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# Patrick Thompson—

Associate Director, Bridge & Specialist Structures, WA

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## Experience Overview—

Patrick Thompson has 17 years experience as a structural engineer in bridge design and design management of multidisciplinary infrastructure projects.

Patrick is the Team Leader for the Bridge & Specialist Structures discipline in the Perth Office, with responsibility for running the business operations of the Bridge & Specialist Structures group in WA, and implementing business strategies relating to the group as set by the BG&E Board.

BG&E's bridge design services include waterways analysis, concept design and planning, tender design, detailed design, contract documentation, review of tenders and provision of technical advice during construction. Patrick has been involved in all these areas, on a variety of large and small projects.

Patrick has acted as design team leader for engineering studies, tenders and detailed design works for numerous major infrastructure projects, including transport infrastructure, heavy haul rail lines and expansion projects. He has managed multidisciplinary teams including structural, civil, waterways and geotechnical disciplines; and has managed interfaces with clients, stakeholders, authorities and third parties.

Patrick is familiar with a variety of contract delivery types and is experienced in meeting client requirements. He works closely with clients to identify their key drivers and to determine the best for project approach to the design process.

Patrick has carried out concept and detailed design for major prestressed concrete and steel bridges throughout Australia, including incrementally launched and multi-span precast bridges, carrying road and rail traffic. Patrick is also experienced in the independent verification of major projects.

## Project Experience

- NorthLink WA Stage 3
- Building Roe 8 Alliance
- NorthLink WA Planning Study
- WestConnex Stage 1A – M4 Widening Tender Design
- Roy Hill Rail Bridges & Civil Works
- FMG Solomon Rail Expansion Project & GNH Overpass
- Cronulla Rail Duplication
- Perth to Thornlie Railway, Canning River Launched Rail Bridge
- Mitcham to Frankston EastLink Project
- Mitchell Freeway Extension
- Roe Street Bus Bridge
- RTIO Rail Capacity Enhancement RCE353 Project
- BHPBIO Rapid Growth Project 5 & Yandi Rail Bridge
- Geraldton Southern Transport Corridor

## Position—

Associate Director, BG&E Pty Limited

## Qualifications—

- BE(Hons)  
Bachelor of Engineering (Honours)
- MIEAust  
Member, Institute of Engineers Australia
- CPEng  
Chartered Professional Engineer
- NPER  
National Professional Engineers Register
- RPEQ  
Registered Professional Engineer Queensland

## Career Milestones—

- 2015/ Associate Director
- 2012/ Associate
- 2009/ Principal
- 2006/ Senior Engineer
- 2000/ Joined BG&E
- 1999/ Bachelor of Engineering, UWA

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## Detailed Project Experience—

2000 - present

BG&E Pty Limited – Associate Director

### Bridge Design

#### **NorthLink WA Stage 3 D&C:**

- Structures Lead for D&C infrastructure project involving 26km of new road, 11 road bridges, 1 pedestrian bridge and 1 pedestrian underpass. Structures include multi-span continuous bridges using precast pre-tensioned beams. Preparation of concept designs, reporting and specifications. Team leader, responsible for design management, personnel and quality of all bridge documents. Interface with the contractor, client and all other discipline teams.

#### **Building Roe 8 Alliance:**

- Assistant Structures Lead for infrastructure project Alliance including 30 structures at a freeway-to-freeway interchange, diamond interchanges, roundabout interchanges, footbridges, underpasses and bridges over environmentally sensitive wetlands. Preparation of preliminary designs, design reports, specifications and structural details. Management of rail authority interface and independent verification interface.

#### **NorthLink WA Planning Study:**

- Structures Lead for planning study for suite of major future infrastructure projects in WA, including 43 structures across numerous major urban and rural interchanges. Preparation of reference design and contract documents for D&C tenders.

#### **WestConnex Stage 1A M4 Widening Tender D&C:**

- Structures Lead for D&C tender for major urban infrastructure in Sydney, NSW. Project included duplication of road viaduct and other significant bridges, major retaining walls, and ITS structures

#### **Roy Hill Iron Ore Project – Rail Bridges & Civil Works:**

- Design team leader for detailed design of eight heavy haul railway bridges over waterways, three rail overpasses, including waterways analysis and flood modelling. Construction support for bridges and civil works.
- Design Manager for rail construction yard, flash butt welding yard, access roads and intersections, including waterways and drainage investigations. Interface with Main Roads WA for design of intersections and level crossing at Great Northern Highway.
- Design Management of multidisciplinary team including bridge, civil, waterways and geotechnical disciplines. Interface with rail designers, Main Roads WA, third parties (BHPBIO, FMGL, BC Iron), EPC, Contractors, Project Management Contractor and Roy Hill. Participation in constructability reviews, Safety in Design workshops, HAZID and HAZOP processes. Responsible for guiding deliverables through the multiple review stages and layers.

#### **Cronulla Rail Duplication D&C:**

- Lead bridge designer for three new rail underbridges as part of the Cronulla Rail Duplication D&C in NSW, consisting of large post-tensioned precast I-beams with precast structural formwork and in-situ deck. The bridges were designed to be constructed at highly constrained sites immediately adjacent to existing rail bridges. The limited clearances available resulted in an innovative concrete through-girder design.
- Design review for three new rail overbridges, consisting of top-down tunnel to carry road traffic over duplicated rail lines. The design featured bored concrete piles with a precast plank and concrete deck, to form a continuous frame. Staged construction to facilitate continuous traffic flow. Designed for construction adjacent to existing rail tunnels

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## **FMG T155: Rail Solomon Spur Expansion Project & GNH Overpass:**

- Design team leader for detailed design of three steel-concrete composite heavy haulage railway bridges, one steel through-girder overpass bridge, and a precast concrete road-over-rail overpass bridge and associated civil works, waterways investigation and major culverts.
- Design management for multidisciplinary team including bridge, civil, waterways and geotechnical disciplines. Interface with rail designers, Main Roads WA, FMGL, Contractors. Participation in constructability reviews, Safety in Design workshops, and construction safety processes.

## **Canning River Rail Bridge:**

- Detailed design of incrementally launched prestressed concrete rail bridge over the Canning River for the Kenwick to Thornlie Passenger Rail Line, including launched post-tensioned box girder, and piled foundations.
- Concept design and planning, including development of options, costing and comparison, liaison with rail authority, adjacent freight rail operator, traditional owners, Swan River Trust. Site visits and workshops with Swan River Trust and Traditional Owners to identify constraints at this sensitive urban wetland location.

## **Roe Street Bus Bridge D&C:**

- Detailed design for D&C of southern abutment approach structure including precast columns and walls, in-situ walls and slabs. The abutment featured an internal void for use as a signals and communications equipment location. The abutment also provided fixity and continuity for the incrementally launched box girder bridge deck. Design review of incrementally launched box girder, piled foundations and tied precast approach ramp walls.

## **Fortescue River Bridge Replacement:**

- Design Manager and multidisciplinary team leader for replacement design of existing single lane bridge in the Pilbara Region of WA with a new 2-lane structure over major water course, including civil design of realignment to bridge approach roads. Tender documents, tender evaluation, and construction support.

## **Mitcham to Frankston EastLink Project:**

- Detailed design of pre-tensioned precast Super-T bridge beams, in-situ decks, and substructure components for two-span integral-abutment traffic bridge in Victoria.

## **Mitchell Freeway Extension D&C:**

- Moore Drive Bridge: Design of pre-tensioned precast bridge beams, in-situ decks and substructure for new three-span road bridge over road and rail. Design of related stairways and pedestrian underpasses.

## **Geraldton Southern Transport Corridor D&C:**

- Detailed design of post-tensioned precast bridge beams, in-situ decks and substructures for four new multi-span bridges over highway and rail.

## **Oakajee Port & Rail Bridges:**

- Design team leader for detailed design of rail bridges for proposed iron ore railway. Design Leader for preliminary design development at feasibility stages, including investigations and inspections.

## **RTIO Rail Expansion Projects:**

- Hope Downs 4 Rail Project: Design team leader for two steel-concrete composite heavy haulage railway bridges.
- RTIO RCE333 Project: Design team leader for detailed design of two steel-concrete composite heavy haul railway bridges, three corrugated steel arch structures, and one road-over-rail overpass bridge, including waterways investigations.

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- RTIO TRRD Rail Duplication Project: Design of pre-tensioned precast concrete bridge beams and substructure. Included analysis of numerous bridge sections and span length options to optimise cost and constructability.

### ***BHPBIO RGP5 Rail Bridges & BHPBIO Yandi Rail Bridge:***

- Design of spread footing foundations with ground anchors for new RGP5 heavy haulage railway bridges. Waterways analysis of major catchments in the Pilbara region. Design team leader for new steel-concrete composite rail bridge at Yandi Wye with tall steel trestle piers and piled foundations

### ***Tender Phase Design***

Preliminary analysis and design for major design, design-and-construct and alliance projects:

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|---|---|
| – Melton Highway Level Crossing Removal (Vic) | – Tonkin Highway Extension (WA)               |
| – Puhoi to Warkworth PPP (NZ)                 | – Mitchell Freeway Extension (WA)             |
| – Nicholson Road Grade Separation (WA)        | – Esperance Port Access Corridor (WA)         |
| – Westgate Distributor (Vic)                  | – Perth to Mandurah Railway Package A (WA)    |
| – WestConnex Stage 1A, M4 Widening (NSW)      | – Cronulla Rail Duplication (NSW)             |
| – Albury-Wodonga Bypass (NSW/VIC)             | – Ipswich Logan Motorway (QLD)                |
| – Reid Highway Extension (WA)                 | – Reid Hwy Alexander Dv Grade Separation (WA) |

### ***Bridge Design Verification***

- Independent review and verification of bridges, tunnels, culverts and waterways analyses for major projects; including precast prestressed concrete bridges, incrementally launched bridges, and various substructure and foundation types.
- RTIO Warramboe Overpass Bridge; Team Savannah Project GNH; New Perth to Bunbury Highway; EastLink Project; Rio Tinto TRRD Rail Duplication; Geraldton Southern Transport Corridor; Tonkin Highway Extension, Perth to Mandurah Railway Package A; Perth to Mandurah Railway Package E; Mining Area 18 load out tunnel; Brockman 4 Rail Tunnel.

### ***Bridge Maintenance, Refurbishment, Load Rating and Strengthening Design***

- Design and documentation of maintenance, strengthening and refurbishment works to timber, steel, concrete and composite bridges. Detailed visual inspections and Scoping of required works for over 175 bridges throughout WA and NSW. Load rating and design of strengthening works to timber, steel, reinforced concrete and composite bridges, including concrete overlays, widening, intermediate piers, refurbishment and temporary works

### ***Waterways Analysis and Design***

- Hydrological analysis of waterways and catchments; and hydraulic analysis and design of bridge, culvert and floodway structures. Investigation of flood events, and design of repair and upgrading works to bridges and associated structures. Detailed structural design of culverts and floodways.
- Key Projects include Roy Hill Project Rail Bridges, FMG Solomon Rail Project; Oakajee Port & Rail Bridges; AR&R Upgrade Project; BHPBIO Rapid Growth Project 5; RTIO Pilbara 320 Rail Project; RTIO Mesa A Rail Bridge; RTIO Brockman 4 mine infrastructure; Tonkin Highway Extension; numerous Main Roads WA bridges, culverts and floodways.

### ***Contract Documentation***

- Preparation of technical specifications, contract documentation, design briefs and material take-offs.

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## ***Temporary Works & Emergency Response***

- Perth to Mandurah Railway – Package F Temporary Works strutting and waling to underground station diaphragm walls and design of service hanging frames.
- RTIO Flood Damage Rail Rectification Project – Design team leader for emergency reinstatement works and design of a large new twin steel arch structure to replace a damaged existing bridge. Design of emergency steel retaining walls.
- RTIO emergency response and repair design to bridge damaged by truck collision.

## **Professional Activities**

Member of WA Branch Committee of the Concrete Institute of Australia 2006-2010

Presentation of technical paper on the Roe Street Bus Bridge at Concrete Institute of Australia Concrete 09 Conference in Sydney.

Interviewer for assessment of CPEng applicants with WA Branch of Engineers Australia