

Ref: 200401

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**RE: CONTRACT NO. 75553 – KAMERUNGA DN600 TRUNK WATERMAIN
NOTICE OF PROPOSED VARIATION 002 – SUMMARY**

Dear Jonathan,

We refer to the abovementioned project and recent discussions regarding the current design constraints with the pipe support and base plate assemblies required for fixing the new DN600 Kamerunga trunk watermain to the underside of the Barron River Bridge structure (Ch. 2328 to Ch. 2618).

Findings from pre-construction inspections and scanning of the existing bridge structure conducted by Dawsons indicate that the current baseplate design will clash with the existing steel reinforcing at almost all locations. Furthermore, the size of the pipe and subsequent bracket assemblies, the variable nature of the existing bridge structure alignment (i.e. girders and headstocks) and site access constraints have raised constructability issues that require further design refinement and customisation to ensure the pipe alignment and individual pipe supports are compatible within the existing bridge corridor. We note the above issues were observed on the land-based elements of the works and we expect will be applicable for the over-water elements that are yet to be inspected.

Following consultation and discussions with CRCW&W, Jacobs, Dawsons and **fgf** regarding the initial findings by Dawsons, it was acknowledged that the current PS1, PS2 and HS1 pipe support design is not compatible with the existing structure and each individual base plate and bracket would require customisation to address the clashes with the existing reinforcement and in-situ structural elements to enable installation on the required alignment. From the land-based data provided by Dawsons, Jacobs have since issued additional base plate configurations amended with multiple slotted holes to allow some horizontal flexibility upon installation and to address the reo clashes. Additional base plate designs will no doubt be required for the over water pipe supports.

Limitations associated with the current hot dipped galvanised steelwork design were noted during discussions particularly the process of base plate and pipe support modifications likely required to address alignment issues and reo clashes determined on site. The suggestion was also made to explore changing the pipe support material from the current hot dipped galvanised steelwork design to 316 stainless steel. It was agreed that this approach would mitigate most risks associated with the current design and would be beneficial for both constructability and ongoing maintenance.

Having regard to the current design constraints outlined above, **fgf Developments Pty Ltd** submit the below proposed options for CRC's consideration.

Option 1 – Revised Slotted/Multiple Hole Base Plate Pipe Supports – Hot Dipped Galvanised Steelwork Assemblies

- Drafting, procurement, fabrication, and installation of additional base plate pipe support based on amended design and hot dipped galvanised steelwork using current scanning data of land-based elements (refer **attached** NPV 002 – Option 1).
- Requires additional mobilisation, equipment hire, labour costs and barge access and potential for further costs if redesign or pipe support modifications are required.
- Potential for additional base plate design for over water section of pipeline which has not been factored into this variation cost.
- Potential cost and scheduling implications arising from delays associated with hot dipped galvanizing procurement process (current lead-time minimum 2-3 weeks from galvanizing supplier in Townsville which may vary).
- Current design of steel sliding pipe supports with steel baseplates requires an additional bearing plate to be installed (one on each side) and will require access, inspection and servicing every 3-5 years to ensure effectiveness.
- No guarantee (without further 3D scanning – refer NPV 001) that revised design will work onsite – risk of further delays/incurred costs due to process for modifications and further hot dipped galvanizing.
- Option 1 will incur ongoing future costs associated with performing maintenance and access tasks.

Option 1 – Variation Cost: Variable cost ± \$62,703.90 + GST

Option 2 – Revised Slotted/Multiple Hole Base Plate Pipe Supports - 316 Stainless Steel Pipe Supports Assemblies

- Drafting, procurement, fabrication, and installation of additional base plate pipe support based on amended design and 316 stainless steelwork using current scanning data of land-based elements (refer **attached** NPV 002 – Option 2).
- Allows flexibility at point of installation and on-site modification and adjustments as required to address clashes with existing reinforcement, in-situ concrete elements and alignment issues.
- Enables customisation and retrofitting of base plates on site, meaning current amended base plate design may be adopted with only minor modifications required on site to suit over-water section.
- 316 Stainless steel option allows on site customization taking 2-3 days in lieu of potential 2-6 weeks with hot dipped galvanized design.
- Reduced member size – 200mm PFC rather than 250mm PFC adopted providing more clearance and less likelihood of clashes with existing bridge structure.
- Includes addition of 11 permanent stainless steel HS1 pipe supports at the locations where temporary installation supports are currently being utilised by Dawsons as part of Option 1 which minimises waste where temporary supports would have been disposed of.
- Additional supports provide reduces spacing between all supports – pipework to be supported at 7.6m spacings in lieu of current 15.5m span.
- 316 stainless steel is available locally meaning reduced procurement time compared with hot dipped galvanised products (refer above).
- Turnaround time for any larger modifications (if required) is reduced to only days rather than weeks.
- Sliding supports are able to utilise polished stainless-steel endplates as a wearing surface against the Teflon pads which eliminates requirement for ongoing inspections and results in no requirement to address dissimilar metals.
- This is a long-term, whole life benefit as ongoing maintenance of 316 stainless steel supports will NOT be required.
- 316 stainless steel pipe supports provides a known, controllable, and confident outcome.

Option 2 – Variation Cost: Fixed cost of \$135,371.00 + GST

In summary, the current design and Option 1 present multiple constructability issues and risks for further variations to be incurred as well as ongoing maintenance costs. The 316 stainless steel option presented above carries the least amount of risk, allows for efficient on-site installation, and provides ongoing benefits to the project and Cairns Regional Council as the asset owners.

If you require any further information or would like to discuss any of the above, please don't hesitate to contact the undersigned on 0488 062 130.

Kind Regards,



Jarryd Londino
Project Engineer
FGF Developments Pty Ltd