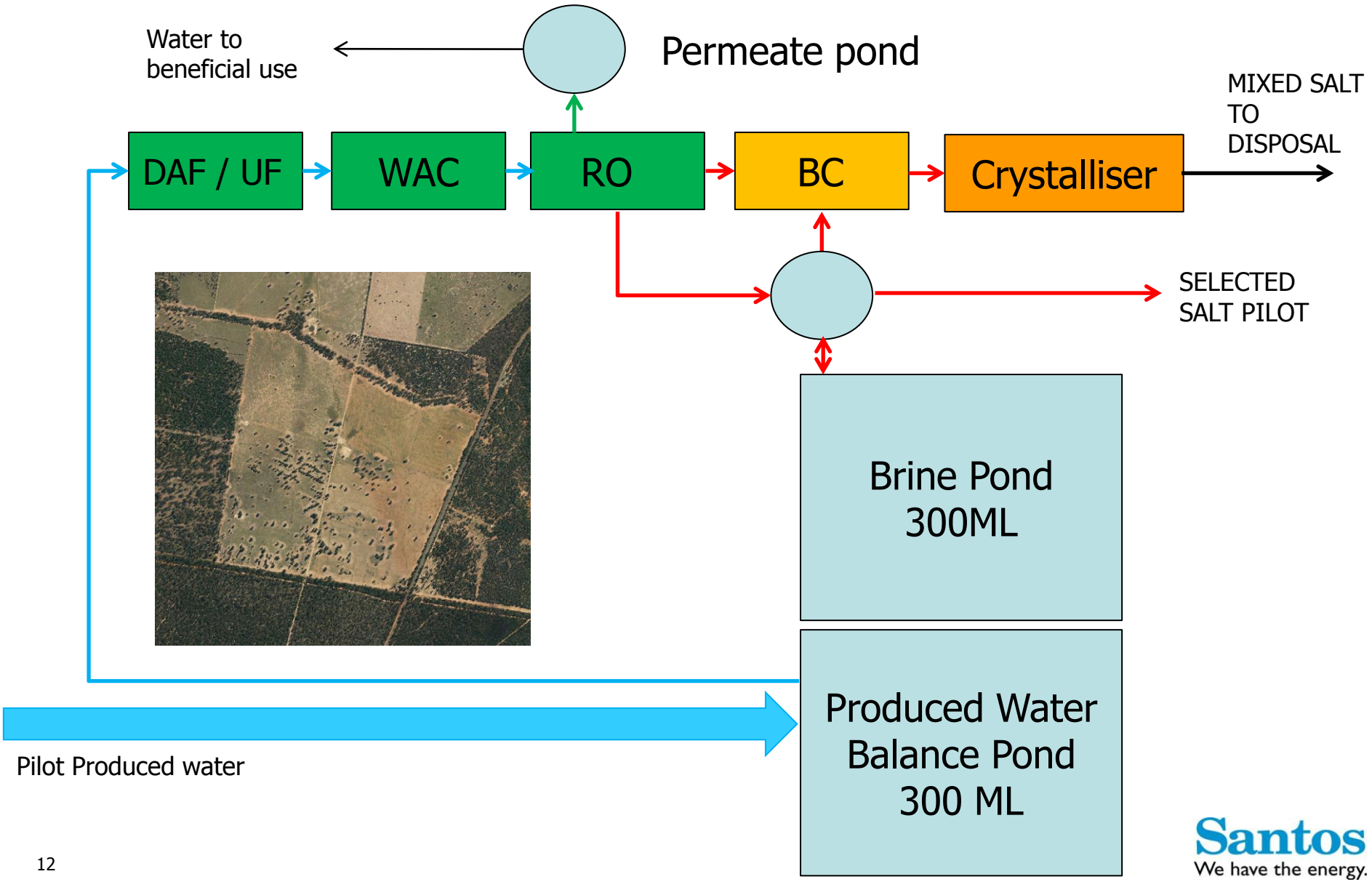
Leewood Phase 2



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We have the energy.

Beneficial water uses & brine management

- Three preferred beneficial water use options
  - Irrigation
  - Managed Aquifer Recharge (MAR)
  - Surface water
- Brine Management
  - Solid mixed salt production via thermal processes
  - Selected mix salt via further specific technology

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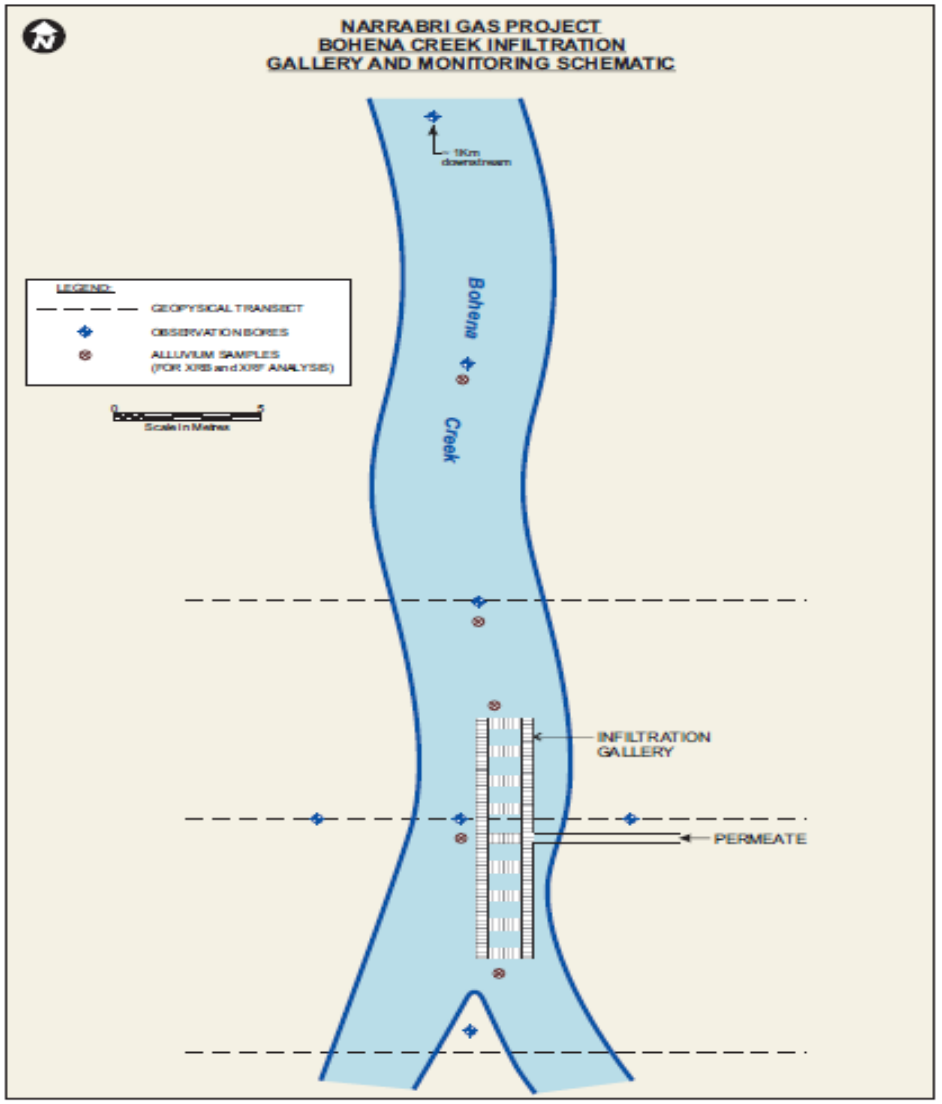
Example MAR scheme

Example only



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Sulphur Reducing Bacteria

Groundwater Bore Inventory (SRB – cells/100ml)				
No. of bores (32)	Min value = 1	Max value = >16,000	Average = 1746	
Bibblewindi Ponds Inventory (SRB – cells/100ml)				
	Bibblewindi Pond 1 = 1100	Bibblewindi Pond 2 = 23	Bibblewindi Pond 3 = 150	

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Questions

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