



Capability Profile

**Civil Engineering Contractors specialising in
Directional Drilling and Case Boring pipeline construction**

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About Codmah

CODMAH is a privately owned business that was formed in 1991 with a vision to provide the highest quality civil engineering support and services.

For over 3 decades we have maintained our place as a strong contender in the Civil Construction industry by delivering high quality civil projects and innovative engineering solutions encompassing trenching, HDD, case boring, pipe jacking and pipe laying techniques to meet our clients' requirements.



Our in-house specialist skills and equipment range allows greater flexibility, adaptability and capacity to manage both planned and unplanned construction challenges.

Our Head Office is based at Prestons, west of Sydney which allows for greater operational flexibility servicing contracts within New South Wales and along the East Coast of Australia. When required, we establish temporary project offices to service & support various civil projects.

In addition to the Sydney basin and throughout NSW, we also undertake both private and Government Funded projects in the ACT, Queensland, Victoria, South Australia and Tasmania.



Corporate Governance

The Management at Codmah take our business, cultural, environmental and social responsibilities and obligations seriously and ensure our ethical standards are maintained through a suite of clearly defined policies and procedures, our significant emphasis on training and development and by aligning our values and behaviours with the expectations of our stakeholders.

To maintain a level of performance which will always meet our clients' highest expectations we are committed to providing outstanding customer service by supplying products and providing services of consistently high quality. This is achieved by ensuring compliance with relevant Laws, Regulations, Codes of Practice, Standards and Specifications and by pursuing an operating philosophy of continual improvement in Quality, Safety and Environmental performance.

Our sustainability has been assured through our focus on Verification of Competency and Training, Work Health, Safety and Environmental initiatives which foster the development of our company values within our workforce and maintaining open communication and reporting regimes with stakeholders.



Scope & Capacity

Codmah have a proven track record having constructed the follow types of pipelines;

- Potable Water – PVC, DICL, GRP and PE;
- Sewer – PE & PVC pipelines: gravity lines & low pressure;
- Gas – Steel, PE & Nylon pipelines: trunk, primary, secondary, medium & low pressure;
- Telecommunication – PVC & PE Conduits;
- Electrical – Conduit Cable Laying and cable hauling.

Codmah has worked with a select group of clients over many years, being a preferred service provider and a panel member for various organisations, both in government and enterprise.

Jemena, Zinfra, Sydney Water, Downer Pipetech, NACAP, Subco South, GAMUDA, WestConnex, APA Group, UGL, NorthConnex, Laing O’Rourke, Caltex, Delta Electricity, PSP Alliance, Transfield Services, John Holland Group, WestConnex, Lend Lease, Ausgrid, BHP Billiton, NT power and water, Central Coast Council, Campbelltown City Council, Pittwater Council, Hornsby Shire Council. Some of our returning and current clients:

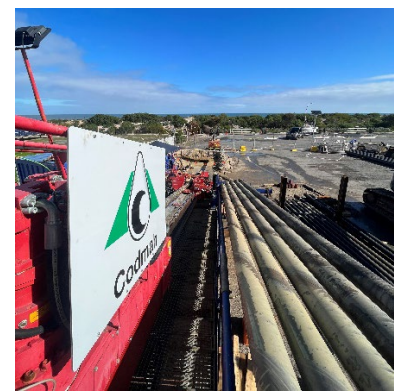


Horizontal Directional Drilling:

We are aware of the many applications and advantages of Horizontal Directional Drilling (HDD). Therefore, we can merge the HDD techniques with our open cut techniques allowing seamless design and construction of Directional Bores and the installation of conduits and or pits.

Our Horizontal Directional Drilling (HDD) capabilities include a range of HDD equipment to cater for small tight access bores, mid-sized bores and large diameter rock bores, utilising rigs from 25 to 250-ton capacity. With minimum disturbance to ground surface at the Launch and Receive pits, the entire process avoids disturbance to roads, highways, railways, watercourses etc. as it is conducted underground at the installation depth of the pipeline route.

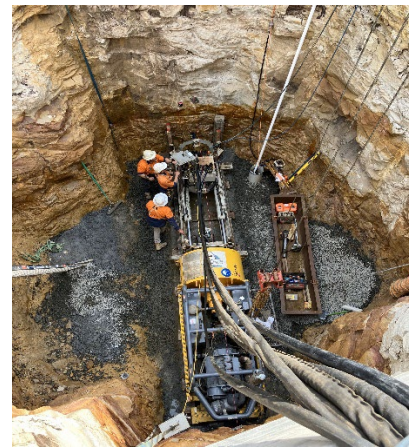
The HDD fleet includes a Herrenknecht 250 ton Crawler, Vermeer D80 x 100, 24 x 40, 36 x 50, D100 x 120 and Ditchwitch AT30. All rigs include their own vacuum sucker truck and recycling units as required.



Cased Auger Boring:

We are equipped with powerful cased auger boring machinery that can cut through a variety of materials, including soil and rock. The use of this machine with additional extension frames enables the use of 6m long casings.

The machine is designed to hydraulically thrust a steel pipe into a simultaneously bored hole, extracting the spoil from the cutting face, through the inside of the steel pipe.



Laser Guided Case Boring:

With our laser guided case boring rig, we are capable of boring 500mmØ mild steel casing to distances of 120m with a tolerance of +/- 25mm. Utilizing the 500mmØ casing, the laser guided rig covers a vast range of services in both water and sewer from 100mm – 300mm and anything in between.

Horizontal cased auger boring is the most practical solution for crossing roads, railways, buildings and almost anywhere that an open excavation is prohibitive.



Resources

Codmah has at its disposal a comprehensive range of plant & equipment coupled with highly experienced and well trained staff.

Codmah is equipped with an extensive fleet of light, medium and heavy vehicles, plant and machinery that allows flexibility to confidently meet specific project requirements.

Codmah's plant and equipment operators are properly trained and deemed competent prior to being authorised for work site operations.

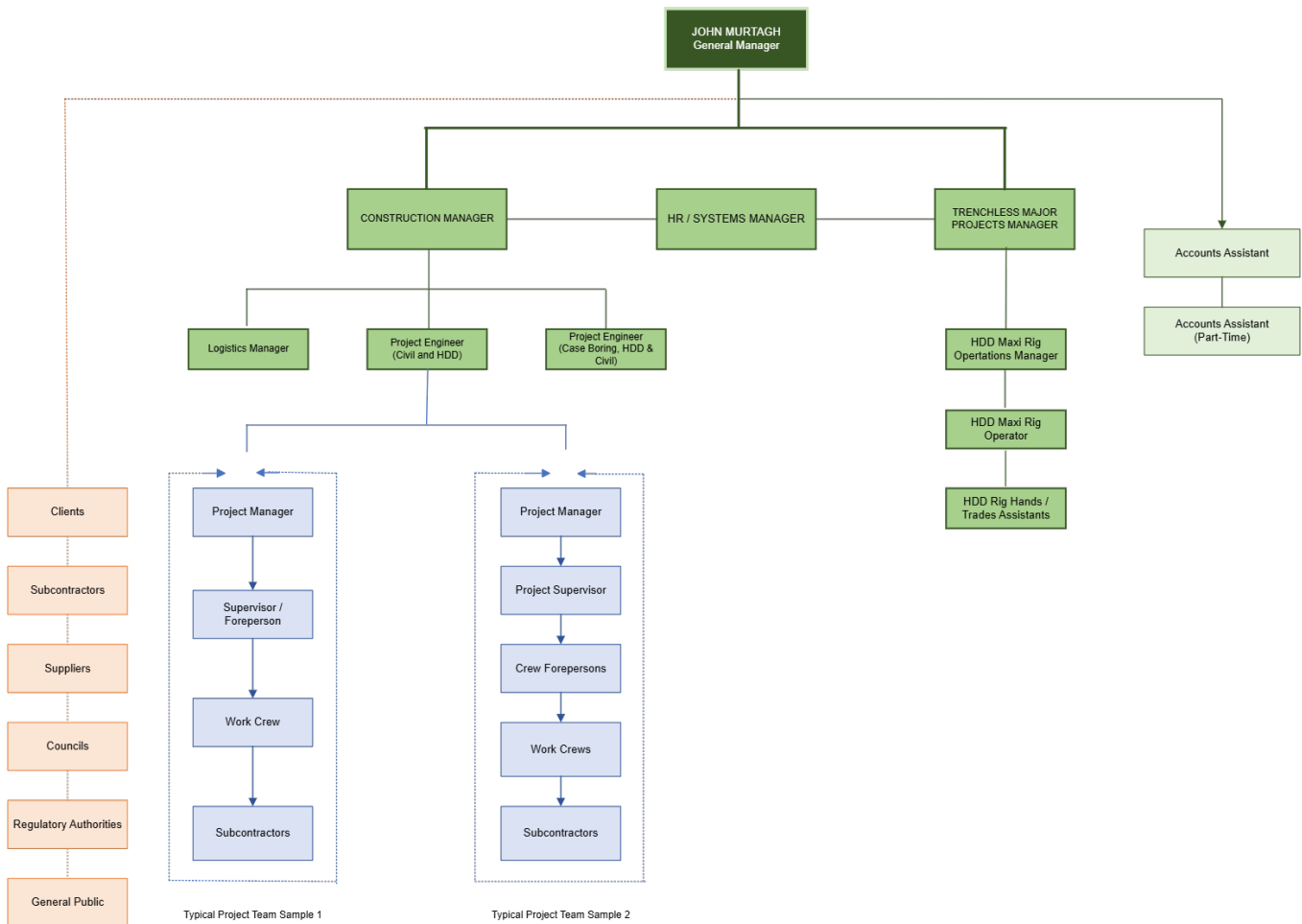
Codmah's comprehensive internal servicing schedule ensures all vehicles, plant and equipment are systematically serviced.

We are equipped to establish and perform works in CBD, residential, rural and remote areas throughout Australia.



Organisational Structure

The Organisational Structure is compliant with the Work Health & Safety Act 2011. The structure below also serves to detail the normal interaction paths that occur between Codmah's staff, Subcontractors, our Clients and Stakeholders.



Project specific structures are compiled for all major projects that Codmah undertakes and copies of these are provide to the particular client/s.

Codmah utilises the full range of our management, technical staff, machinery, labour resources and experience to provide a comprehensive service to our clients ensuring our projects are completed efficiently to the highest quality, environmental and safety standards. This goal is achieved through the cross-disciplinary collaboration, integration and participation of all parties whose experience and vision improve decision making, hence better productivity and efficiency.

Value Add

With over 30 years of operation, Codmah has strived to continually improve the level of service we offer to our clients. As a result of our substantial project experience in the construction of gas, water, electrical, sewer and telecommunication lines Codmah has garnered considerable knowledge in both trenching and trenchless construction techniques. In that time, we have embraced the many applications and advantages offered by trenchless construction techniques such as horizontal directional drilling (HDD) and laser guided thrust auger boring. Today we offer an inhouse turnkey construction package with seamless integration of both open cut and trenchless techniques.

By working collaboratively with Codmah our clients can plan, manage and deliver challenging works without the need to communicate with multiple companies. During the project planning phase Codmah can offer sound, unbiased, practical advice on planning, constructability of design, and methodology on a best for project basis. Sharing our extensive specialist knowledge in all aspects of trenching and trenchless construction enables our clients to make informed decisions regarding the most suitable construction methodology for their applications.

Having been involved in projects at all levels, including Alliance Partners, Principal Contractors and Sub-Contractors we have received a unique insight into the needs of the different commercial entities. This insight allows us to effectively meet the requirements of our clients while also handling the needs of other stakeholders, including Governing Authorities and sub-contractors.

Our experience tells us that successful project outcomes are dependent on effective communication, design, forward planning, procurement, programming, and construction. We therefore believe that co-operative early contractor involvement is crucial in recognising and minimising risk to the construction phase of the project due to flawed design planning or procurement.



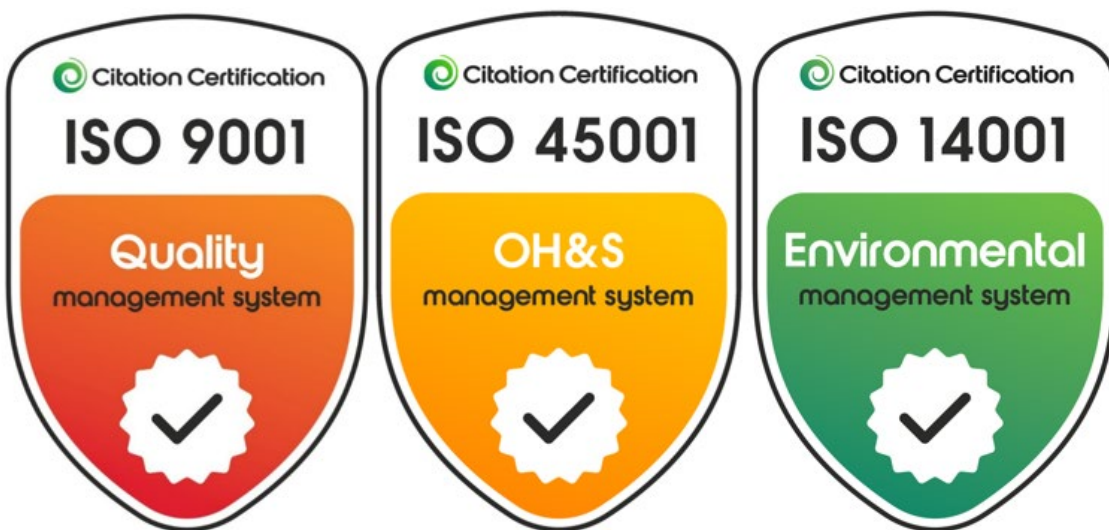
Aerial photo of the Emu Plains Primary Mains Extension.

Gas steel mains constructed under the Nepean River using a combination of Pipe Ramming, Cased Auger Boring and Intercept HDD methodologies.

Performance, Quality, Safety & Environmental

The Codmah team has established a commitment to the implementation and maintenance of an integrated approach in all operations. The delivery of the highest possible standards of service and workmanship is a major objective of our organisation.

Codmah have in place a Certified Integrated Management System, audited annually Citation Certification, to ensure our compliance with ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018 is maintained to the highest level.



Management and Supervision Team

Codmah utilises the full range of our management, technical staff, machinery, labour resources and experience to provide a comprehensive service to our clients ensuring our projects are completed efficiently to the highest quality, environmental and safety standards.

Over the years we have recognized that our clients find it easier and more economical to deal with one contractor rather than a series, which provides better communication hence, better productivity and efficiency.

As Primary Contractor, we take great care in establishing a collaborative relationship with subcontractors, suppliers and consultants to ensuring they operate to the highest standards of work. We have established Procedures in place to ensure we meet our obligations and responsibilities under the WHS Act and Regulations.

Our core personnel for projects include civil engineers, supervisors, directional drillers, stove pipe and butt fusion welders and specialist sub-contractor teams. Their shared academic and technical disciplines encompass Project Management, Civil Engineering, Plumbing, Welding and Motor trade qualifications, Load shifting operators' tickets to name a few. Associated work-related training courses include Work Health & Safety to supervisor level, Gas Industry Training, Water Industry Training Package, Chain of Responsibility, Working at Heights, Pit and Pipe, Asbestos Management, Confined Space, Overhead Powerlines Awareness (Close Approach), Safe Manual Handling, Provide First Aid, Environmental Awareness and Verification of Competency Assessments.



Project Management

Codmah brings to each project a suitably experienced, qualified and skilled management team that ensures the works are completed to the highest industry standards. This is achieved by developing and maintaining systems of work and procedures to effectively manage and control the construction activities in an efficient manner, without risk to the health and safety of the site personnel and public.

The team's typical project management and supervision tasks include the following:

- Preparation, development, implementation and management of project specific Works Management Plan, WHS Management Plan, Quality Management Plan, Environmental Management Plan and Emergency Response Plan.
- Preparation and maintenance of a project specific Skills Matrix with supporting competency documentation for relevant workers.
- Preparation of a detailed site dilapidation report
- Preparation, management and co-ordination of an activity based critical path programme of works outlining the preferred sequence and interface of activities and the dates by which the relevant activities will be completed, with details of the proposed labour, resources, materials, plant and equipment required to achieve the identified project timeline.
- Regular review and update of the Programme of Works plotting actual project progress against target timeline and implementing additional measures if necessary to address any programme slippage.
- Provision of relevant safety policies and procedures, including development of a job hazard assessment, safe work method statement, pre-start check plan and induction and training of workers in the site safety policies and procedures.
- Preparation and management of detailed inspection and Test Plans (ITPs) for all activities.
- Development, maintenance and compliance with chain of responsibility systems.
- Identification, documentation and control of supply hazards and risks.
- Preparation and management of a project predicted monthly cash flow statement including monthly updating and reporting of changes, payments to date and projected final Contract Price.
- Provision of a monthly project progress report detailing status of compliance with the WHS, Environmental and Quality Management Plans including any queries, complaints, comments or problem areas and measures being taken to resolve problems and mitigate any associated risks.
- Progressively compile asset information into a Manufacturing Data Report (MDR) incorporating all required quality control and quality assurance records for the project's Quality Assurance Certification.

Codmah's experience and systematic approach to project management as outlined above significantly reduces the project's inherent construction risks. We also recognise that each project, large or small, is unique and presents its own management and construction challenges. Our experience tells us that there should not be a "one size fits all" approach to the management and construction of pipeline works. Our project management team is flexible and adaptable with a demonstrated collaborative and best for project approach to project planning, risk management, procurement, methodology and delivery.

Project Profile

Sydney-Melbourne-Adelaide-Perth (SMAP) Cable

Client: **Subco South**

Project:

Horizontal directional drilling and installation of beach manholes for the new Sydney-Melbourne-Adelaide-Perth (SMAP) Cable. Construction of Hyper 1 Ocean Fallout, new landing facilities and beach manholes (BMH) at West Beach, SA and Garden Island (WA). Scope of works include:



- Preliminary Works at each site including Geo-technical studies, OH&S, Quality and Environmental Plans, Inductions and local council/managing bodies statutory obligations.
- Construct 1,000m of HDD at East Beach, Adelaide SA for installation of P100 conduit from selected location to the Ocean Outfall point. Construction of Beach Manhole.
- Construct 2,000m of HDD at Garden Island Defense base, WA for installation of P100 conduit from selected location to Ocean Outfall point. Construction of Beach Manhole.
- Existing underground Utility investigations.
-
- HDD Site layout plans.
- Traffic Management.
- HDD and Marine installation procedures.
- Engage Diving crew to survey, inspect and record at Punchout, flange installation and pigging.
- Survey and set out HDD entry and exit locations.
- Provide and maintain all drilling and ancillary equipment and site facilities.
- Reinstatement and restoration.

M7/M12/EDC - DN150 HP gas Relocation

Client: Zinfra Group (John Holland Group)

Project:

- As part of the new M12/EDC project, approximately 2200m of 150ST high pressure secondary gas main is required to be relocated to a new alignment.
- There were two stages to the relocation Stage 1 and Stage 2.
- Stage 1 Construction
 1. 730m by HDD installation in Rock up to 22 meters deep.
 2. 370m of Open Cut Trench installation
 3. 1 x DN150 Isolation Valve
 4. 1 x SDRS Installation
- Stage 2 Construction
 1. 750 m of open Cut Trench Installation
 2. 150 m of HDD installation
 3. 1 x DN150 Isolation Valve
 4. 1 x DN150 MIJ
- The project consisted of installing 5 In-service Hot Tap Fittings.
- Pressure test and commission.
- Cut and cap existing main in 4 separate locations.



SP0053 Mascot Rising Main Replacement

Client: **D4C / Sydney Water**

Project:

- HDD Installation of 380 meters of DN450 PE Rising Main Pipe in sandy water charged ground underneath Coward Street and crossing O’Riordan Street, Mascot.
- The works included stringing and welding, filling, pressure testing and flushing the new pipeline.

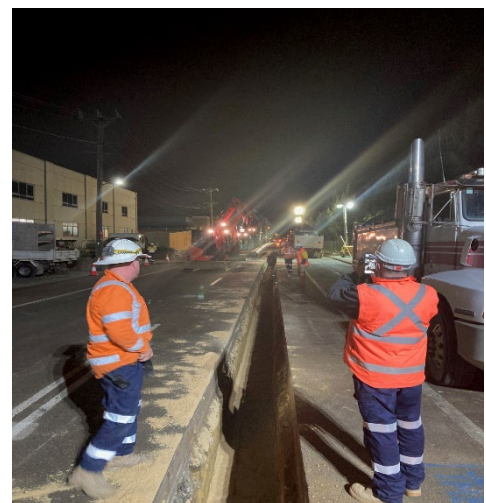


SMW Clyde Station – DN250 Lay Construction

Client: **Zinfra Group (GAMUDA/Laing O’Rourke)**

Project:

- Installation of 600m DN250ST high-pressure gas main.
- Installation of new 250mm gas pipeline via open trench.
- Case Bore / Pipe Jacking crossing of James Ruse Drive.
- Tie-in to the existing DN350 & DN200 Secondary system via Hot Tap Tees.
- Extensive DBYD and service locating as works progress.
- Pressure test all constructed pipe as per Jemena specifications.
- Traffic Control and Night works included.

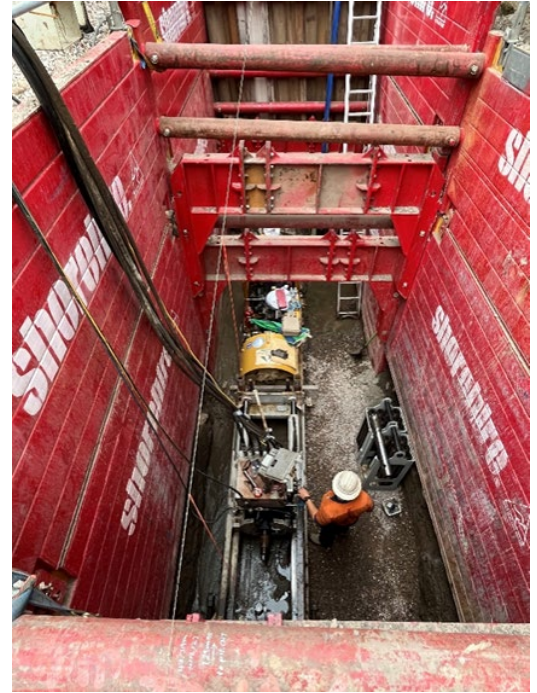


Tallawong Station – Sewer Underbore Works

Client: Kwikflo Group

Project:

- Underbore approximately 114m of 500mm x 6.4mm mild steel casing to house DN300upvc SN8 Sewer.
- Ground conditions shale and rock in sections.



SMW Clyde Station - DN350 Lay Construction

Client: Zinfra Group (GAMUDA/Laing O'Rourke)

Project:

- As part of the new utility corridor being constructed for the Sydney Metro project, Codmah constructed and approximately 430m of 350ST high pressure secondary gas main is required to be relocated to a new alignment.
- Construction of a temporary bypass and relocation.
- Construct Secondary main in Utilities corridor.
- Installation of DN350ST high-pressure gas main via trench and lay.
- The project consisted of installing 6 tees and constructing two bypasses and on
- e permanent main through the utility corridor.
- The length of the pipe network is approximately 750m installed.
- Pressure test and commission.
- Cut and cap existing main.



SPM Integrity Phase 1 – Macquarie Park

Client: **Zinfra Group**

Project:

- Installation of 1700m DN250ST high-pressure gas main.
- Installation of new 250mm gas pipeline via open trench.
- Tie-in to the existing DN250 Secondary system via a DN250 X DN250 Hot Tap Tee
- Includes road crossing within the road envelope using trenching, bedbore and Horizontal Directional Drilling techniques.
- Extensive DBYD and service locating as works progress.
- Pressure test all constructed pipe as per Jemena specifications.
- Traffic Control and Night works included.



Uriarra Water HDD main renewal - Cotter Dam

Client: **Downer Pipetech**

Project:

- HDD Drilling & reaming of 3 HDD Bores, 308mm, 228mm and 350mm length respectively.
- Installation of DN280 PN16.
- Pipe pull back DN180 PN25 for 886mm.
- Wireline Guidance for Rock bores.

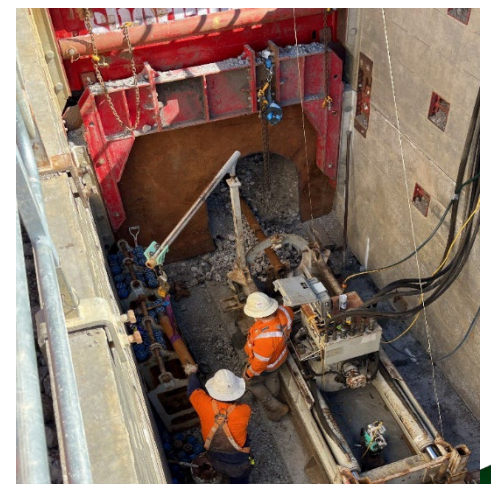


Tom Thumb Rd Case Bore - Port Kembla

Client: **Nacap**

Project:

- 2 x Laser Guided Bores for installation a DN450 High Pressure gas transmission pipeline of approximately 12km in length located within Port Kembla.
- Supply and installation of DN700 mild steel casing.
- Supply & grout bore annulus.

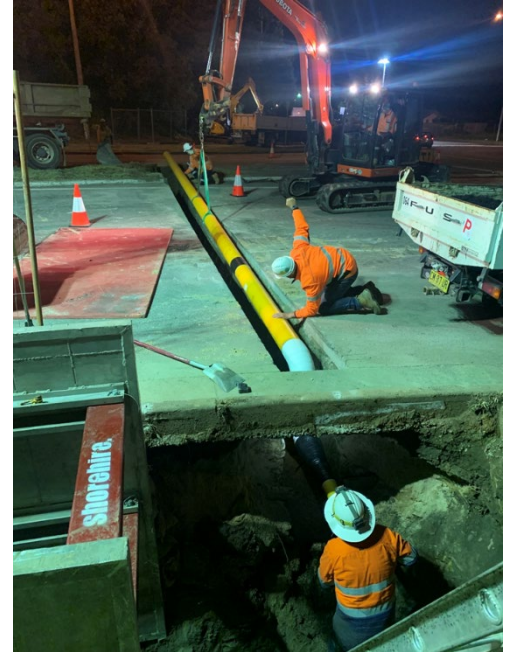


Menangle Park New Estate Secondary Main Construction

Client: **Jemena Asset Management**

Project:

- Construction of approximately 6.5km of DN200 Secondary Main starting at Therry Rd, Englorie Park (Campbelltown), down Gilchrist Dr to Menangle Road and southwest along Menangle Rd to supply gas to the new housing estate in Menangle Park.
- The construction of the new gas main will include a combination of pipe-laying methods such as open trench/backfill, bed bore and Horizontal Directional Drilling (HDD).
- Five Horizontal Directional Drills i) Euglorie Park Drive, ii) Cross Glen Alpine Drive, iii) Campbelltown Golf Club Green along Menangle Rd, iv) Water NSW heritage canal crossing, and v) Crossing of the Hume Highway.
- Vermeer D100 X 120 HDD Rig used on the project allows remote wireline steering to complete designed bore profiles with minimal steering corrections on the bore pilot path – utilised on Drills ii, iv, v.
- Monitoring of the Heritage listed Water NSW canal conducted while horizontal directional drill ongoing.
- The pretested steel pipeline bore string was pulled through the suitably reamed borehole, and the coating integrity was tested prior to the completion of tie-ins to open cut pipeline.
- One bed bore on at the corner of Callaway Ave and Trivoli Lane.
- Welding services, including supply of qualifications for weld procedures, welders and weld supervisors.
- Abrasive blasting and coating of joints and bends, including coating integrity checks.
- Installation of Cathodic Protection.
- Mummification of stopple fittings after commissioning.
- Testing includes Pigging and Pneumatic Pressure Testing of the pipeline.



Sydney Primary Main (SPM) Pigging Facilities – Horsley Park and Lidcombe

Client: Jemena Asset Management

Project:

- Perform integrity examinations of the proposed hot tap sites and verify hot tapping location.
- Installation of spherical tees, TOR and lock-O-ring fittings on the existing SPM at the two hot tap locations including live in-service welding on the SPM.
- Fabrication and installation of DN550 bypass between the two spherical tees, including buried valves and pressurisation line.
- Welding of end caps on existing SPM.
- Demolishing of the existing pipe sections between the spherical tees.
- Buried tie-in welds to the new pig launcher outlet and kicker lines.
- Fabrication and site installation of new above ground launcher facility including:
 - Construct Pig Launcher Barrel (DN650 major X DN550 minor barrel) and associated saddle supports.
 - Construct DN150 kicker line from launcher to buried pipeline welded tie-in.
 - Construct DN550 pipeline connection, including isolation valves and MIJ.
 - Construct Pipe supports for DN550 and DN150 above ground sections.
- Perform Pneumatic tests of bypass and Hot tap fittings post welding.
- Construct associated Civil/Structural Works including:
 - Earthworks to relocate within the facility, existing earthen mound at launcher location,
 - Construction of new compacted hardstand and access road,
 - Supply and installation of valve pits for buried valve spindle connections, cavity bleed and sealant injection ports,
 - Supply and installation of shallow concrete footings for launcher vessel and above ground pipe supports,
 - Supply and installation of permanent and removable bollards,
 - Excavation and backfill of buried pipelines and tie-ins,



- Associated instrument, electrical and cathodic protection works, including:
 - Installation of permanent local earthing grid for the launcher and earth cable connections to piping and supports,
 - Installation of surge diverters at insulation joints, and local pressure gauges and pig sigs,
 - Supply and installation of cathodic protection test point, including associated reference electrode / anode and cabling.
- Installation of Pig Receiver skid and pre-fabricated riser bend.
- Perform earthworks to cut/fill to prepare battered slope around hardstand area.
- Supply and installation of pre-cast concrete flange access pit.
- Supply and installation of bored pier footings and pile caps for receiver skid and off-skid pipe supports.
- Provide traffic management and Road Occupancy Licence at Lidcombe site.
- Excavation, removal and replacement of Asbestos contaminated ground at Lidcombe site.



Port Augusta Energy Park, SA

Client: **Tesmec Pty Ltd**

Project:

- Excavate launch & receive pits (3X) @ (18m x 10.5m x 3m) form slab, pour concrete, muck out spoil during boring process & stockpile in easement. Backfill launch & receive pit post installation works.
- Laser bore 9 x 300mm steel sleeve in dehydrated red earth over an average of 70m.
- String, weld & debeat 9 x DN250 PE100 SDR13.6 carrier mains, 2 x 40mm PE fibre conduits centralise & grout the annulus using a TR rated low MPA fill.



Ethylene Pipeline Decommissioning

Client: **Qenos**

Project:

- Decommission the ethylene pipeline which has been used by Qenos Pty Ltd since 1962 for the transportation of high pressure ethylene gas between the former Clyde Shell refinery and Qenos's site in Botany.
- The removal of the pipeline requires excavation and removal from bridge structures that span road and water way crossings.
- Scope of Works also include end capping, grout filling, removal of ground structures, removal of valve pits / flare points, demolish concrete pits, and full restoration of the disturbed surfaces including stabilized sand and grade and full pavement and grass restorations.
- Much of the works were conducted as night works and use of EWP to access rail bridge pipelines.



The Northern Road Stg 3 – Utilities HDD Package

Client: **Lend Lease Engineering**

Project:

- Install electrical and communications conduits at 18 locations between Wentworth Road and Castle Road, Penrith South.
- Five major crossings beneath M4 motorway using wireline guidance consisting of 360m x 6x140mm & 2 x63mm electrical conduits, 360m x Dn250 water main, 360m x 110mm mud return line, 180m x 7x125mm & 2x63mm Comms, 160 x 4x140mm & 2 x 63mm electrical.
- All bores completed in varying ground conditions from OTR /ROCK



Rozelle Stage 3B

Client: **JHCPBJV**

Project:

- Laser guide 9x utility services in sandstone ranging in size from 400mm – 900mm. Avg. distance 82m.
- 8 bores under the city Westlink leading to the ANZAC bridge.
- All bores allowed for steel sleeving slip lined with RCJP with internal and external annulus grouted with low MPA flowable fill.
- Works were completed on schedule using three crews working day & night shifts



Goulburn Murray Water Irrigation

Client: **John Holland (VIC)**

Project:

- Construction of various irrigation pipelines, channel remediation, pump stations, meter installation, on Farm works.
- Installation of DN710, DN630, DN560, DN400, DN355 HDPE pipeline.
- Construction of offtake structures, slip meters, junction pits, stock and domestic lines.
- Dewatering & decommission of existing GMW channels.
- Re-establishment of boundaries and fencing.



Airport Industrial Lands Collector Sewer

Client: **Armidale Dumaresq Council**

Project:

- Installation, testing and commissioning of 1.8 kilometres of 225mm diameter UPVC gravity sewer.
- A 2.1 kilometres long 150mm diameter UPVC rising main including two thrust bore road crossings.
- 34m and 52m long respectively plus the installation of a packaged pumping station.
- 1.0 kilometres of 63mm polyethylene water main.
- 2.4 kilometres of 100mm conduit and pits for NBN fibre optic cable plus maintenance holes and ventilation structures for the sewer.



Rockhampton Relocation Stage 1

Client: **APA Group (QLD)**

Project:

- The relocation of the APA Steel and PE Network comprised approximately 815m of DN100 API 5L X52 PSL2 consisting of three separate pipe sections to relocate, two open trench road crossings performed during night works and completion of one horizontal directional drill across the Bruce Highway, achieving the required accuracy.
- Installation of a new DRS and associated connecting pipework and abandonment of the existing DRS.
- Approximately 165m of DN160HDPE laid to create the connection point between the DRS and the existing HDPE main.
- Approximately 301m of DN110HDPE constructed to relocate the existing main consisting of a 180m HDD crossing across Ramsay creek consisting of a DN200HDPE sleeve and pullback of the DN110HDPE. The section also consisted of 121m of open excavation and lay.
- All works meet the requirements of APA with successful completion and handover meeting both the program and budget.



Gungahlin to Amaroo Capacity Development Program

Client: **Jemena**

Project:

- Installation, testing and commissioning of 2700 meters of DN150 High Pressure Steel Gas Pipeline.
- Construction included, open cut trenching, horizontal directional drilling, creek crossings, cathodic protection system, installation of Hot Tap Fittings, valves & MIJ's.
- Installation, testing and commissioning of a 150NB Williamson Tee and a 150NB Ball valve to tie-in to the existing secondary main.
- Installation, testing and commissioning of 1 off 100NB Ball valves, including installation of a 150NB insulation Joint on the inlet and 1 off 100NB Ball Valve on the outlet of the Black Box Regulator.
- Installation, testing and commissioning of a 7000 cub/m/Hr Black Box regulator.
- Installation, testing and commissioning of 635m of 150NB Line Pipe with Rock Jacket Coating.



Emu Plains Primary Main Extension - High Pressure Steel Gas Pipeline

Client: Jemena

Project:

- Construction of 3 kilometres of 200NB x 9.6 mm gas main to boost gas supply to the Blue Mountains.
- Construction was carried out in the road pavement through residential, commercial and industrial areas. The route included heavily trafficked Council and RMS roads requiring extensive traffic management during both day and night works.
- The pipeline included straight sections, pipe bends, installation of Impressed Current Cathodic Protection System & Pipeline testing, including NDT of welds and Hydrostatic testing in accordance with Australian Standard AS 2885.
- A rock trencher was utilised to excavate the trench increasing production and minimising hard surface restoration costs.
- Cased boring was used to construct a creek crossing in difficult unstable ground conditions. The excavation for the entry and receive pits was more than 6 meters deep and required extensive shoring.
- A 660m HDD crossing of the Nepean River was constructed in challenging ever changing ground conditions including boulders, cobbles, gravels sand and rock. Following extensive site investigation and preparation works Codmah installed 600mm diameter steel casings from ground level to the bedrock on either side of the crossing using a combination of pipe ramming and thrust auger boring to penetrate, seal and remove the boulder, cobble and sand layers. The HDD pilot shot was then completed utilising two separate drilling rigs operating from either side of the river through the cased sections and intersecting at a point in the middle of the bore. Following successful completion of the intersect procedure the pilot bore was reamed and the gas pipe installed.
- Numerous pipe direction changes and fabrication around existing underground utilities was achieved using both Hot Bends (Induction Bends) and on-site Cold Bends (Field Bends).



Munmorah Delivery Pipeline (MDP) – Colongra Lateral Pipeline

Client: **Jemena on behalf of Delta Electricity**, Nov 2008 – Jan 2009

Project:

- The construction of 400 meters of DN400mm Primary Pressure Gas Pipeline for the connection of the Munmorah Delivery Station to the new gas turbines.
- The pipeline included above ground, below ground, a bridge crossing, installation of Cathodic Protection System & Pipeline testing, including NDT of welds and Hydrostatic testing in accordance with Australian Standard AS 2885.



- Construction of the pipeline from the Munmorah Delivery Station (MDS) to the Inlet Canal Bridge Crossing was by overground techniques, Galvanized Pipe supports were designed and fabricated to suit the ground levels, and these were installed onto cast insitu reinforced pile foundations. The pipe was then welded into sections and lifted on to the supports.
- Construction of the 120 meters of 400NB gas main & 150NB Steel Conduit for electrical and communications supply across the inlet canal was carried out by installing fabricated pipe supports on existing bridge pillars, installation of the supports was carried out by utilising a small scaffold barge. The pipes were welded up in two separate strings and a 200 tonne and 100 tonne crane were employed to lift the pipes onto the pre-installed pipe supports in one day.
- The remainder of the pipework was constructed using conventional open cut trenching methods.
- Connections to the MDS and the Turbine inlet pipeline were carried out by Codmah.



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