Executive Summary

CHAPTER 1 – INTRODUCTION

The Road Network Division of the Northern Territory (NT) Department of Planning and Infrastructure (DPI) proposes to upgrade sections of the Victoria Highway (the Highway) in the vicinity of the Victoria River, Northern Territory between 185 km to 220 km west of Katherine. The proposal involves the construction of new bridges and minor realignments of the highway at the Victoria River, Joe Creek, Lost Creek and Sandy Creek bridge sites, raising two sections of the Highway, and construction of two passing lanes. Access to borrow materials and strengthening and widening parts of the highway are also involved.

This section of the highway is proposed to be upgraded primarily to improve its protection from flooding (flood immunity). The current flooding of the highway has a significant adverse economic impact, with the loss of highway connectivity resulting in a direct adverse impact on freight, strategic and tourist movements and the load-bearing capacity of the road.

Project context

Katherine is 194 km east of the Victoria River Highway Bridge and Timber Creek is 82 km west of the Victoria River Highway Bridge. The Victoria Highway, of which 469 km is located in the Northern Territory, forms part of the Australian Land Transport Network and is a component of the declared Darwin to Perth Corridor. The section of the Highway that this proposal focuses on is closed for parts of most wet seasons owing to floodwaters rising above the Victoria River Bridge and the bridges over the other watercourses.

Annual average times of road closure (AATOC) at the Victoria River, Joe Creek, Lost Creek and Sandy Creek are 96 hours/year, 16 hours/year, 45 hours/year and 10 hours/year, respectively. The standard for a national highway is <12 hours/year. Upgrading the road to a 1 in 20 year storm event would result in AATOCs of 6 hours/year for each of the watercourse crossings.

The NT portion of the Highway is part of the National Land Transport Network, which is owned and managed by the NT Government with funding from the Commonwealth Department of Transport and Regional Services through the AusLink Program.

While the Victoria Highway is an integral part of Australia's National Land Transport system, it does not meet the transport standards of the adjoining sections of the Victoria Highway due to regular closures as a result of flooding. This project is part of the Commonwealth Government's AusLink approved 2005/06-2008/09 works program to improve the standard of the National Land Transport Network in the NT.

The objectives of the proposed works are to:

- provide improved flooding protection (immunity) to a National Highway that is currently closed for parts of most wet seasons
- provide a road consistent with the standards of adjoining sections of the Victoria Highway, and in particular to at least a 1 in 20 year storm event
- improve road users' safety for this section of the Highway.

Environmental assessment process

DPI submitted a Notice of Intent (NOI) for the project in July 2005. A Referral under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth, EPBC Act) was submitted to the Commonwealth Department of the Environment and Heritage (DEH) in August 2005.

Following discussions between the Northern Territory Minister for Natural Resources, Environment and Heritage and the Commonwealth DEH, the proposal was deemed a Controlled Action under the EPBC Act. This was primarily owing to the potential impacts of the proposal on several species of listed conservation significance. Therefore, the Action warranted additional assessment, public review and consultation. The NT Minister and the Commonwealth DEH agreed that the appropriate level of assessment was a Public Environmental Report (PER). Assessment of the PER will be undertaken in accordance with the requirements of the bilateral agreement between the Commonwealth and NT governments.

The PER has been prepared in accordance with the *Environmental Assessment Act 1982*, the guidelines within *A guide to the Environmental Impact Assessment Process in the Northern Territory 1996*, and the PER Guidelines provided to DPI by the NT Minister for Natural Resources, Environment and Heritage and the Northern Territory EPA.

The proposal

The proposal involves the construction of new bridges and minor realignments of the Highway at the Victoria River, Joe Creek, Lost Creek and Sandy Creek bridge sites, raising two sections of the Highway, and construction of two passing lanes. A total of 16.6 km in a corridor of 36 km of the Highway is involved. Strengthening and widening of 15.5 km of road would also be undertaken.

An integral part of the proposal is access to raw materials required for construction, primarily gravel (up to 80,000 m^3), fill (about 430,000 m^3) and construction water. Construction sites and depot areas and all environmental matters involved in construction and potentially impacted by the proposal are also part of the proposal and the PER.

The proponent

Through the Road Network Division, DPI is the notional owner of the Northern Territory's roads. This group is responsible for the provision of safe, accessible transport infrastructure for Territorians and visitors to the Territory. It is the Proponent for this proposal. The Construction Division, which is a Government Business Division of DPI, prepared the PER under delegation from the Road Network Division.

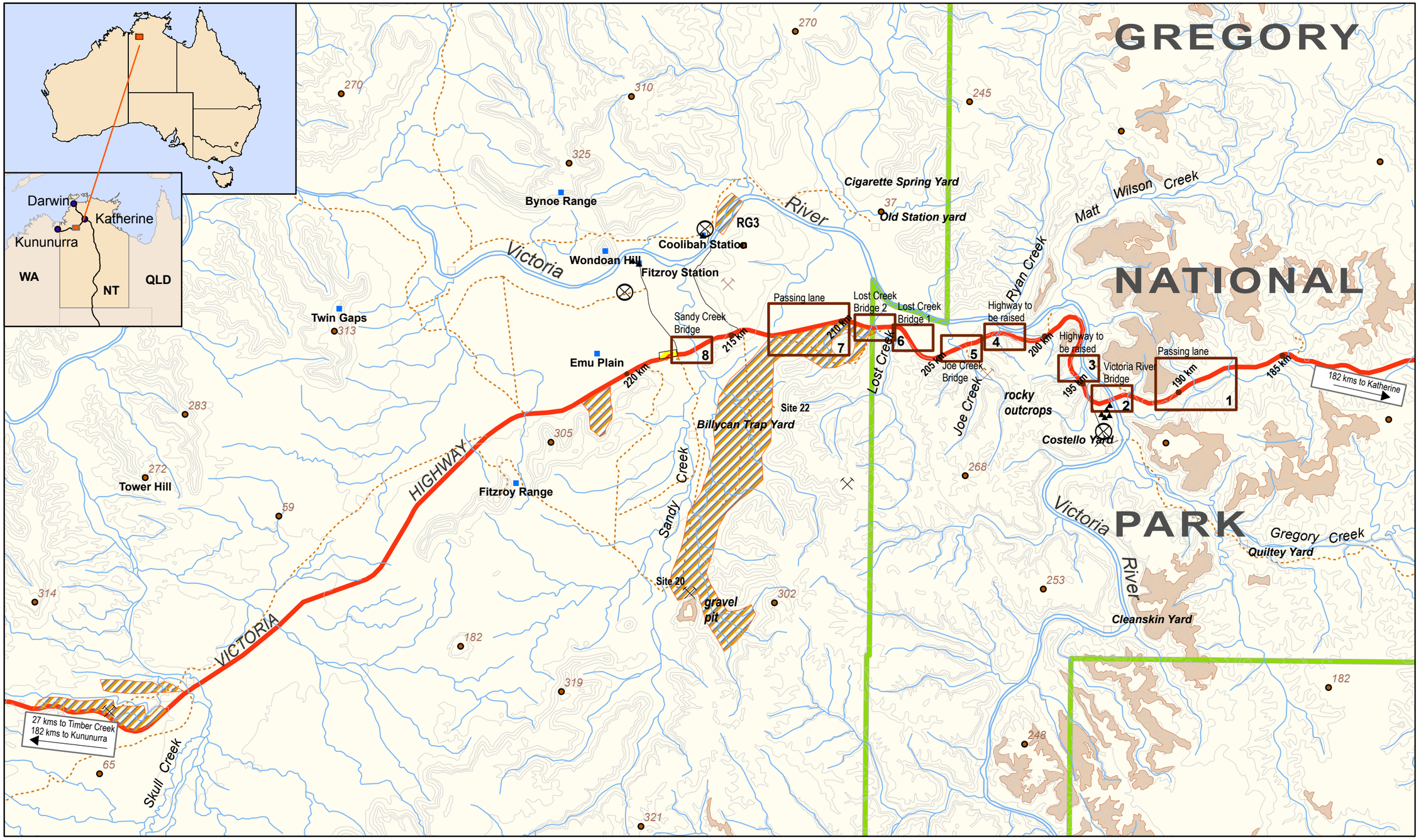

Figure 1

Location of Project Area and Impact Areas

The proposed works and their locations

There are eight impact areas along the Victoria Highway as shown in Figure 1. This approximates to that section of the Highway between 8 km east of the Victoria River Bridge to the Fitzroy Station turn-off. It is possible that work on all of these construction sites may not be undertaken concurrently. It is likely that the bridges creeks will be replaced and the Highway realigned at each of the approaches for each of these sites, together with raising the two sections of the Highway. The other works (passing lanes and road strengthening and rehabilitation works) would be reprogrammed for a future stage.

Potential borrow areas for gravel and fill may be located at existing borrow areas and pits or new borrow areas, which are adjacent to the Victoria River on Coolibah Station, adjacent to Sandy Creek and north of the Victoria Highway at Skull Creek (Figure 1).

CHAPTER 2 – THE PROPOSAL

Legislation and other obligations

Commonwealth and NT legislation applicable to the project is described, along with the relevant NT and DPI policies that will apply to the proposal.

Summary of the project area characteristics

The information in the section is a summary of the characteristics of the project area and the region. More detailed information is provided in Chapter 4 of the PER.

Project impacts

Eight areas along the Highway will be impacted by the proposed works, totalling 16.6 km and 72.05 ha entirely within the road reserve. Construction will largely be conducted during the dry seasons when a minimum of delays and adverse impacts occur owing to the effects of wet weather.

The amount of gravel required for the road works is estimated to be between 30,000 m^3 and 80,000 m^3. The smaller amount will be required for this project, and will be extracted from existing or new borrow pits in the project area. An additional 50,000 m^3 will be required for all of the pavement rehabilitation and widening works. Fill requirements are about 430,000 m^3. The maximum area proposed to be disturbed by extraction of all borrow materials is 40 ha.

All activities

The project's activities will occur in specific phases over 2006 to 2009, including design, a Tender process, pre-construction, construction and post-construction.

Construction

Construction activities will be undertaken in stages, with some overlap between the stages, and will include:

- vegetation clearing, plus initial development of alternative habitat sites, fencing of revegetation areas and weed management
- geotechnical investigations for pavement gravel and fill material searches and drilling at proposed bridge sites and embankment areas to confirm the suitability of the foundations for the proposed new bridge
- earthworks to establish new surface levels, including cut and fill activities
- earthworks for the new approach roads for the realigned section into the new bridge sites
- placement and compaction of a gravel pavement
- placing a bitumen spray seal on the surface of the pavement
- rehabilitation and stabilisation of cleared surfaces including borrow areas
- decommissioning, demolition and removal of the old bridges and rehabilitation of the old road surfaces and bridge areas
- new bridge construction at the Victoria River, Sandy Creek, Lost Creek and Joe Creek
- post-construction remediation and environmental monitoring.

The exact sites of all of the borrow areas to be used as a source of gravel and fill are presently unknown. Assessment and clearance of the proposed areas for Aboriginal significance (Sacred Sites) is ongoing at the time of compiling the PER. However, based on initial discussions with the Traditional Owners, it is likely that sources of raw materials will be available in the vicinity of RG3 on Coolibah Station, Sandy Creek and Skull Creek (Figure 1). Details of construction water sources, work camps and compounds, stockpile and storage areas, construction precincts, and access roads and detours are considered.

Other potential impacts and matters related to construction

Wastes

The contractor will be required to provide NT approved sewage treatment plant (STP) facilities at the main work campsite. Construction wastes will be stockpiled and either recycled or disposed of appropriately according to the NT waste disposal regulations at landfill sites. Domestic wastes will be disposed of daily at a landfill site.

Hazardous materials

All hazardous materials, such as petroleum products, acids, paints, thinners, solvents, gases and similar, will be controlled in accordance with NT legislation, Australian Standards, Codes of Practice and Guidelines, and Material Safety Data Sheet requirements.

Materials' transport requirements

Materials could be sent from Darwin or elsewhere in Australia via the Adelaide to Darwin railway line to Katherine and transported by road transport to the construction contractor's base camp. Alternatively, road transport will supply all the materials. Local transport requirements will be established by the contractor to suit the requirements at each construction site.

Infrastructure requirements

The contractor will establish or provide all infrastructure requirements specifically associated with the project.

Potable water

Potable water will be sourced from existing or new bores or via a water sharing arrangement with the proprietors of the Victoria River Inn.

Traffic management

DPI has a Specification for the management of traffic during road works. Compliance with this Specification is mandatory for all contractors undertaking works under a DPI contract or on its behalf. This will be achieved by the contractor establishing a Traffic Management Plan (TMP). The TMP will address all of the issues relevant to traffic conditions at the worksites.

Emergency matters

It is a requirement under DPI contracts for the contractor to have an approved and agreed Emergency Response Plan (ERP) that applies to all areas and elements of the project and works. This is also a component of the TMP.

Rehabilitation of sites

DPI's Specification for the rehabilitation of sites during and following road works applies. Compliance with this Specification is mandatory for all contractors undertaking works under a DPI contract or on its behalf.

Protection of Aboriginal Sacred Sites

The DPI contract for road works includes specific requirements for the protection of Sacred Sites.

Employment of Aborigines

DPI has specific clauses in its Specifications that require the contractor to employ and train local Aboriginal people. A minimum of 15% of the labour hours in the contract are to be taken by Aboriginal people, and 50% of these people must undergo formal on-the-job training to enhance their future employment opportunities.

Employment and business opportunities

The contract for the works will be a detailed design and document process undertaken by DPI followed by a construction contract. A DPI Specification applies to this matter, especially in relation to the employment of a percentage of the labour force from the local community. Local employment opportunities are emphasised in the Terms and Conditions of the DPI contract. The contractor will submit an Industry Participation Plan as part of the Tender that must illustrate how the contractor will engage with local suppliers during the project.

Policies and resources

DPI's Environmental Policy for roads applies to the project. DPI has the technical resources to manage the proposal and project. These resources are supplemented by other groups in the NT Government plus contractors and consultants as necessary. As stated elsewhere, a contractor will be appointed to undertake the road works.

CHAPTER 3 – ALTERNATIVES

The alternatives to the proposal and its proposed works are 'do nothing', upgrade the entire section of road to meet higher flood protection standards, or a complete realignment of the road.

Do nothing

The 'do nothing' option involves retaining the existing Highway infrastructure and its current road failures and closures. This option will not improve road safety, nor will it provide relief from the flooding that occurs each wet season, which results in the Highway being closed for parts of each year. Damage to the road pavement as a result of water saturation will continue to occur; therefore, DPI will continue to impose axle and configuration limits on heavy transport operators using the Highway. The 'do nothing' option will continue to provide a substandard transport route for a National Highway.

Upgrade to a higher standard

Upgrading to greater flood protection would largely involve the same realignment works and construction activities as the current proposal. However, the greater the flood mitigation standard proposed, the higher the road must be raised, and hence the greater the environmental impact and economic cost of the project.

Horizontal realignment of the road

A third option is the complete realignment of this section of the Victoria Highway to higher ground. This would involve considerable additional environmental impact and cost, which would be unsustainable.

Alternative borrow sources (gravel and fill)

Instead of developing borrow pits close to the project work areas, materials could be transported from commercial quarries elsewhere. Owing to the high cost of this option, the project would then be unsustainable. The Aboriginal Areas Protection Authority (AAPA), Northern Land Council (NLC) and representatives of Traditional Owner groups have been and are being consulted on the location of potential new borrow areas. Once heritage approvals are in place, it will not be realistic to establish alternative sources of these materials.

Alternative access and traffic flow management

An alternative access arrangement for the proposed works along the Highway would be to establish a detour for the length of the road works. This is not practicable without establishing a greater construction foot print and environmental impact for the works. Bridge works and their new alignments will be undertaken adjacent to the existing Highway. There is no alternative to this. For some sections of the new road works, construction will be undertaken 'under traffic'. A TMP will be developed and will apply to all areas of construction on the Highway.

Alternative construction techniques

DPI establishes the requirements and outcomes for the project. The construction techniques and the approach to construction must be established independently by the contractor so as to ensure that the requirements and outcomes are achieved. There is no practical alternative to the use of natural fill material to raise the level of the road.

Alternative environmental management

Proposed environmental management planning and techniques will incorporate all requirements from the PER process into Tender documentation for construction. Once the Tender is let, the contractor will develop a final Environmental Management Plan (EMP).

Future developments

No other major future developments are proposed for this section of the Victoria Highway. Regular road maintenance works will continue as required along the Highway.

CHAPTER 4 – EXISTING ENVIRONMENT, POTENTIAL IMPACTS AND ENVIRONMENTAL SAFEGUARDS

Each of the components of the existing environment and the potential impacts of the project and the environmental safeguards proposed has been established. Most issues and impacts are relatively low risk and can be managed. DPI has stringent Specifications that apply to this project. These are provided in the PER. Absolute compliance with these will be mandatory for the contractor(s) undertaking the works.

Physical environment

Climate

The study area is located in a subtropical, monsoonal climate, with distinct wet and dry seasons. Of the annual average rainfall of 938.5 mm for Timber Creek, 85% falls over December to March, with less then 1% occurring over June to August.

Geology and geomorphology

The area is dominated by the weathered, deeply incised Proterozoic rocks, with Cainozoic sediments confined to the riparian landforms and alluvial channels. The Pinkerton land system dominates the project area, with small occurrences of the Ivanhoe and Dinnabung land systems. The Highway avoids the higher elevation areas and traverses gently undulating to undulating terrain associated with the footslopes of the rocky escarpments, flood plains of the riparian systems and drainage depressions of the Victoria River and its tributaries.

Cut surfaces (cut batter slopes) and fill surfaces (fill batter slopes), especially those associated with the raising of the Highway, pose accelerated erosion risks unless adequate stabilisation and prevention of accelerated erosion is undertaken. Few other constraints or impacts exist for terrain and land systems.

Soils

The soils of the project area are principally skeletal soils associated with the plateaux and escarpments, with deep profile alluvial soils located on the Victoria River flood plain area. Heavy clays occur around Lost Creek and westward to Skull Creek. Potential project impacts are the loss of soil, destabilisation of cut and fill surfaces, followed by accelerated erosion.

Borrow material (gravel)

There are two major potential sources available for gravel, terrestrial and riparian deposits. At this stage of the project it is not clear which source, or combination of sources, will be used for the extraction and processing of gravel. The reason for this uncertainty is primarily owing to the location of Sacred Sites on previously available borrow sites. While the NLC and AAPA assessments of new sites are being undertaken with Traditional Owner representatives, this process had not been completed at the time of compiling the PER.

The choice of which borrow area or areas are used to obtain gravel will initially depend on the outcome of the Sacred Site clearances and, secondly, the additional archaeological, biological and geotechnical investigations that have yet to be undertaken of these defined areas. The results of all of these assessments and the final choice of gravel source sites will be provided to the EPA when available.

The quantity of rock and gravel available from the proposed riparian gravel site (RG3) on Coolibah Station, which is adjacent to the Victoria River, is well in excess of 80,000 m^3. Bed load replenishment of this gravel source occurs annually during the wet season due to the movement of materials downstream and into deposition beds. A bed load transport of about 360,000 m^3/year occurs. Additional areas adjacent to Sandy Creek are likely to contain suitable terrestrial gravel sources within its boundaries.

Borrow material (fill)

Approximately 430,000 m^3 of fill is proposed to be extracted from a general area south of the Victoria Highway, near Sandy Creek, and/or north of the Highway around Skull Creek. Fill material will be sourced to a maximum depth of 2 m and from an area of approximately 25–30 ha. The process for defining and assessing the exact location of borrow areas for the extraction of fill is as described for gravel sources.

Surface water resources

The Victoria River has a large catchment area of 77,230 km^2. The main tributaries of the Victoria River are Ryan Creek, Matt Wilson Creek, Sullivan Creek, Lost Creek, Joe Creek and Sandy Creek. As a result of the large catchment and intense rainfall during the wet season, the Victoria River system regularly floods. However, during the dry seasons, the tributaries of the Victoria River stop flowing, and the Victoria River becomes very low late in the dry season. During most years the River maintains some flow during the dry season.

The heavy monsoonal rains and associated high volumes and velocities of surface water run-off that the area receives can cause accelerated soil erosion from disturbed areas. Floods will have impacts on what construction activities can be undertaken during the wet season, and flooding events will cause delays in construction. Within the Victoria River, water may be obtained for construction purposes only under approvals and licence conditions established by the NT Department of Natural Resources, Environment and the Arts (NRETA).

Underground water resources

The study area is located in the Ord–Victoria groundwater province. Regular replenishment of groundwater occurs during the wet season. DPI is currently investigating the availability of existing groundwater bores to supply water for construction. These matters will be subject to further discussions, review and approval from NRETA.

Biological environment and ecology

A review of the EPBC Act Protected Matters database indicated that no World Heritage Places, National Heritage Places, Ramsar sites, Commonwealth Marine Areas, Commonwealth Lands, Commonwealth Heritage Places, Places on the Register of the National Estate or Commonwealth Reserves are located within the project area or are likely to be impacted by the proposal. No threatened ecological communities, whales and other cetaceans or critical habitats were listed as being within the project area or are likely to be impacted by the proposal.

Vegetation communities

The vegetation communities are typical of much of the Top End and mostly comprise open woodlands. There are also areas of *Chionachne cyathopoda* and *Mnesithea rottboellioides* tall grassland (cane grass) associated with riparian areas of some of the woodlands. No communities of National or Territory Threatened conservation status or significance were identified in the project area.

The key potential impacts associated with the removal of native vegetation are:

- the removal of a maximum of 72.05 ha from the impact sites along the Victoria Highway and an estimated maximum of about 40 ha of native vegetation through the clearing and use of borrow areas
- 5 ha reduction in the distribution and abundance of the regionally restricted vegetation community, cane grass grassland

Native flora

The specialist report commissioned by DPI indicates that 13 species of NT conservation significance have been recorded in the region and project area. None of these species or its habitat is impacted by the proposal.

Weeds

Twenty-five introduced species have been recorded in the region and project area of which 10 are declared weeds in the Northern Territory, and six species are weeds of concern for this project, namely rubber bush (*Calotropis procera*), Parkinsonia (*Parkinsonia aculeata*), devil's claw (*Martynia annua*), Noogoora burr (*Xanthium strumarium*), bellyache bush (*Jatropha gossypifolia*) and wild passionfruit (*Passiflora foetida*). The introduction and dispersal of weeds as a result of construction could result in adverse impacts on the pastoral industries and conservation resources, and adversely impact species of conservation significance.

Fauna species

The number of fauna species recorded in the project area according to taxonomic group are 38 mammals (six introduced), 147 birds (one introduced), 51 reptiles (one introduced), and 20 amphibians (one introduced). About 40 species of fish, including elasmobranchs (rays and sharks), have been recorded in the Victoria River system. DPI commissioned detailed assessments of the potential terrestrial and aquatic impact areas, which involved surveys of terrestrial fauna, the purple-crowned fairy-wren and aquatic fauna.

Fauna habitat

Key habitat for fauna along the Victoria Highway includes riparian and aquatic areas and flood plain woodland, especially the areas of cane grass grasslands in parts of the flood plain. All habitats along the Victoria Highway corridor have been disturbed and impacted by human disturbance. Of the habitats surveyed, most are widely distributed through the Northern Territory's Top End and elsewhere in the project area and region. It was considered that the relatively small area proposed to be affected by the project in an existing impact and high use corridor is of limited consequence to fauna.

The riparian and aquatic areas provide habitat for aquatic wildlife, including nationally significant sawfish species and several other species of conservation significance. The cane grass grasslands are an important regional habitat for a number of fauna species, particularly the purple-crowned fairy-wren, which is nationally Vulnerable. In the Victoria River region, cane grass stands are threatened by feral animals, such as pigs and buffaloes, which disrupt them and bare the soil surface to erosion, followed by weed infestations that colonise the disturbed areas.

The key potential impacts of the proposal are loss of habitat, potential loss of individual animals owing to a reduction in habitat availability and fragmentation, displacement of individuals, increased potential for predation and increased competition for resources

Threatened fauna

Twenty-four threatened or conservation significant species have been recorded in the region. Many of these have not been recorded or are considered unlikely to occur in the project area. Management and mitigation measures for these species of low risk will be established in the final EMP developed by the contractor for the project. These measures will be applied should the species occur during construction. Higher risk species are discussed below.

Purple-crowned fairy-wren

Purple-crowned fairy-wren (*Malurus coronatus coronatus,* western subspecies) occurs in the study area. The Victoria River District is now a stronghold for the species, which is listed as Vulnerable under the EPBC Act and as Near Threatened under the *Territory Parks and Wildlife Conservation Act 2005* (TPWC Act).

The survey identified 13 sites with cane grass (*Chionachne cyathopoda*), with fairy-wrens present at seven sites. The species also occurs adjacent to the potential gravel borrow site, RG3. The greatest number of individual birds was recorded at Lost Creek, Victoria River and two culvert sites. The consultant did not have detailed construction drawings of all sites at the time of the investigation and several of its sites were incorrectly identified, including the location of Escarpment Creek. Consequently, its estimate of direct impacts on cane grass over-estimated the potential damage on this habitat. The introduced black rat (*Rattus rattus*) occurred in two of the cane grass areas. Its presence in this habitat increases the risk to purple-crowned fairy-wren and other bird species, as the rat is a known predator of bird eggs and hatchlings.

The potential impacts of this proposal on the fairy-wren are:

- direct loss of individuals through displacement during the roadworks and disruption to breeding activities and the success of breeding
- direct loss of breeding and foraging habitat (about 5 ha for all of the proposal)
- fragmentation of areas of limited habitat, causing less suitable habitat to be available and reduction in dispersal capability of birds
- indirect loss of individuals through increased competition for resources, reduced dispersal corridors and potential increased predation.

The key recommendations of the specialists were to minimise disturbance impacts to the areas of cane grass and to establish suitable habitat rehabilitation measures in compensation for the areas of cane grass that must be impacted. Detailed mitigation measures have been developed and will be implemented via the EMP in consultation with NRETA.

Aquatic fauna

Twenty-seven species of fish, four species of reptile and one elasmobranch (ray) were recorded in the project area. The freshwater whip ray was the only species recorded that is listed as Data Deficient in the NT. Freshwater sawfish (*Pristis microdon*) and dwarf sawfish (*Pristis clavata*) occur in the region. These species are listed as Vulnerable in the NT, with *Pristis microdon* also listed as Vulnerable under the EPBC Act. Previous research and anecdotal evidence from the local community and Traditional Owners indicate that both of the sawfish species occur in the pools adjacent to the proposed gravel excavation site (RG3) and at the Victoria River Bridge, usually at the end of the wet season.

The potential impacts of the project on aquatic species are disruption of breeding owing to construction activities and loss of habitat, such as temporary indirect loss of habitat through pollution, and changes in hydrology and the river bed. Extraction of gravel material from RG3 would have little or no impact if:

- extraction occurs in the dry season from the deposits adjacent to and not from the Victoria River
- the area is rehabilitated to allow existing flows to be maintained
- small areas of vegetation along the water edge, which are potential freshwater crocodile and turtle nesting sites, were avoided.

If any of the species are present in remnant pools beneath the new bridge alignment over the Victoria River, then removal and translocation of individual animals may be required. Seasonal variation of the aquatic and terrestrial fauna will be assessed by surveys later in 2006.

Pest animal species

Twelve pest animal species have been recorded in the region. The cane toad (*Bufo marinus*) is now widespread throughout the region. The proposed works have the potential to encourage breeding and dispersal of pest animals, which compete with, prey on and adversely impact on native species and their habitat. The project may assist in the protection of threatened cane grass habitat and purple-crowned fairy-wren populations in the region by various rehabilitation measures and control of pest animals.

Air quality, noise and vibration

The Highway has long history of construction and air quality, noise and vibration issues are expected to be typical of road works. There will be some additional noise, vibration and air quality issues during the construction of the bridge foundations. Point sources of dust will be associated with work areas as dust generated by vehicles working at sites and travelling along bare earth surfaces. Dust suppression procedures will be required to reduce occupational health and safety risks for all road users and to minimise impacts of dust within the construction zones. This will be managed by the contractor as part of the Health and Safety Plan for the project. Where possible, the project will comply with the NT Greenhouse Action Strategy; for example, by not burning construction wastes and cleared vegetation.

Waste management

Waste management actions will be required for a number of processes undertaken during construction, such as chemical storage and use, sewage treatment, power generation, fuel storage and use, workshops and infield plant servicing. Potential impacts include management of hydrocarbons and chemicals (including spills), hazardous wastes, hard wastes, putrescible wastes and other waste types. A waste management plan will be part of the EMP. This will comply with all legislation, EPA requirements and guidelines. Illegal dumping and littering will be prohibited.

Biting insects

A number of potential disease vector species and nuisance mosquito species are present in the region. However, the two most numerous species are likely to be *Ochlerotatus* (formerly *Aedes*) *normanensis* and *Culex annulirostris*. Both are vectors of viruses that infect people. Environmental modifications resulting from construction activities could lead to increased mosquito populations. Road works could lead to the establishment of new mosquito breeding areas through pooling of stormwater and the presence of receptacles that store sufficient water to allow for out-of-season breeding of mosquitoes. All of these factors may then result in transmission of diseases by mosquitoes. Details of the safeguards and management measures are included in the EMP and this topic will also be part of the Health and Safety Plan for the project.

Infrastructure

The Victoria Highway and its associated road infrastructure, including bridges, culverts, signs and similar, and the national main trunk optical fibre cables (OFCs) are the only infrastructure in this section of the road. Damage to the OFCs will be avoided. Vibration impacts on the OFC from construction will be monitored by Telstra. Access to public areas in the Gregory National Park adjacent to the project area and to access roads, including those leading to adjacent properties, will not be impeded.

Transport

The Victoria Highway is the only sealed, arterial road in the region and is the major east to west road corridor. The estimated average annual daily traffic (AADT) volume on the Highway in the vicinity of the project area was 200 vehicles per day (vpd) in the dry season of 2004. It is estimated that an increase from 30 to 70 vpd (depending on which month of the wet season) to 190 vpd will occur over the wet season once the flood plain section of the Victoria Highway is upgraded.

A major user of the Highway in the near future will be the Department of Defence (Defence), which has a large field training area and live firing range, Bradshaw Field Training Area (BFTA), north of Timber Creek. Most deployments will occur between the 1st Brigade barracks at Palmerston and BFTA.

Mandatory safety requirements as per Australian Codes of Practice and Australian Standards will apply to all construction activities and all road users. The medium and long-term impacts of this proposal are positive owing to improved flood protection (immunity) of this section of the Victoria Highway. This project will provide a road consistent with National Highway standards and the expectations of road users. Improved road safety for road users will also be an outcome of the project.

Fire

Fires are a regular occurrence in the Victoria River region (and the Top End generally), particularly during the late wet/early dry season, when understorey grasses start to dry off and controlled burns are undertaken. Fire frequency for controlled burns in the Victoria River region is typically every three years. Fire is a medium to high risk issue for all of the Top End, not just this proposal. Fire fuel loads in and around contractor and construction sites must be controlled under legislative, common law and duty of care requirements. Mitigation measures are proposed via a Fire Management Plan as part of the EMP and as a component of the Health and Safety Plan, which includes specific reference to the Emergency Response Plan.

Socio-economic

The road easement along the section of the Highway affected by this proposal is 100 m wide. It is owned by the NT government and managed by DPI. This impact corridor has been used for road construction, maintenance and management actions for over 30 years. The key stakeholders are users of the Highway and those landowners and managers adjacent to the Highway and its proposed impact sites. A large percentage (71%) of the road reserve is located adjacent to the Gregory National Park (Victoria River Sector), which is administered by the NTPWS. Other land tenure adjacent to the Highway includes Aboriginal land, pastoral leases and private freehold.

Economic benefit

Closure of the Highway has major ramifications for interstate traffic and is of even greater importance for regional and local traffic. The current Annual Average Time of Submergence for Victoria River and Lost Creek is 113 and 52 hours respectively compared with less than 15 hours for the balance of the route and a national standard of 12 hours/year. The annual delay costs (direct costs only in the absence of detailed data on indirect costs) range from $1.45m/year to $3.56m/year. Further economic benefits accrue to this project from the widening and strengthening work.

Employment and training opportunities

DPI will undertake detailed design for the project followed by letting of a construction contract through Public Tender. The contractor or contractors appointed to undertake the works will be responsible for ensuring that maximum local employment and business opportunities are established. A DPI Specification applies to this matter, especially in relation to the employment of a percentage of the labour force from the local community.

Local employment opportunities are emphasised in the Terms and Conditions of the DPI contract that will apply to the work. The obvious opportunities for employment and training of local community members are associated with providing materials, equipment and labour for aspects of the construction work force.

Gregory National Park uses and users and other properties

DPI will ensure that its impacts accord with the Management Plan requirements for this section of the Gregory National Park. The Victoria Highway is adjacent to part of the Intensive Use Zone of the Gregory National Park. All potential borrow material sites and other access, impact and use sites are located on privately owned land and are not in the Gregory National Park. Access to most of the visitor and facility sites in the park is unlikely to be disrupted. Discussions with NTPWS at Timber Creek will be undertaken by DPI to provide for management of access during construction. Consultation with adjoining property owners and managers will be undertaken to ensure that road works do not significantly impact upon their activities.

Road users and communities

The purpose of the project is to provide enhanced access during the wet season. This will be a significant future advantage for the region and all road users. Impacts on road users will not be greatly different to road works along any other section of road. Over the past five years numerous road works programmes have been completed along major highways throughout Australia, involving construction of new bridges, new routes and passing lanes. At most, the impacts will be an inconvenience to road users by adding no more than 10 minutes to the journey between Kununurra or Timber Creek and Katherine.

In summary, the Victoria Highway is the primary route for freight defence and tourist transport in this region. The upgrading of the bridges and pavement in this section of the Highway will provide much higher flood protection for the Highway and transport using the road. This will benefit the local region, the community of Katherine to the east and Timber Creek to the west, BFTA and the broader regional communities including Kununurra and the Ord region.

Aboriginal, historic and cultural heritage values

People of seven Aboriginal language groups have traditional links to the region. Within the vicinity of the project area, there are two groups with ties to the land. The proposal for the road works along the Highway does not seek to interfere with any of these values. Consequently there has been ongoing and effective consultation with all Traditional Owner groups and field investigations to identify sites of significance.

Aboriginal heritage (archaeology)

The archaeological surveys determined that the risk of impacting archaeological sites during the construction phases of this project was low at Victoria River, Joe Creek, Lost Creek and Sandy Creek and for up to 50 m either side of the Highway. No additional assessment of these sites is required. Assessment of the proposed borrow areas will occur after clearance of potential sites by representatives of the Traditional Owners, AAPA and NLC. Areas of the potential gravel source at RG3 contain large deposits of stone artefacts. Further assessment of this site is required.

Aboriginal heritage (Sacred Sites)

The AAPA has undertaken, and is undertaking, Sacred Site clearance investigations of the project area. This includes the works proposed to be undertaken along the Highway and the potential borrow sites that were not previously assessed. AAPA will issue a Clearance Certificate for these works, which include the road and bridge works along the Highway. The only outstanding issue is the Joe Creek Bridge area. AAPA indicated that it will continue to liaise with the NLC regarding this site.

Consultation over potential borrow sites will continue to be undertaken by DPI through AAPA and the NLC with the Traditional Owners. Current land claims in region are only associated with the Gregory National Park. It is unlikely that this proposal will impact the determination of claimants and Native Title on this land area.

European heritage

No significant sites of major European heritage are recorded in the impact areas, but several sites of local significance were recorded. All these sites are clear of potential project impacts.

Combined and cumulative impacts

The region is sparsely populated and the most obvious impacts in the region are associated with pastoral management, tourism and management of the Gregory National Park. There are no other proposals for major projects in this section of the region that would add to the impact of the proposed works.

Sustainability

The NT Government aims to sustainably deliver an advanced and efficient road transport system for the Territory with the essential elements of an EMS guiding day-to-day service delivery and long-term planning. All of the EMS strategies and commitments apply to the current proposal.

CHAPTER 5 – ENVIRONMENTAL MANAGEMENT

DPI is committed to sustainable development and sound environmental management within its Department and as a component of its projects as exampled in its environmental policy for roads. Environmental management of the project will be based on DPI policy and contractual requirements as enforced through the EMP for the project. The contractor will comply with all legislative and other relevant policy, standards, guidelines and similar requirements. These include ecologically sustainable development (ESD) principles and sound environmental management practices.

DPI requires that an EMP is prepared and implemented as part of its contractual requirements and obligations. Only contractors certified under AS/NZS ISO 9001, AS/NZS ISO 14001 and AS/NZS 4801 will be considered for this project. These qualifications and systems imply that the contractor has an understanding of the stringent quality requirements applicable to this project and that there is aconcomitant reduction in risk associated with the works and the management of its impacts.

Environmental Management Plan

The EMP will outline all potential environmental impacts of the works and describe the proposed mitigation measures and techniques to be adopted during construction. An outline of a draft EMP is presented in the PER. The final EMP will be developed and managed by the contractor undertaking the works and it will be subject to DPI approval.

The objectives of the EMP will be to avoid or minimise the environmental impacts of activities associated with the planning, pre-construction, construction, and post-construction phases of the project. DPI has a legal and moral obligation to limit its adverse impacts on the environment and the contractor has the same obligations.

Future development of the EMP

It is expected that, in finalising the environmental assessment process, the authorities will establish a set of conditions for the project. These conditions will be incorporated into the final EMP that is developed by the contractor responsible for the project. DPI will ensure that this happens through its Tender and contractual requirements for the project.

In developing the EMP, the contractor will also be required to address all of the DPI Tender Specifications relating to environmental protection. Management, monitoring and review phases will be established. A set of benchmark criteria will be developed and progress measured against these criteria to determine the overall level of success of the EMP.

The final EMP will be developed in consultation with all relevant stakeholders and will apply to all environmental aspects of the project. It will include components for induction and training of all of the work force, review and audit of the EMP, licensing and approvals, monitoring and reporting requirements and a procedure for continuous improvement.

CHAPTER 6 – HEALTH AND SAFETY PROGRAM

The contractor (and any subcontractors) will at all times identify and exercise all necessary OH&S precautions. This includes the contractor and subcontractor employees, DPI employees and members of the public. The contractor will comply with all relevant statutory matters, especially requirements in legislation, including their amendments and Regulations, plus all relevant Australian Standards and construction requirements.

The contractor will ensure that all necessary permits, licences and approvals relevant to health and safety matters for the project are obtained. The contractor must also ensure that it complies with responsibilities under its obligations to due diligence, duty-of-care and common law. In addition, the contractor must consult and actively liaise will all relevant NT health and safety authorities.

Health and safety plan

Only contractors accredited under AS/NZS 4801 will be considered for this project, consequently the Health and Safety Plan will comply with all statutory and best practice requirements. The contractor will submit a copy of its OH&S management system to DPI and it will comply with the requirements of the System. The Health and Safety Plan will address all relevant elements of the NT Work Health Regulations, the National Code of Practice for the Construction Industry (APCC 1977) and Procedure 03—Safety Management, of the Civil Contractors Federation Integrated Management System. The contractor will, prior to commencement of work, prepare a Risk Assessment for the project.

An Emergency Response Plan (ERP) will be prepared by the contractor, either as a stand-alone plan or an integral part of the Health and Safety Plan. All linkages to local and regional emergency management and counter disaster plans will be included in the ERP.

CHAPTER 7 – RISK ASSESSMENT

The results of a preliminary risk assessment for the proposal are detailed in the PER. The risk assessment details and classifies broad-scale environmental risks associated with all aspects of the proposal. The methodology used for this assessment is based on the requirements of AS/NZS 4360:2004, Risk Management. The assessment provides a risk assessment ranking for individual risks to the environment. It is expected that the assessment will be subject to continuous review and expansion at a later date by the contractor that undertakes the project. The contractor's EMP will then be updated to manage all risks.

The overall risk ranking for the project is low to moderate. All risks are considered to be manageable with avoidable or minimal environmental impacts providing that management procedures and mitigation strategies are developed, followed and actively implemented.

CHAPTER 8 – PUBLIC INVOLVEMENT AND CONSULTATION

This proposal has involved consultation with representatives of a range of government and non-government groups for several years. All key stakeholders in the Commonwealth and NT governments and in the region of the project area have been consulted and their views obtained about the project and its impacts. No adverse comments have been received to date.

DPI and the contractor appointed to undertake the project are committed to maintaining effective consultation with all key stakeholders.

Chapters 9 and 10 respectively of the PER contain the references and glossary for the proposal.

Appendices, as Volume 2 of the PER, include the specialist reports commissioned by DPI to provide detailed information about specific topics.