Date: 8/12/2016

Attention:
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Dear Alana,

RE: Response to Further Information Request by NT EPA (your ref # 2015/0182-02)

Thank you for your letter dated 28 November 2016 and the attached *Additional Information and Adverse Findings for the Northern Gas Pipeline (NGP) Project*.

This letter outlines the position and response Jemena Northern Gas Pipeline Pty Ltd (Jemena) take to the items raised in the aforementioned correspondence from the NT EPA. With respect to the additional information requested, Jemena provide in this response further information regarding our water sourcing strategy, traffic management and the Economic and Social Impact Management Plan (ESIMP). With respect to comments in relation to issues of fauna management, Jemena have accepted many of the NT EPA's likely recommendations and have provided detailed reasoning where other alternate measures are suggested for NT EPA's consideration. For concerns regarding permanent or ephemeral pools or the presence of large riparian trees having significance to indigenous people, Jemena present further information that we consider addresses these concerns.

To satisfy the additional information requests from the NT EPA, Jemena needs to undertake some additional assessments, as described in this response, Jemena request that the NT EPA give consideration to allowing the EIS assessment process to continue concurrent with Jemena finalising these other works.

The completion of the EIS assessment is on the critical path for Jemena to achieve the Northern Territory Government's project delivery timeframes. Jemena are therefore seeking to further engage with the NT EPA in relation to options for the EIS assessment to continue concurrent with Jemena's work to provide the additional information requested.

We trust that the information provided in this response addresses the NT EPA's request for further information and is sufficient for the NT EPA to complete its examination of the final EIS. We would welcome the opportunity to discuss this further with you at your earliest convenience. In the interim if you have any queries I can be contacted on 0417 115 605.

Regards,

Jonathan Spink

Northern Gas Pipeline Project Director

JEMENA'S RESPONSE TO ADDITIONAL INFORMATION REQUEST

Water Sourcing

From commencement of the NGP Project, Jemena has been working with its Construction Contractor to develop a sustainable water sourcing strategy to meet its construction requirements. Jemena have investigated sourcing of water for construction from bores and dams on the following properties along the construction right of way and have completed water quality analysis to determine their suitability:

- Soudan Station
- Barkly Down Station
- Phillip Creek (two sites)
- Tennant Creek Station

The volumes of water and indicative locations where this water will be required have now been determined. Jemena have reached agreement with one landholder to install and equip two bores on their property and are in the process of formalising agreements with the landholders of the above properties but have been unable to make this information public during the draft EIS due to ongoing negotiations. Jemena also note that we have agreed to not source water from any Aboriginal Land Trust Areas without the agreement of the Traditional Owners and Land Councils.

Jemena has engaged a hydrogeologist to assess the potential impacts of groundwater extraction. The hydrogeologist will assess the potential impacts of groundwater extraction at the proposed locations as relevant to existing (surrounding) users and/or groundwater dependent ecosystems (GDEs). Data analysis and modelling is currently being undertaken, and the method is outlined in Attachment 1. Early indications from the hydrogeologists are that Jemena's water usage is very low and likely to be insignificant to existing groundwater levels. This will be confirmed in the hydrogeologist's report which Jemena anticipates will be completed and provided to the NT EPA by early January 2017.

Jemena and its Construction Contractor have also received water studies for potential bore locations across the Northern Territory from Power and Water Corporation to support their water source planning.

Jemena expect that the final location of water supply for construction will be made just prior to mobilisation for construction in March 2017 following formal land owner agreements being finalised.

Jemena requests that the NT EPA consider allowing the EIS assessment to proceed, as a hydrogeologist is currently modelling potential impacts of groundwater extraction to inform sustainable extraction rates, and this information will be provided to the NT EPA once complete. Jemena has also committed to only extracting within the sustainable rates of each respective bore, and in accordance with landholder agreements and consent.

Traffic Management

A high level Traffic Management Plan (TMP) was provided with the draft EIS, and in the Supplementary EIS Jemena committed to developing a Traffic Impact Assessment (TIA) and TMP that would be approved by NT Department of Infrastructure, Planning and Logistics (DIPL) before commencement of construction.

A TIA will be required in accordance with *AUSTROADS Guide to Traffic Management Part 12: Traffic Impacts of Development*. A TIA is mandatory to assure the road authority, in this instance DIPL, can measure the project's acknowledgement of the risks associated with the works impact on NT roads, infrastructure and road safety. The TIA is to include details on access, vehicle types, volumes of existing vehicles and increased traffic and other relevant matters, including risk assessments to reflect how all roads and infrastructure will be affected. This includes impacts on commercial enterprises and tourist attractions and infrastructure. The project's impact on roads and road users falls under the purview of DIPL. Jemena has been engaging with DIPL since the 22 of May 2015, and has worked with them to define the scope of the TIA and TMP to ensure their requirements are met. The scope for the TIA is attached as Attachment 2.

Up until recently, the project did not have sufficient detailed information to commence the TIA. The construction program and land access negotiations needed to be significantly progressed to inform expected vehicle traffic across specific areas in the region. The information required to inform the TIA, which subsequently informs the TMP, is now available. Jemena have now engaged Arup, a suitably qualified consultant to prepare the TIA and TMP. Arup are also DIPL's preferred consultant for these works, given significant past experience between this consultant and the Department.

A draft of the TIA and TMP are intended to be completed by 17 of February 2017 and 24 of February 2017 respectively, with the final reports completed one week after comments are received back from Jemena and DIPL.

Jemena requests that the NT EPA consider allowing the EIS assessment to proceed, based on the commitment that the TIA and TMP will be submitted for separate review and approval by DIPL in late February 2017.

Economic and Social Impact Management Plan

Jemena notes that the NT EPA has requested the Economic and Social Impact Management Plan (ESIMP) to be submitted at this time.

The ESIMP will be provided by 12 December; however, Jemena notes that a significant amount of work in economic and social impact management has been undertaken to date, involving the preparation of:

- an Economic Impact Assessment (June 2016)
- a Social Impact Assessment Scoping Study (July 2016)
- extensive stakeholder and community consultation (August and September 2016)
- the Economic and Social Impact Assessment (ESIA) Report (November 2016)

The SIA Scoping Study contained a framework ESIMP that was awaiting the completion of the community consultation, the ESIA Report and critically, further progress in discussions and negotiations with stakeholders directly impacted by the Project such as Aboriginal Traditional Owners and private landowners.

In addition, the participation in and contribution to the ESIMP of other actors involved in the social and economic development in the Territory, particularly in the region is also a fundamental component of a successful ESIMP.

In this regard, the ESIMP should be viewed as a working document that may change throughout its implementation in response to human and other changes in the communities involved, Government policy changes and as emerging issues are experienced.

Nonetheless, Jemena believes that the work undertaken and the resulting ESIMP to be submitted is of a high standard and will to the extent reasonably practicable, be successful in managing any of the impacts (risks and opportunities) that may arise as a result of the NGP Project.

JEMENA'S RESPONSE TO ADVERSE FINDINGS

Fauna Management

Jemena and its Construction Contractor have significant experience in pipeline construction open trench management, and always consider the health and wellbeing of fauna in how these works are planned and managed.

The NGP has been planned to be constructed in a single dry season between the cooler climatic months of March to November inclusive. The pipeline construction is planned to commence in April 2017 and majority of trench is planned to be completed by end of November 2017, this is equivalent to 129 trenching days where the trenching crews will be working on their work cycles of 23 days on and 8 days off. Any trench length restrictions, 20km or otherwise, would constrain the construction of the NGP and would likely result in the NGP pipeline not being able to be constructed in a single dry season, due to only 3-4 days between the trenching and lower in operation. This would have the following impacts;

- Increase the overall duration of the project, and push construction into a wet season, where the project would then need to manage water course crossings with water and associated flora and fauna issues. The increased duration for the project, would also result in longer term impact to the land and environment.
- Moving construction into the wet season would result in further road access constraints, and greater prevalence of impact to roads and communities.
- Furthermore, from a budgetary perspective, restricted open trench limits can significantly increase the time and cost of pipeline construction. The pipeline spreads that immediately follow the trenching crew would be held up if the open trench ahead is delayed.

Rather than imposing a fixed open trench length, sufficient fauna spotter catcher (FSC) teams will be provided such that there will be one team per 20km of open trench. This is seen as a practical solution to ensuring that the full trench can be inspected each morning, whilst still allowing the NGP project to achieve up to 5km of pipeline installed per day by having no restriction on the total amount of open trench. Jemena believe this maintains the outcomes that the NT EPA are seeking in that the each 20km section would be inspected each morning.

Jemena's Construction Contractor has provided a detailed response regarding their performance on previous projects (Attachment 3), and has addressed the allegations from the 2004 Telfer Gas Pipeline Project in WA by providing further context. The table below provides Jemena's responses to the NT EPA likely recommendations, and the Attachment 3 also gives detailed responses to the matters raised.

NT EPA likely recommendation	Jemena response
The maximum length of the open trench not exceeds a length capable of being practically inspected and cleared by fauna spotter catchers	Jemena propose no restriction on the total amount of open trench and would instead like to commit that for every 20km of open trench, there will be a team of two fauna spotter catchers (FSC) performing daily inspections. Jemena would consider that this should therefore allow for multiples of sections to remain open to ensure construction can progress quickly to ensure impact on land and environment is minimized to as short a period as possible.
Max length of the open trench not exceeds 20km in any case	A 20km total restricted length would constrain the construction of the NGP and would likely result in the NGP pipeline not being able to be constructed in a single dry season, due to only 3-4 days between the trenching and lower in operation. Attachment 3 outlines the construction process and schedule. With the obligation to have an FSC team for every 20km of open trench Jemena believes that this will achieve the same mitigation that the NT EPA is seeking of risk to biodiversity from trench operations.
Fauna shelters be placed at intervals not greater than 500m	Jemena will comply with this request.
Fauna ramps and/or earth plugs be placed at intervals not greater than 1 km.	Mandating trench plugs at a set interval will constrain pipeline construction by requiring a break in welded lengths that would then need to be reinstated later, requiring further time for access later and ongoing disruption to the land, landholder operations and environment. Jemena's preference is that trench plugs and ramps should be located at intervals to minimise erosion and allow movement of wildlife and cattle across and/or out of the trench if they fall in and need to escape. We would propose that trench plugs should be installed where required by the Landholder or otherwise every 1,200m to 3,000m apart depending on the land use and type.
All fauna spotter catchers hold a valid permit to take or interfere with wildlife issued under the *Territory Parks and Wildlife Conservation Act* and be experienced in the identification of fauna and assessment of fauna condition.	Jemena will comply with this request.
Trench inspections be completed within 4 hours of sunrise. Additional inspections should occur at frequencies to ensure maximum recovery of fauna from the trench that may not be able to be identified within 4 hours of sunrise.	Due to work health and safety requirements driving is not permitted in the dark, consequently allowing for, in the worst case scenario, 1 hour to get to site Jemena would like this increased to 5 hours after sunrise particularly to address the winter period.

NT EPA likely recommendation	Jemena response
Works on the trench not commence until trench inspections have been completed.	The FSCs will proceed ahead of the works crews involved in trench closure activities such as bedding placement, lower in and backfill. The construction work crew must ensure that all fauna spotter catchers have completed their inspection and are at a safe distance prior to commencing activities. It is not practical to wait the full four hours before 20km is cleared before any works start as this would significantly reduce the available working time in the day and would expose the workforce to increased Work Health and Safety risks by working into the darker evening hours. This would also cause construction to run late and into the wet season if work hours were limited by four hours per day.
A vet be on standby if fauna are in need of medical treatment, such as from injury.	The FSCs that will be employed will have the appropriate skills to handle the small reptiles and mammals that are traditionally encountered in open trenches. Due to the remoteness of the project and the type of fauna expected to be encountered, a vet being on standby is not a practical control, both as a waste of skill set, and the cost imposition given the limited requirement. Jemena's Construction Contractor are planning on using Steve Wilson and Gerry Swan to be the lead Fauna Spotter Catchers and supported by additional Fauna Spotter Catchers to ensure we achieve the complete length of open trench is inspected. Jemena can provide their CVs on request, and they both have websites that fully express their qualifications.

Watercourse crossings

At the time of the submission of the EIS, Jemena were in the process of completing Sacred Site surveys, consultations and negotiations regarding a range of matters, including the protection of cultural values, including Sacred Sites and cultural values associated with waterholes and water courses and the associated vegetation, particularly large trees.

Outcomes from these discussions have resulted in a number of Sacred Site conditions that protect and uphold these values. These conditions have been agreed between Jemena and the Land Councils and the resulting reports and agreed conditions will constitute an agreement pursuant to S22 of the *Northern Territory Aboriginal Sacred Sites Act* that will result in the grant of an Authority Certificate. This information has been provided to the Aboriginal Areas Protection Authority (AAPA) responsible for issuing the Authority Certificate.

Out of respect to and at the request of the Traditional Owners and the Land Councils, Jemena has committed to a Confidentiality Agreement in regard to the Cultural Information obtained during consultations and field investigations with the Traditional Owners. For this reason the information cannot be provided. Jemena can advise that there are a number of waterholes in the vicinity of the Ranken, James and Georgina Rivers that are Sacred Sites and that have been avoided in consultation with the Traditional Owners and Land Councils. Similarly, where there are large eucalyptus trees that are of specific cultural value to Traditional Owners and Site Custodians, these have been noted, avoided and included in the agreed Sacred Site conditions.

The conditions of the Authority Certificate implemented during the construction and operations phase of the Project will ensure the protection of these values, in accordance with the wishes of the Traditional Owners, Site Custodians and the Land Councils.

Consequently, pools and large trees will not be impacted by this Project.

Jemena would be happy to arrange a meeting between Jemena, NT EPA and AAPA if this requires further discussion. Also if required, Jemena could also seek the Land Councils consent to provide maps of these watercourse crossings which demonstrates avoidance of the identified Sacred Sites and Cultural Heritage artefact areas, which at this time is still subject to confidentiality provisions with those groups.

Attachment 1: Scope for Hydrogeologist work

The scope for the hydrogeological study is summarised as follows:

- Modelling: The impacts of groundwater extraction on existing users will be assessed using analytical modelling methods based on conventional pumping test solutions (i.e. Theis solution or similar).
- Drawdown scenarios for up to four single extraction bores will be modelled, this assumes that a new extraction bore will be required to supply water to each of the four designated dam sites in the Northern Territory.
- Extraction rates will be based on the construction water demand requirements and assume that all construction water is extracted from groundwater bores (as opposed to using some existing dams) to model the worst-case scenario.

Outputs:

- Distance drawdown graphs will be produced which display the maximum expected drawdown and radial distance from the production bore.
- Local scale water level drawdown maps will be produced showing the maximum modelled cone of depression around the supply bores.
- These maps will identify any landholder bores and recorded Groundwater Dependent Ecosystems (GDEs) that fall within the zone of influence of the construction supply bores.
- Where relevant, and where there is sufficient data to allow it, the maximum rate of extraction without impacts to other users/GDEs will be identified for each bore.
- The cumulative impact of groundwater extraction will be discussed with consideration of the local aquifer conditions, expected recharge rates, and scale of Project water extraction volumes compared to other extraction in the region.
- The requirements for further work will be identified (if applicable) to confirm the modelling and determination of impacts of groundwater extraction.

Attachment 2: Traffic Impact Assessment Scope of Work

Existing Conditions Review

Teleconference Meeting with NT Department of Infrastructure, Planning and Logistics
This to establish an understanding of priorities for these organisations and to provide a local understanding of the issues for the existing traffic network. The extent of the TIA includes Warrego Road, Stuart Highway, Barkly Highway, Purrukwurru Road, Austral Downs Road along with any local roads that intersect these roads.

Site Inspection
The consultant will conduct an independent site inspection of the project extents including Warrego Road, Stuart Highway, Barkly Highway, Purrukwurru Road and Austral Downs Road. The site inspection of the existing road network potentially affected by the project will assist us in establishing an understanding of the local conditions and standard of the road network.

Crash Analysis
As part of the existing conditions review we will also undertake a high level review of the 5 most recent years of crash data available and identify any crash hotspots along the route based on the Federal Blackspot Program Criteria.

Traffic Data
A baseline of traffic conditions will be established having regard to traffic data (traffic volumes, vehicle type, traffic speed etc.) available from NT Government and the local government authorities and seasonal factors (where available).

Transport Impact Assessment

Assessment of Impacts
The predicted change in traffic volumes during construction and operation will be estimated based on the Project traffic generation provided by Jemena and the baseline traffic volumes.

Potential impacts (access, safety, intersection and road performance) on the local and state road network resulting from traffic generated by the Project will be assessed. This would include recommendations for the road width, road surface and intersection configurations.

Assess Residual Impact and Legacy Issues
Assessment of any residual impacts of construction, operation and maintenance of the project on roads and traffic such as modified road configuration, additional roadside hazards, or modification of existing movement patterns.

Risk Assessment
The consultant will develop and propose appropriate measures to avoid, manage and mitigate identified traffic risks including:

- Identifying locations where there is an increased risk of road traffic crashes associated with increased traffic generated by the Project, both during the construction and operation phases. This will be based on the existing crash rates along the road network and on the review of existing road network conditions
- Risks that the Project will create demand for upgrades to the regional road networks

- Vehicular access risks
- Increased dust due to construction traffic
- Safety risks for the workforce and general public associated with:
    - An increase in the volume of traffic during initial construction and subsequent stages of the Project
    - An increase in the number and frequency of heavy vehicles moving onto and off the site during construction stages

Traffic Management Plan

An overview of the key traffic management measures outlining the number and type of vehicle movements accessing the site, hours of operation, traffic speed, traffic routes, likely diversion route for traffic on the local road network, treatments for moving plant and equipment across key roads and required approvals prior to construction and operation. This will also include commentary on any screening that may be required to address issues relating to driver distraction and impacts on the NT Rail Link.

The TMP will be developed to meet the requirements of, but not limited to; the Northern Territory Control of Roads Act, Northern Territory Traffic Act, Development Guidelines and Permit to Work within a Northern Territory Government Road.

Stakeholder Engagement

The consultant will liaise with key stakeholders either in person or over the telephone as required.

Attachment 3: McConnell Dowell's Environmental History and Detailed Responses to NT EPA's Fauna Management Recommendations

McConnell Dowell's Environmental History

In response to the NT EPA's concerns toward McConnell Dowell's environmental history and inability to execute environmental protection measures to adequate standard, following the 2004 Telfer Gas Pipeline Project. In 2005, McConnell Dowell secured the contract to construct a 46km pipeline off the Telfer Gas Pipeline to supply the Nifty Copper Mine in the Great Sandy Desert, Western Australia. Building on the improvements through lessons learned on the Telfer Gas Pipeline, McConnell Dowell was able to celebrate its environmental success on this project as a Nominee of the 2006 Western Australia Golden Gecko Award[1], and achieving the Runner-Up position on the Shell – IPLOCA Environmental Award 2006.[2]

McConnell Dowell does take pride in its project delivery objectives and those of its stakeholders. This has been recently recognised at an international level where McConnell Dowell has been recognised for outstanding project delivery outcomes.[3]

The knowledge of the habitat and climatic conditions was not well understood by all parties involved in the Telfer Gas Pipeline Project. Due to reasons outside the control of McConnell Dowell, the construction of the Telfer Gas Pipeline did not commence until after Consent to Construct was achieved on 31st October 2003, followed by commencement of ROW construction which started on 3rd November 2003. Other recent contractors have been exposed to similar situations where they are forced into the disruptive summer wet season due to late starting dates.[4]

On the Telfer Gas Pipeline Project the late start of construction activities had forced the construction to be executed during the worst time of year being the summer months which are subjected not only to the cyclone season but an increased trend for the likelihood of increased fauna pit fall rates. Woinarski states that wildlife mortality is likely to be highest in hot weather and wildlife activity may also be higher in warm weather than cool weather, that the influence of seasonality on mortality patterns may provide one mechanism for minimising the impact of pipeline construction.[5]

This trend was observed during the Nifty Gas Pipeline Project where trench mortality was recorded at 4.4% when compared to the Telfer Pipeline mortality rate of 38.2%[6] and further supported by the data from the Nifty Pipeline Project as presented in the IPLOCA

[1] http://www.dmp.wa.gov.au/Documents/Environment/Golden_Gecko_Awards_15_year_commemorative_booklet.pdf Page 19
[2] http://www.iploca.com/platform/content/element/7253/2006EnvAwardMcConnellDowell.pdf
[3] http://www.iploca.com/page/content/index.asp?MenuID=626&ID=1666&Menu=1&Item=48.5.2 and supported with the publication http://www.iploca.com/platform/content/element/25093/2016EPEMcConnellDowell-FTP2Project.pdf
[4] https://au.news.yahoo.com/thewest/wa/a/31117862/33m-writ-over-cost-of-pipeline-delay/#page1
[5] Woinarski, J.C.Z., Armstrong, M., Brennan. K., Connors, G., Milne, D., McKenzie, G. and Edwards, K., 2000, A different fauna? Captures of vertebrates in a pipeline trench, compared with conventional survey techniques; and a consideration of mortality patterns in a pipeline trench. Australian Zoologist 31: 421-431
[6] http://mbsenvironmental.com.au/wp/wp-content/uploads/2014/09/MBS-GEMG2010-Pipeline-Fauna-Management-Presentation.pdf Page 6

Environmental Award 2006 submission in Figure 4.[7] Review of the type of fauna captured indicates that it was predominated by reptiles, specifically Geckos and Dragons.

During construction of the Nifty Gas Pipeline, which was constructed in more appropriate climatic conditions, it was observed by fauna officers that the number of animals captured within open trench overnight was related to overnight temperatures; specifically less animals were captured when overnight temperatures were low or strong winds were experienced.

This was observed by the overall fauna capture rate was 39.2 animals per kilometre and the fauna mortality rate was 1.37 animals per kilometre or 3.49% of all animals captured. This is significantly lower than that experienced during construction of the Telfer Gas Pipeline (overall mortality of 38% with a capture rate of 77.2 animals per kilometre) and very similar to that experienced during construction of the Eastern Gas Pipeline which had resulted in a mortality rate of 41.8%.[8]

Given the higher fauna capture rate experienced for the Nifty pipeline compared to the Eastern Gas Pipeline, the lower overall mortality rate is considered a more positive outcome. Geckoes were known to be one of the most adversely impacted species during construction of the Telfer Gas Pipeline. This has been attributed to their typically thin-skinned bodies that are not able to withstand high temperatures. Typically Geckoes are nocturnal to prevent desiccation. Provision of shade in the trench until retrieval prevents desiccation.

The negative press of McConnell Dowell relating to the high mortality of fauna on the Telfer Gas Pipeline took place in February 2004 around the same time adverse weather events started to occur along the pipeline route from 11th February 2003, followed by Cyclone Monty on 27th February 2003 which caused the complete construction crew to be evacuated and finally Cyclone Fay which caused the full construction spread to be evacuated from site on 25th March 2003.[9]

In March 2004, the far reaching inundating effects of Cyclone Fay required the suspension of the project until its re-start in May 2004 when the flooding of the right-of-way and its surrounds subsided for safe access and construction. A trench restriction on the length of open trench was an appropriate measure during this cyclonic period.

In planning for the return to construction following the three month evacuation period, MCD regrouped and made several successful improvements to both our Construction approach and Fauna Management. This enabled McConnell Dowell to significantly reduce the fauna death in pipeline trench recover its position as an environmentally aware constructor of transmission gas pipelines.[10]

Based on these lessons learned, the NGP project is scheduled to be constructed outside of the known summer months with Pipeline Construction planned to be carried out between the months of March 2017 and pipe lowered into trench and backfilled by end of November 2017.

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[7] http://www.iploca.com/platform/content/element/7253/2006EnvAwardMcConnellDowell.pdf Figure 4

[8] Ayers, D., and Wallace, G., 1997, Pipeline trenches: an underutilised resource for finding fauna. Pp. 349-357 in *Conservation Outside Nature Reserves,* The University of Queensland, Brisbane.

[9] http://www.bom.gov.au/cyclone/history/wa/2004.shtml accessed 5th December 2016

[10] http://www.iploca.com/platform/content/element/7253/2006EnvAwardMcConnellDowell.pdf Page 24

The application of blanket conditions for fauna management on pipelines as a whole, or for a large project which spans different environments and seasons, is ineffective and does not guarantee an outcome of minimal fauna death. On large projects where the risks will change with time and location, it may be preferable that Ministerial conditions specify a comprehensive, auditable management plan, rather than listing a number of blanket measures.' [11]

Detailed Responses to NT EPA's Fauna Management Recommendations

- *The maximum length of the open trench not exceeds a length capable of being practically inspected and cleared by fauna catchers.*

Agreed, as pipeline construction is a relatively dynamic linear construction activity that can be impacted by numerous events. Such events may cause a delay and / or disruption to an individual discrete activity or to a worse extent may cause an impact to the whole construction spread at the same time by a single event. This wording as a condition is seen as practical and allows for the possibility for the high planned daily production rates that are planned to be achieved on the NGP project of up to 5km of pipeline installed per day. This objective driven recommendation can be set as an objective in the Construction Environmental Management Plan.

Day to day assessment planning during construction is critical to achieving outcomes. This may include monitoring of weather forecasts, daily fauna numbers and species and close liaison with construction crews and managers on construction forecasts to determine the appropriate maximum length of open trench rather than defining a maximum length.[12]

- *The maximum length of the open trench not exceeds 20 km in any case.*

The most important driver of trench inspection rates is fauna density (captures per kilometre), and fauna resource planning must consider this. [13]

We have planned around our fauna trench teams maintaining a 20km section of trench each. Open trench limits can greatly increase the time and cost of pipeline construction, if they are too restrictive or do not take into account the construction methodology. Lowering in and trenching often face hold-ups for completely different reasons and if the spread is too tight, one crew will often be waiting for the other, standing still at a very high hourly cost.[14]

A 20km restricted length would constrain the construction of the NGP that would likely result in the NGP pipeline not being able to be constructed in a single dry season, due to only 3-4 days between the trenching and lower in operation.

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[11] O'Brien, D and Davey, S, 2012. Fauna Management in Gas Pipeline Construction, MBS Environmental, http://mbsenvironmental.com.au/wp/wp-content/uploads/2014/09/MBS-GEMG2010-Pipeline-Fauna-Paper.pdf accessed 5th Dec 2016. Page 6.

[12] O'Brien, D and Davey, S, 2012. Fauna Management in Gas Pipeline Construction, MBS Environmental, http://mbsenvironmental.com.au/wp/wp-content/uploads/2014/09/MBS-GEMG2010-Pipeline-Fauna-Paper.pdf Page 6

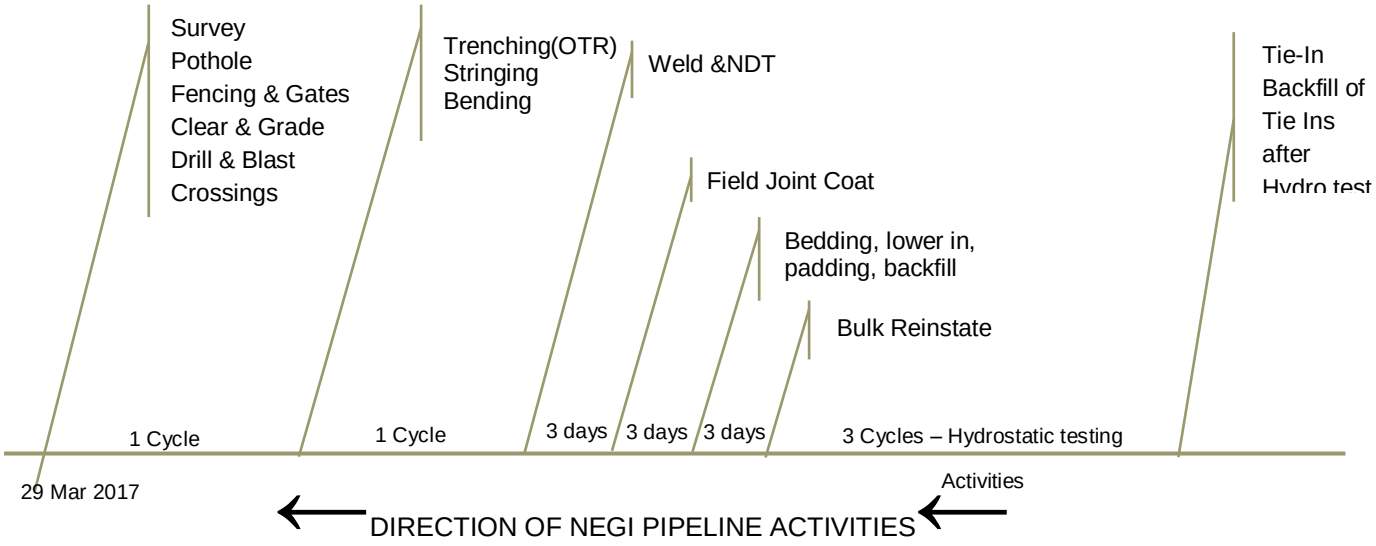
[13] Ibid Page 8

[14] O'Brien, D and Davey, S, 2012. Fauna Management in Gas Pipeline Construction, MBS Environmental, http://mbsenvironmental.com.au/wp/wp-content/uploads/2014/09/MBS-GEMG2010-Pipeline-Fauna-Paper.pdf . Page 9

The NGP has been planned to be constructed in a single dry season between the cooler climatic months of March to November inclusive. The 575km section of trench is planned to commence at the end of April 2017 and majority of trench is planned to be completed by end of November 2017, this is equivalent to 129 trenching days where the trenching crews will be working on their 23/8 work cycles.

To achieve the required production of up to 5km of trench is required to be excavated in a single day and is balanced with the required resources to achieve in excess of 5km of pipe lowered in each day. Although an average of 5km of lower in is planned in a single day it is not unusual for pipeline spreads to be able to achieve well in excess of this production with over 10km in a single day achievable.

The self-managed proposal of *the maximum length of the open trench not exceeds a length capable of being practically inspected and cleared by fauna catchers* would be sufficient to enable enough buffer distance between our construction activities. The below diagram indicates the separated distances (based on time) required between the construction activities to enable efficient construction.



- *Fauna shelters be placed at intervals not greater than 500m*

Agreed and is the critical control when compared to inspections and ramp installation. Shelters are most popular with geckoes and all types of small mammals.

- *Fauna ramps and / or earth plugs be placed at intervals not greater than 1km.*

Trench plugs and ramps will be located at intervals to minimise erosion and allow movement of wildlife and cattle across and/or out of the trench if they fall in and need to escape. Trench plugs will be installed where required by the Landholder or otherwise every 1,200m to 3,000m apart wherever:

1. wildlife corridors are identified;

2. access roads or livestock trails are crossed;
3. there are gaps in soil / vegetation stockpiles so that animals are directed to them; and/or
4. at the beginning and end of each pipe string.
5. Increase the frequency of trench plugs and ramps in sensitive areas.

There is mixed experience in the success of the use of earth plugs on various projects, despite there being earth ramps at about 500m there is no evidence that animals were using these to escape, although several sand goannas were observed entering the trench via these ramps.[15]

- *All fauna spotter catchers hold a valid permit to take of interfere with wildlife issued under the Territory Parks and Wildlife Conservation Act and be experienced in the identification of fauna and assessment of fauna condition.*

We agree to such a condition and intend using both Steve Wilson[16] and Gerry Swan[17] who have both worked on McConnell Dowell pipeline projects previously and have in excess of 10 years of experience in working on gas and water pipeline projects in the clearance of fauna from open trenches throughout Australia in addition to their own areas of expertise and numerous books and articles that both have authored.[18]

We intend that Steve and Gerry will manage and coordinate the inspection activities and we will commit to utilising local skilled and experienced Aboriginal rangers to support Steve and Gerry to ensure the maximum length of open trench not exceeds a length capable of being practically inspected and cleared by fauna spotter catchers.

- *Trench inspections be completed within 4 hours of sunrise. Additional inspections should occur at frequencies to ensure maximum recovery of fauna from the trench that may not be able to be identified within 4 hours of sunrise.*

Trench deadlines should not be met at the expense of conducting effective inspections. Morning trench inspection deadlines should be set appropriate to the location and time of year. Inspection rates are largely driven by fauna numbers. Due to WHS requirements driving is not permitted in the dark, consequently allowing for, in the worst case scenario, 1 hour to get to site we would like this increased to 5 hours after sunrise. A commitment can be made to carry out the inspections within 5 hours due to the site access and required travel durations.

- *Works on the trench not commence until trench inspections have been completed.*

Trench fauna clearance will commence from in front of the Lower In crew on a daily basis and work in a forward progression to the trenching spread. Works would not commence on lowering in pipe into the trench until the fauna trench inspection has been completed.

[15] Wilson, S., Swan, G., 2015, Where do they all come from? Animal movement immediately following a hummock grassland fire. Australian Zoologist: 2015, Vol. 37, No. 4, pp. 485-491.
[16] http://www.stevekwilsonreptiles.com.au/
[17] http://australianmuseum.net.au/gerry-swan
[18] http://www.publish.csiro.au/book/7231/

- *A vet be on standby if fauna are in need of medical treatment, such as from injury.*

Mortality rates encountered on pipeline projects are traditionally caused through the loss of geckoes and lizards, not large mammals, the experienced fauna handlers proposed in Steve Wilson and Gerry Swan are experienced herpetologists and capable in assessing and providing assessment and assistance to injured animals. They are also experienced in preserving samples that are later sent to museums for further species identification assessments. Due to the remoteness of the project and the type of fauna expected to be encountered a vet being on standby is a less practical control as the fauna spotter catchers will be suitably experienced and qualified to handle such fauna.