Title of Proposal - Great Northern Highway - Bindoon Bypass

Section 1 - Summary of your proposed action

Provide a summary of your proposed action, including any consultations undertaken.

1.1 Project Industry Type

Transport - Land

1.2 Provide a detailed description of the proposed action, including all proposed activities.

The proposed action involves the construction of a new section 48 km of the Great Northern Highway (GNH) in the Bindoon region, in order to provide a bypass around Bindoon Hill and the town of Bindoon. This section of new road is referred to as the Bindoon Bypass. The Bindoon Bypass will depart from the existing GNH at the Chittering Roadhouse to the railway line just north of Mooliabeenee Road, Mooliabeenee. From here, the road will follow the railway line for approximately 12 km where it will curve to the east and tie into the existing GNH near Calingiri West Road (Figure 1). The objective of the Bindoon Bypass is to provide an alternative highway route around Bindoon Hill, allow passage of 53.3 m road trains along this section of highway and improve the safety and efficiency of freight transport.

The new Bindoon Bypass will consist of the following elements:
• approximately 33 km of dual carriage way between Chittering Roadhouse and the Bindoon-Moora Road intersection with a seal width of 9 m on a nominal formation of 11 m and median spacing between carriageways of 30 m;
• approximately 15 km of single carriageway from the Bindoon-Moora Road intersection to Calingiri West Road intersection with a seal width of 10 m on a nominal formation width of 11 m with a 1 m wide centre line treatment;
• new intersections to connect the Bindoon Bypass to existing local roads;
• seven northbound and six southbound overtaking lanes;
• bridge crossing over the Brockman River;
• installation of culverts for minor creek crossings;
• fencing of the new road reserve. The road reserve boundary has been developed on the basis of achieving an approximately 120 m reserve along the entire corridor;
• a rail crossing to connect Gingilling and Cullalla Roads to the Bindoon Bypass;
• relocation and/or reinstatement of driveways and other works as agreed with individual landowners;
• one northbound and one southbound roadside stopping (rest) areas;
• local service roads to provide controlled access to properties adjacent to the new highway;
• landscaping and revegetation within the road reserve; and
• relocation of services such as water, power and telecommunications.

1.3 What is the extent and location of your proposed action? Use the polygon tool on the

map below to mark the location of your proposed action.

Area	Point	Latitude	Longitude
Bindoon Bypass	1	-31.463606645342	116.05027303062
Bindoon Bypass	2	-31.463130771578	116.05010136925
Bindoon Bypass	3	-31.445119001981	116.04220494591
Bindoon Bypass	4	-31.412894192998	116.04314908348
Bindoon Bypass	5	-31.401649523453	116.04237660728
Bindoon Bypass	6	-31.391099553262	116.03864297233
Bindoon Bypass	7	-31.32205593237	116.03932961784
Bindoon Bypass	8	-31.304200425535	116.02654084526
Bindoon Bypass	9	-31.302403688152	116.02611169182
Bindoon Bypass	10	-31.29965351356	116.03147610985
Bindoon Bypass	11	-31.292245977466	116.03203400932
Bindoon Bypass	12	-31.277282446085	116.04078873955
Bindoon Bypass	13	-31.273321113851	116.04087457023
Bindoon Bypass	14	-31.249072669075	116.03701218925
Bindoon Bypass	15	-31.234138985042	116.03336438499
Bindoon Bypass	16	-31.213660957145	116.03645428978
Bindoon Bypass	17	-31.209440023685	116.04057416282
Bindoon Bypass	18	-31.195234281308	116.04263409935
Bindoon Bypass	19	-31.182641879061	116.04834184013
Bindoon Bypass	20	-31.184697895901	116.07040032707
Bindoon Bypass	21	-31.183706607642	116.09932526909
Bindoon Bypass	22	-31.173279094952	116.1379490789
Bindoon Bypass	23	-31.173242376329	116.14284142815
Bindoon Bypass	24	-31.169754042251	116.15743264519
Bindoon Bypass	25	-31.155946322735	116.17725953423
Bindoon Bypass	26	-31.155799421285	116.18309602104
Bindoon Bypass	27	-31.169423561834	116.17996320091
Bindoon Bypass	28	-31.169533722101	116.16953477226
Bindoon Bypass	29	-31.170378279892	116.16816148125
Bindoon Bypass	30	-31.179594486253	116.15532979332
Bindoon Bypass	31	-31.186496874005	116.14430054985
Bindoon Bypass	32	-31.192077159983	116.12207040154
Bindoon Bypass	33	-31.194940600046	116.10056981407
Bindoon Bypass	34	-31.196188739112	116.09675034843
Bindoon Bypass	35	-31.198538132689	116.09396085106
Bindoon Bypass	36	-31.19908876337	116.08739480339
Bindoon Bypass	37	-31.197730535227	116.07894048057
Bindoon Bypass	38	-31.191636623052	116.07512101494
Bindoon Bypass	39	-31.19204044865	116.06349095665
Bindoon Bypass	40	-31.195270991401	116.05409249626
Bindoon Bypass	41	-31.229038242516	116.04563817345
Bindoon Bypass	42	-31.272550835485	116.04769810997

Area	Point	Latitude	Longitude
Bindoon Bypass	43	-31.315530082135	116.04332074486
Bindoon Bypass	44	-31.35401873011	116.04340657554
Bindoon Bypass	45	-31.378130257473	116.04563817345
Bindoon Bypass	46	-31.41981613698	116.0459814962
Bindoon Bypass	47	-31.438931233207	116.04580983482
Bindoon Bypass	48	-31.450720594073	116.05156049095
Bindoon Bypass	49	-31.453942273105	116.05765446983
Bindoon Bypass	50	-31.454381584388	116.06434926353
Bindoon Bypass	51	-31.459506730441	116.05645284019
Bindoon Bypass	52	-31.464045911291	116.05404958092
Bindoon Bypass	53	-31.463606645342	116.05027303062

1.5 Provide a brief physical description of the property on which the proposed action will take place and the location of the proposed action (e.g. proximity to major towns, or for off-shore actions, shortest distance to mainland).

The proposed action is predominantly located within the Shire of Chittering in the State of Western Australia. Small areas of the project area that extend across the rail reserve are located in the Shire of Gingin. The Bindoon Bypass will be constructed between Chittering Roadhouse and Calingiri West Road. The proposed action is approximately 57.5 km to 94.5 km north east of Perth and 5 km west of Bindoon (Figure 1).

The land within the project area is a mixture of the existing GNH road reserve, local road reserves managed by the Shire, Crown reserves and privately-owned properties. The proposed action is within a predominantly agricultural landscape with fragmented patches of remnant native vegetation.

1.6 What is the size of the proposed action area development footprint (or work area) including disturbance footprint and avoidance footprint (if relevant)?

650 ha Disturbance Footprint within 3,422 ha Development Envelope

1.7 Is the proposed action a street address or lot?

Lot

1.7.2 Describe the lot number and title. Refer to Attachment A

1.8 Primary Jurisdiction.

Western Australia

1.9 Has the person proposing to take the action received any Australian Government grant funding to undertake this project?

No

1.10 Is the proposed action subject to local government planning approval?

No

1.11 Provide an estimated start and estimated end date for the proposed action.

Start date 06/2020

End date 12/2040

1.12 Provide details of the context, planning framework and State and/or Local government requirements.

The proposed action will be subject to the State regulatory framework outlined below:

- *Environmental Protection Act 1986* (WA) (EP Act);

- Environmental Protection (Noise) Regulations 1997 (WA);

- Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (WA);

- *Aboriginal Heritage Act 1972* (WA);

- *Heritage of WA Act 1990* (WA) (AH Act);

- *Rights in Water and Irrigation Act 1914* (WA) (RIWI Act);

- *Biodiversity Conservation Act 2016* (WA);

- *Biosecurity and Agriculture Management Act 2007* (WA) (BAM Act);

- *Wildlife Conservation Act 1950* (WA) (WC Act); and

The proposed action will require the following approvals and permits:

- Assessment and approval under Part IV of the EP Act;

- Works which interfere with the bed or banks of watercourses within the boundaries of areas proclaimed under the RIWI Act will require a permit under Section 17 of the Act.

- Approval under Section 18 of the AH Act will be required for works within the boundary of any known Aboriginal heritage sites.

1.13 Describe any public consultation that has been, is being or will be undertaken, including with Indigenous stakeholders.

From the commencement of planning studies associated with the proposed action, consultation has been undertaken with various parties including:

- Shire of Chittering;

- Shire of Gingin;

- Environmental Protection Authority (EPA);

- Department of the Environment and Energy (DoEE);

- Department of Water and Environmental Regulation (DWER);

- Department of Biodiversity Conservation and Attractions;

- Department of Planning, Lands and Heritage

- Department of Transport;

- Local community;

- Landowners, tenants and lease holders;

- Heavy Vehicle Liaison Group;

- Local Businesses,

- Chittering Tourist Association;

- Wheatbelt Development Commission;

- Bindoon Bypass Reference Group;

- Agricultural Lime Cartage Association; and

- Traditional Owners (TOs) of the Yued Noongar dialect group.

A number of methods have been used to communicate with stakeholders including:

- community consultation sessions;

- Heavy Vehicle Liaison Group sessions;

- project overview brochures and newsletters;

- newspaper advertising;

- media briefings/ releases;

- direct mail/ email;

- Collabmaps (online spatial comments tool);

- direct contact with key stakeholders (face-to-face meetings);

- public displays (static displays of enlarged maps – accompanied by newsletters);

- Ministerial Briefing Notes; and

- website information.

A number of issues and concerns have been raised to date. The major issues raised were:

- Bindoon town viability (reduced number of visitors to town);

- Property devaluation;

- Severance of properties and impact on economic viability;

- Noise and visual impacts;

- Environmental impacts including pollution of waterways; and

- Loss of access to water bores, dams and soaks.

Further consultation will take place as the proposed action progresses.

1.14 Describe any environmental impact assessments that have been or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the

project.

The EP Act requires all proposals that are likely to have a significant impact on the environment be assessed by the Environmental Protection Authority (EPA) to determine whether the proposal can be managed to meet the EPA's environmental objectives and whether conditions should be placed on a proponent to provide an added level of certainty that appropriate environmental management will be undertaken.

Preliminary Environmental Impact Assessment (PEIA) was undertaken for the Development Envelope related to the proposed action. The PEIA assessed the proposed action against publically available environment and heritage information, together with the results of ecological surveys undertaken specifically for the proposed action. The PEIA determined that potentially significant impacts could occur in relation to the following EPA factors:

- Flora and Vegetation;

- Terrestrial Fauna;

- Hydrological Processes;

- Inland Waters Environmental Quality; and

- Social Surroundings.

A referral under the EP Act has been prepared and will be submitted to the EPA in parallel with this EPBC Act referral. A number of pre-referral meetings have been held with the EPA and Office of the EPA (now part of DWER) to assist in preparation of the referral and scoping of ecological studies for Spring 2017.

The proposed action, which is the focus of this referral, may impact on listed threatened species and ecological communities (such as Carnaby's Black Cockatoo and the Banksia Woodlands of the Swan Coastal Plain). If it is determined that the action is a Controlled Action, it is requested that assessment is undertaken under the provisions of the bilateral agreement or an accredited assessment process.

1.15 Is this action part of a staged development (or a component of a larger project)?

No

1.16 Is the proposed action related to other actions or proposals in the region?

Yes

1.16.1 Identify the nature/scope and location of the related action (Including under the relevant legislation).

The proposed action is related to the Great Northern Highway: Muchea to Wubin Stage 2 Upgrade Project (GNH M2W). The GNH M2W project is a series of upgrades and realignments of the existing Great Northern Highway between the towns of Muchea and Wubin and consists of nine separate construction packages.

The following referrals have been submitted for the Great Northern Highway: Muchea to Wubin Stage 2 Upgrade Project:

- Walebing to Wubin (EPBC2016/7761). A referral was submitted on 12 August 2016. It was decided on 19 October 2016 that the proposal was a controlled action with the controlling provision being Threatened Species and Communities (namely Carnaby's Black Cockatoo and the Eucalypt Woodlands of the WA Wheatbelt TEC). Assessment is via Preliminary Documentation.

- Muchea North (Old Gingin Road to Chittering Roadhouse) (EPBC 2016/7656). A referral was submitted on 1 March 2016. It was decided on 10 May 2016 that the proposal was a controlled action, with the controlling provision being Threatened Species and Communities (namely Carnaby's Black Cockatoo). Assessment is via Preliminary Documentation.

- Miling Straight (EPBC 2015/7584). A referral was submitted on 19 October 2015. It was decided on 12 November 2015 that the proposal was not a controlled action.

- New Norcia Bypass (EPBC 2015/7523). A referral was submitted on 20 July 2015. It was decided on 31 August that the proposal was not a controlled action.

- Upgrade and realignment the GNH between Batty Bog and Walebing (2014/7129). A referral was submitted on 10 February 2014. It was decided on 6 March 2014 that the proposal was not a controlled action.

- Upgrade and realignment the GNH between Bindi Bindi and Lyons East Road (2012/6700). A referral was submitted on 2 January 2013. It was decided on 23 January 2013 that the proposal was not a controlled action.

The Bindoon Bypass will tie in to the Muchea North construction package at the southern end and the existing GNH near Calingiri West Road in the north.

Section 2 - Matters of National Environmental Significance

Describe the affected area and the likely impacts of the proposal, emphasising the relevant matters protected by the EPBC Act. Refer to relevant maps as appropriate. The interactive map tool can help determine whether matters of national environmental significance or other matters protected by the EPBC Act are likely to occur in your area of interest. Consideration of likely impacts should include both direct and indirect impacts.

Your assessment of likely impacts should consider whether a bioregional plan is relevant to your proposal. The following resources can assist you in your assessment of likely impacts:

• Profiles of relevant species/communities (where available), that will assist in the identification of whether there is likely to be a significant impact on them if the proposal proceeds;

• Significant Impact Guidelines 1.1 – Matters of National Environmental Significance;

• Significant Impact Guideline 1.2 – Actions on, or impacting upon, Commonwealth land and Actions by Commonwealth Agencies.

2.1 Is the proposed action likely to have ANY direct or indirect impact on the values of any World Heritage properties?

No

2.2 Is the proposed action likely to have ANY direct or indirect impact on the values of any National Heritage places?

No

2.3 Is the proposed action likely to have ANY direct or indirect impact on the ecological character of a Ramsar wetland?

No

2.4 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed species or any threatened ecological community, or their habitat?

Yes

2.4.1 Impact table

Species	Impact
Glossy-leaved Hammer Orchid (Drakaea	A known record for this species occurs within

Species	Impact
elastica) – Endangered	the project area. Direct disturbance to this location is possible, depending upon the final alignment of the road. Additional individuals may be present in suitable habitat within the project area. Further surveys are currently underway to establish the presence of this species.
Spiral Bush (Spirogardnera rubescens) – Endangered	A known record is located adjacent to the project area, in the road reserve for Hay Flat Road. This location is unlikely to be impacted. Other individuals/populations may occur within the project area. Further surveys will be undertaken in Spring 2017 to confirm is this species is present.
Grevillea corrugata – Endangered	A known location of this species is approximately 1.5 km east of the project area. Habitat for the species is present within the project area and surveys are planned for Spring 2017 to confirm if it is present.
Carnaby's Black Cockatoo (Calyptorhynchus latirostris) [Endangered] and Forest Red-tailed Black Cockatoo (C. banksii naso) [Vulnerable]	Clearing of an estimated 144 ha of foraging and/or breeding habitat for both species. Additional foraging and/or breeding habitat may be found as isolated trees within otherwise cleared paddocks, which accounts for 392 ha within the project area. Further surveys are required to accurately quantify and map habitat for each species. Clearing of an estimated 281 potential breeding trees for Carnaby's Black Cockatoo, based on current survey information. Further surveys are required to accurately define the number of potential breeding trees present, determine if any have hollows suitable for Black Cockatoos and to identify any active hollows. The number of potential (or actual) breeding impacted trees may change as a result of the surveys. An assessment against possible impacts against the EPBC Act referral guidelines for three threatened black cockatoo species was undertaken (see Attachment B). This assessment found that there is a high risk of significant impact as there is potential for clearing of more than 1 ha of quality foraging habitat, clearing or degradation of vegetation containing breeding habitat and, until further surveys are undertaken, potential for clearing of known nesting trees.

Species	Impact
Chuditch (Dasyurus geoffroii) – Vulnerable	Potential for clearing and fragmentation of habitat. Further surveys are required to determine if the species occurs in or near the project area and to map habitat.
Banksia Woodlands of the Swan Coastal Plain TEC – Endangered	Clearing of up to 70 ha of the TEC, based on current survey information. Additional surveys are required to accurately define the extent of the TEC in the project area.

2.4.2 Do you consider this impact to be significant?

Yes

2.5 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed migratory species, or their habitat?

Yes

2.5.1 Impact table

Species	Impact
Common Sandpiper (Actitis hypoleucos)	Habitat for this species may be found along the banks of the Brockman River and other creeks within the project area. Many of these creeks are dry during the summer months and as such are only likely to provide habitat in the wetter months such as August, September and May. As such, the species is likely to be an infrequent visitor the area. Clearing for road construction and installation of culverts will be required where the Bindoon Bypass crosses over creeks, while a bridge crossing is proposed for the Brockman River. The habitat present in the project area for this species does not represent critical habitat and individuals will be able to move to other areas of the Brockman River or other creeks while construction is taking place. The potential impact on the species is therefore considered negligible.
Curlew Sandpiper (Calidris ferruginea)	Wetlands within the project area may provide habitat for this species. Clearing for road construction and installation of culverts/bridges will be required in wetland areas. Most of these

Species	Impact
	areas are not permanently inundated and the species is likely to be an infrequent visitor to the area during wetter months such as August and September. The wetland areas present in the project area do not represent critical habitat and individuals will be able to move to other nearby wetlands while construction is taking place. The potential impact on the species is therefore considered negligible.
Red-necked Stint (Calidris ruficollis)	Wetlands within the project area may provide habitat for this species. Clearing for road construction and installation of culverts/bridges will be required in wetland areas. Most of these areas are not permanently inundated and the species is likely to be an infrequent visitor to the area during wetter months such as September. The wetland areas present in the project area do not represent critical habitat and individuals will be able to move to other nearby wetlands while construction is taking place. The potential impact on the species is therefore considered negligible.
Wood Sandpiper (Tringa glareola)	This species is an uncommon visitor to the southern half of Australia between September and April. Wetlands within the project area may provide habitat for this species. Clearing for road construction and installation of culverts/bridges will be required in wetland areas. Most of these areas are not permanently inundated and the species is likely to be an infrequent visitor to the area during wetter months such as September. The wetland areas present in the project area do not represent critical habitat and individuals will be able to move to other nearby wetlands while construction is taking place. The potential impact on the species is therefore considered negligible.
Common Greenshank (Tringa nebularia)	Wetlands within the project area may provide habitat for this species. Clearing for road construction and installation of culverts/bridges will be required in wetland areas. Most of these areas are not permanently inundated and the species is likely to be an infrequent visitor to the area during wetter months such as September. The wetland areas present in the project area

Species	Impact
	do not represent critical habitat and individuals will be able to move to other nearby wetlands while construction is taking place. The potential impact on the species is therefore considered negligible.
Glossy Ibis (Plegadis falcinellus)	Habitat for this species within the project area includes wetlands and seasonally inundated paddock areas. Clearing will be required in these areas. Many areas of inundation are not permanently wet and, if the species is present, individuals are likely to move out of the area during the summer months in search of better habitat (for example irrigated pastures). The project area is not considered critical habitat for the species and individuals will be able to move to other nearby wetlands while construction is taking place. The potential impact on the species is therefore considered negligible.

2.5.2 Do you consider this impact to be significant?

No

2.6 Is the proposed action to be undertaken in a marine environment (outside Commonwealth marine areas)?

No

2.7 Is the proposed action to be taken on or near Commonwealth land?

No

2.8 Is the proposed action taking place in the Great Barrier Reef Marine Park?

No

2.9 Is the proposed action likely to have ANY direct or indirect impact on a water resource related to coal/gas/mining?

No

2.10 Is the proposed action a nuclear action?

No

2.11 Is the proposed action to be taken by the Commonwealth agency?

No

2.12 Is the proposed action to be undertaken in a Commonwealth Heritage Place Overseas?

No

2.13 Is the proposed action likely to have ANY direct or indirect impact on a water resource related to coal/gas/mining?

No

Section 3 - Description of the project area

Provide a description of the project area and the affected area, including information about the following features (where relevant to the project area and/or affected area, and to the extent not otherwise addressed in Section 2).

3.1 Describe the flora and fauna relevant to the project area.

Main Roads commissioned flora and vegetation surveys of the project area in Spring 2016 (Focused Vision, 2017). The surveys identified 350 flora taxa from 183 genera and 56 families across the project area. No flora species listed under the WC Act or EPBC Act was recorded and no range extensions were identified. Seven species listed as Priority flora species by the Parks and Wildlife Service (Department of Biodiversity Conservation and Attractions) were recorded from the project area. Additional surveys are planned to confirm the presence or absence of flora species listed under the EPBC Act or WC Act.

In conjunction with the Spring 2016 flora and vegetation surveys, Bamford Consulting Ecologists undertook fauna surveys of the project area to identify the fauna values present within the project area. Nine vegetation and substrate associations (VSAs) were identified consisting of Banksia woodland, Banksia woodland with scattered Marri and/or Jarrah, Marri-Jarrah woodland, Marri-Jarrah woodland with little to no understorey, Wandoo woodland, heath, waterways or wetlands, paddocks with large remnant trees, and paddocks. These VSAs can be considered fauna habitat types.

The desktop study of the project area (Bamford, 2017) identified 46 conservation significant fauna species which may be present. Of these, 21 are listed under the WC Act and nine are listed as threatened under the EPBC Act with a further seven listed as migratory. The remainder are species that have been listed under the WA Department of Biodiversity Conservation and Attractions' Priority Fauna List. The majority of the listed species are bird species.

The Forest Red-tailed Black Cockatoo and Carnaby's Black Cockatoo were both recorded during field surveys in 2016 (Bamford, 2017). Foraging and breeding habitat for Black Cockatoos occurs within the project area with 39 records of foraging activity and 846 potential breeding trees identified (three with previously used but not currently active hollows) (**Figure 2**). The Chuditch may also occur in the project area, though none were recorded during the field survey (Bamford, 2017). If they occur, Chuditch are likely to be found in the woodland vegetation.

3.2 Describe the hydrology relevant to the project area (including water flows).

The project area lies within the Ellen Brook sub-catchment and the Brockman River sub-catchment, which are both within the Swan Avon (Main Avon) Catchment area (DoW, 2016a) (**Figure 3**). A number of streams cross the project area including Brockman River, Udumung Brook, Longbridge Gully and Lennard Brook. Water flows are generally south and east towards the Brockman River and ultimately to the Swan River. A small section of the project area, where tributaries of Lennard Brook cross, water flows are to the west, then north into Gingin Brook and ultimately the Moore River.

The Chittering – Needonga Lakes (a Nationally Important Wetland) is to the south of Gray Road, at the junction with the existing GNH, and runs parallel to the existing GNH. No direct impact to this wetland is expected, however indirect impacts may occur should Gray Road require upgrading.

3.3 Describe the soil and vegetation characteristics relevant to the project area.

The project area lies within the Dandaragan Plateau subregion of the Swan Coastal Plain Bioregion and the Northern Jarrah Forest subregion of the Jarrah Forest Bioregion, as defined by the Interim Biogeographic Regionalisation for Australia (IBRA) (DoEE; 2016). The Dandaragan Plateau is known to exhibit a degree of floristic endemism and contain a large number of rare flora (Desmond, 2001). The Northern Jarrah Forest subregion includes extensive patches of Banksia low woodland on localised sheets of sand, and granite outcrops supporting heath. This subregion has moderate species richness (Williams and Mitchell, 2001). Vegetation communities have been mapped extensively by Beard (1981), and then updated by Heddle et. al. (1980), and Mattiske and Havel (1998).

The vegetation in the area has been broadly characterised as Banksia low woodland, Jarrah–Marri woodland, Marri woodland, Bullich (Eucalyptus megacarpa) and Blackbutt (E. patens) in the valleys and Wandoo (E. wandoo) and Marri woodlands with Powderbark (E. accedens) on breakaways (Desmond 2001, Mitchell & Williams, 2001).

The Focused Vision (2017) surveys mapped 13 vegetation types (**Figure 4**), which can be broadly classified as Eucalypt woodlands, Eucalypt and Banksia woodlands, Eucalypt and Sheoak woodlands, Banksia woodlands, Melaleuca woodlands, Kunzea shrublands and Eucalypt and Melaleuca woodlands. Three of the vegetation types identified by Focused Vision (2017) are considered likely representations of the Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (Banksia Woodlands TEC) (**Figure 5**). Further surveys are planned in Spring 2017 to accurately define the extent of the Banksia Woodlands TEC.

The following Soil Landscape Systems occur within the project area (Purdie et. al., 2004):

- **Mogumber System**: Gentle to moderate sloping sandplain, varying from pale to yellow clayey sand with gravel and laterised ridges;

- **Dandaragan System**: Subdued dissected lateritic plateau, undulating low hills and rises with narrow alluvial plains. Variable deep sands and sandy gravels plus minor earths, duplexes and clays;

- **Gabbla System**: Western boundary of the Darling Plateau to the east of the Dandaragan plateau. Gently to moderately slopes. Yellow, red and grey loams and clays, with gravel common and sand pockets;

- **Capitella System**: subdued stripped lateritic plateau, undulating to gently undulating low rises with gently undulating plain including dunes; pale and yellow deep sands, sandy gravels, some duplex; from sandstones plus alluvial and aeolian deposits;

- **Yarawindah System**: dissected lateritic plateau with rolling to undulating low hills and undulating rises; loamy gravel, loamy earth, loamy duplex, some rock; weathered schist and some gneiss;

- **Udamong System**: Northern Darling Range near New Norcia. Partially stripped lateritic plateau with undulating low hills to gently undulating rises. Loamy gravel, minor pale sand and clay; deep weathered granitic gneiss, gneiss and schist; and

- **Julimar System**: Moderately dissected areas with gravelly slopes and ridges and minor rock outcrop on the eastern side of the Darling Plateau over weathered granite and granitic gneiss. loamy gravel, shallow duplexes and pale deep sand common.

3.4 Describe any outstanding natural features and/or any other important or unique values relevant to the project area.

There are no outstanding natural features in the project area. The following nature reserves are in close proximity to the project area (**Figure 6**):

- **Clune Park (Reserve 43381)** – vested in the Shire of Chittering for the purposes of public recreation

- **Reserve 42560** – under management order with the Conservation Commission of WA for the purposes of foreshore Management

- **Udumung Nature Reserve (Reserve 965)** – vested in the Conservation Commission of WA for the purpose of conservation of flora and fauna.

3.5 Describe the status of native vegetation relevant to the project area.

The 2016 spring surveys undertaken by Focused Vision (2017) found that the condition of the vegetation within the project area ranged from Completely Degraded to Excellent with over 75% represented by cleared pasture with occasional trees or stands of trees, usually native Eucalypts. Approximately 19% of the area was recorded as Good condition or better with 1.76% in Excellent condition.

The vegetation types recorded by Focused Vision in the project area have been correlated to the Shepherd et. al. (2002) vegetation associations used to assess current extent against pre-European extent (Government of Western Australia, 2016). Three vegetation communities are considered to be Vulnerable with less than 30% of their pre-European extent remaining. The communities were EwXpHh (Shepherd et. al. (2002) vegetation association 4), CcXpBe (Shepherd et. al. (2002) vegetation association 999) and EwBeNa (Shepherd et. al. (2002) vegetation association 1018).

3.6 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area.

The topography of the project area is undulating with the land surface varying from 165 m Australian Height Datum (m AHD) to 225 m AHD. Slopes are generally gentle, though can be greater than 5 degrees in creek valleys.

3.7 Describe the current condition of the environment relevant to the project area.

The project area is a mixture of areas of native vegetation and cleared paddocks. Over 75% of the project area is cleared paddock, some with occasional trees or stands of trees, usually native Eucalypts. Areas of native vegetation identified as Good to Very Good quality show some level of weed invasion. Feral and pest animals are known from the area with the feral pigeon, laughing dove, spotted dove, Long-billed Corella, Rainbow Lorikeet, house mouse, brown rat, black rat rabbit, dog, fox, feral cat, and feral pig all likely to occur.

3.8 Describe any Commonwealth Heritage Places or other places recognised as having heritage values relevant to the project area.

There are no Commonwealth Heritage Places or places listed on the WA State heritage register within the project area. Seven places listed on the Shire of Chittering's Municipal Heritage List occur within the project boundary (**Figure 7**).

3.9 Describe any Indigenous heritage values relevant to the project area.

A search of the Department of Planning, Land and Heritage Aboriginal Heritage Inquiry System identified the following Aboriginal Heritage sites that are intersected by or adjacent to the project area (**Figure 7**):

- Wetlands & Watercourses Moore River to Bullsbrook, known as Complex #42: (DAA Site ID: 19138). It is a complex of multiple sites (sites 19183, 3525, 20008, 20749 and 21614-21620) that are all registered as mythological/sacred sites associated with the Waugal. The sites specifically impacted by the proposed alignment within this complex include Boonanarring Brook (Site ID: 21616); Moore River Waugal (Site ID: 20749); Wallering Brook (Site ID: 21617); Chandala Brook (Site ID: 21620);

- Udumung Brook Artefact 1 (Other Heritage Place - Site ID: 22027); and

- Burroloo Well site (Other Heritage Place - Site ID: 3528).

It is also important to note that wetlands and watercourses are of special importance and significance to Aboriginal people. Wetlands are places that served as areas for resource procurement and are often associated with camps and sometimes with strong positive memories of earlier times (Big Island, 2015). The Traditional Yued Owners stated that watercourses are often considered to have been created by mythological beings, usually a serpent of some form which in this area is known as the Waugal (Big Island, 2015).

Ethnographic and Archaeological surveys are planned for later in 2017 to confirm the Aboriginal heritage values present in the Project area.

3.10 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the project area.

The project area is a combination of freehold privately-owned land, road reserved managed by Main Roads WA, local road reserves managed by the Shire of Chittering, and Crown reserves managed by a number of entities.

3.11 Describe any existing or any proposed uses relevant to the project area.

Existing land uses in the project area are mixed agriculture, horticulture (orchards) extractive industries and transportation (road and rail). No additional land uses are proposed for the project area.

Section 4 - Measures to avoid or reduce impacts

Provide a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action. Include, if appropriate, any relevant reports or technical advice relating to the feasibility and effectiveness of the proposed measures.

Examples of relevant measures to avoid or reduce impacts may include the timing of works, avoidance of important habitat, specific design measures, or adoption of specific work practices.

4.1 Describe the measures you will undertake to avoid or reduce impact from your proposed action.

Impact Avoidance

Corridor Selection Process

Main Roads commissioned ASJV (Arup and Jacobs Joint Venture) to undertake a corridor selection study for the Bindoon Bypass. The study was undertaken in three stages: options development; preliminary options assessment; and detailed options assessment. The purpose of the study was to identify a preferred corridor which would have the lowest social, environmental and economic impacts while improving freight efficiency, by allowing 53.5 m road trains to travel between Muchea and Wubin, and enhancing overall road safety.

The options development stage involved the creation of a constraints map to show environmental, social, geological, hydrological, existing/proposed planning developments and other constraints. This information was then used during a constraints workshop to identify corridors for further investigation. A total of seven preliminary corridor options were identified as shown on **Figure 8**.

The preliminary corridor options were taken forward into the preliminary options assessment stage. This stage involved rapid multi-criteria analysis (MCA) of the seven preliminary corridor options, based on desktop data for environmental, heritage and social impact assessment. Travel time data was used to assess freight efficiency and construction cost estimates were produced for each corridor. The “Previously endorsed PDNH”, “Brand Highway North” and “Brand Highway South” options were discounted on the basis of potential significant environmental impacts. The “Brand Highway North” and “Brand Highway South” options were also discounted as they were considered too long to be efficient for 53.5 m road trains. The “GNH minimum upgrade” option was discounted on the basis of fright efficiency and travel time. Three options (“Hybrid Calingiri” – renamed Western Bypass Corridor A, “Hybrid Hill” – renamed Western Bypass Corridor B and “GNH full upgrade” – renamed Eastern Bypass Corridor C) were taken forward to a detailed MCA process.

The detailed MCA was structured around the six objectives of road safety, freight efficiency, network reliability, travel wellbeing, sustainability and environment, which were scored against a number of criteria on a scale of 1 to 5 with 5 being the best possible score. Western Bypass Corridor A was the best performing option in the detailed MCA. This strong performance in the MCA, combined with a comparable cost to the cheapest option, a good BCR, the least risks to delivery of the project, and better travel characteristics, resulted in the Western Bypass Corridor A being endorsed by the WA Minister for Transport as the preferred corridor on 12 January 2017, following approval by the Western Australian Planning Commission. Western Bypass Corridor A is the subject of this referral. Further Details on Western Bypass Corridor B and Eastern Bypass Corridor C are provided in Section 8 (Proposed Alternatives).

Concept Design Process

Information from the surveys already completed, together with information gathered from planned surveys has been and will continue to be fed into the design process. Where practicable, the road design and alignment will avoid areas of high environmental significance such as Black Cockatoo nesting trees, trees with hollows suitable for Black Cockatoos and occurrences of the Banksia Woodland TEC. It may not be practicable to avoid all environmentally significant areas due to other project constraints such as links to existing and proposed roads, road geometry, and the locations of significant heritage sites, existing houses and other structures. The proposed alignment will be selected to minimise impacts to flora and fauna while achieving the project objectives of improved road safety and geometry.

Environmental Management

The following measures are proposed to reduce or avoid impacts to Matters of National Environmental Significance, particularly Black Cockatoos and the Banksia Woodland TEC:

- Additional surveys will be undertaken in Spring 2017 to accurately define the extent of the Banksia Woodland TEC, locations of trees with hollows suitable for Black Cockatoos and confirm the presence or absence of any other species listed under the EPBC Act within the project area, for example Chuditch and *Drakaea elastica*.

- Where clearing of the Banksia Woodland TEC is unavoidable, the clearing footprint shall be kept to that required for safe working conditions. No additional areas of laydown, vehicle turn-around or the like will be cleared within occurrences of the Banksia Woodland TEC.

- Trees known to contain hollows suitable for use by Carnaby’s Black Cockatoo will be physically inspected for fledglings prior to being felled, if clearing is occurring during cockatoo breeding season.

- The area to be cleared will be accurately pegged/marked on the ground. Laydown and other ancillary areas will be located outside of areas of native vegetation (e.g. in paddock areas).

- Weed and hygiene control measures will be in place during construction. These will include verifying all plant and machinery as clean prior to arrival at site and segregating stripped topsoil according to its weed and disease status.

- During construction, vehicle speed on site will be limited to reduce the risk of vehicle-fauna collisions.

- Where clearing of trees with previously used or hollows suitable for Carnaby's Black Cockatoo is unavoidable, artificial hollows will be installed as agreed between Main Roads WA, DoEE and the EPA (as appropriate) via the offset proposal for the project.

4.2 For matters protected by the EPBC Act that may be affected by the proposed action, describe the proposed environmental outcomes to be achieved.

Potential impacts to Carnaby's Black Cockatoo and the Banksia Woodlands of the Swan Coastal Plain considered the most significant impacts from the proposed action. As such, environmental outcome have only been proposed for these two Matters of National Environmental Significance.

The proposed environmental outcomes for Black Cockatoos are:

- no net loss of known nesting hollows for Black Cockatoos;

- minimise loss of Black Cockatoo foraging habitat;

- no mortality of Black Cockatoos as a result of clearing activities associated with the proposed action; and

- minimise the risk of introduction or spread of weeds or disease that may impact on habitat for Black Cockatoos.

The proposed environmental outcomes for the Banksia Woodland TEC are:

- minimise clearing of the Banksia Woodland TEC; and

- provide appropriate offsets for unavoidable residual impacts to the TEC.

Section 5 – Conclusion on the likelihood of significant impacts

A checkbox tick identifies each of the matters of National Environmental Significance you identified in section 2 of this application as likely to be a significant impact.

Review the matters you have identified below. If a matter ticked below has been incorrectly identified you will need to return to Section 2 to edit.

5.1.1 World Heritage Properties

No

5.1.2 National Heritage Places

No

5.1.3 Wetlands of International Importance (declared Ramsar Wetlands)

No

5.1.4 Listed threatened species or any threatened ecological community

Listed threatened species and communities - Yes

5.1.5 Listed migratory species

No

5.1.6 Commonwealth marine environment

No

5.1.7 Protection of the environment from actions involving Commonwealth land

No

5.1.8 Great Barrier Reef Marine Park

No

5.1.9 A water resource, in relation to coal/gas/mining

No

5.1.10 Protection of the environment from nuclear actions

No

5.1.11 Protection of the environment from Commonwealth actions

No

5.1.12 Commonwealth Heritage places overseas

No

5.2 If no significant matters are identified, provide the key reasons why you think the proposed action is not likely to have a significant impact on a matter protected under the EPBC Act and therefore not a controlled action.

Not applicable

Section 6 – Environmental record of the person proposing to take the action

Provide details of any proceedings under Commonwealth, State or Territory law against the person proposing to take the action that pertain to the protection of the environment or the conservation and sustainable use of natural resources.

6.1 Does the person taking the action have a satisfactory record of responsible environmental management? Please explain in further detail.

Main Roads WA is a State agency with a demonstrable record of responsible environmental management and environmental management systems. Main Roads recognises the importance of the natural environmental and social values and the broader benefits that these values provide to the community.

Main Roads WA is committed to protecting the natural environmental and social values in all of their activities. All work undertaken by Main Roads WA is completed in accordance with their Environmental Policy and Environmental Management System (EMS) that is implemented, maintained, continually improved and compliant with ISO 14001:2015. Main Roads EMS holds Certificate No. MRWQ51–CCE02 which complies with the requirements of ISO 14001:2015 environmental management systems comprising ‘Activities, products and services associated with delivering Road Management (planning, building and maintaining) on Western Australia’s State Road Network’. The EMS was certified in 8 January 2008 and expiring on 8 June 2019.

Main Roads WA has a demonstrated history of responsible environmental management associated with the construction of new and upgraded road infrastructure projects in Western Australia. Examples of these projects include:

- New Norcia Bypass, Great Northern Highway Upgrade;

- Bindi Bindi to Lyons East Road, Great Northern Highway Upgrade;

- Batty Bog Road to Walebing, Great Northern Highway Upgrade;

- Gateway WA - Perth Airport and Freight Access;

- Bunbury Port Access Road; and

- New Perth to Bunbury Highway.

6.2 Provide details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against either (a) the person proposing to take the action or, (b) if a permit has been applied for in relation to the action – the person making the application.

Not Applicable

6.3 If it is a corporation undertaking the action will the action be taken in accordance with the corporation's environmental policy and framework?

Yes

6.3.1 If the person taking the action is a corporation, please provide details of the corporation's environmental policy and planning framework.

Main Roads WA's EMS is independently certified and covers all of their processes and activities that have the potential to impact on the environment. The EMS enables compliance with Main Roads WA's environment and heritage compliance obligations, providing the framework for driving environmental requirements throughout leadership, planning, support, operation, performance evaluation and improvement actions. The proposed action, therefore, will be undertaken, monitored and measured in accordance with the Main Roads WA EMS.

Main Roads WA Environmental Policy commits to protecting and enhancing the natural environmental and social values in all Main Roads WA activities.

6.4 Has the person taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?

Yes

6.4.1 EPBC Act No and/or Name of Proposal.

Main Roads WA has referred over 30 proposals under the EPBC Act since January 2013. The 10 most recent referrals are:

- 2017/7972: Armadale Road Duplication - Tapper to Anstey Road;

- 2017/7934: Road Widening Kojonup South SLK 254.9 to SLK 259.8;

- 2017/7907: Albany Highway Crossman Intersection Improvements;

- 2017/7884: Indian Ocean Drive Passing Lane and Widening 52-258 SLK;

- 2017/7880: Marble Bar Road (M030) Coongan Gorge Realignment;

- 2017/7864: Brand Highway Widening and Passing Lanes Project 34.83-164.3 SLK:

- 2016/7811: South Western Highway upgrade (Padbury Hill Stage 2);

- 2016/7777: South Coast Highway Cheynes East Intersection upgrade and realignment;

- 2016/7762: Upgrade section of Albany Highway, Harold Road Passing Lane; and

- 2016/7761: Great Northern Highway, Muchea to Wubin Upgrade Stage 2-Walebing to Wubin. ????

Section 7 – Information sources

You are required to provide the references used in preparing the referral including the reliability of the source.

7.1 List references used in preparing the referral (please provide the reference source reliability and any uncertainties of source).

Reference Source	Reliability	Uncertainties
Bamford (2017) Great Northern Highway: Bindoon Bypass Fauna Assessment, Prepared for ASJV	The information sources used to inform this referral are both recent and reliable. Database searches and field surveys were undertaken in 2016. Field surveys followed regulatory requirements set out in published guidance material.	There are no uncertainties
Beard, J.S., 1981. Swan 1:1000000 vegetation series: explanatory notes to sheet 7: the vegetation of the Swan area. University of Western Australia, Nedlands, WA.	The information sources used to inform this referral are reliable	There are no uncertainties
Desmond, A., 2001. Swan Coastal Plain 1 (SWA1 – Dandaragan Plateau subregion). A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002.	The information sources used to inform this referral are reliable	There are no uncertainties
DoEE (2016h) Interim Biogeographic Regionalisation for Australia, Version 7; Australian Government Department of the Environment and Energy, Canberra, October 2016	The information sources used to inform this referral are both recent and reliable.	There are no uncertainties
Focused Vision Consulting (2017) Level 2 Flora and Vegetation Assessment and Targeted Thelymitra Stella Survey – Great Northern Highway, Muchea to Wubin Upgrades, Stage 2 Bindoon	The information sources used to inform this referral are both recent and reliable. Database searches and field surveys were undertaken in 2016. Field surveys followed regulatory requirements set out in	There are no uncertainties

Reference Source	Reliability	Uncertainties
Options Feb 2017	published guidance material.	
Government of Western Australia. (2016). 2016 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of June 2016. WA Department of Parks and Wildlife, Perth	The information sources used to inform this referral are both recent and reliable.	There are no uncertainties
Heddle, E. M., Loneragan, O. W., and Havel, J. J (1980) Atlas of Natural Resources Darling System, Western Australia. Department of Conservation and Environment.	The information sources used to inform this referral are reliable	There are no uncertainties
Mattiske, EM and Havel JJ 1998 Vegetation Mapping in the South West of Western Australia and Regional Forest Agreement vegetation complexes. Map sheets for Pemberton, Collie, Pinjarra, Busselton, Margaret River, Mt Barker, and Perth, Western Australia. Scale 1:250,000. Department of Conservation and Land Management, Perth	The information sources used to inform this referral are reliable	There are no uncertainties
Purdie, B R, Tille, P J, and Schoknecht, N R. (2004), Soil-landscape mapping in south-Western Australia : an overview of methodology and outputs. Department of Agriculture and Food, Western Australia, Perth. Report 280	The information sources used to inform this referral are recent and reliable	There are no uncertainties
Shepherd, D.P., Beeston, G.R., Hopkins, A.J., 2002. Native vegetation in Western Australia : extent, type and status (No. 249). Department of Agriculture and Food, Western Australia	The information sources used to inform this referral are recent and reliable	There are no uncertainties
Williams, K., Mitchell, D., (2001). Jarrah Forest 1 (JF1 - Northern Jarrah Forest Subregion), in: May, J.E., McKenzie, N.L. (Eds.), A	The information sources used to inform this referral are reliable	There are no uncertainties

Reference Source	Reliability	Uncertainties
Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002. Department of Conservation and Land Management, Perth		

Section 8 – Proposed alternatives

You are required to complete this section if you have any feasible alternatives to taking the proposed action (including not taking the action) that were considered but not proposed.

8.0 Provide a description of the feasible alternative?

A wide range of corridors were investigated including the previously endorsed Perth Darwin National Highway (PDNH), Brand Highway alternatives and hybrid GNH/PDNH corridors. Two Multi Criteria Analysis (MCA) processes were undertaken to refine the number of preliminary corridors for the Bindoon Bypass from sixteen down to three; Western Bypass Corridor A (the proposed action); Western Bypass Corridor B; and Eastern Bypass Corridor C.

The three corridors were presented to the Minister for Transport on 21 March 2016 (**Figure 9**). Approval was received to undertake further analysis and a public consultation process. Following the public consultation, the GNH M2W team developed a detailed MCA framework to assess the three corridors. The detailed MCA structured around the following six objectives which were scored against a number of criteria on a scale of 1 to 5 with 5 being the best possible score:

- Improve Road Safety - provide a safe route that minimises conflicts between varies types of vehicles and hence reduces the risk of death, serious injury or damage;

- Increase Freight Efficiency - minimise fuel usage and reduce delays for all road users;

- Improve Network Reliability - provide consistent and predictable travel times, and improve network reliability and access;

- Enhance Travel Wellbeing - improve roadside amenities and provide a higher perceived level of safety for all road users;

- Contribute to Sustainable and Viable Communities - minimise interruption to the livelihood of the local community due to the land take, noise and visual impact, socioeconomic impact and heritage impact; and,

- Enhance the Environment - minimise environment impact and retain the environmental value of the area.

The environmental criteria considered were:

- Threatened Ecological Communities / Priority Ecological Communities;

- reserves, conservation covenants and other conservation areas;

- Black Cockatoo habitat (foraging, breeding/nesting);

- conservation significant flora;

- native / remnant vegetation clearing;

- wetlands and watercourses; and

- landforms.

In addition to the detailed MCA, the three corridors were assessed and compared in terms of cost, economics (Benefit Cost Ratio (BCR)), project delivery risks and other engineering considerations.

Once the scoring was completed, the scores were combined with each objective given equal weighting. This resulted in Western Bypass Corridor A achieving the highest (best) score. Sensitivity Analysis was undertaken for each objective to determine what effect, if any, this would have. In all cases, Western Bypass A was still the best performing option. A weighting of 60% or more for the Environmental Objective was required to change the outcome of the MCA from Western Bypass Corridor A to Eastern Bypass Corridor C.

This strong performance in the MCA, combined with a comparable cost to the cheapest option, a good BCR, the least risks to delivery of the project, and better travel characteristics, resulted in the Western Bypass Corridor A being endorsed by the WA Minister for Transport as the preferred corridor on 12 January 2017, following approval by the Western Australian Planning Commission.

Not taking the action is not considered a viable alternative for the following reasons:

- The steep grades at Bindoon Hill represent an obstacle for 53.3 m road trains. An alternative route around Bindoon Hill is required to allow passage of 53.3 m road trains and improve the efficiency of freight transport along the highway.

- Additionally, the steep grades at Bindoon Hill present a hazard to heavy vehicles and other road users. Heavy vehicles slow down to extremely slow speeds travelling uphill, while on the

downhill side, there is a risk of heavy vehicles being unable to control the increase in speed, presenting a higher risk of collisions or vehicle rollovers. The Bindoon Bypass eliminates the need for heavy vehicles to travel this section of road.

- Heavy vehicles currently travel through the town of Bindoon, creating a community safety hazard. Bindoon Primary School is located approximately 180 m east of the existing GNH at the northern end of Bindoon. The Bindoon Bypass will remove heavy vehicles from the town (except those servicing Bindoon), providing an increase in community safety and amenity.

8.1 Select the relevant alternatives related to your proposed action.

Locations

8.3 What is the extent and location of your proposed alternative action?

Area	Point	Latitude	Longitude
Eastern Bypass Corridor C	1	-31.466095791806	116.05147466026
Eastern Bypass Corridor C	2	-31.466095791806	116.05138882957
Eastern Bypass Corridor C	3	-31.455919157653	116.05799779259
Eastern Bypass Corridor C	4	-31.44705946068	116.06452092491
Eastern Bypass Corridor C	5	-31.443251730185	116.06786832176
Eastern Bypass Corridor C	6	-31.431461429632	116.07550725304
Eastern Bypass Corridor C	7	-31.415421311106	116.09044179283
Eastern Bypass Corridor C	8	-31.413883073405	116.09524831138
Eastern Bypass Corridor C	9	-31.412564563872	116.1010847982
Eastern Bypass Corridor C	10	-31.40904844786	116.10494717918
Eastern Bypass Corridor C	11	-31.394836136623	116.11086949669
Eastern Bypass Corridor C	12	-31.388974763064	116.10906705223

Area	Point	Latitude	Longitude
Eastern Bypass Corridor C	13	-31.376957803496	116.10417470299
Eastern Bypass Corridor C	14	-31.368017360812	116.1033163961
Eastern Bypass Corridor C	15	-31.36017545275	116.10812291466
Eastern Bypass Corridor C	16	-31.346322259924	116.11516103111
Eastern Bypass Corridor C	17	-31.344636282365	116.1204825338
Eastern Bypass Corridor C	18	-31.339358244219	116.12297162376
Eastern Bypass Corridor C	19	-31.329901018733	116.12228497825
Eastern Bypass Corridor C	20	-31.325941897982	116.12588986717
Eastern Bypass Corridor C	21	-31.31604336764	116.13455876671
Eastern Bypass Corridor C	22	-31.307170467297	116.14211186729
Eastern Bypass Corridor C	23	-31.308270459005	116.14640340172
Eastern Bypass Corridor C	24	-31.309077111428	116.1502657827
Eastern Bypass Corridor C	25	-31.299836861027	116.14863499962
Eastern Bypass Corridor C	26	-31.286194835314	116.15661725365
Eastern Bypass Corridor C	27	-31.284434430125	116.15893468223
Eastern Bypass Corridor C	28	-31.278346108812	116.15987881981
Eastern Bypass Corridor C	29	-31.276438842975	116.16176709495
Eastern Bypass Corridor C	30	-31.274824972527	116.16717442833
Eastern Bypass Corridor C	31	-31.257510807423	116.17755994163
Eastern Bypass Corridor C	32	-31.252154511372	116.1778174337
Eastern Bypass Corridor C	33	-31.244963389537	116.17652997337
Eastern Bypass Corridor C	34	-31.197987498804	116.17524251304
Eastern Bypass Corridor C	35	-31.194169682399	116.1748133596

Area	Point	Latitude	Longitude
Eastern Bypass Corridor C	36	-31.190278287939	116.17421254478
Eastern Bypass Corridor C	37	-31.182641879062	116.17618665062
Eastern Bypass Corridor C	38	-31.155762695888	116.18253812157
Eastern Bypass Corridor C	39	-31.155762695888	116.18425473533
Eastern Bypass Corridor C	40	-31.168395393163	116.18142232262
Eastern Bypass Corridor C	41	-31.183009028201	116.17755994163
Eastern Bypass Corridor C	42	-31.189176920833	116.17661580406
Eastern Bypass Corridor C	43	-31.197693826088	116.17764577232
Eastern Bypass Corridor C	44	-31.225001488518	116.17833241783
Eastern Bypass Corridor C	45	-31.243642511711	116.17850407921
Eastern Bypass Corridor C	46	-31.252448014916	116.18142232262
Eastern Bypass Corridor C	47	-31.260078786781	116.17919072471
Eastern Bypass Corridor C	48	-31.272697555659	116.17301091514
Eastern Bypass Corridor C	49	-31.278126041645	116.16871938072
Eastern Bypass Corridor C	50	-31.27973985561	116.1644278463
Eastern Bypass Corridor C	51	-31.286634931476	116.16116628013
Eastern Bypass Corridor C	52	-31.295729792203	116.15464314781
Eastern Bypass Corridor C	53	-31.304090422187	116.15206822716
Eastern Bypass Corridor C	54	-31.310837056373	116.15241154991
Eastern Bypass Corridor C	55	-31.315383428619	116.14297017418
Eastern Bypass Corridor C	56	-31.329021228512	116.1294089254
Eastern Bypass Corridor C	57	-31.336645803882	116.13026723228
Eastern Bypass Corridor C	58	-31.343536715504	116.12649068199

Area	Point	Latitude	Longitude
Eastern Bypass Corridor C	59	-31.349694124385	116.11550435387
Eastern Bypass Corridor C	60	-31.363766688108	116.1100111898
Eastern Bypass Corridor C	61	-31.368896786335	116.10760793053
Eastern Bypass Corridor C	62	-31.370655612695	116.10812291466
Eastern Bypass Corridor C	63	-31.374319728552	116.11395940147
Eastern Bypass Corridor C	64	-31.381647531609	116.11722096763
Eastern Bypass Corridor C	65	-31.394543076635	116.11807927452
Eastern Bypass Corridor C	66	-31.40406705796	116.11653432213
Eastern Bypass Corridor C	67	-31.412564563872	116.10932454429
Eastern Bypass Corridor C	68	-31.414322572465	116.09859570824
Eastern Bypass Corridor C	69	-31.415421311106	116.09567746483
Eastern Bypass Corridor C	70	-31.418717449816	116.09327420555
Eastern Bypass Corridor C	71	-31.423478334577	116.0921584066
Eastern Bypass Corridor C	72	-31.425382620811	116.08872517906
Eastern Bypass Corridor C	73	-31.422892392572	116.0869227346
Eastern Bypass Corridor C	74	-31.425455861817	116.08409032188
Eastern Bypass Corridor C	75	-31.434610537049	116.07550725304
Eastern Bypass Corridor C	76	-31.443105275922	116.07164487205
Eastern Bypass Corridor C	77	-31.449402602534	116.07018575035
Eastern Bypass Corridor C	78	-31.453869054358	116.06726750694
Eastern Bypass Corridor C	79	-31.456285242805	116.0638342794
Eastern Bypass Corridor C	80	-31.460824579808	116.05705365501
Eastern Bypass Corridor C	81	-31.466535046077	116.0526762899

Area	Point	Latitude	Longitude
Eastern Bypass Corridor C	82	-31.466095791806	116.05147466026
Western Bypass Corridor B	1	-31.46594241432	116.05127173254
Western Bypass Corridor B	2	-31.463782713973	116.05277376959
Western Bypass Corridor B	3	-31.455729154843	116.05127173254
Western Bypass Corridor B	4	-31.443501063989	116.05152922461
Western Bypass Corridor B	5	-31.438008887094	116.05101424048
Western Bypass Corridor B	6	-31.434640192692	116.04732352087
Western Bypass Corridor B	7	-31.4286348285	116.0426886637
Western Bypass Corridor B	8	-31.403071110488	116.04328947852
Western Bypass Corridor B	9	-31.398602238317	116.04328947852
Western Bypass Corridor B	10	-31.377940097033	116.05032759497
Western Bypass Corridor B	11	-31.373616591742	116.05135756323
Western Bypass Corridor B	12	-31.357200116227	116.06345969031
Western Bypass Corridor B	13	-31.338214992747	116.07830839941
Western Bypass Corridor B	14	-31.333009907493	116.08423071692
Western Bypass Corridor B	15	-31.330223968939	116.09075384924
Western Bypass Corridor B	16	-31.328317752942	116.09204130957
Western Bypass Corridor B	17	-31.322525552109	116.09272795508
Western Bypass Corridor B	18	-31.317319599203	116.09083967993
Western Bypass Corridor B	19	-31.311600051562	116.08929472754
Western Bypass Corridor B	20	-31.311013411653	116.0850890238
Western Bypass Corridor B	21	-31.307860159542	116.08500319311
Western Bypass	22	-31.306466828475	116.09719115088

Area	Point	Latitude	Longitude
Corridor B Western Bypass	23	-31.305586819288	116.10302763769
Corridor B Western Bypass	24	-31.302726732666	116.108177479
Corridor B Western Bypass	25	-31.302506722406	116.11530142615
Corridor B Western Bypass	26	-31.307860159542	116.12542944739
Corridor B Western Bypass	27	-31.310500098734	116.13469916174
Corridor B Western Bypass	28	-31.306906829985	116.1417372782
Corridor B Western Bypass	29	-31.309106806713	116.15032034705
Corridor B Western Bypass	30	-31.299719881324	116.14860373328
Corridor B Western Bypass	31	-31.286151188274	116.15650015662
Corridor B Western Bypass	32	-31.284317431307	116.15907507727
Corridor B Western Bypass	33	-31.278229102439	116.16001921484
Corridor B Western Bypass	34	-31.276321834236	116.16190748999
Corridor B Western Bypass	35	-31.274707961787	116.16731482336
Corridor B Western Bypass	36	-31.257540518952	116.1774428446
Corridor B Western Bypass	37	-31.251890720223	116.17795782873
Corridor B Western Bypass	38	-31.245139868032	116.17649870703
Corridor B Western Bypass	39	-31.197943810982	116.1752112467
Corridor B Western Bypass	40	-31.19030802061	116.17400961706
Corridor B Western Bypass	41	-31.155718988581	116.18250685522
Corridor B Western Bypass	42	-31.155718988581	116.18422346899
Corridor B Western Bypass	43	-31.18920665385	116.17658453772
Corridor B Western Bypass	44	-31.197723556429	116.17761450598
Corridor B Western Bypass	45	-31.243892375122	116.17855864355

Area	Point	Latitude	Longitude
Corridor B Western Bypass	46	-31.252404352261	116.18139105627
Corridor B Western Bypass	47	-31.259888387792	116.17924528906
Corridor B Western Bypass	48	-31.272800622384	116.17289381811
Corridor B Western Bypass	49	-31.278155746683	116.16868811438
Corridor B Western Bypass	50	-31.279989623472	116.16413908789
Corridor B Western Bypass	51	-31.286884681075	116.16096335242
Corridor B Western Bypass	52	-31.295979517708	116.15452605078
Corridor B Western Bypass	53	-31.304266790097	116.15177946875
Corridor B Western Bypass	54	-31.310793420745	116.15220862219
Corridor B Western Bypass	55	-31.310646759854	116.14637213538
Corridor B Western Bypass	56	-31.309400133062	116.14156561682
Corridor B Western Bypass	57	-31.312260017094	116.13564329932
Corridor B Western Bypass	58	-31.309253470002	116.12294035742
Corridor B Western Bypass	59	-31.304046783433	116.11444311926
Corridor B Western Bypass	60	-31.304120119045	116.10877829382
Corridor B Western Bypass	61	-31.306686829487	116.10345679114
Corridor B Western Bypass	62	-31.308960143196	116.1000235636
Corridor B Western Bypass	63	-31.312186687819	116.09616118262
Corridor B Western Bypass	64	-31.317246273867	116.09453039954
Corridor B Western Bypass	65	-31.322232266638	116.09444456885
Corridor B Western Bypass	66	-31.32787785146	116.09427290747
Corridor B Western Bypass	67	-31.330737174343	116.09375792334
Corridor B Western Bypass	68	-31.333303159386	116.09118300269

Area	Point	Latitude	Longitude
Corridor B Western Bypass	69	-31.337042040919	116.08543234656
Corridor B Western Bypass	70	-31.339021388648	116.08165579626
Corridor B Western Bypass	71	-31.343346485076	116.08191328833
Corridor B Western Bypass	72	-31.375008928724	116.05573492834
Corridor B Western Bypass	73	-31.399627899923	116.04672270605
Corridor B Western Bypass	74	-31.428122157638	116.04595022986
Corridor B Western Bypass	75	-31.43654425223	116.05333166907
Corridor B Western Bypass	76	-31.455509502619	116.05376082251
Corridor B Western Bypass	77	-31.463343446789	116.05496245215
Corridor B Western Bypass	78	-31.466491482736	116.05255919287
Corridor B Western Bypass	79	-31.4664182738	116.05255919287
Corridor B Western Bypass	80	-31.46594241432	116.05127173254
Corridor B			

8.4 Provide a brief physical description of the property on which the alternative proposed action will take place and the project location (e.g. Proximity to major towns, or for off-shore projects, shortest distance to mainland.

Both Western Bypass Corridor B and the Eastern Bypass Corridor C options are located in the Shire of Chittering in the State of Western Australia between Chittering Roadhouse and Calingiri West Road. Western Bypass Corridor B passes approximately 5 km to the west of the town of Bindoon while the Eastern Bypass Corridor C passes approximately 1.6 km to the east. A large portion of the Eastern Bypass Corridor C followed the current GNH alignment while Western Bypass Corridor B is largely over land where there are currently no roads.

8.5 What is the size of the development footprint or work area of the alternative?

Western Bypass Corridor B: 450 ha and Eastern Bypass Corridor C: 416 ha

8.6 Is the alternative proposal a street address or lot?

Lot

8.6.2 Describe the lot number associated with the alternative proposal.

The land associated with the alternative proposals is a mixture of the existing GNH road reserve, local road reserves managed by the Shire, Crown reserves and privately-owned properties. A complete list of lots for each alternative corridor is provided as **Attachment C.**

8.7 Is there a different local government area and council contact for the alternative?

No

8.8 Provide details of the context, planning framework and State/Local Government requirements.

This information is the same as for the proposed action.

8.9 Describe any public consultation that has been, is being or will be undertaken (including with Indigenous stakeholders).

Consultation for the alternatives was undertaken in conjunction with the proposed action. The information provided in Section 1.13 provides the consultation undertaken to date for the alternatives as well as the proposed action.

8.10 Describe any environmental impact assessments that have been, is being or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the project for the alternative.

N/A

8.11 Is the alternative activity part of a staged development or a component of a larger project?

No

8.12 Nominate any matters of National Environmental Significance that are likely to be impacted by this alternative proposal by ticking the relevant checkboxes.

- Listed threatened species or any threatened ecological community
- Listed migratory species

8.12.1 Please provide further information on potential impacts of matters of environmental significance that you have nominated above.

Western Bypass Corridor B was likely to result in clearing of 71.3 ha of habitat for Black Cockatoos and 26 ha of vegetation likely to include the Banksia Woodlands TEC and additional 40 ha of native vegetation is in areas identified as possibly containing the TEC. Eastern Bypass Corridor C was likely to result in clearing of 94.5 ha of habitat for Black Cockatoos. Approximately 90 ha of native vegetation within the development footprint for Eastern Bypass Corridor C is within the area identified as potentially containing the Banksia Woodlands TEC.

Impacts in relation to listed migratory species are expected to be similar to that identified for the proposed action and are not expected to be significant.

It should be noted that these alternative corridor options do not account for clearing required for intersections, side roads, service roads and driveways.

8.13 Describe any impacts on the flora and fauna relevant to the alternative proposal.

Other than the impacts identified in Section 8.12.1, the MCA estimated the clearing of native vegetation required for each alternative was 71.3 ha for Western Bypass Corridor B and 94.5 ha for Easter Bypass Corridor. This information was based on publicly available data as survey data for the alternative corridors was not available.

It should be noted that these alternative corridor options do not account for clearing required for intersections, side roads, service roads and driveways.

8.14 Describe the hydrology relevant to the alternative proposal (including water flows).

Western Bypass Corridor B

Western Bypass Corridor B lies within the Brockman River catchment, with the exception of a small area that is within the headwaters of Lennard Brook, which is in the Gingin Brook catchment. Water flows within the Brockman River catchment are south and east towards the Brockman River and ultimately to the Swan River. The section within the Gingin Brook catchment flows towards the west.

Eastern Bypass Corridor C

The Eastern Bypass Corridor C is within the Brockman River catchment. Water flows are generally to the west into Longbridge Gully, Wootra Brook, Chittering-Needonga Lakes, Brockman River and other un-named creeks. The Eastern Bypass Corridor C passes through the Chittering-Needonga Lakes, a listed Nationally Important Wetland. In this area, it follows the alignment of the existing GNH, however construction works would be required to widen the road. The majority of the area of this alternative is upstream of the Chittering-Needonga Lakes.

8.15 Describe the soil and vegetation characteristics relevant to the alternative proposal.

The Vegetation Characteristics are similar to those described for the proposed action in Section 3.3. The following soil landscape systems occur within both alternative areas (Purdie *et. al.*, 2004):

- Bindoon System: Gentle to steep hills with gentle valleys on metamorphic gneiss and schist, and dolerite. Variable soils;

- Nooning System: Brockman river valley flattish valley floors of the upper that is prone to salinity. Loams, clays and gleyed salty sandy clays and gravelly soils are present;

- Gabbla System: Western boundary of the Darling Plateau to the east of the Dandaragan plateau. Gently to moderately slopes. Yellow, red and grey loams and clays, with gravel common and sand pockets;

- Wundowie System: Intact undulating lateritic terrain with minor rock outcrops in the north eastern Darling Range. "Buckshot" gravels, duricrust and some deep sands;

- Udamong System: Northern Darling Range near New Norcia. Partially stripped lateritic plateau with undulating low hills to gently undulating rises. Loamy gravel, minor pale sand and clay; deep weathered granitic gneiss, gneiss and schist; and???????

- Julimar System: Moderately dissected areas with gravelly slopes and ridges and minor rock outcrop on the eastern side of the Darling Plateau over weathered granite and granitic gneiss. loamy gravel, shallow duplexes and pale deep sand common.

Western Bypass Corridor B also includes the Mogumber System, as described in Section 3.3.

8.16 Describe any outstanding natural features and/or unique values relevant to the alternative proposal.

There are no outstanding natural features or unique values of the areas for the alternative actions.

8.17 Describe the remnant native vegetation relevant to the alternative proposal.

The condition of the vegetation is expected to be similar to that mapped for the proposed action, given the proximity of the alternatives to the proposed action. It has been estimated that 84% of the Western Bypass Corridor B and 77% of Eastern Bypass Corridor C are cleared paddocks with occasional isolated trees or stands of trees.

8.18 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the alternative proposal.

The gradient of the alternatives is similar to that of the proposed action. For the Western Bypass Corridor B, the topography is undulating with the land surface varying from 165 m Australian Height Datum (m AHD) to 225 m AHD. Slopes are generally gentle, though can be greater than five degrees in creek valleys.

Topography of the Eastern Bypass Corridor C is hiller than either the proposed action or Western Bypass Corridor B. The land surface varies from 130 m AHD to 280 m AHD with slopes generally between zero and five degrees, though in some location, such as the Bindoon Hill, slopes exceed 10 degrees.

8.19 Describe the current state of the environment relevant to the alternative proposal.

No specific assessment of the current state of the environment for the alternatives has been undertaken. It is expected that this will be very similar to the current state of the environment for the proposed action.

8.20 Describe any Commonwealth Heritage Places or other places recognised as having heritage values relevant to the alternative proposal.

The areas for the alternative actions do not include any Commonwealth Heritage Places. Western Bypass Corridor B intersects three places listed on the Shire of Chittering’s Municipal Heritage List while the Eastern Bypass Corridor C intersects nine Municipal Heritage List properties.

8.21 Describe any Indigenous heritage values relevant to the alternative proposal.

Western Bypass Corridor B was likely to impact on the same Aboriginal heritage values as the proposed action (Western Bypass Corridor A) while Easter Bypass Corridor was likely to impact on the Burroloo Well site.

8.22 Describe any other important or unique values relevant to the alternative proposal.

Western Bypass Corridor B intersects the Udumung Nature Reserve while the Eastern Bypass Corridor C intersects Udamung Nature Reserve, Chittering Lakes Nature Reserve (vested in the Conservation Commission of WA for the purpose of conservation of fauna) Burroloo Well Nature Reserve (under management order with the Conservation Commission of WA for the purpose of conservation of flora and fauna) and Clarty Reserve (Reserves 38516 and 38837 – vested in the Shire of Chittering for the purpose of public recreation).

8.23 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the alternative proposal.

The area of the alternative actions is a combination of freehold privately-owned land, road reserved managed by Main Roads WA, local road reserves managed by the Shire of Chittering, and Crown reserves managed by a number of entities.

8.24 Describe the existing uses of the area relevant to the alternative proposal.

The existing land uses of the alternatives are mixed agriculture, horticulture, tourism and transportation.

8.25 Identify any proposed uses of the area relevant to the alternative proposal.

No additional uses are proposed for the alternatives.

8.26 What are the proposed measures for any alternative action to avoid or reduce impact?

As the alternative will not be progressed, no measures beyond those for the proposed action which could also be applied to the alternatives have been identified.

8.27 Do you have another alternative?

No

Section 9 – Contacts, signatures and declarations

Where applicable, you must provide the contact details of each of the following entities: Person Proposing the Action; Proposed Designated Proponent and; Person Preparing the Referral. You will also be required to provide signed declarations from each of the identified entities.

9.0 Is the person proposing to take the action an Organisation or an Individual?

Organisation

9.2 Organisation

9.2.1 Job Title

Project Director

9.2.2 First Name

Norm

9.2.3 Last Name

Fox

9.2.4 E-mail

norman.fox@mainroads.wa.gov.au

9.2.5 Postal Address

Waterloo Crescent
East Perth WA 6004
Australia

9.2.6 ABN/ACN

ABN

50860676021 - MAIN ROADS

9.2.7 Organisation Telephone

138 138

9.2.8 Organisation E-mail

enquiries@mainroads.wa.gov.au

9.2.9 I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

Not applicable

Small Business Declaration

I have read the Department of the Environment and Energy's guidance in the online form concerning the definition of a small a business entity and confirm that I qualify for a small business exemption.

Signature:..... Date: .....

9.2.9.2 I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations

No

9.2.9.3 Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made

Person proposing the action - Declaration

I, NORM FOX, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.

Signature: Norm Fox Date: 31/8/17

I, NORM FOX, the person proposing the action, consent to the designation of NORM FOX as the proponent of the purposes of the action describe in this EPBC Act Referral.

Signature: Norm Fox Date: 31/8/17

9.3 Is the Proposed Designated Proponent an Organisation or Individual?

Organisation

9.5 Organisation

9.5.1 Job Title

Project Director

9.5.2 First Name

Norm

9.5.3 Last Name

Fox

9.5.4 E-mail

norman.fox@mainroads.wa.gov.au

9.5.5 Postal Address

Waterloo Crescent
East Perth WA 6004
Australia

9.5.6 ABN/ACN

ABN

50860676021 - MAIN ROADS

9.5.7 Organisation Telephone

138 138

9.5.8 Organisation E-mail

enquiries@mainroads.wa.gov.au

Proposed designated proponent - Declaration

I, NORM FOX, the proposed designated proponent, consent to the designation of myself as the proponent for the purposes of the action described in this EPBC Act Referral.

Signature:..... Date: 31/8/17.....

9.6 Is the Referring Party an Organisation or Individual?

Individual

9.7 Individual

9.7.1 Job Title

Senior Environment and Heritage Advisor

9.7.2 First Name

Lisa

9.7.3 Last Name

Boulden

9.7.4 E-mail

Lisa.Boulden@jacobs.com

Referring Party - Declaration

I, LISA BOULDEN, I declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence.

Signature:..... Date: 31/8/17

Appendix A - Attachments

The following attachments have been supplied with this EPBC Act Referral:

1. bindoonbypass-2016springfaunasurveyreport_part1.pdf
2. bindoonbypass-2016springfaunasurveyreport_part2.pdf
3. bindoonbypass-2016springfaunasurveyreport_part3.pdf
4. bindoonbypass-2016springfaunasurveyreport_part4.pdf
5. bindoonbypass-2016springfloravegetationsurveyreport_part1.pdf
6. bindoonbypass-2016springfloravegetationsurveyreport_part2.pdf
7. bindoonbypass-2016springfloravegetationsurveyreport_part3.pdf
8. bindoonbypass-2016springfloravegetationsurveyreport_part4.pdf
9. bindoonbypass-2016springfloravegetationsurveyreport_part5.pdf
10. bindoonbypass-attachment_a.pdf
11. bindoonbypass-attachment_b.pdf
12. bindoonbypass-attachment_c.pdf
13. developmentenvelope.zip
14. figure01-gnh-cn12-e-ea-gd-00017.pdf
15. figure02-gnh-cn12-e-ea-gd-00018.pdf
16. figure03-gnh-cn12-e-ea-gd-00019.pdf
17. figure04-gnh-cn12-e-ea-gd-00020.pdf
18. figure05-gnh-cn12-e-ea-gd-00021.pdf
19. figure06-gnh-cn12-e-ea-gd-00022.pdf
20. figure07-gnh-cn12-e-ea-gd-00023.pdf
21. figure08-gnh-cn12-e-ea-gd-00024.pdf
22. figure09-gnh-cn12-e-ea-gd-00025.pdf
23. indicativedisturbancefootprint.zip