



Gloucester Gas Project Environmental Assessment

November 2009

VOLUME 4

VOLUME 4 – FIGURES

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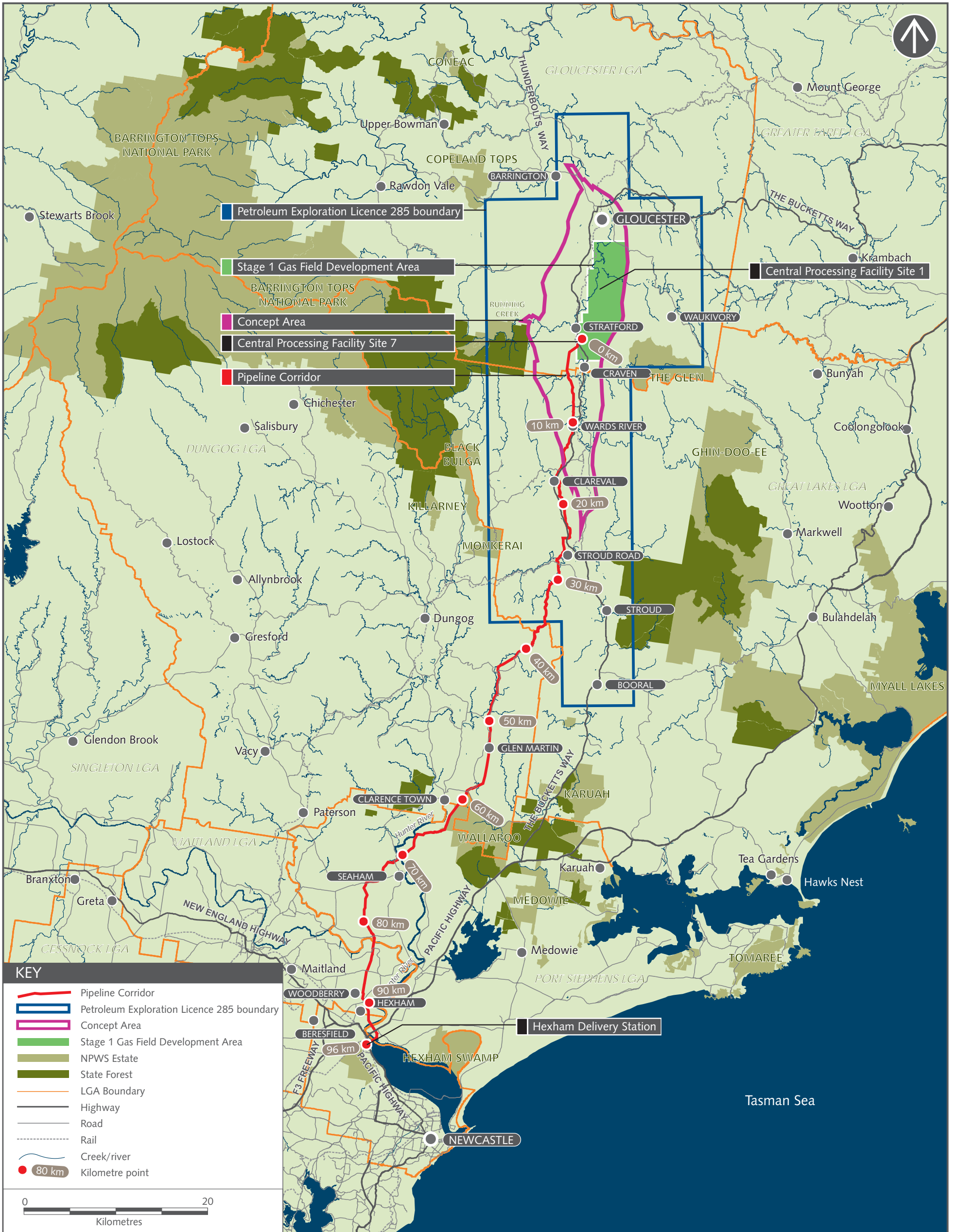


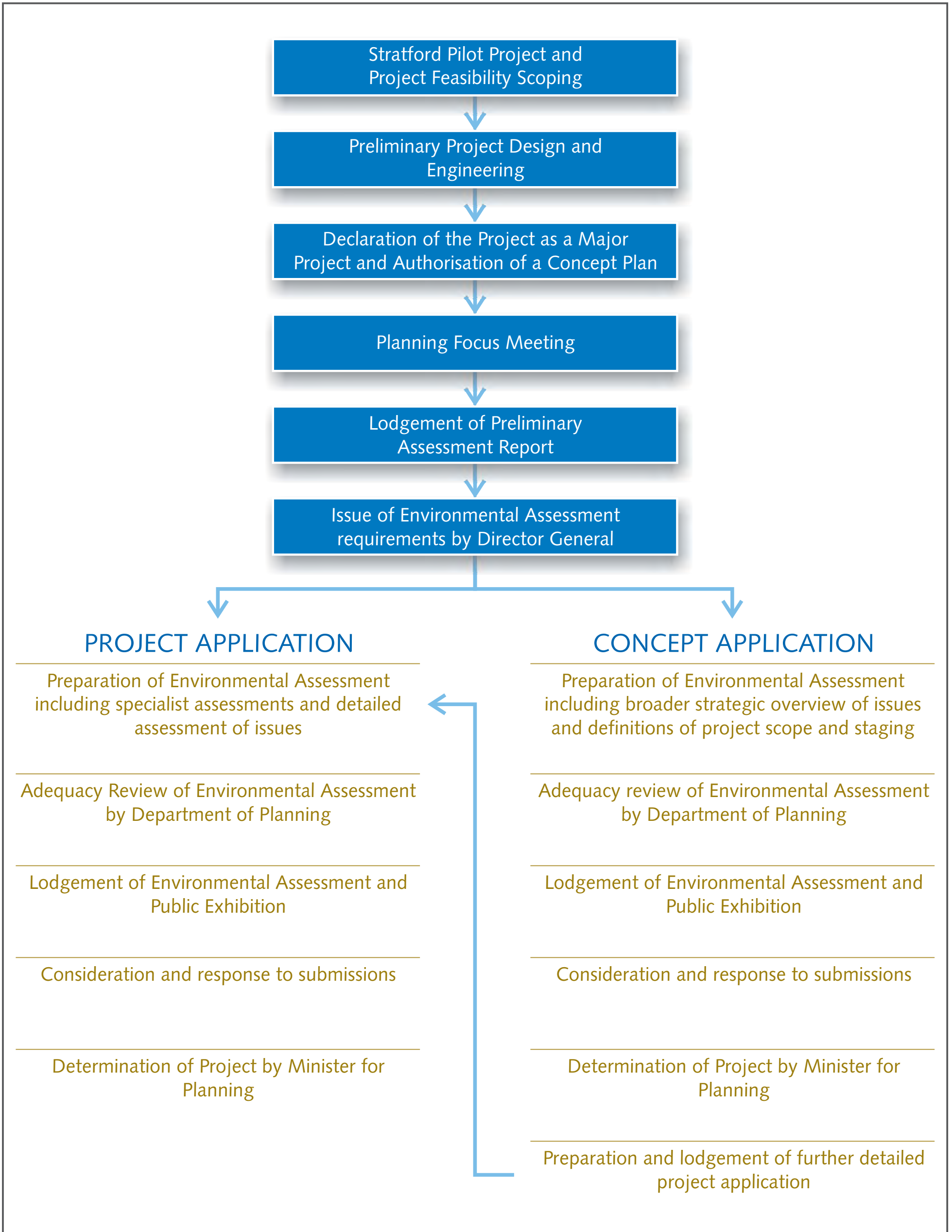
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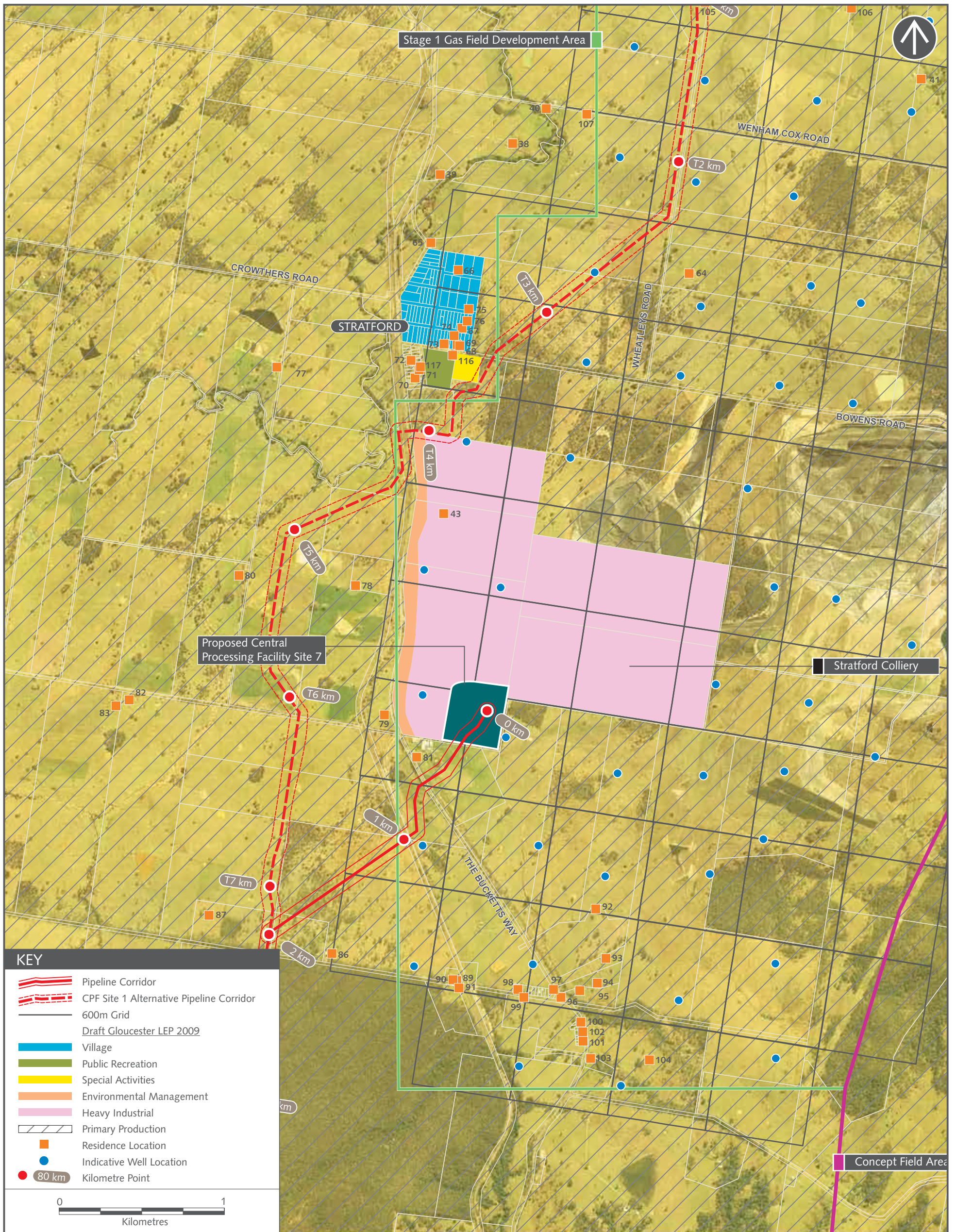


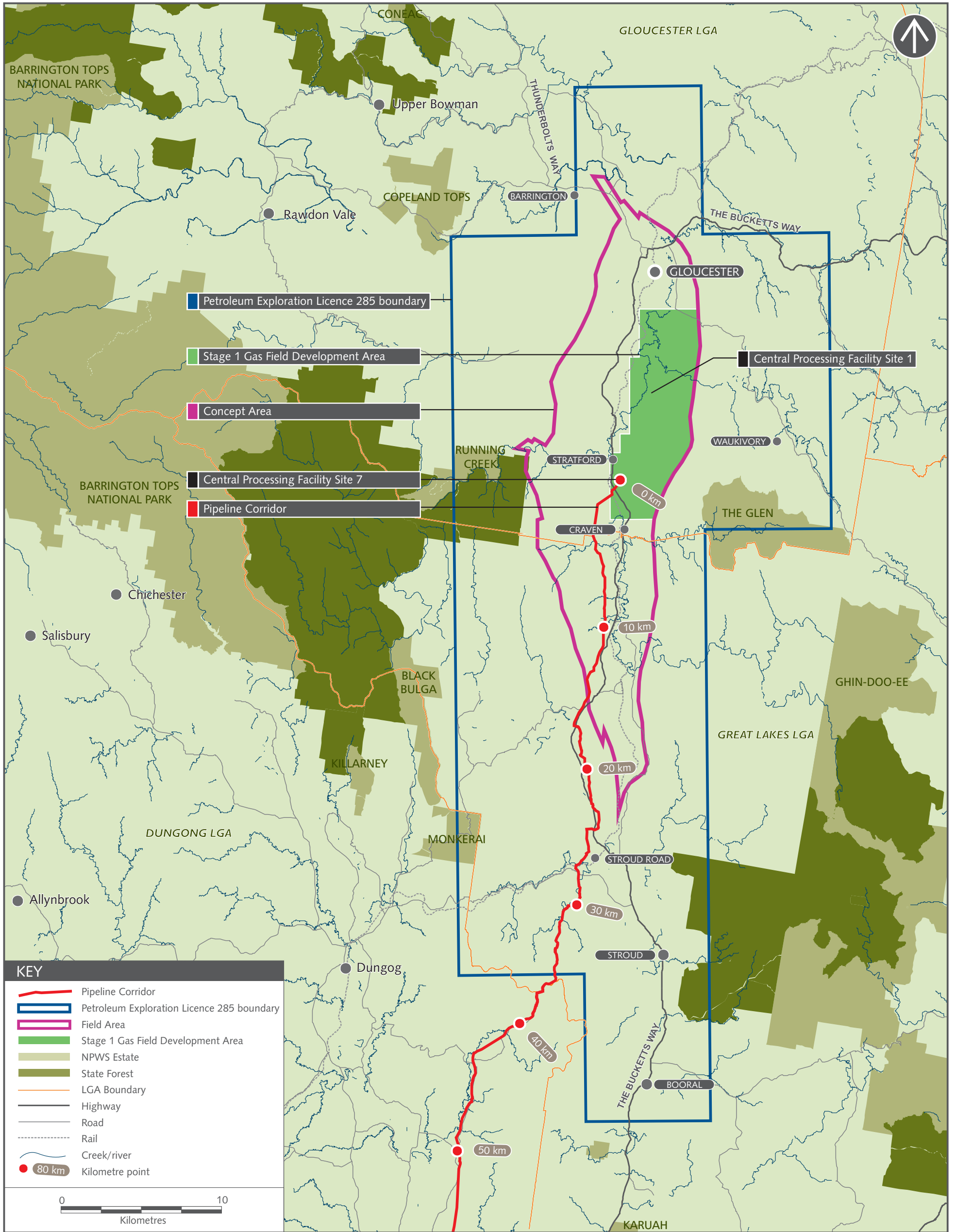
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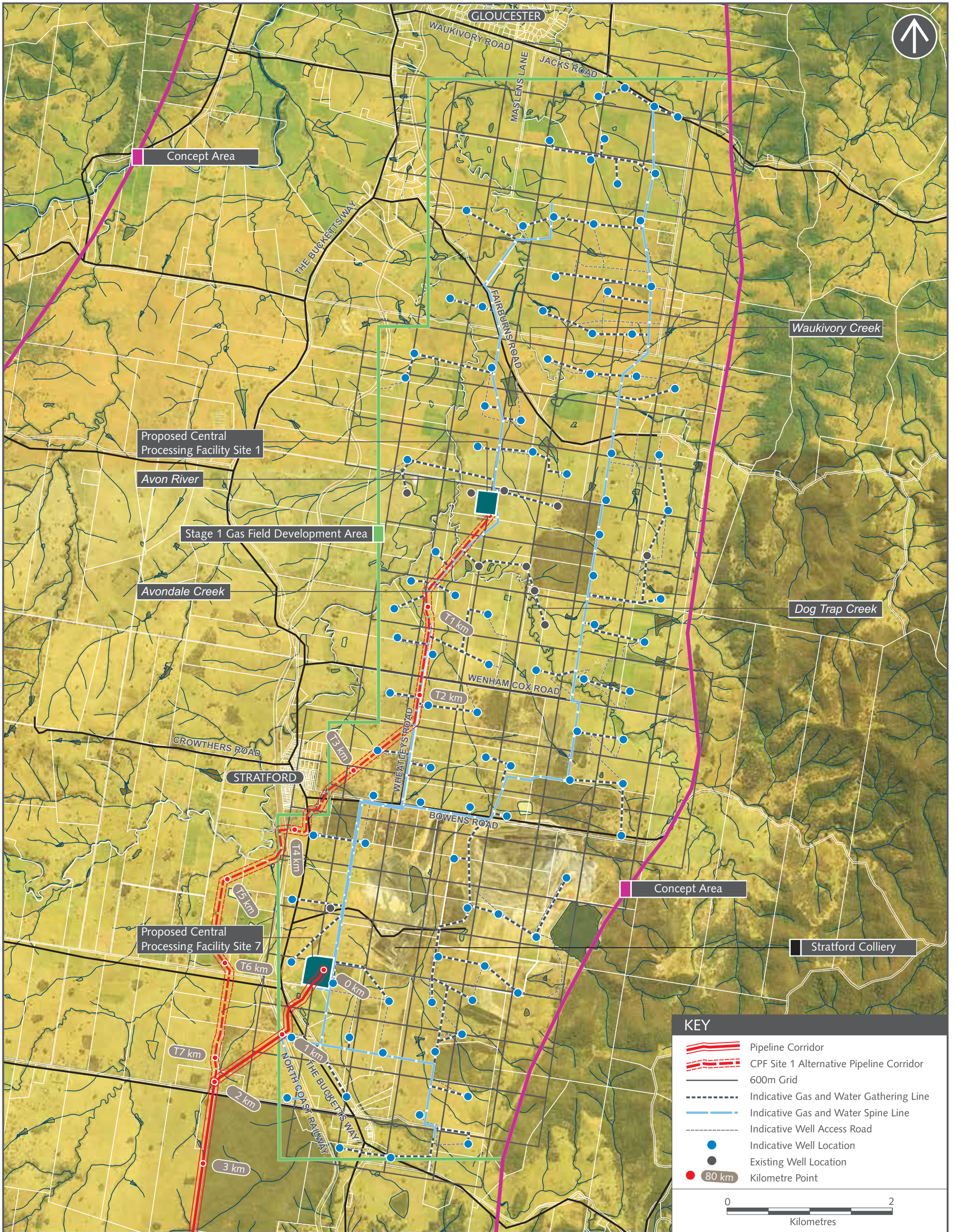
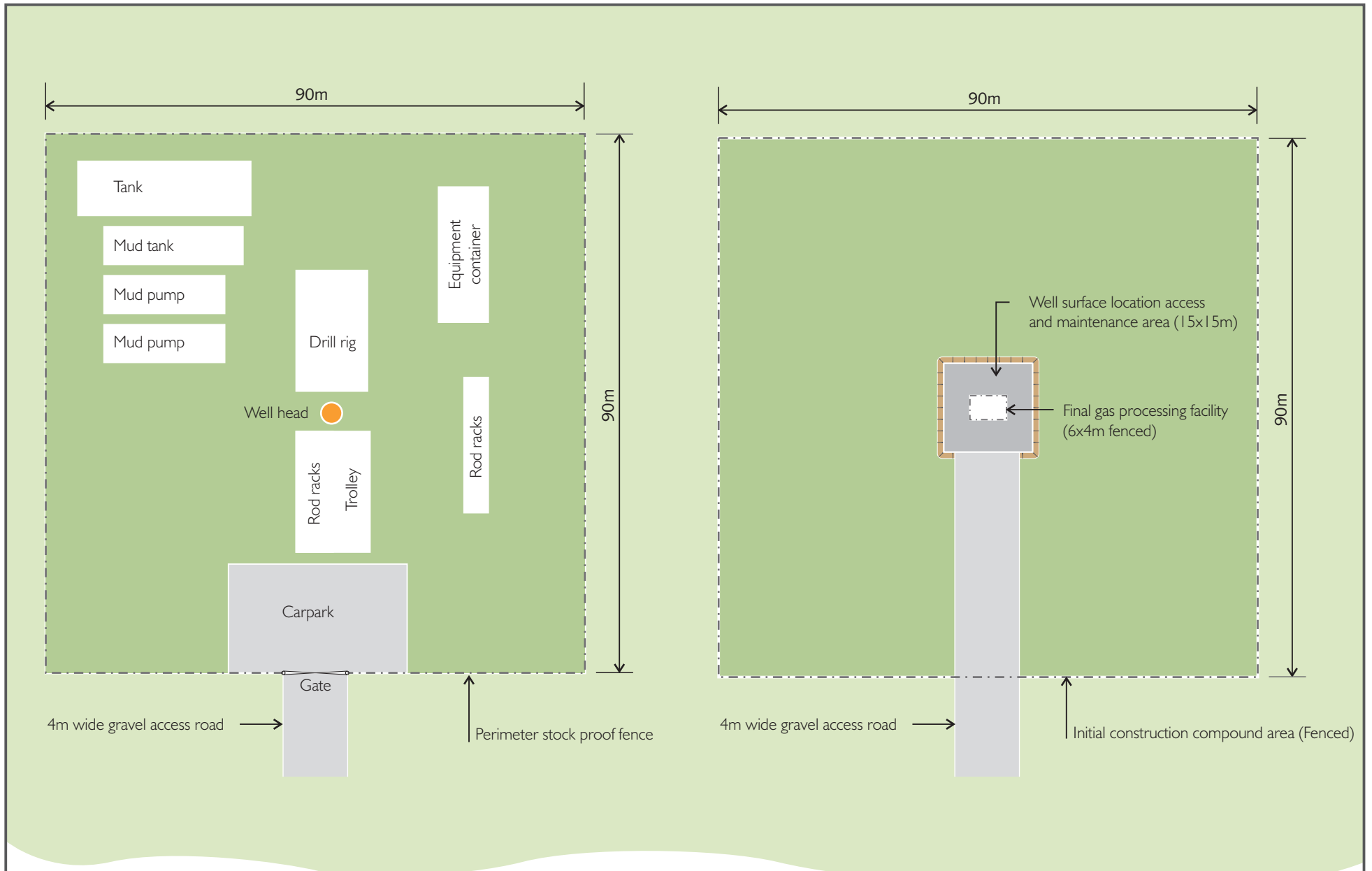
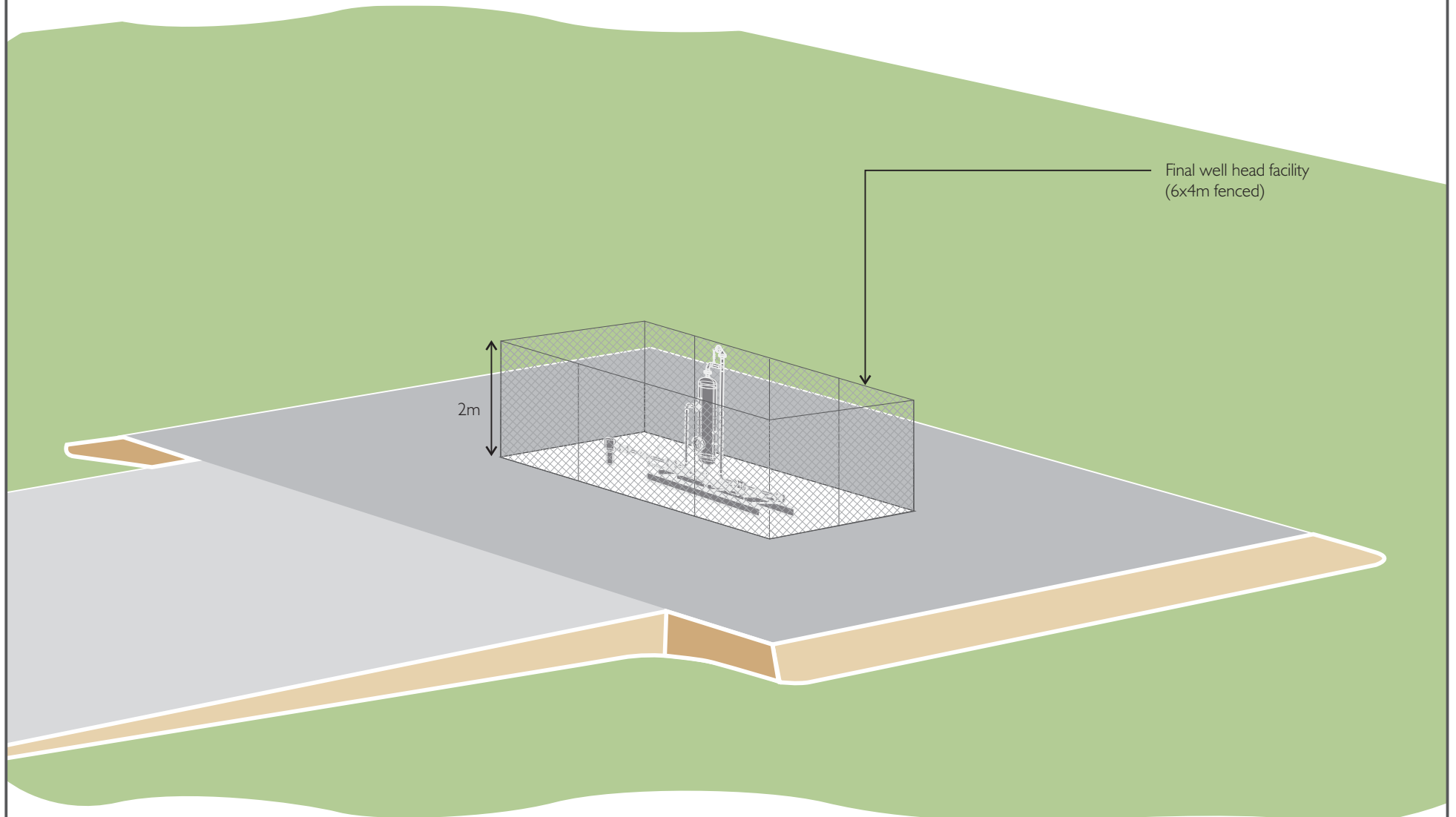


FIGURE 5.2



Conceptual Construction Site Layout

Conceptual Operational Site Layout



Conceptual Final Gas Well Head

Note: All dimensions are approximate

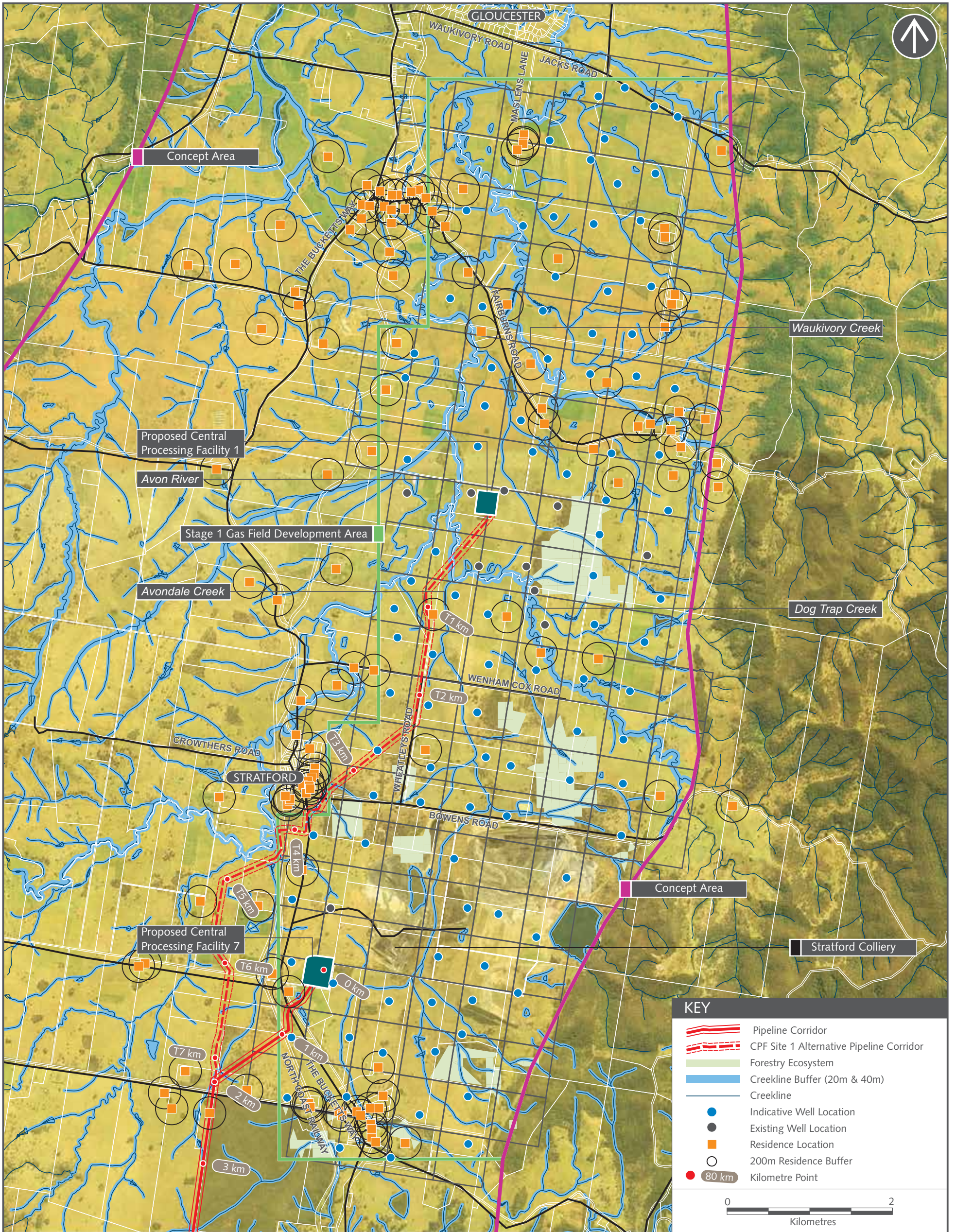


FIGURE 5.4

TOTAL CONSTRUCTION TIME FRAME APPROXIMATELY: 24hr Drilling - 6-8 Weeks
Daytime Drilling - 8-10 Weeks

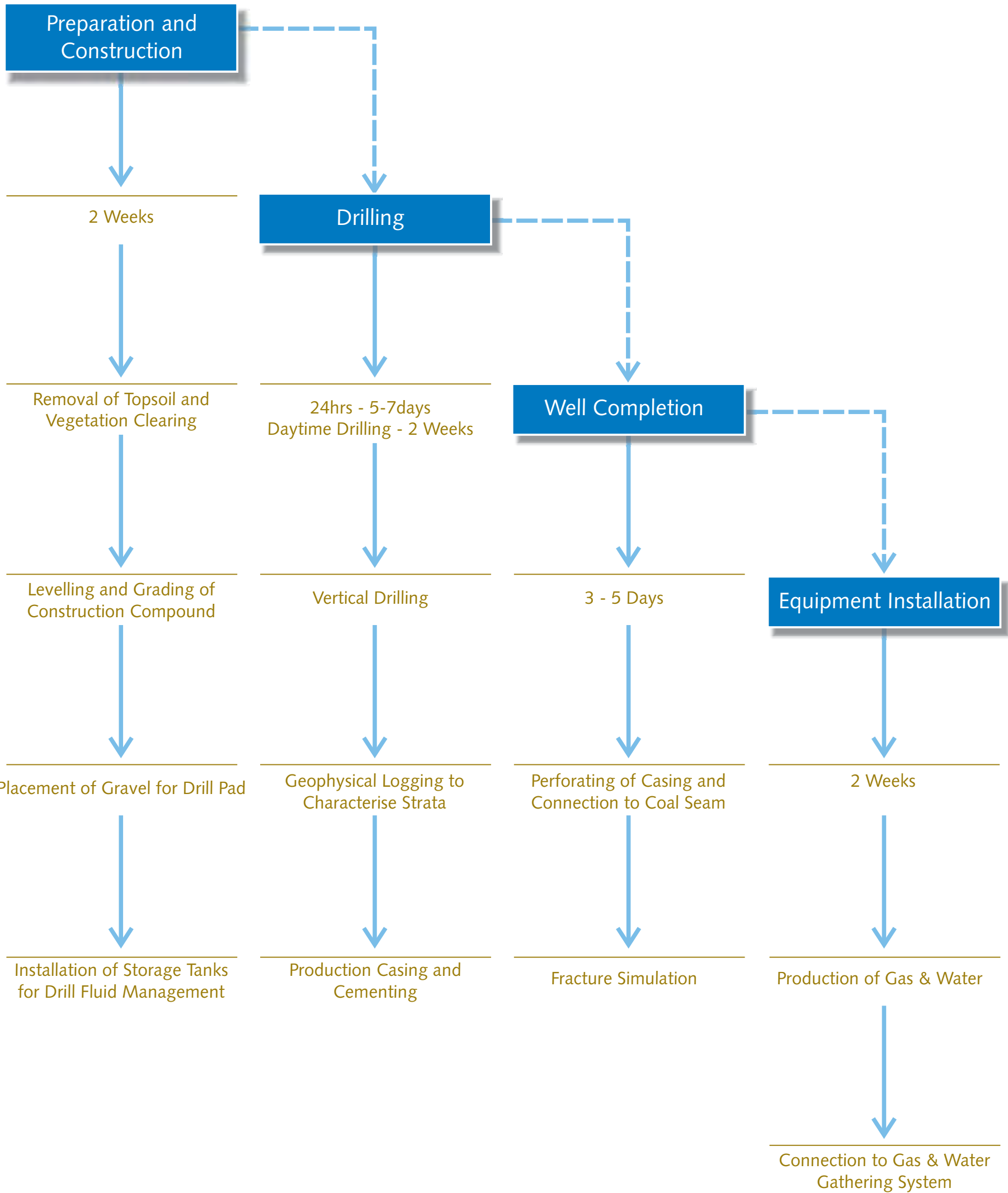
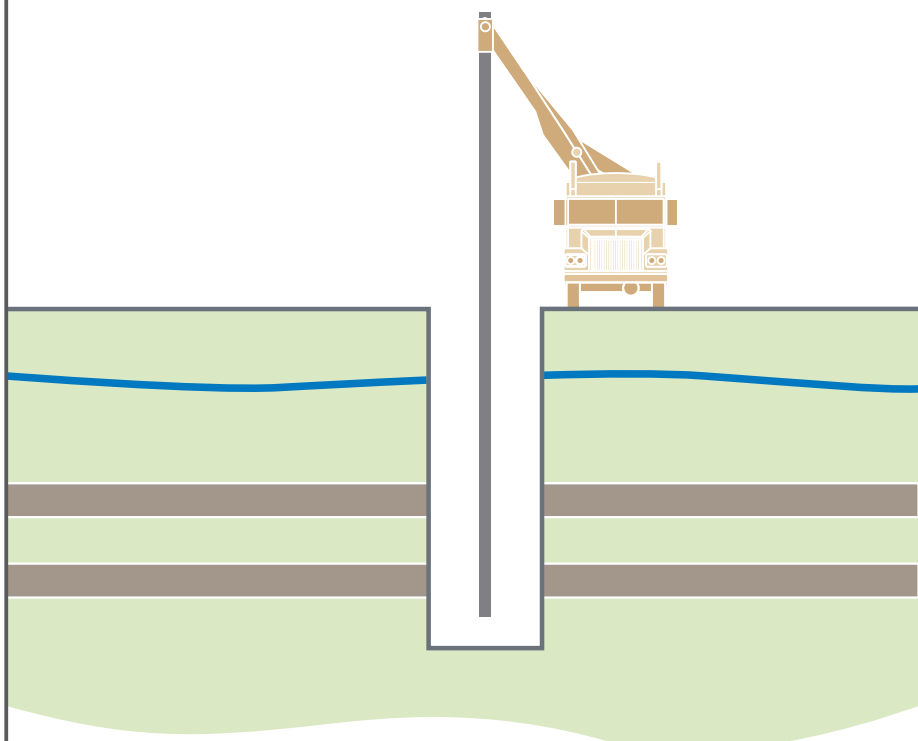


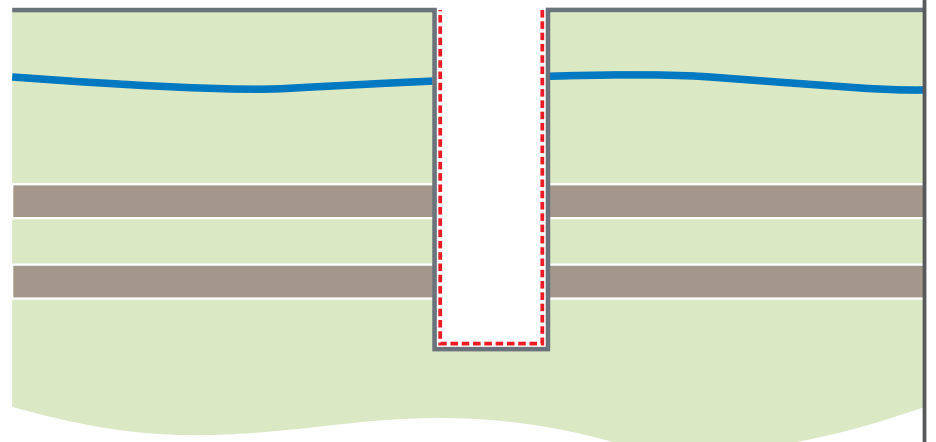
FIGURE 5.5

STEP 1 | VERTICAL DRILLING



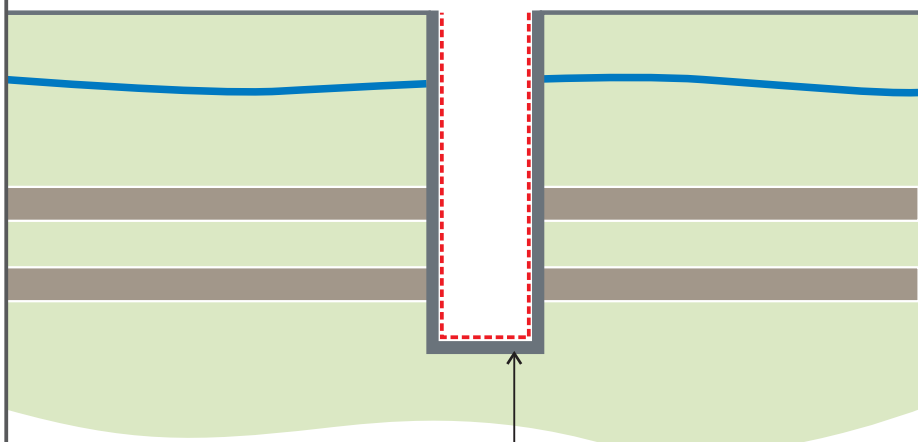
Wells would be drilled utilising technologies including vertical drilling, directional drilling and horizontal directional drilling.

STEP 2 | WELL CASING



Typical vertical well design would include installation of a conductor casing from the surface to base of alluvial sediments (approx 50m), drilling and installation of a surface casing within the first 10% of the well, and installation of a production casing within the outside two casings to the total depth of the well.

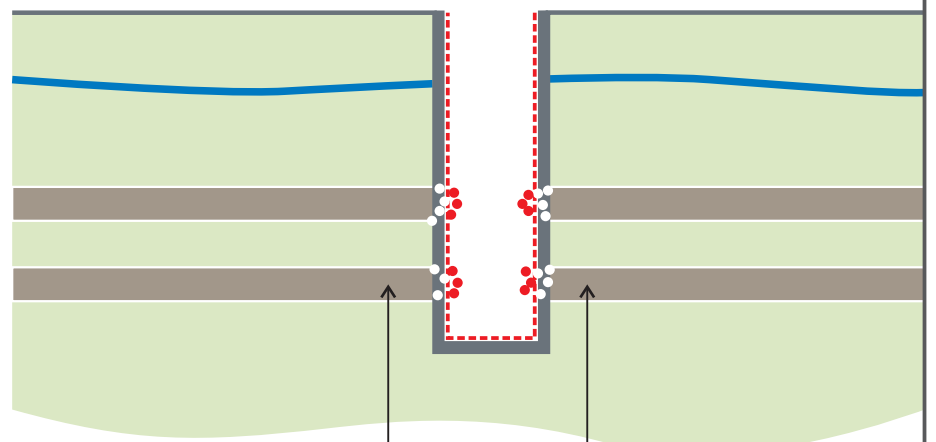
STEP 3 | CEMENTING



Cementing to seal borehole and isolate aquifers and coal seams

The production casing would be pressure cemented to seal the well. This process would isolate aquifers and other formations that may be encountered.

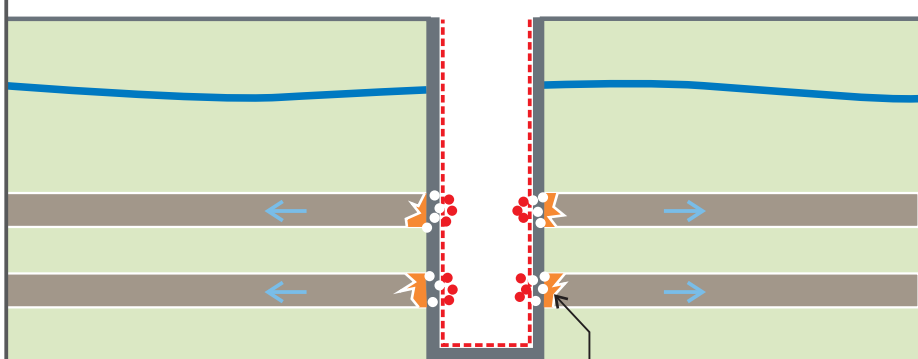
STEP 4 | WELL COMPLETION - PERFORATION



Production casing and cement is perforated to connect borehole to coal seam

Perforation of the production casing would be undertaken to allow communication between production casing and target coal seams.

STEP 5 | WELL COMPLETION - FRACTURE STIMULATION

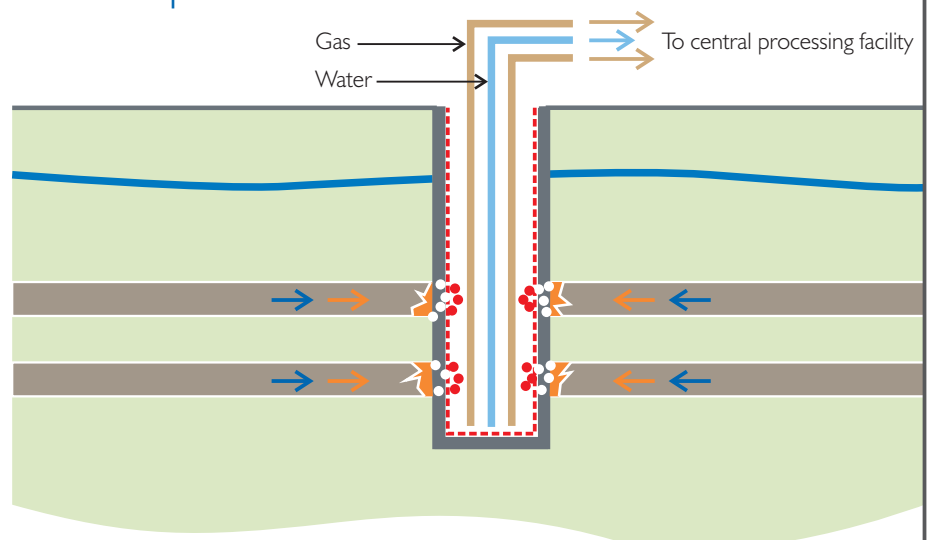


KEY

- Aquifer
- Coal seam
- Production casing string
- Gas flow
- Frac Water
- Produced Water

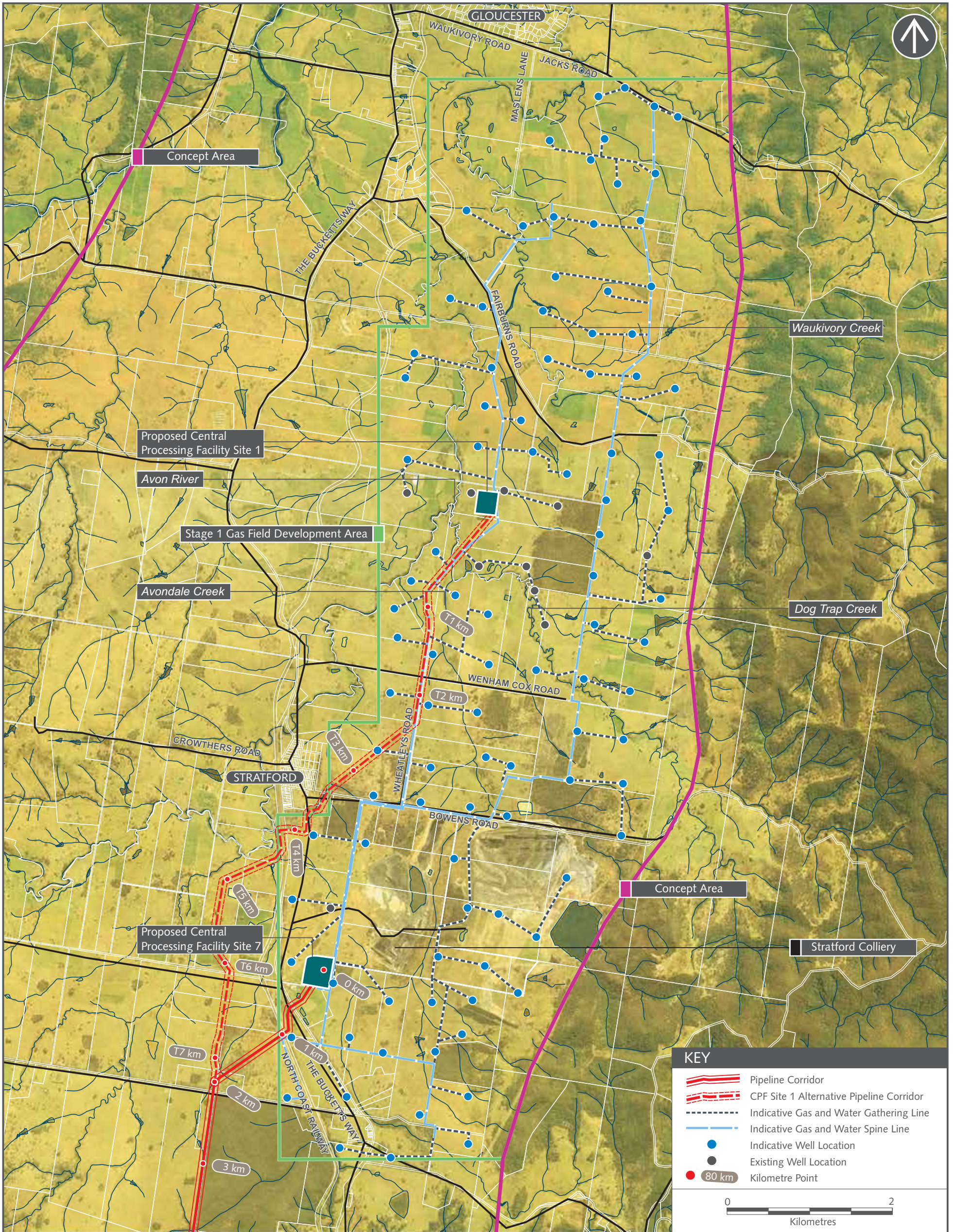
Fracture stimulation typically involving the injection of water base fluids and sand would be undertaken to widen paths in coal seam for gas flow.

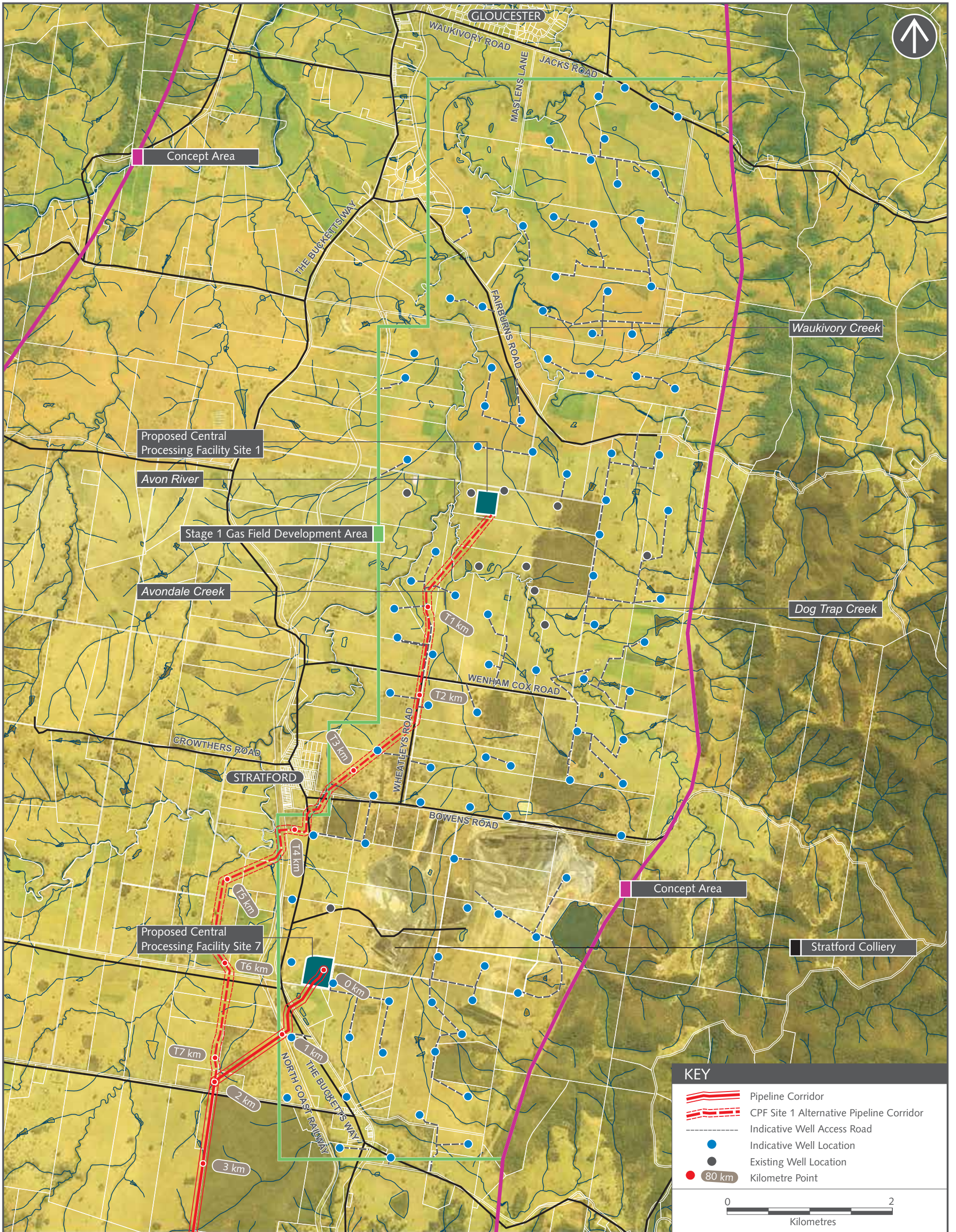
STEP 6 | PRODUCTION



Fracture stimulation widens the paths in the coal seam to provide a conductive path for gas to flow. Produced water flows into the well and is pumped to the surface. The drop in aquifer pressure enables gas production to commence.

FIGURE 5.6





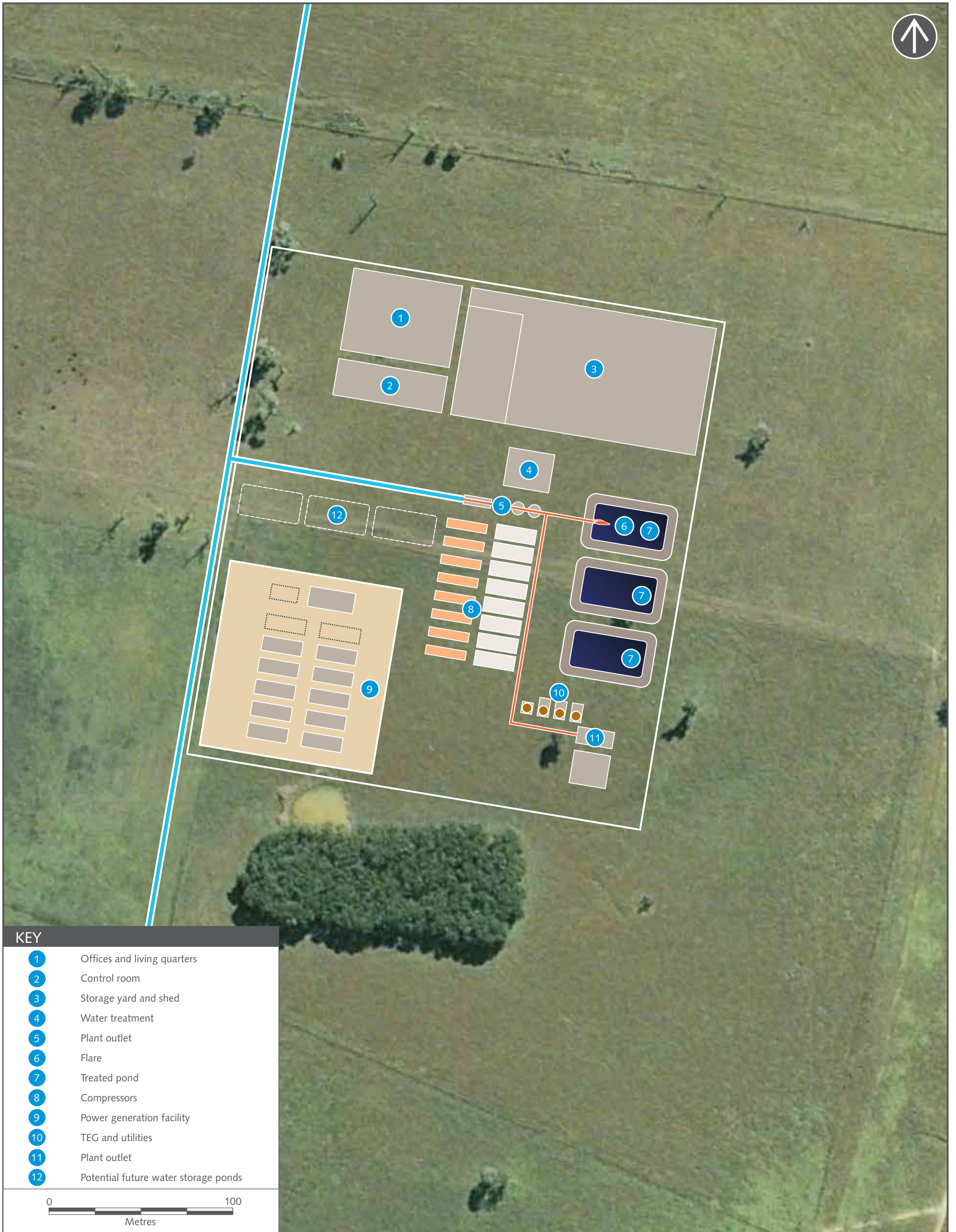
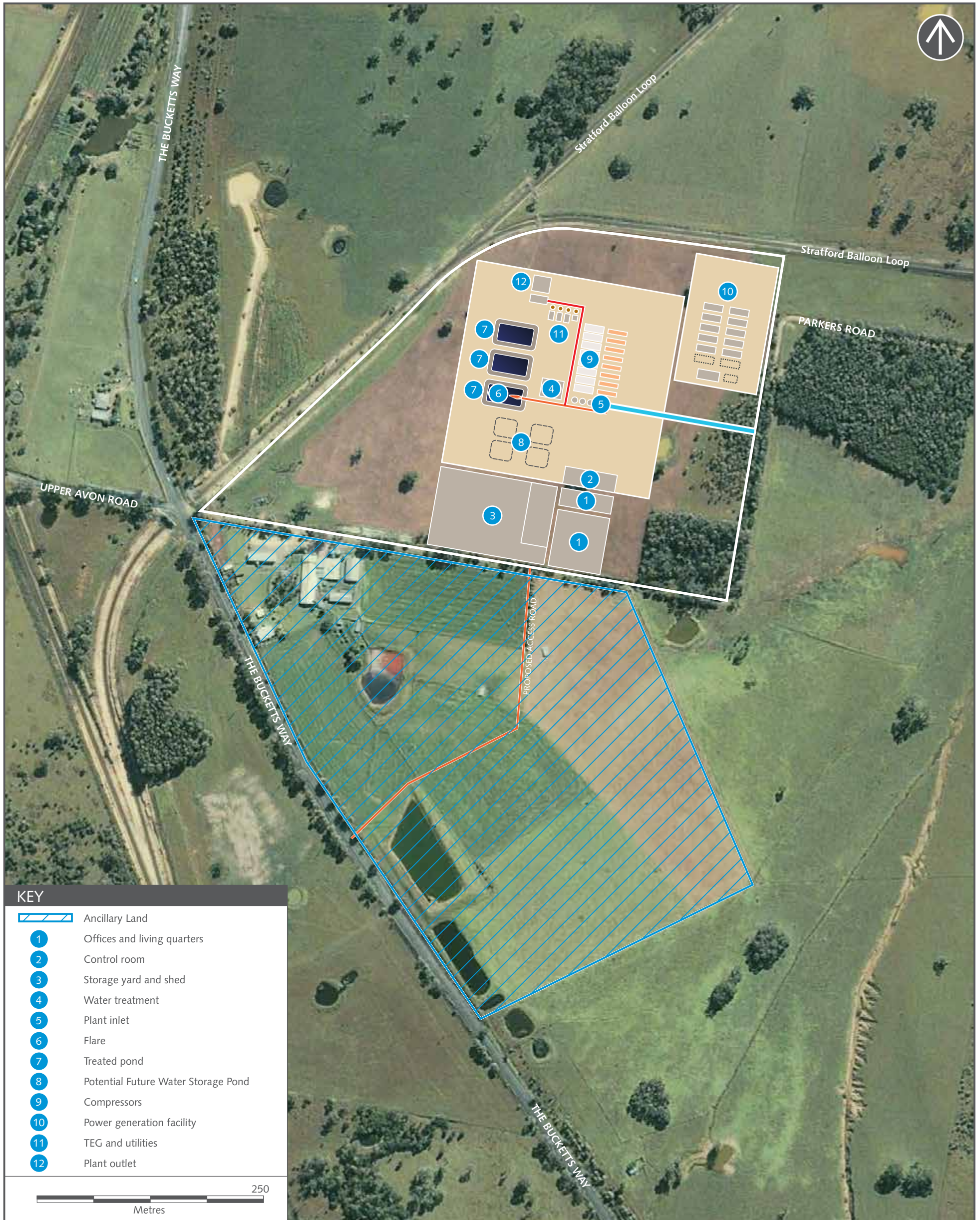


FIGURE 5.9



KEY














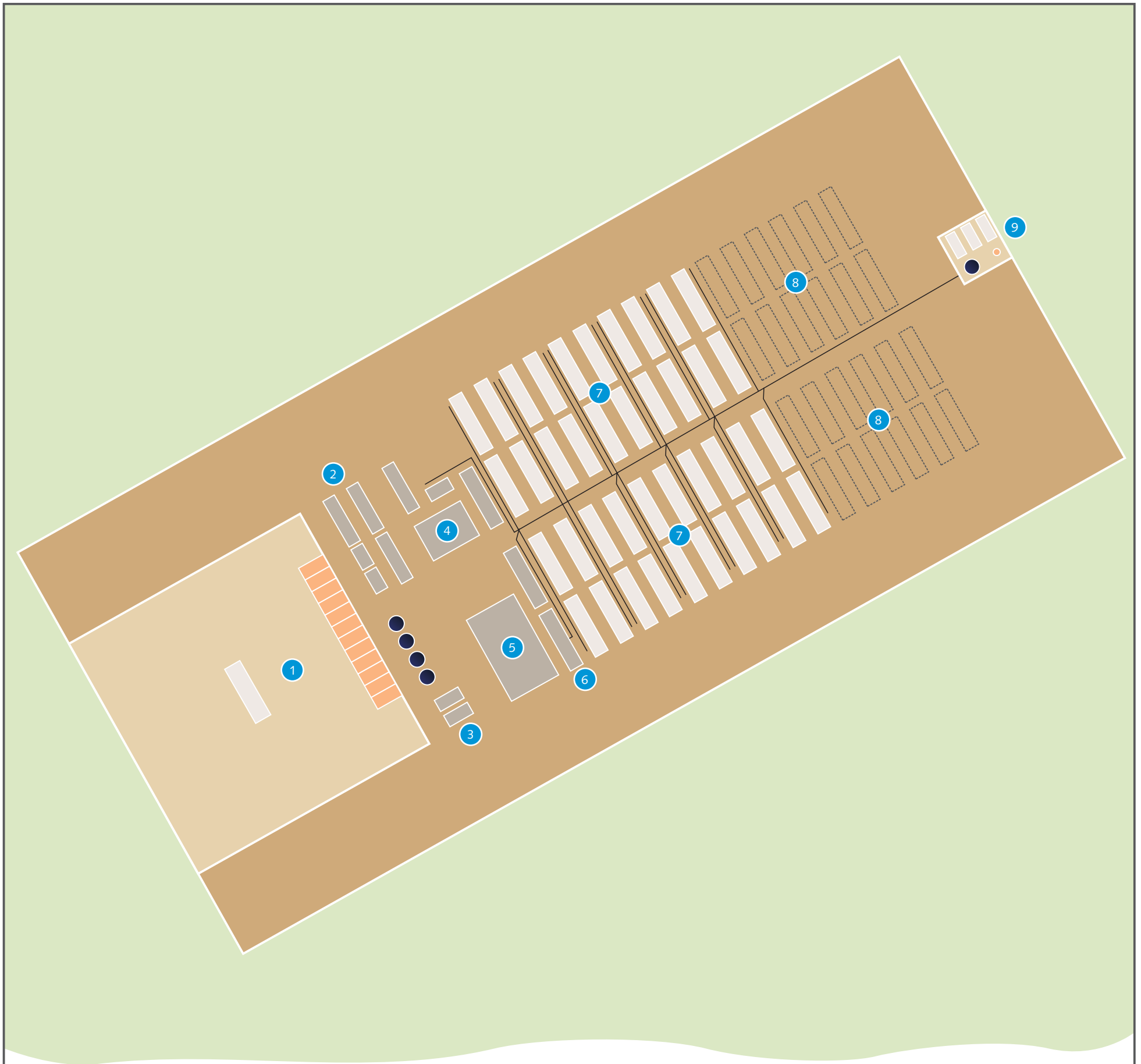
-  Ancillary Land
-  1 Offices and living quarters
-  2 Control room
-  3 Storage yard and shed
-  4 Water treatment
-  5 Plant inlet
-  6 Flare
-  7 Treated pond
-  8 Potential Future Water Storage Pond
-  9 Compressors
-  10 Power generation facility
-  11 TEG and utilities
-  12 Plant outlet



FIGURE 5.10





KEY

- 1 Laydown Service Area
- 2 Offices
- 3 Water
- 4 Recreation
- 5 Kitchen/Dining
- 6 Laundry
- 7 Accommodation
- 8 Area for Accommodation Expansion
- 9 Sewage Treatment System

NOT TO SCALE

FIGURE 5.12

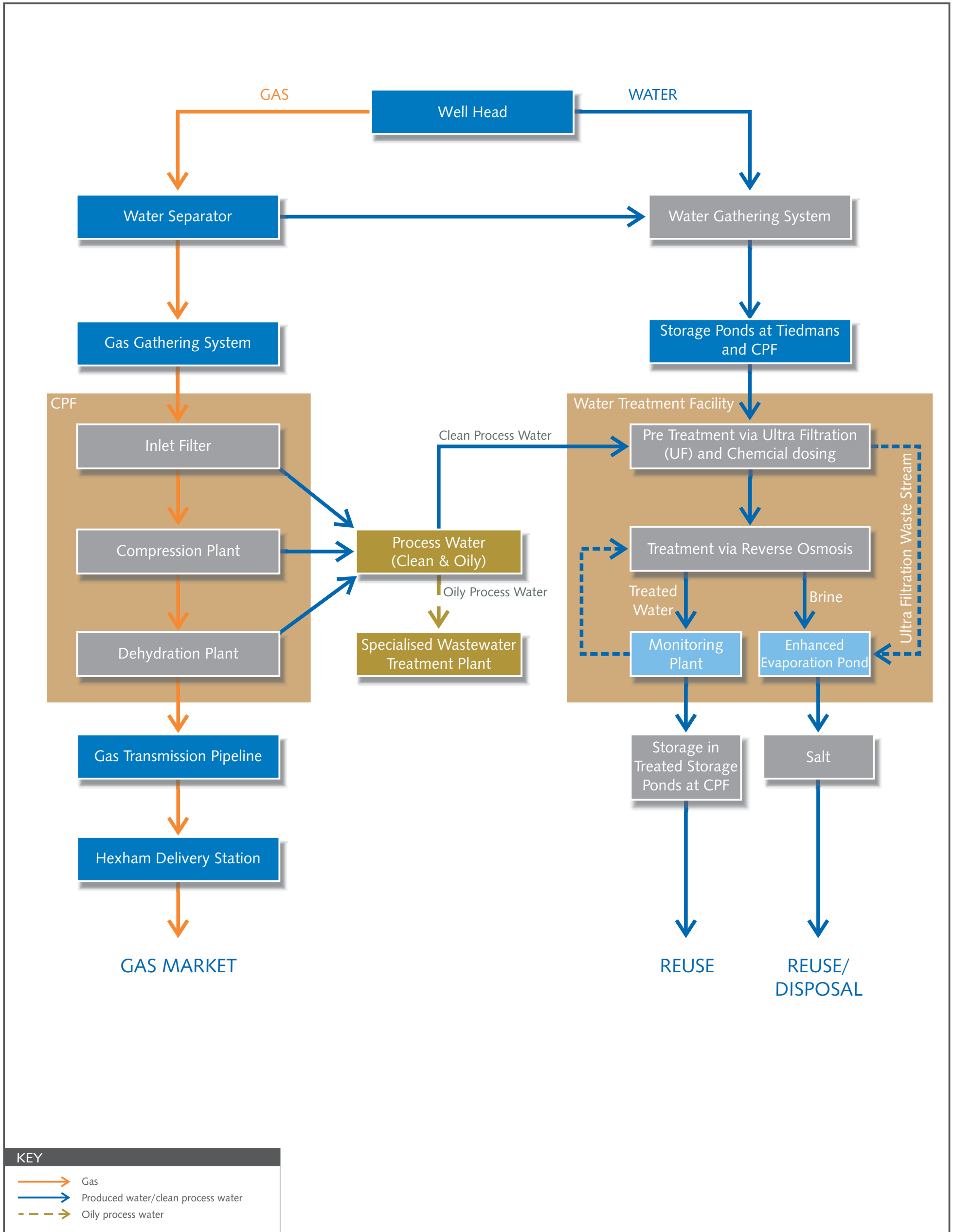
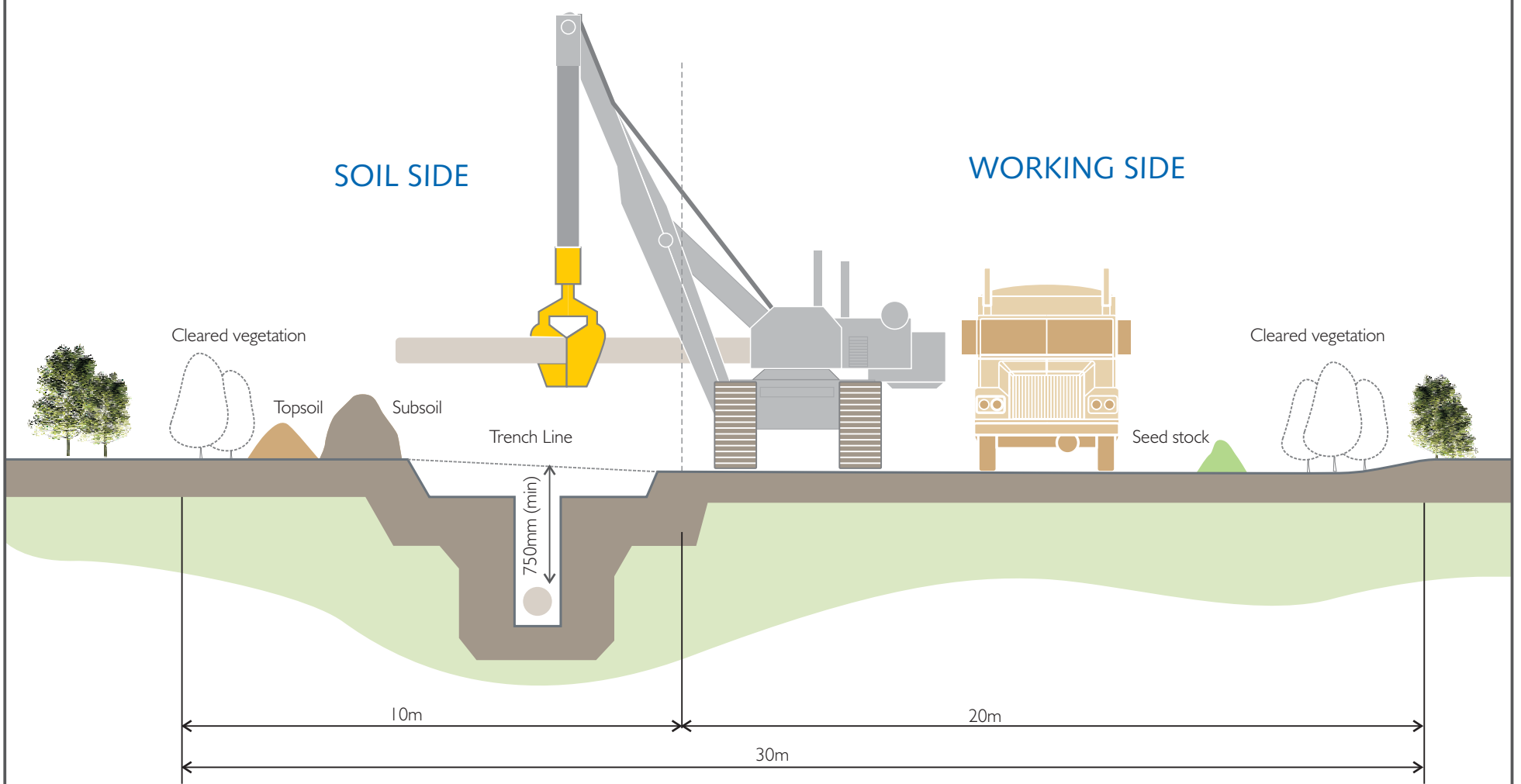


FIGURE 5.13

RIGHT OF WAY SCHEMATIC DIAGRAM



SENSITIVE WATER CROSSINGS

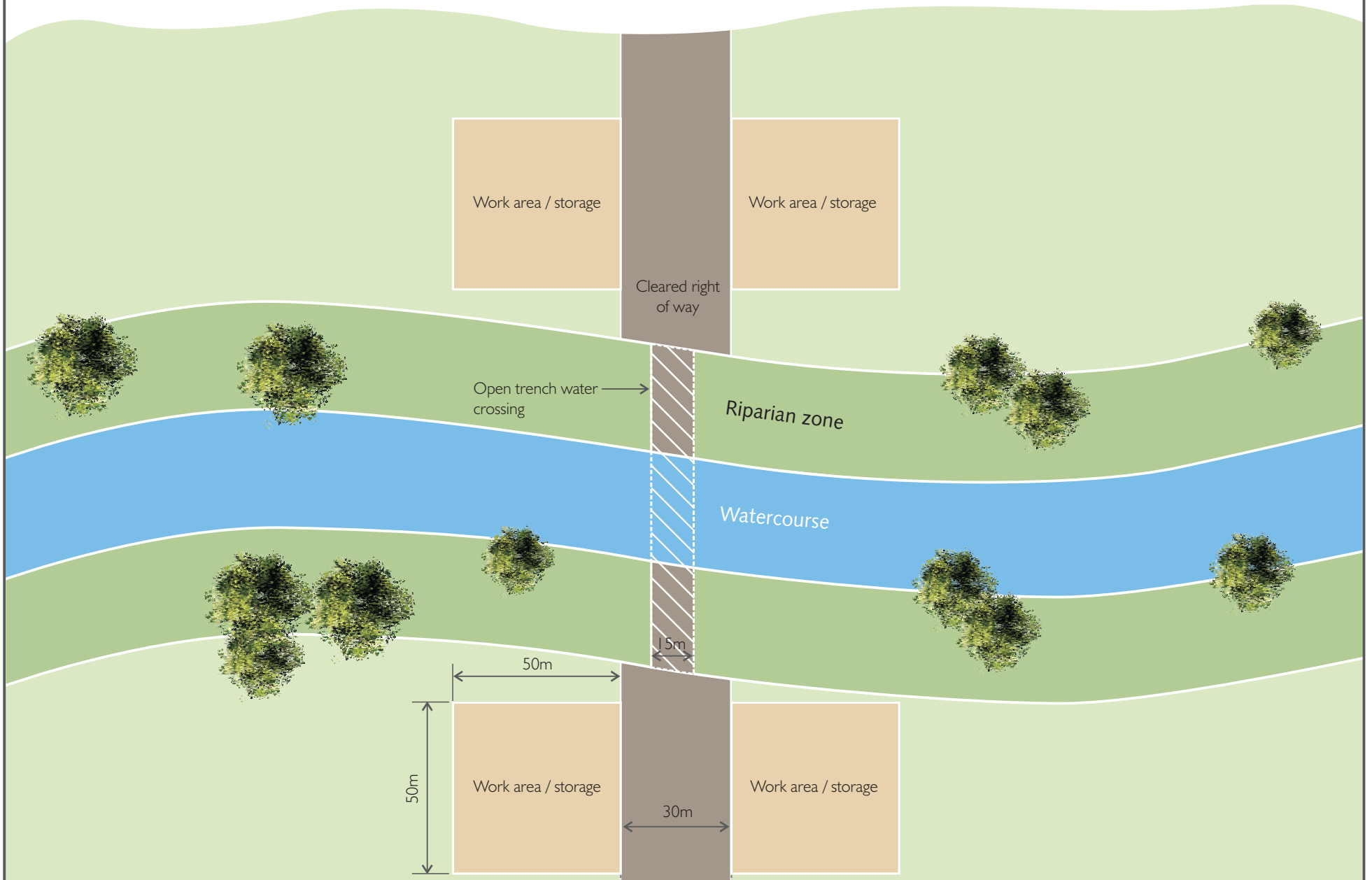


FIGURE 5.14



Photograph 1

Well showing indicative well head infrastructure



Photograph 2

Reduced ROW, minimising clearing of remnant vegetation



Photograph 3

Grading and stockpile preparation including placement of drainage pipe to allow runoff to drain through stockpile



Photograph 4

Trenching using trenching machinery



Photograph 5

Padding of pipe trench prior to lowering of pipe



Photograph 6

Lowering in of pipe



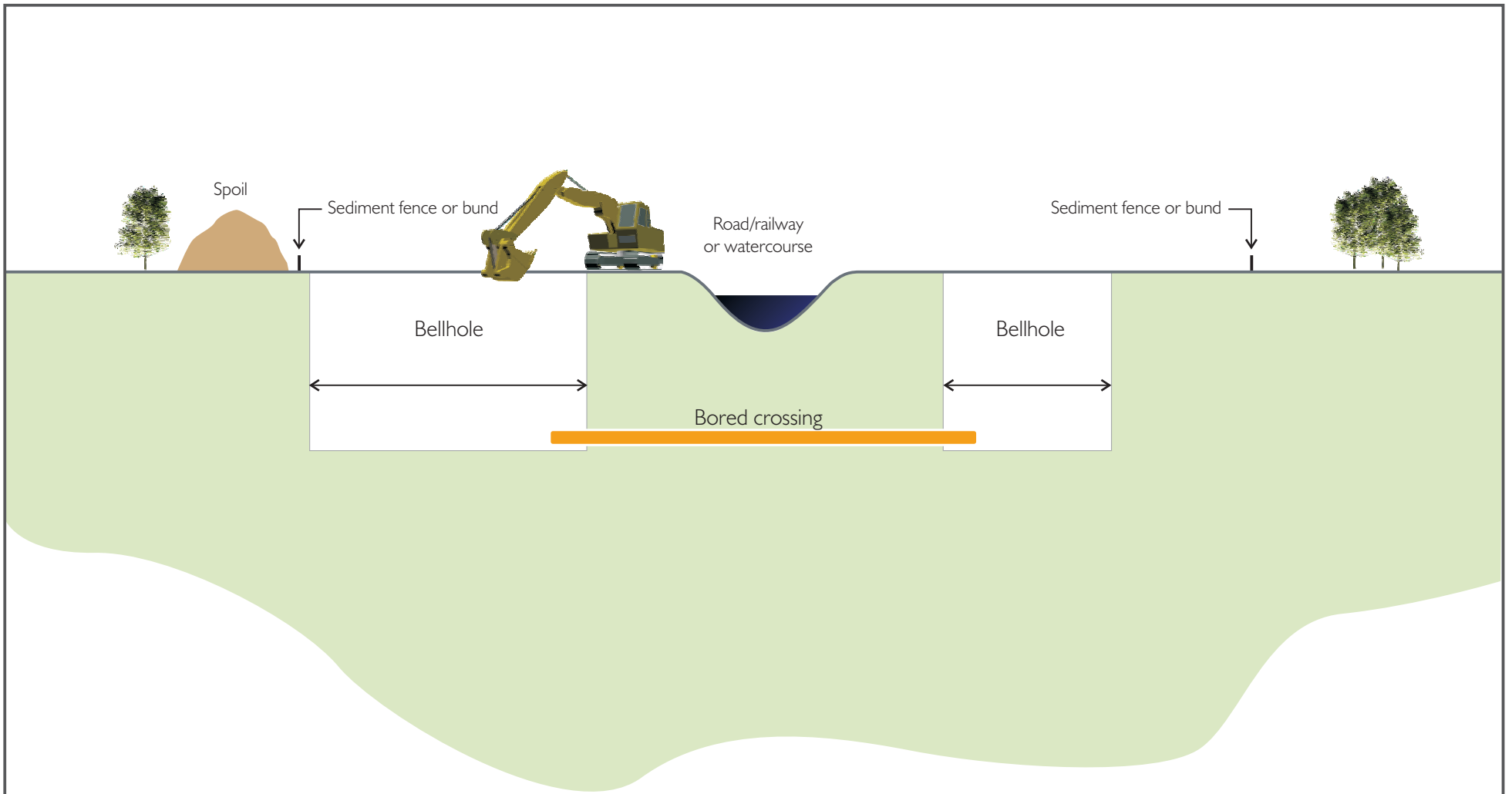
Photograph 7

Backfilling of trench following lowering of pipeline

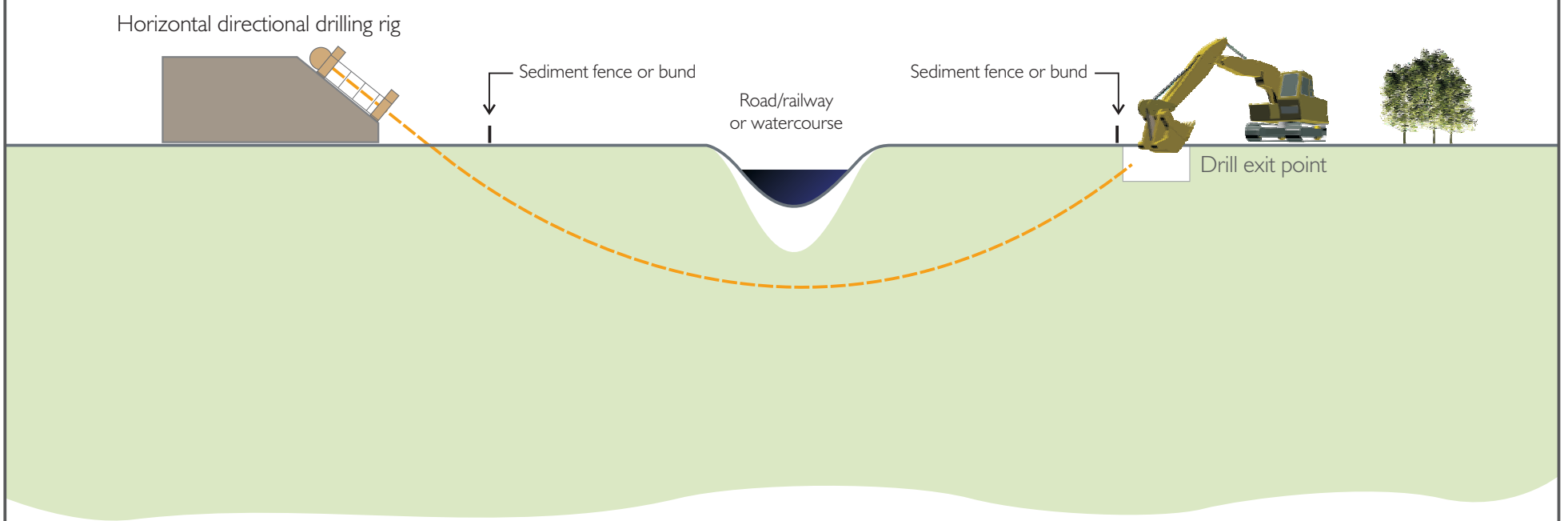


Photograph 8

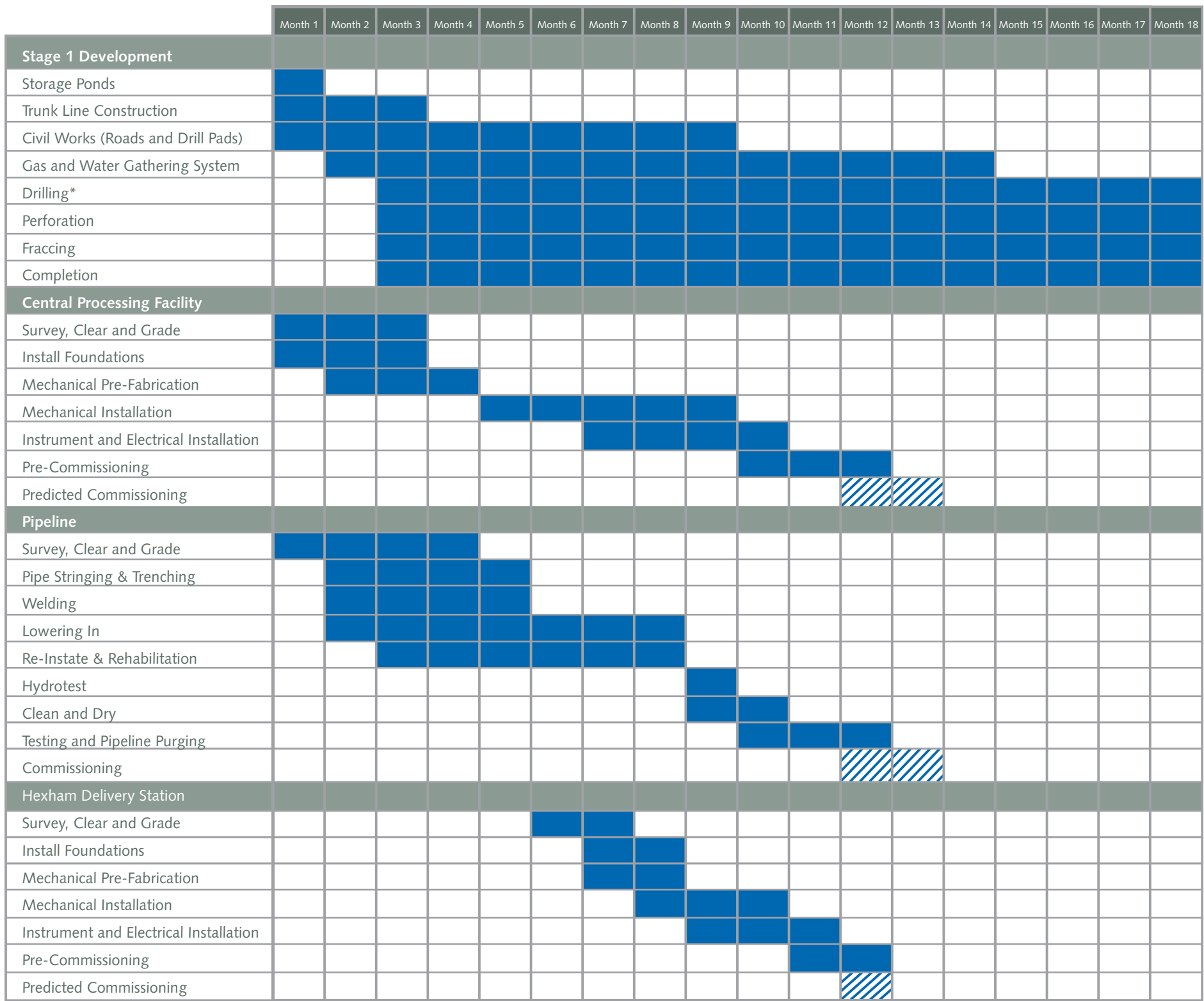
Reinstatement of ROW including pipeline marker



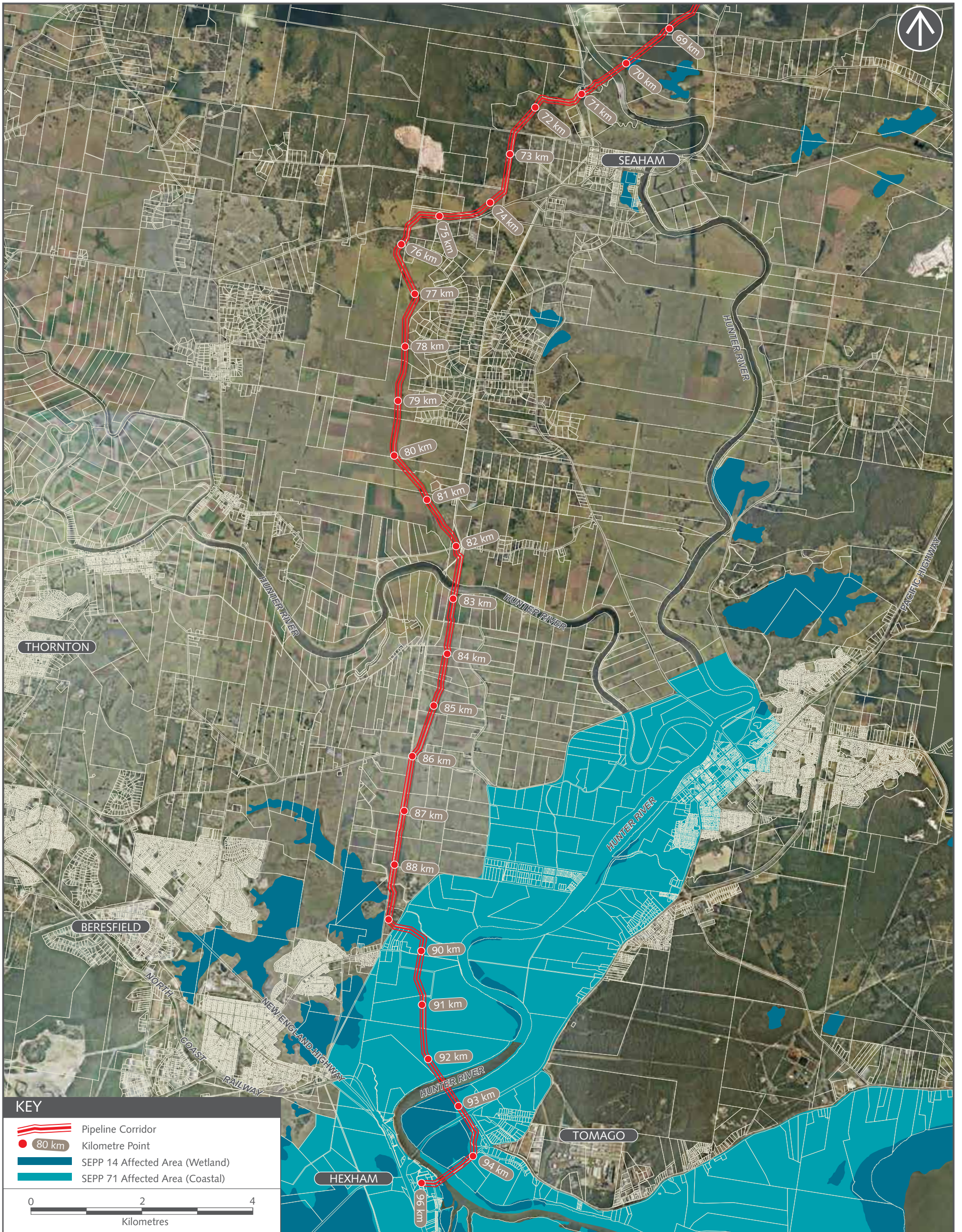
SCHEMATIC PROFILE OF BORED CROSSING



SCHEMATIC PROFILE OF HORIZONTAL DIRECTIONAL DRILLING



* Assumes daytime drilling only. If 24hr drilling is undertaken, drilling time could be reduced by up to 50%



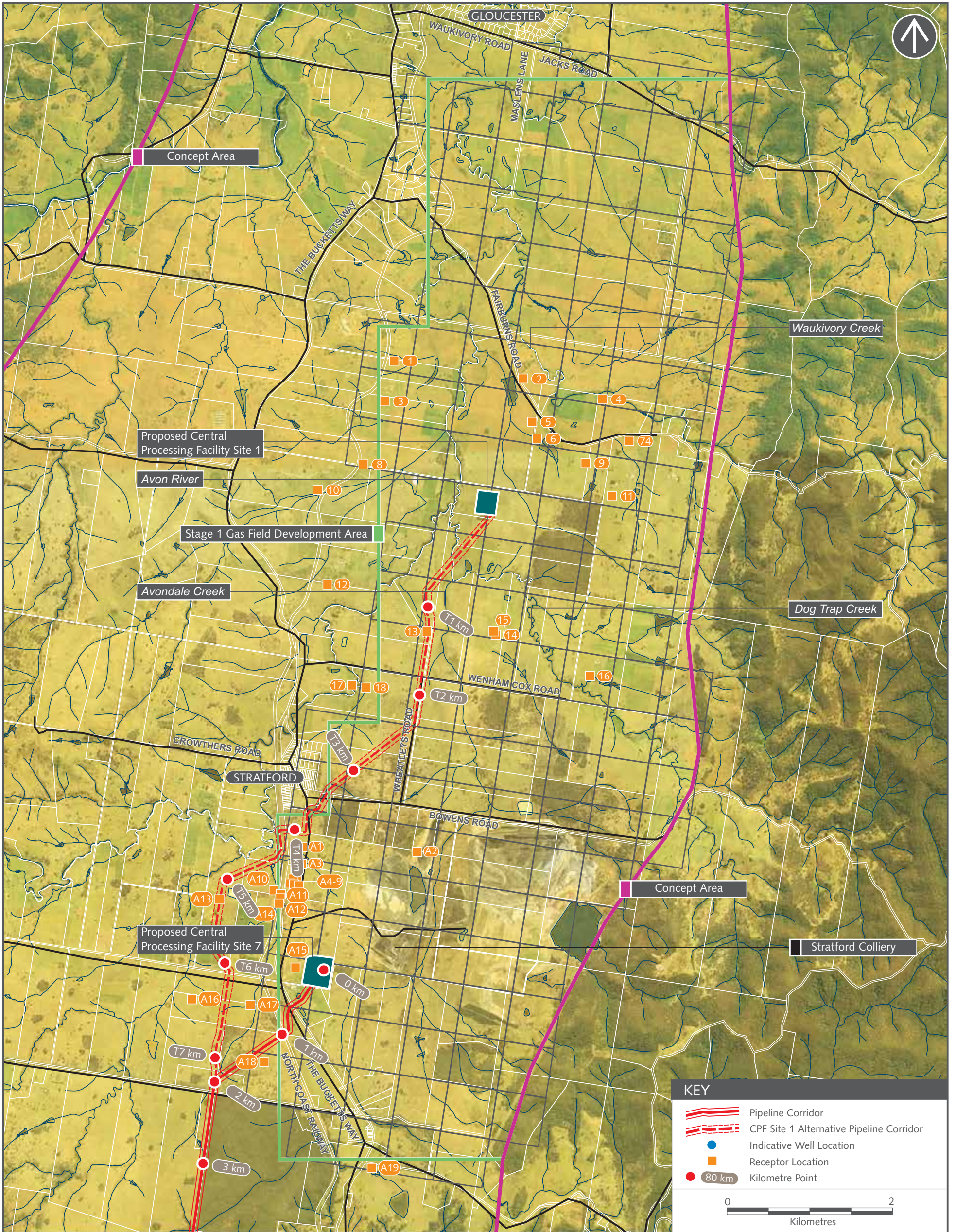


FIGURE 9.1

