

8 Construction of the Northern Expressway and Port Wakefield Road Upgrade

8.1 Construction issues and activities – Northern Expressway

8.1.1 Program of works

To achieve a relatively compact construction period, it is proposed to construct the Expressway by securing and fencing the corridor, constructing the key bridges, overpasses and interchanges concurrently where possible, and accessing and constructing the connecting roadway from within the corridor as much as possible.

The proposed program of works for the Northern Expressway Project is shown in Table 8.1 as follows:

Table 8.1

Proposed program of work for the Northern Expressway Project

Event or activity	Date
Announcement of proposed route	November 2006
Concept design	November 2006–July 2007
Detailed site survey	November 2006–July 2007
Design and construct Port Wakefield Road Upgrade	April 2007–December 2008
Land acquisition	July 2007–September 2008
Service relocations	July 2007–July 2008
Design and construct Expressway and interchanges	September 2008–December 2011
Open Northern Expressway	December 2011

It is likely that construction of the Northern Expressway will be carried out in a way that enables bridges and overpasses, and relocation of services to be undertaken in advance of the main contract. These early packages of work may include the Gawler River bridge, Two Wells Road overpass, Angle Vale Road overpass, Curtis Road overpass and services relocations.

The main design and construction contract would include Gawler interchange, Expressway and interchanges, Womma Road–Heaslip Road overpass, Taylors Road bridge, intersection tie-ins at the Gawler Bypass and Port Wakefield Road, landscaping, traffic management systems and lighting.

8.1.2 Construction methods

The following section describes likely construction methods that could be employed by the contractor(s) for various aspects of the project. These may be amended during the detailed design phase to comply with the project approval conditions or to achieve a more efficient solution to the project objectives.

Construction of the main alignment may involve the following activities:

- mapping to confirm boundaries and define the location of sensitive areas
- establishment of on-site compounds with access roads to the major elements of the project

- clearing and grubbing of vegetation, and mulching/recycling material for reuse on the project
- stripping and stockpiling of topsoil for reuse
- service relocations
- establishment of borrow pits for supply of fill material.

The Expressway corridor will generally occupy a 70 m width. There will be localised widening of this corridor (to 100 m) to accommodate noise mounds and drainage structures (side swale drains, detention basins etc).

The Expressway formation will be a 0.5 m to 1.5 m high embankment, 50 m wide within this 70 m to 100 m corridor. The shoulder of the embankment will be formed with material excavated from the new drainage swales on each side of the embankment.

The works will involve heavy earth working and compaction machinery including excavators, dump trucks, road trucks, graders, water trucks and heavy vibrating rollers.

Final pavement selection is not expected to be decided until the contracts for construction are let. The pavement may be deep lift asphalt or concrete over a crushed rock base and may require the establishment of on-site asphalt and/or concrete batch plants. Alternatively, materials may be imported from quarries and asphaltic concrete or concrete plants in the local region and placed with specialised paving equipment.

Ancillary works such as landscaping, lighting and communication systems will be undertaken by specialist contractors in the second half of the construction period.

Bridge and overpass structures

A total of 11 bridges will be constructed along the lengths of the Northern Expressway. These structures will be refined during detailed design to achieve the most economic solution.

As part of early package works, bridges and overpasses at Gawler River, Two Wells Road, Angle Vale Road and Curtis Road may be constructed in advance of the main contract. The proposed structures will typically be double span bridges with a central median pier and laid-back abutments. The early construction of these (off-line) bridges will enable dedicated access to the 23 km work corridor, without undue interference with the adjacent local road network.

Similar structures will be constructed as part of the main contract at the intersection of the Expressway with the Gawler Bypass, Womma Road/Heaslip Road and at Taylors Road over the rail tracks.

Construction works associated with bridge and overpass structures will include the formation of ramps adjacent to the Expressway corridor. Fill material for the construction of ramp embankments may potentially be sourced from three proposed borrow pits, adjacent to the Gawler River at Wingate Road. Subject to material testing, the borrow pits have the potential to supply sufficient quantities of suitable fill material to meet volume requirements. Construction and fill materials may be carted by road trucks using temporary construction tracks created within the Expressway corridor and/or on local roads to the overpass sites.

Structure foundations are likely to be driven reinforced concrete piles using rigs. However, the final method of construction will be determined by the contractor.

Service relocation

Services are generally only affected at the overpass sites where the Expressway crosses local roads. Most underground services will be unaffected by the Expressway formation as it is a shallow earthworks formation above the existing ground level.

Service relocation work will involve:

- ETSA: raising poles and lines at overpasses and some local roads, and undergrounding some low voltage lines
- ElectraNet: raising two high voltage distribution lines and towers over the new Expressway alignment
- SA Water: protection of existing pipes and minor works to domestic water supply lines
- Virginia Wastewater Reticulation Scheme: re-laying pipes in concrete lined steel and pipe protection works
- Telstra and Optus: relocating some optic fibre and copper cables
- SEA Gas: pipe protection works
- Epic Energy: excavation, inspection, recoating and protecting existing pipe.

Contractor facilities and storage

Contracts will specify construction management requirements including criteria for the location of fenced storage areas for construction compounds, possible batch plant sites and storage facilities for fuel, construction materials and equipment. These will generally be at each of the interchange and overpass sites and security will be provided to monitor these areas.

Construction hours

The proposed construction hours are expected to be between 7 a.m. and 7 p.m. Monday to Saturday and between 9 a.m. and 7 p.m. on Sundays and public holidays. Any works outside of these hours will be undertaken in accordance with DTEI's Infrastructure Works at Night Operational Instruction to minimise disturbance to local communities.

Environmental management during construction

Construction contracts will specify the requirements for environmental management during construction. A draft Environmental Management Plan outlining the proposed management measures is included in Part F, Chapter 41.

Safety provisions

The project Safety Management Plan will outline the safety management measures to be followed during construction including:

- fencing off intensive work areas
- signage to indicate changed local road conditions
- temporary pavements
- safety barriers around works at local roads
- hoardings, barriers or bunting at excavation sites

- clear advertising of emergency contact numbers
- fenced storage and equipment compounds
- education of the public regarding the works and potential hazards.

8.1.3 Traffic management

Haulage routes

For overpass construction, pavement and material deliveries, the haul routes will include mainly, but not exclusively:

- Two Wells Road
- Wingate Road
- Angle Vale Road
- Andrews Road
- Womma Road
- Heaslip Road
- Taylors Road.

For the Expressway embankment, the haul route will be mainly the Expressway corridor and occasionally the roads listed above.

The contractor is to consult with local councils to obtain necessary approvals, where required, for the use of local roads to haul materials and equipment.

Temporary road closures

Construction activities will be undertaken within the framework of a contractor-managed construction works management plan(s) that will address issues where works are close to local residents.

Generally, temporary closures will only be necessary for service relocation works. All new work is designed to be off-line of existing roads until the new overpasses are operating.

The scheduling of temporary road closures will be in consultation with councils and involve advance notification to the local community.

Access arrangements

Where necessary, new or temporary access arrangements will be provided to local residents.

Minimal traffic management is required on existing local roads due to the construction of the new overpasses off-line, prior to the new Expressway embankment works.

Significant traffic management will be required at the connections of the Expressway with Gawler interchange and Port Wakefield Road, for which a special traffic management plan for each connection is to be prepared by the contractor.

The design of the Expressway at each conflict point will need to consider effective traffic management strategies to be implemented during the construction stage.

8.2 Landscape implementation – Northern Expressway

8.2.1 Plant and seed supply

Protection of biological diversity is a key sustainability objective of the project; therefore much of the plant material used to landscape the corridor would be propagated from locally derived seed stock or cuttings to protect the flora gene pool.

Very little remnant native vegetation remains in the Northern Adelaide Plains region, and as the revegetation works would require a significant volume of seed, sources of seed within a provenance of 10–20 km of the Expressway corridor would be used (depending on species) to ensure the ongoing viability of existing remnant vegetation. Seed would be collected in accordance with legislative requirements. Early in the construction phase, nurseries would be engaged to propagate plants.

Plants that provide beneficial effects for managing insects and pests that affect the horticultural industry may be used. This would reinforce the approach already occurring through the efforts of the City of Playford and City of Salisbury.

8.2.2 Planting and seeding

A combination of semi-advanced tree planting, tubestock planting, hydro-seeding and direct seeding techniques would be used to establish vegetation along the Northern Expressway corridor.

Areas to be landscaped would be cleared of weeds before planting or seeding commences. Topsoil cleared from beneath the road pavement area would be stockpiled on site and would be spread within landscape areas to improve soil conditions. If necessary, areas of compacted soil would be deep-ripped before planting or seeding occur to facilitate root penetration.

Slow-release fertiliser and water retention agents would be added to the soil to improve plant growth and survival rates and to minimise watering requirements. The need for watering would be minimised, but as it would be required during the establishment phase it would be sourced in accordance with water policy requirements of the time.

Planting

In high profile locations such as roundabouts, plants at a semi-advanced stage of growth may be used; however, it is likely that tubestock and viro-cells would be used for most of the revegetation works. Where necessary, seedlings would be protected by tree guards and marker stakes during the first year. Mulch or weed mats would be used to control the growth of weeds and to conserve soil moisture. Weed control would be carried out to ensure that areas of revegetation have the best possible chance of survival. Watering would take place during the warmer months for the first two years after planting, to ensure high survival rates.

Mulch available from the clearance of vegetation within the corridor would be spread on site. Due to the large volumes required, mulch manufactured from recycled green waste would also be used.

Direct seeding

Some areas within the corridor may be direct seeded. Direct seeding involves the establishment of trees, shrubs and understorey plants by sowing seed directly onto the site to be revegetated.

Hydro-seeding

A dryland grass seed mix would be hydro-seeded along the verges and within the median. The grass would be regularly slashed to ensure roadside clear zones and sight distances are maintained and so that it would not become a fire hazard. In some areas, native grass seed could be added to the seed mix.

Weed control

An extensive weed control program would be carried out within the Expressway corridor prior to all planting or seeding works and on an ongoing basis during the first two years of establishment. This would ensure that the native plants are given the best possible chance of becoming established.

A weed management plan would be incorporated into the project's Environmental Management Plan. This would ensure that construction activities are carried out in a way that minimises the risk of transferring weeds between properties or from the corridor into adjacent agricultural and horticultural land.

8.2.3 Protection of existing vegetation

Construction of the Northern Expressway would necessitate the removal of a limited number of remnant native trees, shrubs and grasses. All remnant native vegetation within the corridor that is not directly affected by construction works would be retained and protected.

Protection measures would include installing temporary fencing around isolated trees and patches of vegetation, minimising vehicle movements beneath trees and preventing stockpiling near existing vegetation. It is likely that horticultural crops (e.g. almonds, olives, vines, etc.) would be removed from the Expressway corridor and would not be part of the landscaping scheme.

Existing amenity plantings (e.g. native or exotic feature trees, wind breaks, etc.) would be assessed and their removal or retention would be dependent on their consistency with the landscape and urban design proposal.

8.3 Construction – Port Wakefield Road Upgrade

The Port Wakefield Road Upgrade involves a reconfiguring of intersections and lanes to increase capacity, and the relocation and undergrounding of some services. Work will comprise mainly planing and laying of a new asphaltic concrete pavement.

Design and construction of the Port Wakefield Road Upgrade will be carried out between March 2007 and October 2009.

The extent and scope of works will be typical of an upgrade to a major road. The experience and systems applied to construction management for such an upgrade are well known as are the risks and hazards.

Construction hours

The proposed operation hours are expected to be between 7 a.m. and 7 p.m. Monday to Saturday and between 9 a.m. and 7 p.m. on Sundays and public holidays. Any works outside of these hours will be undertaken in accordance with DTEI's Infrastructure Works at Night Operational Instruction to minimise disturbance to local communities.

8.4 Landscape implementation – Port Wakefield Road Upgrade

Planting and seeding

The approach proposed for planting and seeding the Northern Expressway will be tailored to suit the landscaping requirements for the areas affected by works along the existing Port Wakefield Road. Vegetation will only be provided where upgrading works have changed vegetation or to improve the immediate landscape amenity in those areas.

Protection of existing vegetation

Construction of Port Wakefield Road Upgrade would necessitate the removal of a limited number of native trees, shrubs and grasses. All native vegetation within the corridor that is not directly affected by construction works would be retained and protected.

Protection measures would include installing temporary fencing around isolated trees and patches of vegetation, minimising vehicle movements beneath trees and preventing stockpiling near existing vegetation.

