CLL Company Profile and Capabilities

SERVICE & SOLUTIONS

CLL GROUP (CLL) is a well-established construction company specializing in piling, ground improvements, slip stabilization, ground anchors, retaining walls, civil structures, drainage, and contaminated site remediation. With extensive experience across these disciplines, CLL has built a strong reputation as a reliable and innovative industry leader.

At CLL, we pride ourselves on being at the forefront of ground improvement and piling techniques, leveraging advanced European technologies that set us apart. These cutting-edge systems allow us to tackle complex challenges efficiently, often eliminating provisional tags from tenders and streamlining project delivery. Our collaborative approach ensures that we work closely with your design consultants to develop cost-effective, fit-for-purpose solutions for in-ground challenges.

As part of our commitment to strong partnerships, we offer our expertise and time at no cost—providing indicative pricing and tailored recommendations to help achieve project goals efficiently.

CLL employs 250+ professionals, including engineers, project managers, estimators, machine operators, tradesmen, and skilled labourers. Our workforce includes specialist piling crews and industrial rope access teams, as well as tradesmen such as carpenters, mechanics, and formwork specialists.

OUR EXPERTISE

Geotechnical & Civil Engineering Solutions

- Piling solutions (Olivier Piling, CFA, Bored, Driven, Sheet Piling)
- Retaining and stabilization systems
- Ground anchors and soil nailing
- Deep foundation and ground improvement techniques

Critical Slip Rehabilitation & Drainage

- Earthworks and slope stabilisation
- Cross road drainage and culvert installation
- Swale and water diversion systems
- Manhole and bored drain installations

Specialized Construction Services

- Bridge and structure foundations
- Marine piling and coastal protection
- Infrastructure resilience solutions
- Sustainable construction initiatives

WHY CHOOSE CLL?

- **Industry Leadership:** Cutting-edge European piling and ground improvement technologies.
- **Experience & Expertise:** Decades of experience in delivering large-scale infrastructure projects.
- **Innovative Methods:** Leaders in advanced piling and geotechnical stabilization.
- **Sustainability Focus:** Commitment to environmentally friendly construction practices.
- **Safety & Quality Assurance:** Adherence to the highest industry standards.
- **Project Delivery Excellence:** Proven track record of delivering projects on time and within budget.

LET'S WORK TOGETHER

We welcome opportunities to collaborate on upcoming projects. Get in touch to discuss how CLL can bring value to your project by contacting the person who gave you this brochure or via our branches located on the last page of this document.

CLL SERVICE & SOLUTIONS

DESIGN & CONSTRUCT

CLL takes care of the design and build of your in-ground projects, simplifying the process for our clients and reducing costs.

Our 35 years of experience across complex landscapes provides valuable insight into pre-purchase and pre-design feasibility assessments, and the overall design of the project.

We work with a small number of expert geotechnical consultants who have experience and an appetite for design and build projects. Ground improvement work, by design, does not structurally connect with the rigid floor structures, therefore our Geotech experts are involved from the very beginning. This ensures that what is constructed below the ground is fit for purpose for what will be built above it.

EARLY CONTRACTOR INVOLVEMENT - ECI

Getting us involved from the outset of your project means a seamless end-to-end solution.

Our 35 years of experience across complex landscapes provides valuable insight into pre-purchase and pre-design feasibility assessments, and the overall design of the project.

The construction industry is trending towards a more unified approach to projects and CLL offers significant experience in design and construction as well as ECI. Consultant led designs are fraught with risk due to the lack in understanding of site specific methodologies, real time innovation and evolution of construction techniques, and current market costs.

We offer significant experience in design and construction as well as ECI with a robust understanding of design, method, and cost relationships and an understanding of the connection between the foundation and structure.

CLL Double Rotary CFA Technology

SERVICE & SOLUTIONS

CFA PILING

Continuous Flight Auger, sometimes known as auger cast piling, is a technique to create concrete deep foundations.

A continuous flight auger drill is the same length as the required hole depth, and concrete is injected through a hollow shaft under pressure as the auger is extracted.

Reinforcement is inserted after the auger is removed, creating a continuous pile without ever leaving an open hole. Fifteen years ago, CLL was introduced to CFA piling when visiting a contractor in Sydney. Soon after, we visited rig manufacturers in Italy, and our first CFA rig was soon on the water heading for Auckland.

DOUBLE ROTARY CFA

From the time we started with CFA it has always been the dream of the CLL team to get a double rotary rig because of the superior accuracy and speed that they enable.

About 7 years after introducing CFA, CLL bought a DR-CFA rig from Perth.

The technique is particularly valuable when constructing secant walls and the piles produced form a very accurate clean line.

Unlike conventional top-drive rotary rigs, a double rotary has two counter rotating rotary drives working simultaneously but in opposite directions.

The hydraulic top-drive rotates the drill string. The lower independent rotary drive advances a steel casing through unconsolidated overburden. This casing‘s rotation provides borehole stability.

CLL DOUBLE ROTARY CFA

Pioneering Precision in Piling

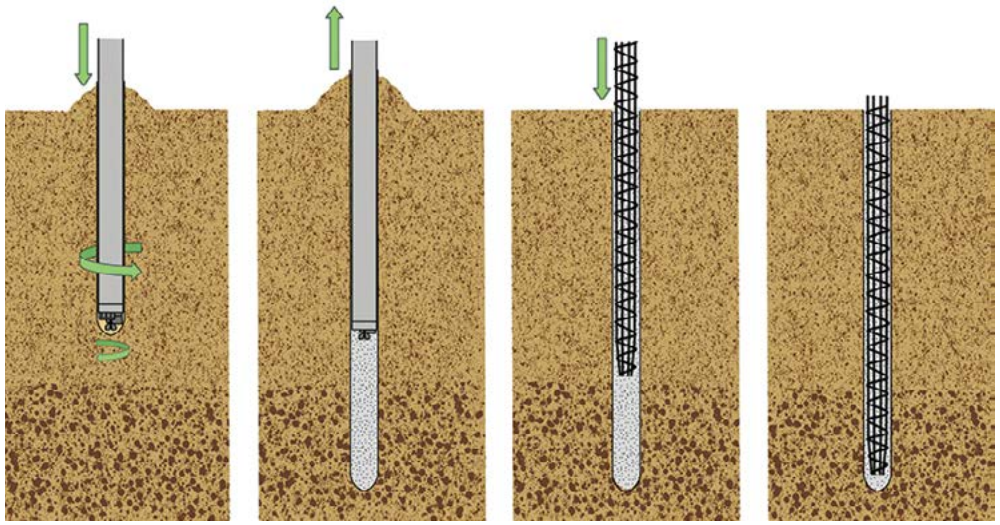
DOUBLE ROTARY CFA

1. Auger and casing drill simultaneously into the ground by rotating in opposite directions.

2. Auger and casing are extracted whilst concrete is pumped in through a hollow stem.

3. Reinforcement is then inserted.

4. Finished pile.



Benefits

- Removes Tags from tenders
- With good Geotech it can guarantee the price
- Eliminates cave-ins
- No requirement for insitu casings
- Eliminates the auger wanting to walk
- Close to 100% verticality
- 2.5 times faster than standard CFA
- High water table is not an issue

Why Double Rotary CFA?

The technique is ideal when constructing secant walls as the piles form a very accurate clean line.

Unlike conventional top-drive rotary rigs, a double rotary rig features two counter-rotating drives working simultaneously:

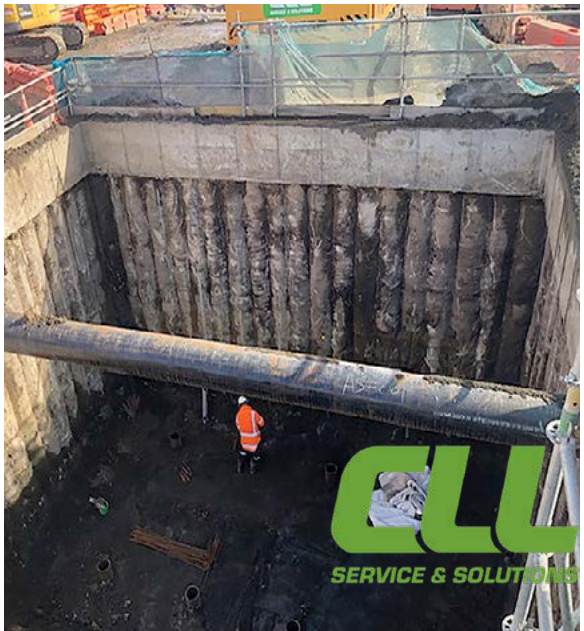
- Hydraulic Top-Drive – Rotates the drill string.
- Lower Independent Drive – Advances a steel casing through unconsolidated overburden, providing superior borehole stability.

This dual-action system eliminates the risk of soil flighting or decompression during drilling and ensures exceptional accuracy - a game-changer for secant walls and deep foundations that require a clean, precise finish.

The CLL Advantage

- **The only company in NZ offering Double Rotary CFA.**
- **Greater accuracy than traditional CFA.**
- **Faster installation without compromising quality.**
- **Unmatched stability in challenging ground conditions.**

At CLL, we don't just follow industry trends - we set them. With our exclusive Double Rotary CFA rigs, we're delivering stronger, smarter, and safer foundations for New Zealand's most complex projects.



PROJECT INFORMATION SHEET

CENTRAL INTERCEPTOR PROJECT

LOCATION	**AUCKLAND**
CLIENT	**GHELLA**
START & FINISH DATES	**2020 - 2024**
VALUE	**$16M CIRCA**

PROJECT OVERVIEW

The Central Interceptor Project is a critical sewerage infrastructure upgrade aimed at improving wastewater management in Auckland. Since August 2020, construction contractor Ghella engaged CLL, alongside a competitor, to construct secant walls for deep shaft access. Due to CLL's superior execution and quality control, we have since been entrusted with completing secant bored pile shafts at 13 diverse locations across Auckland. These locations include Miranda Reserve, Blockhouse Bay, Haverstock, Sandringham, Rawalpindi Reserve, Mt Albert, Western Springs, Norgrove, Mt Albert, Tawariki (Ponsonby), Keith Hay Park & Walmsley (Mt Roskill), Mangere Pump Station and Point Erin (Westhaven).

The primary objective was to establish lodging and receiving shafts for tunnel boring machines, vital components for the construction of a sewer line. The project entailed intricate foundation pile installations beneath proposed manholes and chambers, demanding precision and expertise. The construction process employed advanced machinery, the LRB355 drill rig and a 50t crane carrying out works at most of the sites.

Each location posed unique challenges, requiring secant bored pile shafts of varying depths and dimensions. Diameters ranged from 600mm to 1050mm, with specific sizes tailored to individual locations. Notably, Tawariki required three shafts, while Keith Hay Park & Walmsley necessitated two. The project employed the double rotary CFA (Continuous Flight Auger) method, a sophisticated technique renowned for its accuracy and efficiency, particularly in challenging geological conditions.

CLL SERVICE & SOLUTIONS

PROJECT SITE SUMMARIES

May Road (Māngere East) - 2020

Scope of Work:

- Shaft A: 324 piles, 900mm diameter, 26.4m depth.
- Shaft B: 70 piles, 900mm diameter, 26.4m depth.
- CFA Double Rotary technique.

Performance: Successfully delivered dry shaft despite initial site challenges. Led to CLL securing additional work.

Miranda Reserve - 2021

Scope of Work:

- 68 piles, 750mm diameter, depths of 17-20m.
- CFA Double Rotary technique.

Performance: Successfully delivered with no remedial works required.

Western Springs - 2022

Scope of Work:

- 64 piles, 900mm diameter, 13m depth.
- CFA Double Rotary technique.

Performance: Two soft piles had minor soft spots, but no remedial work required.

Rawalpindi Reserve - 2022

Scope of Work:

- 52 piles, 750mm diameter, 16.5m depth.
- CFA Double Rotary technique.

Performance: One cage didn't reach bottom, but no remedial work required.

Keith Hay Park Deep Shaft - 2023

Scope of Work:

- Three shafts, varying from 15 to 34 piles, depths from 14.6m to 16m, 750mm diameter.
- CFA Double Rotary technique.

Performance: No specific issues reported.

CLL SERVICE & SOLUTIONS

Walmsley Deep Shaft - 2023

Scope of Work:

- 134 piles, 750mm diameter, 19.5m depth.
- CFA Double Rotary technique.

Performance: No specific issues reported.

Tawariki (Ponsonby) - 2023

Scope of Work:

- Three structures, pile diameters from 600mm to 1050mm, depths from 8.5m to 20m.
- CFA Double Rotary technique.

Performance: Successfully delivered per specifications.

Mangere Pump Station (Māngere) - 2023

Scope of Work:

- 124 piles, 600mm diameter, depths of 12.5m-13m.
- CFA Double Rotary technique.
- Variation work added: 34 piles, 600mm diameter, 12.5m-13m depth.

Performance: Delivered per client variation request.

Haverstock Road - 2023

Scope of Work:

- 50 piles, 750mm diameter, 15m depth.
- CFA Double Rotary technique.

Performance: No remedial work required.

Point Erin (Westhaven) - 2024

Scope of Work:

- 68 piles, 900mm diameter, 24m depth.
- CFA Double Rotary technique.

Performance: Due to restricted access, innovative splicing methods were employed. Successfully delivered as planned.

PROJECT EXECUTION AND ACHIEVEMENTS

- Watertight Construction: CLL's expertise ensured high-quality, defect-free piles.
- Program Adherence: Each shaft was delivered on schedule, meeting project time-lines.
- Budget Compliance: All works were completed within budget.
- Client Trust: Consistently delivering quality results secured CLL's long-term partnership with Ghella.

CONCLUSION

CLL's involvement in the Central Interceptor Project highlights our ability to deliver high-quality, technically demanding foundation solutions. Our proven expertise in secant bored pile wall construction has solidified our standing as a trusted contractor in large-scale infrastructure projects, ensuring long-term partnerships and successful project outcomes as each job was completed to specification, on time, and within budget.

CLL SERVICE & SOLUTIONS

CLL Olivier Piling Technology

SERVICE & SOLUTIONS

OLIVIER PILING TECHNOLOGY

The Olivier pile is a patented drilled displacement pile made of concrete (or reinforced concrete) with a screw-shaped (helical) shaft, that is produced without vibration and without soil removal.

Due to its screw shaped shaft, the Olivier pile is suitable for soils with low load-bearing capacities, such as clay and loam, but it can be used in almost all types of soil.

The Olivier pile can be made with any foundation machine with a minimum torque of 10 t/m. The Belgian, Gerdi Vankeirsbilck, applied for the production patent for the Olivier pile in April 1996 and various licenses have been granted for this technique in Belgium and internationally. In 2018, a new patent was applied for, which involved a method of drilling without the use of a lost bit.

An Olivier pile is drilled into the ground using a drilling rig with a top-type rotary drive with variable rate of penetration. A lost tip is attached to a partial-flight auger which, in turn, is attached to a casing. The casing, which is rotated clockwise continuously, penetrates the ground by the action of a torque and a vertical force.

At the desired installation depth, the lost tip is released, and the reinforcing cage is inserted into the casing. Concrete is then placed inside the casing through a funnel.

The casing and the partial flight auger are extracted in a counter-clockwise rotation, producing the Olivier pile shaft in the shape of a screw.

Common auger head diameters:

- Diameter 510mm
- Diameter 610mm
- Diameter 710mm

OLIVIER & TRADITIONAL FDP COMPARISON

OLIVIER PILE
Screw-shaped shaft

NEW OLIVIER DPA
Smooth to slightly curved shaft

TRADITIONAL FDP
Smooth shaft

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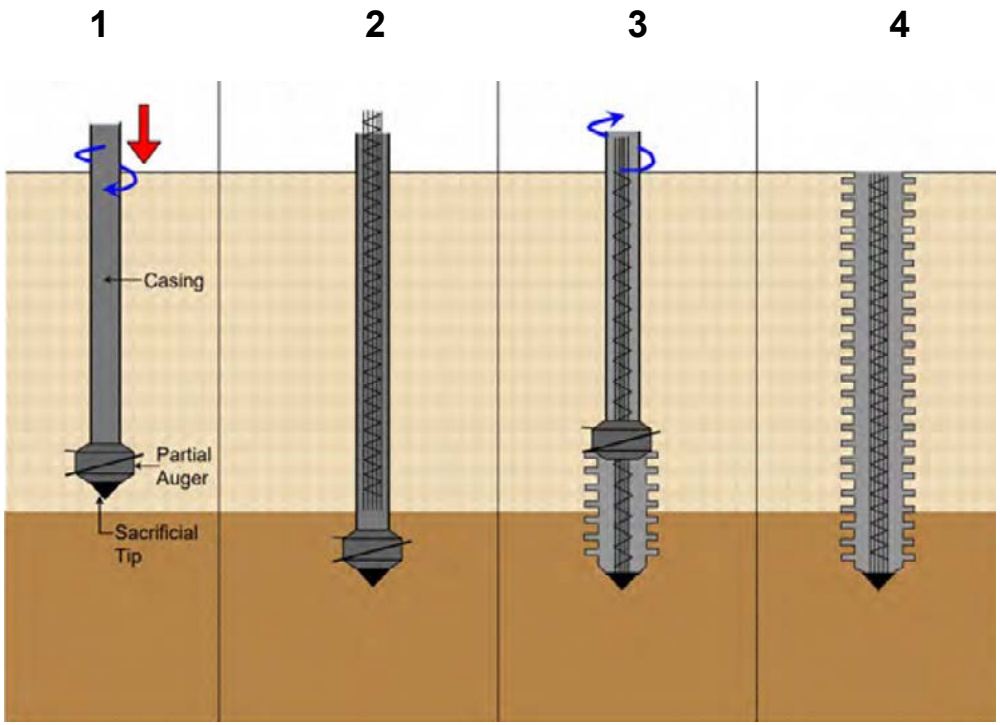
OLIVIER IMPLEMENTATION

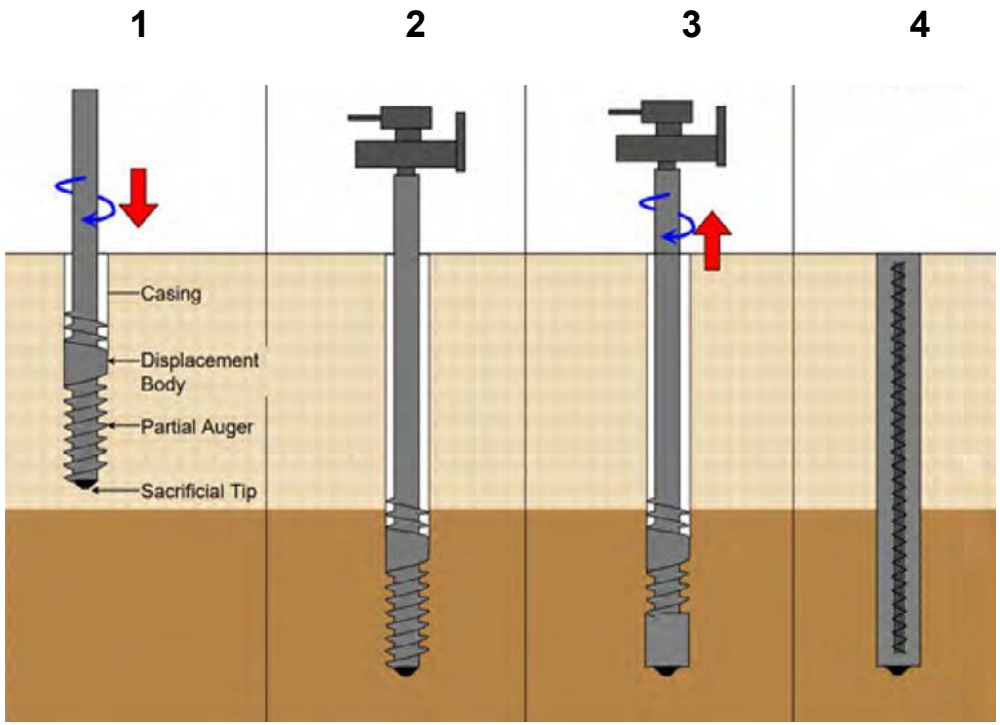
Drilling in is done in a clockwise direction, screwing back is anti-clockwise (reversed).



1. Drilling with clockwise auger rotation an vertical force.
2. Insertion of reinforcing cage and release of sacrificial tip at the desired depth.
3. Concrete pumping and extraction of casing with counter-clockwise rotation.
4. Completed OLIVIER pile with screw-shaped shaft.

TRADITIONAL FDP IMPLEMENTATION

Drilling in and out is always done in the same direction (clockwise).



1. Drilling with clockwise auger rotation and vertical force.
2. Concrete injection and release of sacrificial tip at the desired depth.
3. Extraction of casing with clockwise rotation and vertical force.
4. Insertion of reinforcing cage and completed pile.

CLL SERVICE & SOLUTIONS

CLL will soon be adopting OLIVIER's new cylindrical full displacement pile, which can be drilled into the ground even more easily. It includes an automatic coupling for drilling pipes to enable faster and more efficient construction of foundations.

The new cylindrical full displacement pile (OLIVIER DPA) allows construction on both hard and unstable soil layers.

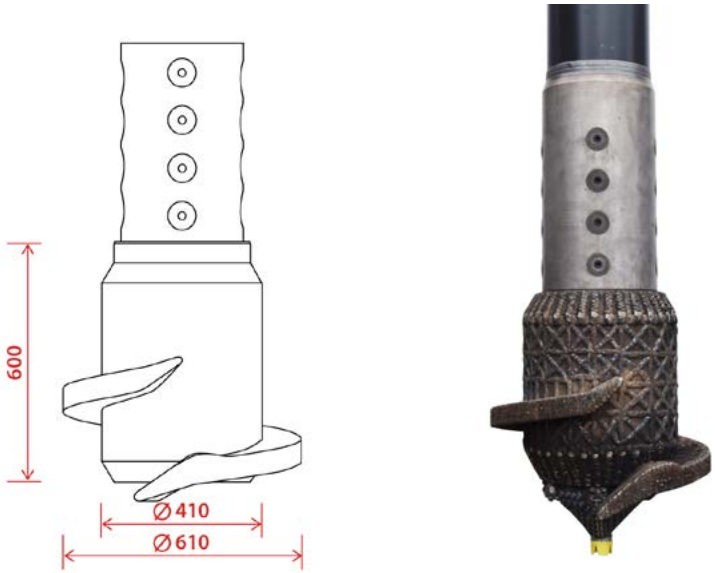
The pile can be drilled without vibrations, even through layers of sand.

The unique flaps system and reusable drill tip eliminates the need to replace drill tips manually after each pile, which reduces the risk of accidents and injuries significantly, as well as costs.

AUGER HEAD - Useful Drilling Length

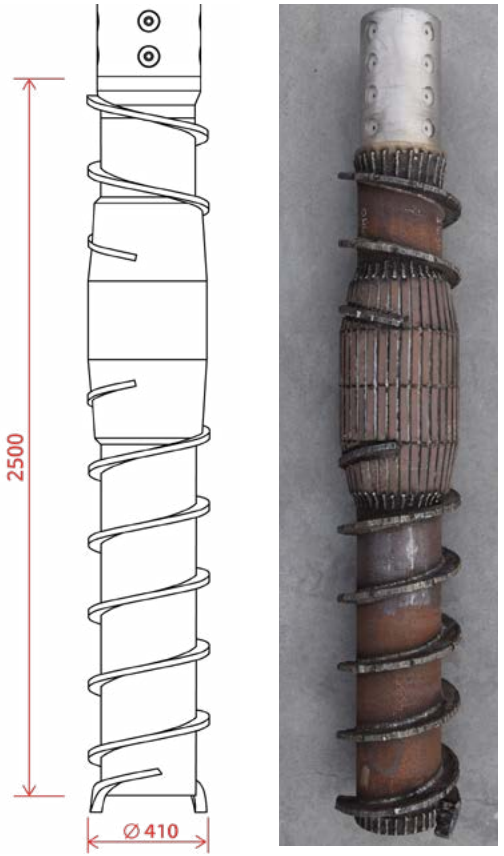
OLIVIER Ø41

Between 500 & 600 mm friction means that only 500 - 600 mm gets hot and can wear off.



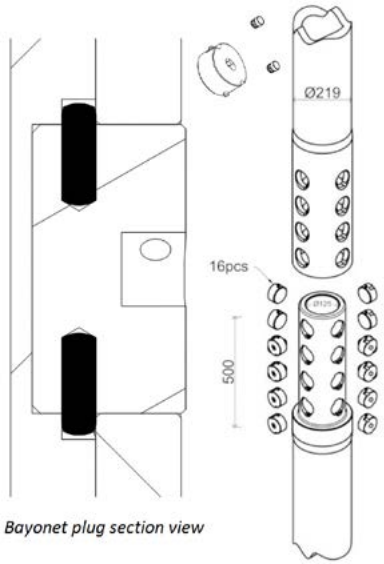
With one set of drilling pipes and one diameter of guide, all diameters of Olivier piles can be drilled.

TRADITIONAL FDP Ø41



3 m friction means that 3 m can heat up and wear off increasing the chance of concrete getting stuck.

OLIVIER AUGER HEAD - Couplings

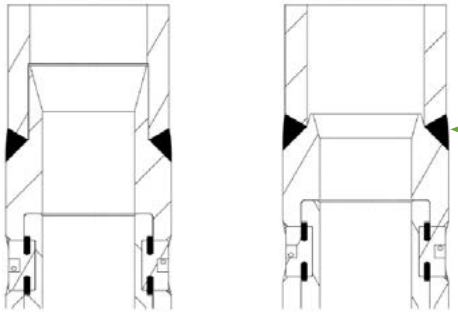


Bayonet plug section view

Available with seal for high-pressure grout injection

Press in pipe + weld

Welded to the pipe



Two types of welding connection

OLIVIER CD COUPLER

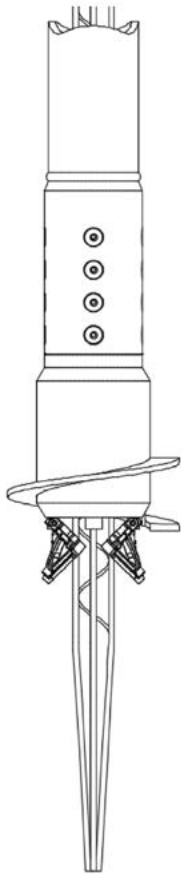
- Full round coupling (No Hex or Octagonal).
- Connected by a male and a female side that slide 500 mm and fixed with 16 bayonet plugs.
- No screw thread.
- Plug completely sealed from the inside of the drill pipe so no grout or concrete can escape.
- The coupling can always be disconnected, even after long periods of time.
- Designed to use in clockwise and anti-clockwise direction.
- Coupling has ± the same diameter as drilling pipe, so less wear.
- Available with seal for high-pressure grout injection.
- Plugs have the same outside radius as the coupler, so less wear.
- Applicable for various techniques: FDP, CFA, Soilmix, Geothermal, and more.
- The female connector is always on top (the female coupler can wear out, so there are always more auger heads than drill tubes provided. Auger heads have a male coupling, so there is minimal wear).
- Two types of welding connection.
- Coupling above the auger head works as an isolator,
- For dismounting: couplings can be rotated against one another after all plugs have been removed.
- High drilling torques, axial and radial forces

CLL SERVICE & SOLUTIONS

The new OLIVIER DPA, eliminates the need for grout injection in hard sand layers. With smaller pile diameters, such as 360 mm, larger reinforcement cages can be placed through the drilling pipe. This is made possible by using a feed pipe with a diameter of 324 mm along its entire length.

The patented flaps also ensure a more precise positioning of the auger head, therefore installing the reinforcement and pouring concrete is a breeze.

AUGER HEAD - Concrete System



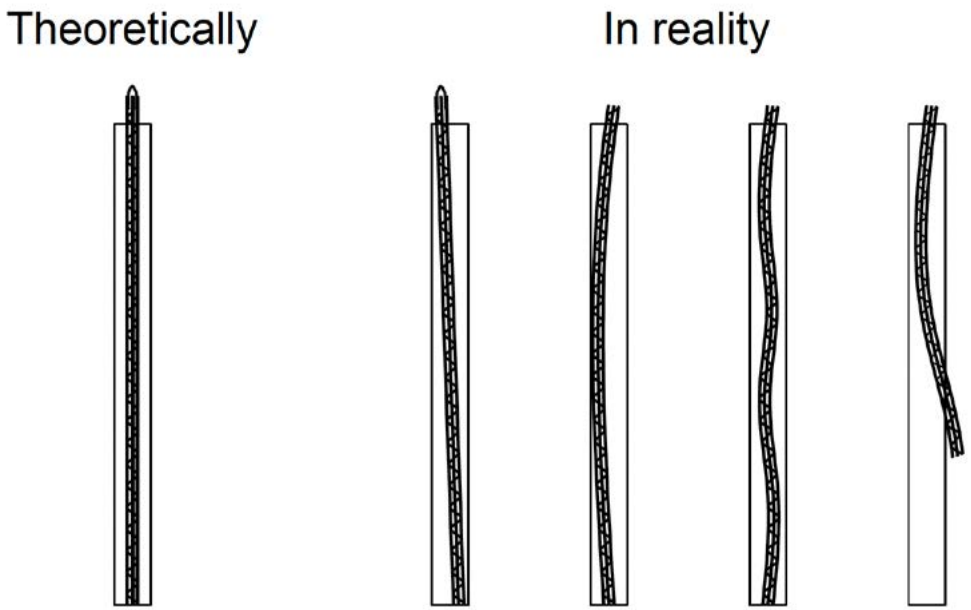
The OLIVIER Auger Head is designed for an open concrete system:

- Full length reinforcement and concrete are placed through the drill pipe and auger head.
- Use of gravitational concrete pressure.
- Large pile diameters enable large reinforcement cages.

Traditional FDP is a closed concrete system:

- In a closed concrete system, full length reinforcement is difficult to place because it has to be place afterwards. The soil on the sides can loosen during the placement of the reinforcement and get into the concrete.
- More expensive concrete is needed so that it stays fluid longer to get the reinforcement to depth.

This diagram shows the potential problems with placing the reinforcement afterwards:



OLIVIER PILE - Concrete Consumption

OLIVIER Pile
40% less concrete consumption because there is no concrete between the screws of the pile.

Olivier pile d41/61
Core Ø = 410 mm
Outside Ø = 610 mm
Concrete/m = 0,133 m³/m
Pile 12 m = 1,591 m³

Traditional FDP Pile
Concrete consumption according to the full outside diameter and length of the pile.

FDP pile d61
Outside Ø = 610 mm
Concrete/m = 0,292 m³/m
Pile 12 m = 3,507 m³

CLL SERVICE & SOLUTIONS

OLIVIER

Displacement: 100% displaced to the bottom of the pile, so hardly any soil comes up with it when screwing back.

Spoil: Little or No soil comes to surface.

Pitch: When screwing back, a constant pitch is used, so no interruptions can occur in the pile concrete.

Grout Injection: Travels better through hard soil layers. If Grouting Injection is needed with other full displacement systems, it is not necessary with an OLIVIER Auger Head.

Piling Machine: Can be used big machines like Liebherr LRB355 and on small machines like Fundex CD20.

Machine Setup: With one set of drilling pipes, all diameters of pile can be made. Only one diameter of guide is needed. With one guide, all diameters of OLIVIER auger heads can be used.

Machine Torque: Possible with small machines from 10t/m drilling torque for smaller diameters.

Transport: Small auger head, length ±1m and weight 250kg to 2000kg so it can easily be sent by package services, such as DHL.

TRADITIONAL FDP

Displacement: Lower part is not displaced, which means drilling deeper.

Spoil: Soil on lower part of auger head comes back up to surface, which requires removal.

Pitch: No constant pull-up speed. Risk of interruptions in the pile if pulled up too fast.

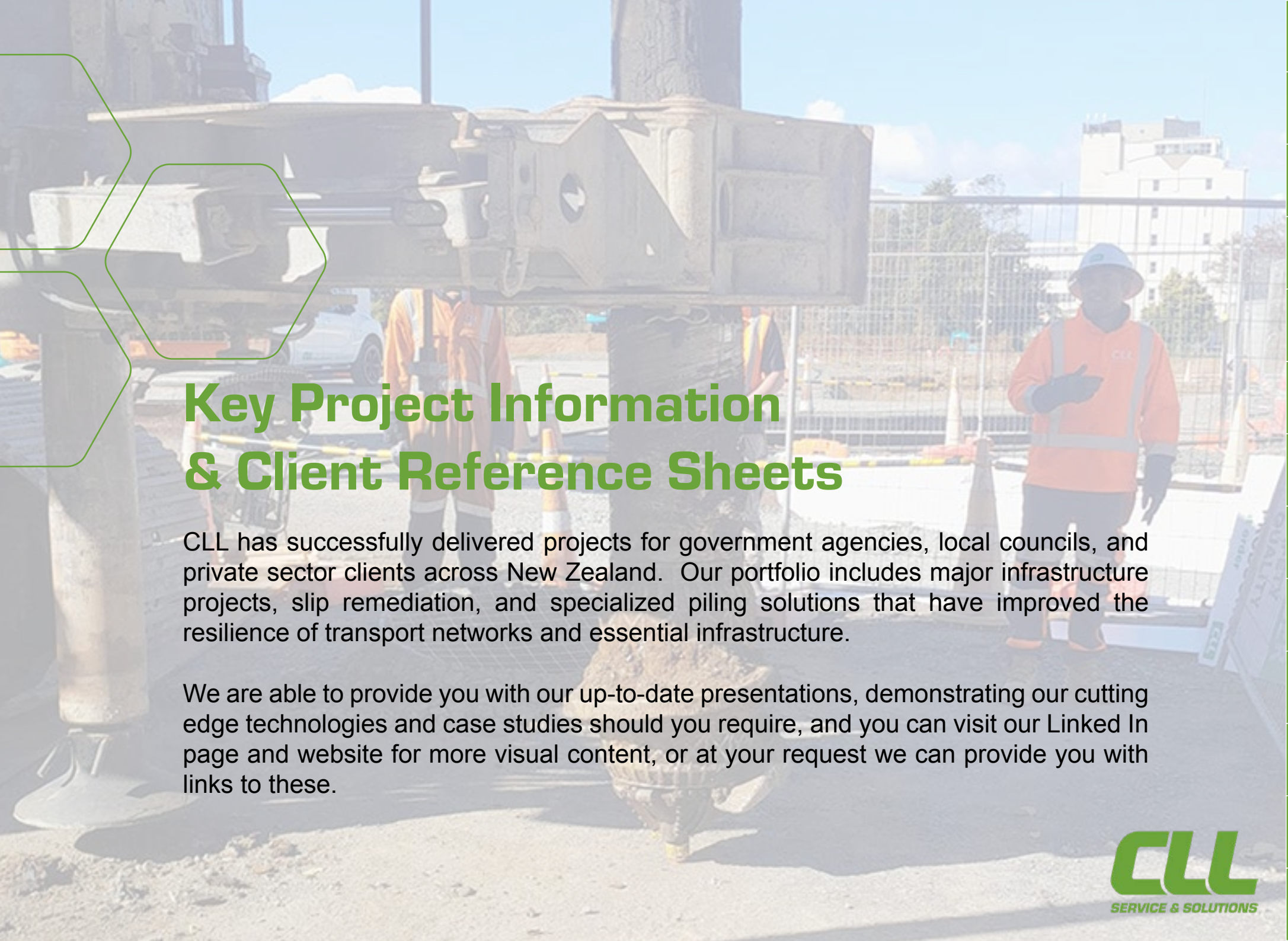
Grout Injection: Difficult to get through hard soil layers. Often Grouting Injection is used here.

Piling Machine: Used on large machines starting with a operating weight of 40t.

Machine Setup: For every diameter of auger a different guide is needed.

Machine Torque: Minimum 20t/m drilling torque required. More friction equals more drilling torque to get the auger head into the ground, which creates more friction, more wear and more fuel consumption.

Transport: Large auger head, length ±3,5m and weight 1500kg to 3000kg, so it requires truck transport.



Key Project Information & Client Reference Sheets

CLL has successfully delivered projects for government agencies, local councils, and private sector clients across New Zealand. Our portfolio includes major infrastructure projects, slip remediation, and specialized piling solutions that have improved the resilience of transport networks and essential infrastructure.

We are able to provide you with our up-to-date presentations, demonstrating our cutting edge technologies and case studies should you require, and you can visit our Linked In page and website for more visual content, or at your request we can provide you with links to these.

CLL SERVICE & SOLUTIONS

PROJECT INFORMATION SHEET

80 MT WELLINGTON HIGHWAY

LOCATION	**80 MT WELLINGTON HIGHWAY, AUCKLAND**
CLIENT	**SIMPLICITY LIVING**
START & FINISH DATES	**JANUARY 2024**
VALUE	**$5M**

PROJECT OVERVIEW

CLL was approached for early advice to guide the foundation concept for the Simplicity funded Kianga Ora partnership for affordable housing. CLL assessed the Geotech fee proposals received to date by Simplicity and advised that there was a significant opportunity to save money if sufficient information about the soil structure was available. In the end, they recommended an additional scope for Geotechnical investigations which Simplicity agreed to carry out with haste. As a result of this, it became clear in the additional Geotech information that the originally assessed necessity for 40-50m deep piles for the 11-storey building did not apply.

The costs for the conventionally designed system of bored piles, pile caps, ground beams, hard fill, and reinforced concrete slab was in the order of 100% more expensive than the alternative developed by CLL with their designer CMW.

RIGID INCLUSION

Several other buildings are planned for this site, and they vary in height and load. All buildings will be founded on a GI type system at considerable savings to the project.

PROJECT INFORMATION SHEET

HOSPITAL ROAD

LOCATION	**30 HOSPITAL ROAD, OTAHUHU, AUCKLAND**
CLIENT	**TE WHANAU O WAIPAREIRA TRUST**
START & FINISH DATES	**EARLY 2024**
VALUE	**CIRCA $1.7M**

PROJECT OVERVIEW

Initially, this project was developed at the design stage using 40-45m deep large diameter bored piles. The ground conditions were such that the piles needed to be constructed under bentonite or polymer. CLL was approached for pricing for this scope. During the pricing it became evident to CLL that GI should be investigated because there were significant cost savings. CLL requested a budget of 60K to carry out lab testing and seismic CPT testing. The budget approved and the testing confirmed that the foundation system could be designed as GI using Olivier Piles or both uplift and compression loads with a savings to the client in the order of 50% of the original piling cost.

RIGID INCLUSION

CLL in the previous 2 years had been approached by the European manufacturer of the Olivier system, with a view to adopting the Olivier system as part of its foundation offering. Olivier had noted that CLL were running a number of Liebherr rigs. Olivier and Liebherr had a history of working together as the Liebherr rigs suit very well with demands of installing the Olivier system. CLL looked at the pros and cons of bringing the Olivier system in New Zealand and assessed that the large capital outlay would be worth it in the medium-long term and therefore went ahead with the arrangement. The big advantages of Olivier over other displacement systems is that the steel may be installed prior to the concrete being poured and that for equivalent friction and end bearing capacities. The Olivier system removes 40% less spoil and uses 40% less concrete. This substantial price reduction enabled the client to remain within the budget constraints and to ensure the project's timely completion.

CLL RAPs Technology - Rammed Aggregate Piers

SERVICE & SOLUTIONS

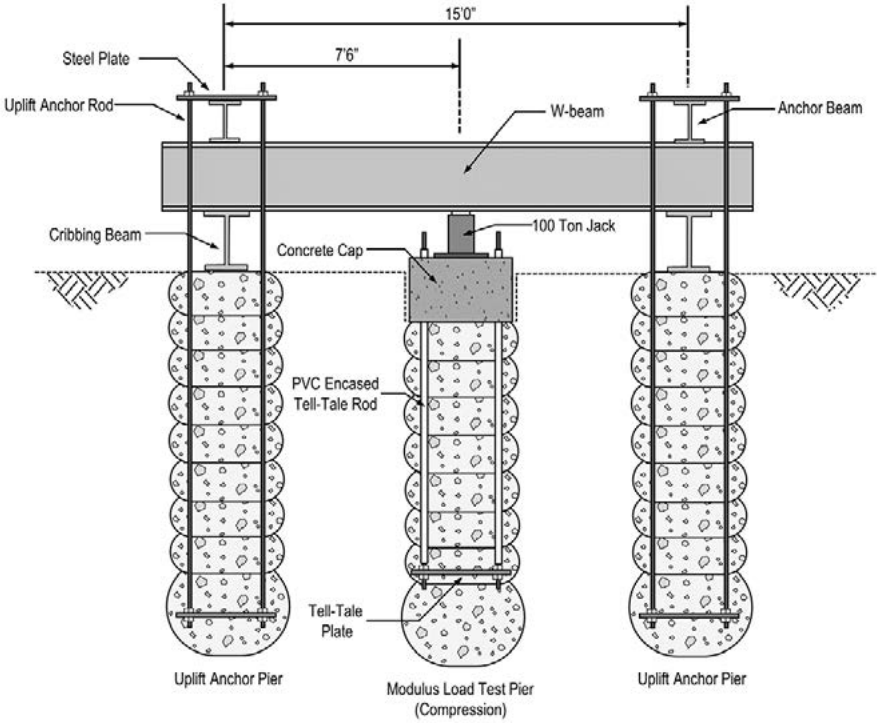
RAMMED AGGREGATE PIERS (RAPs)

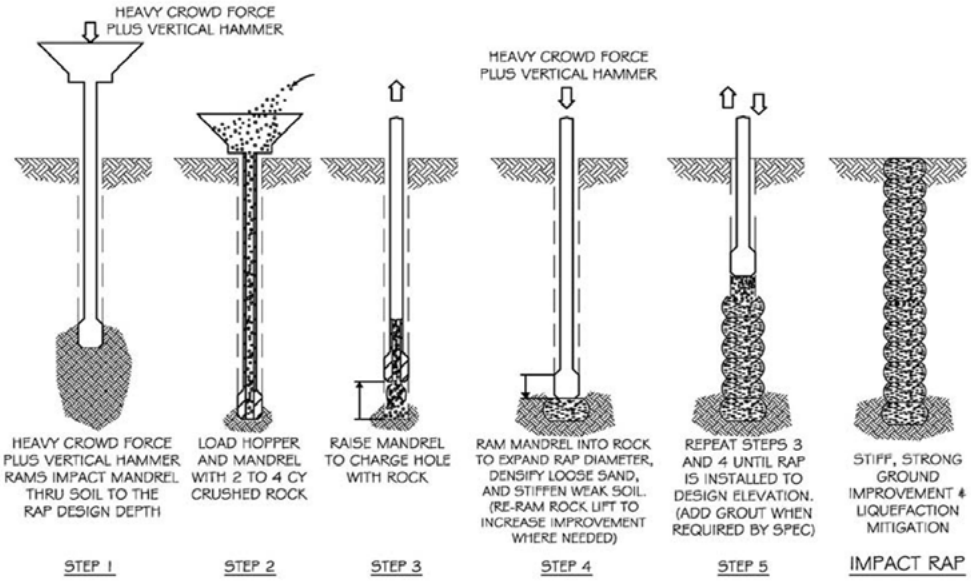
A Rammed Aggregate Pier (RAP) is a foundation system that uses no concrete and removes no spoil. RAPs are stiff, compacted stone inclusions that reinforce and densify the ground, along with providing a drainage path.

Weak Soils are displaced with columns of aggregate, which are compacted in place using a vibrating steel tamper. This process densifies the matrix soils between the piers. The result is a stiffened mass of soil that provides increased bearing capacity and eliminates, or controls load induced, or liquefaction induced settlement.

The process is carried out with state-of-the-art variable moment leader mounted hammers, manufactured in Germany. The force is applied vertically rather than horizontally, as in the case of Stone Columns with the double benefit of producing a very stiff aggregate column without damaging adjacent structures and services.

RAPs UPLIFT ELEMENT

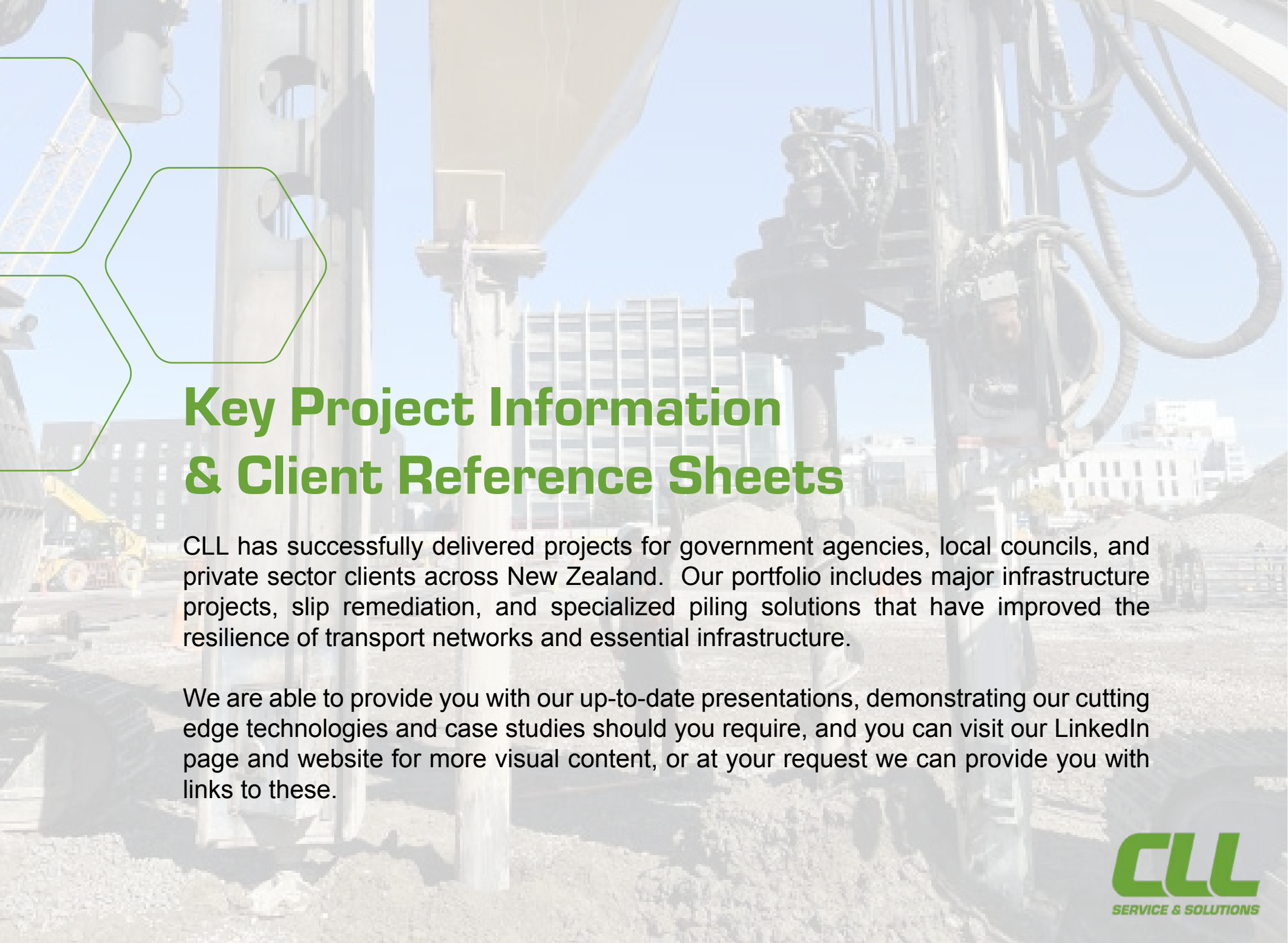




SERVICE & SOLUTIONS

RAPs KEY FACTS

- Densify loose sands, provide stiff element in the ground, increase the shear modulus of the ground, provide a path for pore water pressure to dissipate during an event. Provide lateral confinement.
- Most cost-effective solution on the market for liquefaction mitigation
- Most cost-effective solution on the market for mitigation of load induced settlement
- Very fast construction
- Generally suitable for improving soils which are not weaker than 20-30kPa. Where soils are weaker than required, RAPs may be grouted.
- Individual RAPs can support up to 450kN ULS compression of uplift loads, depending on the founding soils.
- Vibratory technique is vertical opposed to lateral which creates a significantly stiff column of aggregate without effects on adjacent structures
- No spoil generated



Key Project Information & Client Reference Sheets

CLL has successfully delivered projects for government agencies, local councils, and private sector clients across New Zealand. Our portfolio includes major infrastructure projects, slip remediation, and specialized piling solutions that have improved the resilience of transport networks and essential infrastructure.

We are able to provide you with our up-to-date presentations, demonstrating our cutting edge technologies and case studies should you require, and you can visit our LinkedIn page and website for more visual content, or at your request we can provide you with links to these.

CLL
SERVICE & SOLUTIONS

PROJECT INFORMATION SHEET

TE KAHA STADIUM

LOCATION	**CHRISTCHURCH CBD**
CLIENT	**BESIX WATPAC**
START & FINISH DATES	**AUGUST 2022 - MARCH 2023**
VALUE	**$7M**

PROJECT OVERVIEW

Our client required a ground improvement solution for the Te Kaha Stadium project in Christchurch, seeking enhanced soil density and load capacity for the proposed arena structure.

In November 2021, CLL partnered with Tonkin & Taylor, to secure a design and build contract for this project. Following an extensive design phase and site trials, we were selected for the project and commenced operations in August 2022.

The project involved enhancing soil density through the incorporation of our innovative *Geopier Rammed Aggregate Piers (RAPs). Using multiple advanced fixed mast rigs, we compacted 20,400m³ of aggregate to depths of up to 12m, significantly improving the ground density and load capacity.

The successful completion of this project resulted in a return engagement for additional RAPs in May 2023 and established a strong foundation for potential future collaborations.

PROJECT INFORMATION SHEET

WAIPIPI WIND FARM

LOCATION	**WAVERLEY, TARANAKI**
CLIENT	**HIGGINS**
START & FINISH DATES	**AUGUST 2019 - SEPTEMBER 2020**
VALUE	**$8M**

PROJECT OVERVIEW

Our client required comprehensive ground improvements for 26 wind turbine sites situated in Waverley, located 80km south of Taranaki. The project demanded the installation of Geopier Rammed Aggregate Piers (RAPs) across an expansive area, with the challenge of remote execution and difficult terrain.

We successfully undertook the complex task of implementing ground improvements across the wind turbine sites. Spanning 97,700 lineal meters, our team utilised five fixed mast rigs, diligently working to install 11,365 Geopier Rammed Aggregate Piers (RAPs) at depths reaching up to 15 meters. This project marked the largest Geopier RAP undertaking ever accomplished in New Zealand.

Our team functioned as a self-sufficient unit due to the remote location. We established a lay-down area, provided two full-time mechanics, and deployed a full-sized fuel tanker on-site. Negotiating the challenging eight-kilometre expanse from wind turbine 1 to wind turbine 30, which traversed iron sands, presented considerable challenges and placed substantial strain on equipment. Despite these adversities, our team exhibited unwavering dedication, ensuring the project's successful completion.

PROJECT INFORMATION SHEET

MCLAUGHLINS ROAD, WIRI

LOCATION	**69 MCLAUGHLINS ROAD, WIRI, AUCKLAND**
CLIENT	**MACRENNIE COMMERCIAL CONSTRUCTION**
START & FINISH DATES	**APRIL 2023 - MAY 2023**
VALUE	**$3.5M**

PROJECT OVERVIEW

The client required ground improvement measures to support the development of agricultural warehousing facilities in Wiri, Auckland. The project faced escalating foundation costs, threatening to exceed the budget for the 10,000 square meter warehouse with high 40kpa floor loads. The initial contract was for a conventional steel job at $11.8 million, but progress was hindered by these financial constraints.

CLL addressed this issue by proposing an optimised design to reduce costs. In collaboration with our Geotech partners at CMW Designers, we conducted a thorough analysis and additional Geotech input, leading to the recommendation of a ground improvement technique using Rigid Inclusions (RAPs). To support the redesign, we requested an additional $50,000 for Cone Penetration Testing (CPT) and laboratory testing.

Following the redesign approval, we installed and comprehensively load-tested 1,970 RAPs, each 8 meters deep with diameters of 600mm. This redesign resulted in a remarkable cost saving of $8 million for the client. Despite the redesign, we completed the project one month ahead of schedule.

PROJECT INFORMATION SHEET

NORTHERN QUARTER

LOCATION	**68 WILLOW STREET, TAURANGA**
CLIENT	**WATTS & HUGHES**
START & FINISH DATES	**AUGUST 2023 - DECEMBER 2023**
VALUE	**$2.6M**

PROJECT OVERVIEW

The Northern Quarter Commercial Development sought to revitalise Tauranga's CBD by creating contemporary office and hospitality spaces, to foster a vibrant hub for residents, workers, and visitors. However, the site presented a major challenge with liquefiable soils overlying soft, compressible soils. Initially designed for a Stone Columns solution, it soon became clear that the required volume of stone columns was impossible.

CLL, in collaboration with our geotechnical subcontractors Geovert, identified Rammed Aggregate Piers (RAPs) as a feasible and cost-effective solution. Our team successfully installed 1,913 RAPs, each with a diameter of 600mm and depths ranging from 6.7m to 9.7m. To support increased loads under the structure's beams, 903 of these RAPs were grouted. This strategic approach ensured the project's success and delivered a robust foundation for the contemporary office space and hotel development.

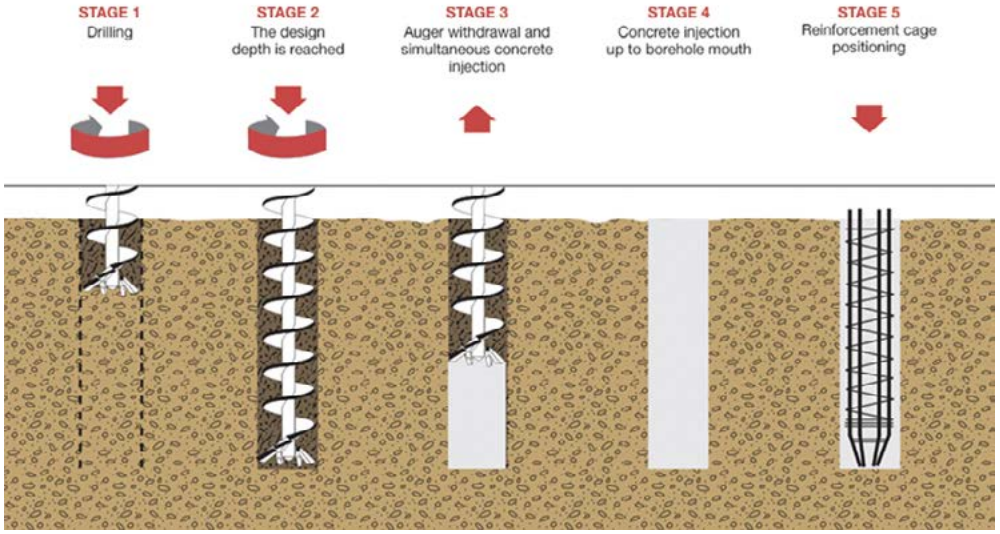
CLL Streamlined CFA Technology

SERVICE & SOLUTIONS

WELCOME TO THE FUTURE OF PILING

CLL has recently innovated a tried and tested piling solution for poor, soft and unstable ground conditions. Streamline CFA is now adapted for light commercial and residential use.

STREAMLINE CFA



Stage 5 reinforcement includes; Timber, UC-Beams, Reinforcement Cages and Strand Anchors.

APPLICATIONS:

- Residential
- Industrial
- Commercial
- Excavator based as opposed to Crane based

BENEFITS

Removes issues such as:

- Cave-ins
- Casings
- Water Table Issues
- Low site establishment
- Up to 100 lineal mtrs per day

STREAMLINE CFA Vs BORED PILING

Streamline CFA offers numerous advantages over conventional open bored piling in poor ground conditions.

LOW VIBRATION AND NOISE

The increase in urban densification has made traditional bored piling, sheet piling, and driven piling more problematic. Streamlined CFA (Continuous Flight Augering) offers an excellent solution, as it minimises noise and vibration impacts on nearby businesses and residents.

COST AND TIME

Traditional casings for stabilising collapsing ground are expensive, slow, and often have long procurement times. Streamlined CFA eliminates this need.

Our modified piling equipment resolves issues of conventional piling, such as high mobilisation costs, long setup times, and the need for engineered piling platforms.

While conventional bored piling is slow and fragmented, the Streamlined CFA drills in a single pass, pours concrete, and installs reinforcement in as little as 20 minutes per pile, boosting production.

SAFETY

Streamlined CFA eliminates the risks associated with hole collapse, open holes, and the need for protective measures and costs typical of conventional piling methods.

ACCURACY

Drilling to the full depth in a single stroke reduces the likelihood of enlarged hole diameters, resulting in lower concrete consumption and less spoil removal. It also enhances positional accuracy.

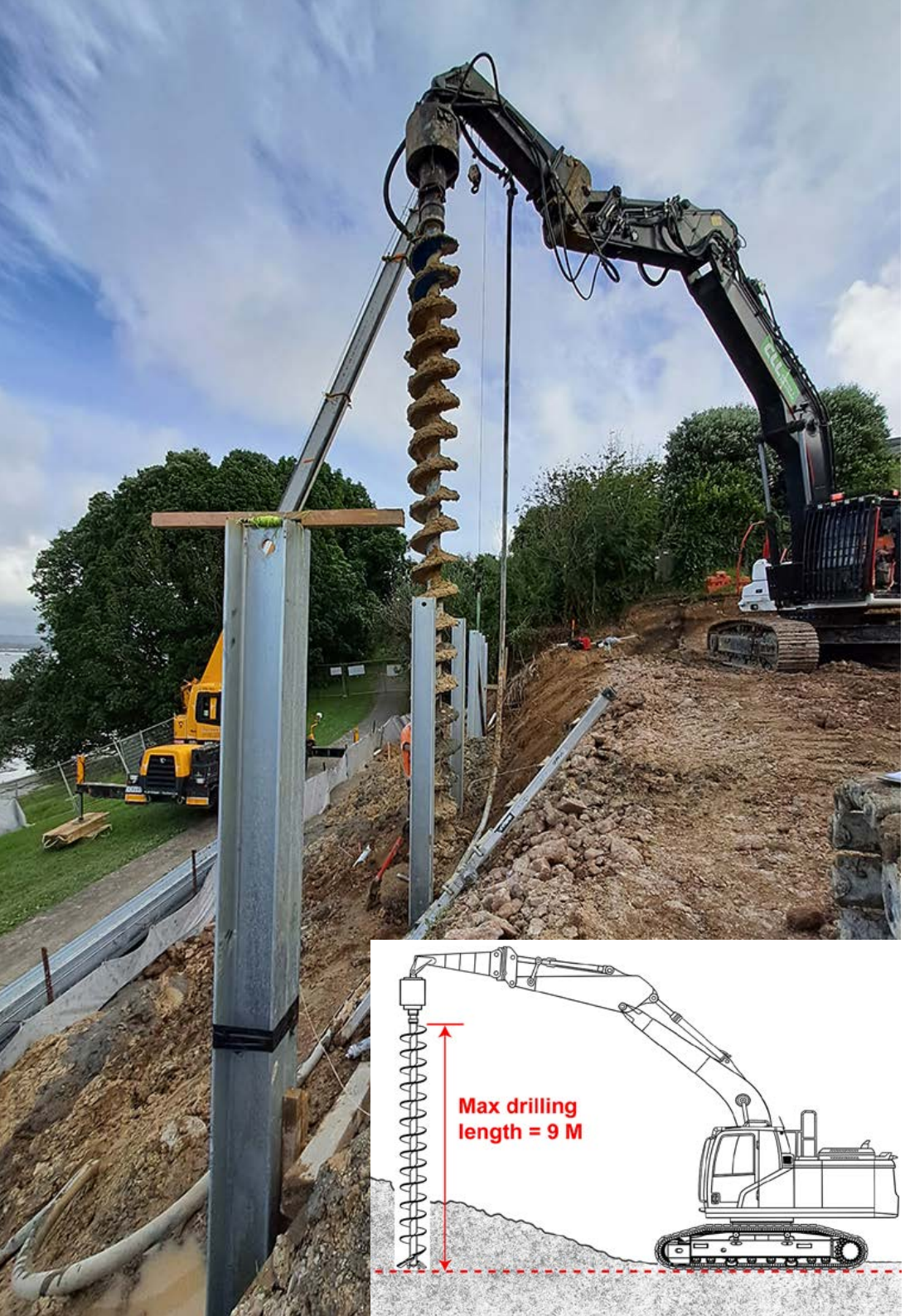
CAPABILITY

The center of the pile can be installed as close as 400mm from adjacent structures, making it ideal for projects in confined spaces. Available diameters are 350mm, 450mm, 600mm, and 750mm.

Up to 8.5m for S-CFA Hard Pile (with REO cage)

Up to 9m for S-CFA Soft Pile (with no REO cage)

CLL SERVICE & SOLUTIONS



CASE STUDY

The Streamlined CFA process proved highly effective in a recent project involving the installation of retaining wall posts.

Conventional piling methods failed as the holes collapsed due to the water table, present at a depth of 3 meters.

By utilizing 600mm diameter CFA piles, we successfully reached a depth of 5.8 meters despite the challenging wet sandy conditions.

This approach not only saved the client considerable time but also resulted in significant cost savings.

CLL Capabilities
Rail Construction

SERVICE & SOLUTIONS

CLL has significant experience with New Zealand's rail network and has delivered a variety of rail infrastructure projects, including the design and build, to stabilise and improve rail sites in major cities around the country, where it is critical to maintain an uninterrupted train service.

We are experts in the intricacies of working on live railways and understand the safety protocols and inherent challenges and risks.

Working within electrified areas needs clever solutions to eliminate H&S risks and we have invested heavily in the latest technology and equipment required to safely and successfully deliver projects in this challenging environment.

MANCO RAIL EXCAVATOR

Our Hi-Rail Hidromek 145LCSR-H4 is a 14 t excavator with the ability to work on any terrain and the undercarriage has been modified with a Manco Rail system to allow it to manoeuvre along rail tracks.

TEI TD75 ELECTRIC MICROPILING RIG

Our TEI TD75 is an electric/hydraulic limited access rig designed to safely install cased and hollow bar micro piles in challenging or tight spaces, and can provide turbo grouting.

MANCO RAIL MLRB-34 LOW BED TRANSPORTER

Our self-propelled Manco MLRB-34 with infill flat decks provides versatility to use the unit as a multi-purpose rail transporter to carry plant, equipment, tools, railway sleepers, or aggregate materials.

CLL
SERVICE & SOLUTIONS

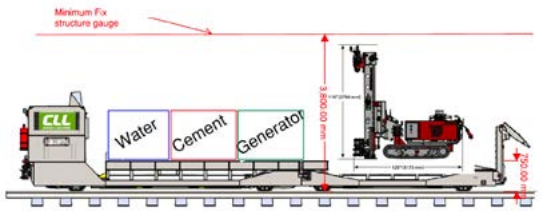
GROUND IMPROVEMENT - RAIL

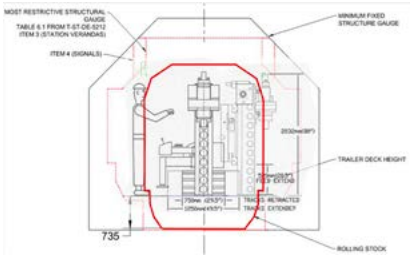
TEI TD75 ELECTRIC MICROPILING RIG

Our low head TD75 electric / hydraulic limited access drill rig can provide turbo grouting on defective sections of track formation within the electrified area under electric isolation only.

MANCO RAIL MLRB-34 LOW BED TRANSPORTER

The TD75 rig can be deployed to specific rail locations on top of our MANCO RAIL MLRB-34 low bed self-propelled transporter. The rig does NOT leave the transporter and the whole operation can be performed within the footprint of the transporter. This forms a self-contained unit that is fully mobile within the rail environment and encompasses a drilling rig, grouting plant, generator and raw materials (water, cement, additives). Grout injection will not compromise ballast layer.



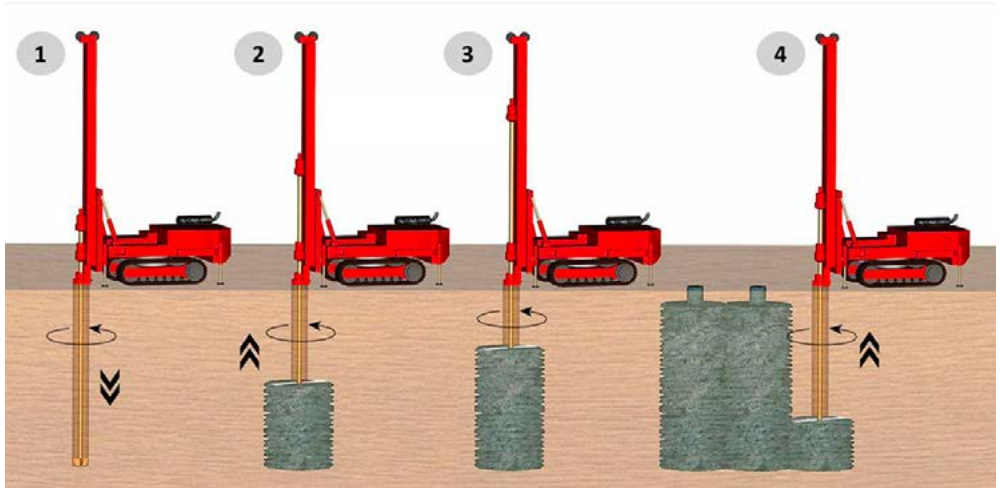


TURBO GROUTING PROCESS

The Turbo grouting process involves cutting the soil with a stream of fluid at high velocity and mixing this eroded soil with a self-hardening grout to form columns and other structures in the ground.

This is a ground improvement technique used in construction to strengthen and stabilise soil. This process creates a cement-stabilised column. This column improves the soil's mechanical characteristics, such as its strength, permeability, and load-bearing capacity.

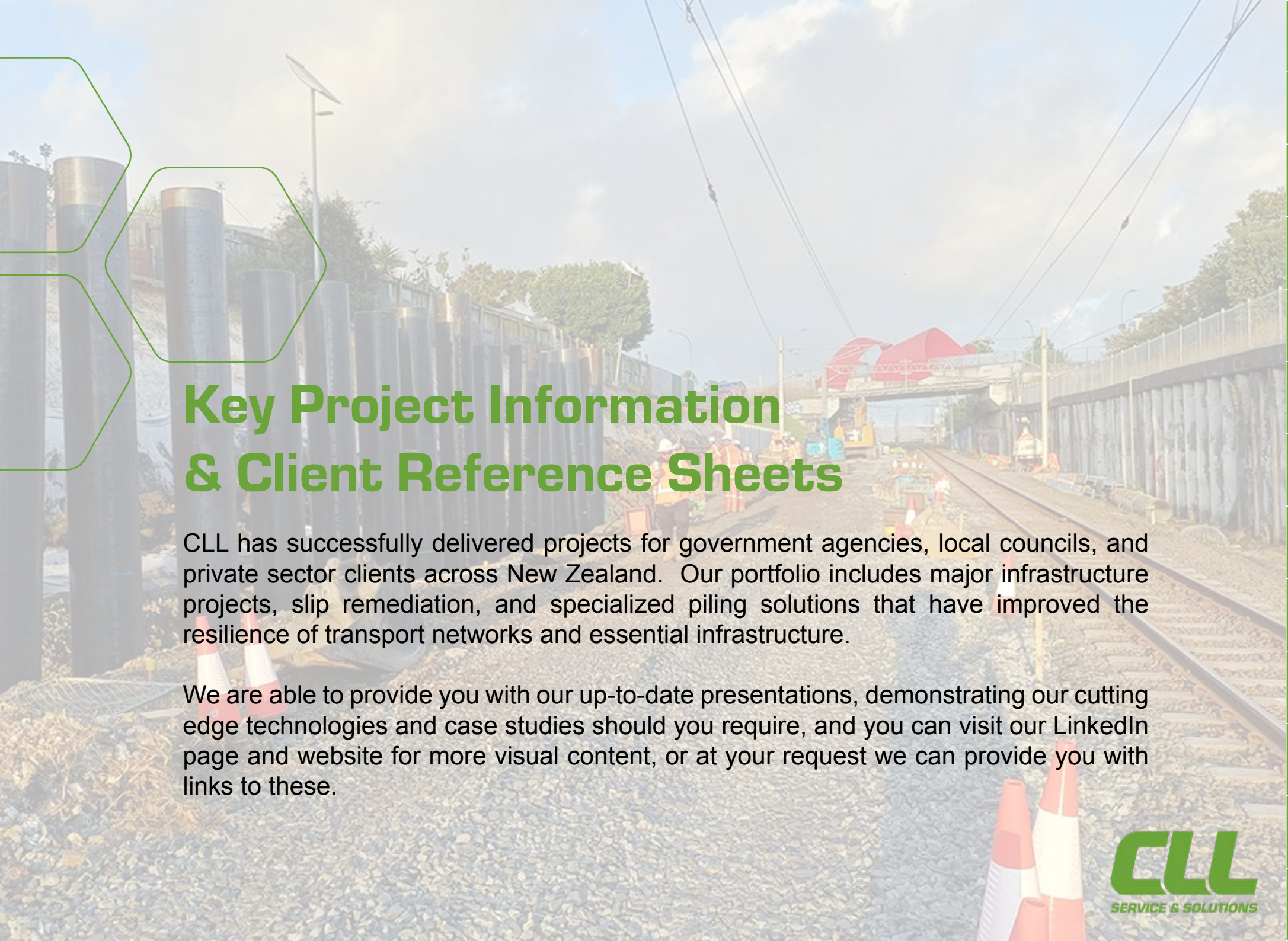
The single fluid system is the simplest. Grout is pumped through the rod and exits the horizontal nozzle(s) in the monitor at high velocity. This energy breaks down the soil matrix and replaces it with a mixture of grout slurry and in situ soil.



BENEFITS

- A solution adapts to all types of soil
- The possibility of modifying the diameter of the column by modifying the parameters of the jet, this adjusts the column diameter to support areas under and between sleepers
- A process that requires little space, small footprint and limited height access
- The possibility of constructing large columns from small boreholes
- Methodology development to maintain ballast free of grout
- Self-contained independent operation, able to work within the same dynamic envelope of a train

CLL SERVICE & SOLUTIONS



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CLL SERVICE & SOLUTIONS

PROJECT INFORMATION SHEET

STURGES ROAD BLOCK OF LINE (BOL)

LOCATION	STURGES ROAD, HENDERSON
CLIENT	JOUBERT PILAT LTD
START & FINISH DATES	28 DECEMBER 2023 - 10 JANUARY 2024
VALUE	$1.2M

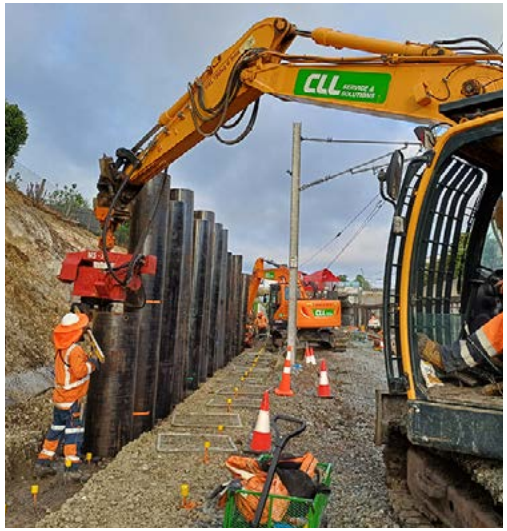
PROJECT OVERVIEW

KiwiRail encountered a challenge at Sturges Road, Henderson, where a 160-meter slip had compromised the rail line, necessitating immediate action to restore safety and stability. The solution involved constructing a retaining structure within a tight holiday schedule.

CLL was tasked with installing 108 steel Universal Columns (UCs) to support a concrete panel retaining wall. The UCs, ranging from 7 to 10 meters, were placed in cased concrete piles to address challenging ground conditions. The galvanised casings, treated with anti-graffiti coatings, were vibrated into the ground, drilled out, and the UCs were installed with a strict 50mm tolerance, using UC guide beams for precise alignment.

Due to the complexity of working under non-live overhead wires, CLL used specialised equipment, including two hi-rail 14-tonne drill rigs, a 36-tonne digger, a 23.5-tonne digger, and the MLRB self-propelled Manco Rail trailer to transport the UCs along the tracks.

The project was successfully completed between December 28 and January 10, 2024, with teams working 12-hour days throughout the holiday period to meet the deadline.



CLL SERVICE & SOLUTIONS

PROJECT INFORMATION SHEET

308 SH1, TE HANA, WELLSFORD

LOCATION	**308 STATE HIGHWAY 1, TE HANA, WELLSFORD**
CLIENT	**JOUBERT PILAT LTD**
START & FINISH DATES	**MARCH 2024 - APRIL 2024**
VALUE	**$140K**

PROJECT OVERVIEW

KiwiRail faced a critical issue with soil slippage threatening the stability of their rail infrastructure. The slippage posed a significant risk to the safety and operational efficiency of the rail line. To address this, KiwiRail required the construction of a robust retaining wall to stabilise the soil and protect the rail line from potential slip threats. The solution needed to ensure long-term stability and reliability of the rail corridor.

CLL, in collaboration with JPL as a sub-contractor, was engaged to design and construct a retaining structure for KiwiRail.

The project involved the installation of UC beams and timber lagging to create a 40m long retaining wall capable of withstanding the slip pressures.

We installed 39 units of 250 Universal Columns (UCs) as the primary structural elements of the retaining wall. The installation process utilised a vibro-hammer on a 30t Excavator in conjunction with pre-drilling techniques for placement of the beams. To complement the UC beams, 150x50 timber lagging was installed between the beams.

PROJECT INFORMATION SHEET

AUCKLAND RAIL ELECTRIFICATION

LOCATION	**VARIOUS LOCATIONS AUCKLAND WIDE**
CLIENT	**HILOR (HAWKINS AND LAING O'ROUKE JOINT VENTURE)**
START & FINISH DATES	**2010 - 2014**
VALUE	**$19M**

PROJECT OVERVIEW

CLL was contracted to install foundations for the masts needed to electrify the Auckland Railway. The project was conducted in a safety-critical, live railway environment, with most tasks performed at night, on weekends, or during public holidays. Throughout the project, an exemplary safety record was achieved.

The scope of work included installing approximately 2,600 piles up to 1200mm in diameter and 11 meters deep, as well as 600 pads and 50 rock anchors. Numerous retaining walls and other ancillary structures were constructed, using around 14,000 cubic meters of concrete in total.

PROJECT INFORMATION SHEET

KINGSLAND RAIL UNDERPASS

LOCATION	**KINGSLAND, AUCKLAND**
CLIENT	**HAWKINS**
VALUE	**$5M**

PROJECT OVERVIEW

A new underpass was to be constructed at Kingsland Railway Station in Kingsland, Auckland. The key stakeholders included KiwiRail, ARTA, Opus, and Hawkins Infrastructure.

CLL successfully executed the installation project, which involved retaining, excavating, and installing a pre-cast underpass structure. The specific construction tasks included constructing a palisade wall with 750mm diameter x 19m deep piles, excavating 900m³ of material, applying shotcrete facing to retained areas, installing a 14m long pre-cast underpass, waterproofing and backfilling the underpass with hardfill, casting an in-situ staircase, installing 200m of public storm-water line, and reinstating footpaths.

Given the tight 21-day program over the Christmas break, CLL planned and implemented enabling works, including building temporary ramps for access and drilling platforms on a live rail system in the months leading up to the Christmas Block of Line (BoL). Utilising specialist drilling equipment and methodologies, CLL addressed deep piling in challenging ground conditions, managing casing and groundwater control. The main construction phase involved a dedicated team working in shifts to ensure timely and precise completion of the project. The project was delivered on time and met all specifications.

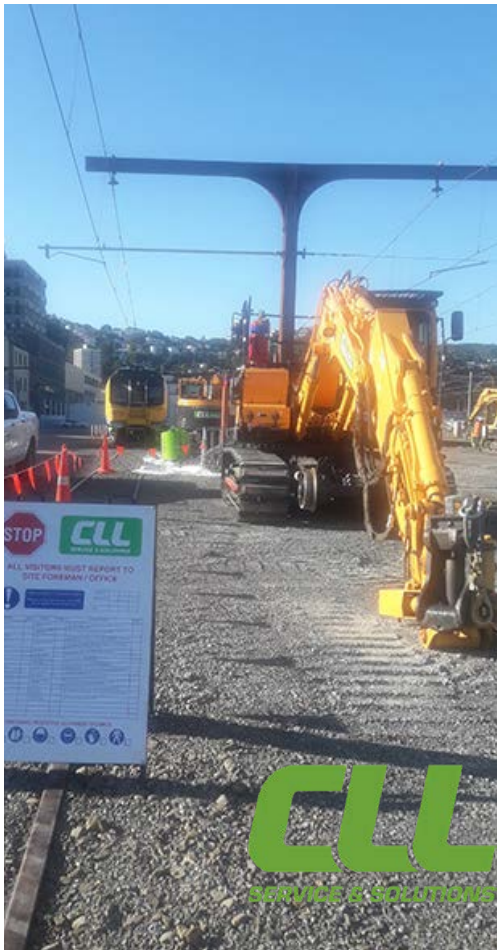
PROJECT INFORMATION SHEET

WELLINGTON METRO OLE UPGRADE

LOCATION	WELLINGTON
CLIENT	FULTON HOGAN / JOHN HOLLAND JOINT VENTURE
START & FINISH DATES	6 MONTHS BETWEEN DECEMBER 2019 AND DECEMBER 2020
VALUE	$2M

PROJECT OVERVIEW

The project involved upgrading the foundations for Overhead Line Equipment (OLE) structures. All equipment and masts, some of which were originally installed as far back as 1938, were replaced with new infrastructure. The work spanned the entire Wellington network, a fully electrified and operational area, and was scheduled during BOL periods starting from the 2019 Christmas BOL, continuing through the Easter weekend, and extending well into 2020.



PROJECT INFORMATION SHEET

MOUNT EDEN STATION

LOCATION	**MT. EDEN STATION, AUCKLAND**
CLIENT	**CRL CONSTRUCTION**
START & FINISH DATES	**JANUARY 2022 - MARCH 2022**
VALUE	**$3.5M**

PROJECT OVERVIEW

This project required the supply and construction of reinforced concrete piles for the foundations of the new Mt Eden Train Station extension. It involved dealing with demanding geological conditions, including Basalt volcanic rock and East Coast Bays Formation Mudstone/Sandstone Rock (ECBF rock).

CLL managed the installation of 68 reinforced concrete piles, ranging from 8 to 28 meters in length. To tackle the challenging geological conditions, we utilised the LB24 and EK90 drills equipped with a 600mm diameter down-the-hole (DTH) hammer, supported by a 70-ton crane. This equipment enabled us to achieve impressive penetration rates of 2 meters per hour in thick basalt layers.

Despite the complexities posed by the ground strata and the confined site due to live rail lines and close proximity to other trades, CLL's methodology ensured safety within these constraints and resulted in a successful completion.

PROJECT INFORMATION SHEET

PUKEKOHE TO PAPAKURA, AUCKLAND

LOCATION	**PUKEKOHE TO PAPAKURA, AUCKLAND**
CLIENT	**KIWIRAIL**
START & FINISH DATES	**OCTOBER 2022 - MAY 2023**
VALUE	**$6.9M**

PROJECT OVERVIEW

This project focused on establishing the necessary infrastructure for the electrification of the railway line from Pukekohe to Papakura, enhancing commuter travel with a more efficient and environmentally friendly electric train connection from Auckland's CBD to Pukekohe.

In continuation of our successful partnership with KiwiRail, we installed 490 piles (both concrete and steel) to support the overhead electrification infrastructure.

The proximity to an active bidirectional rail line added significant complexity to the project. Our team worked closely with KiwiRail to coordinate activities and meet the operational requirements of the active rail line, ensuring a safe and timely project execution.

PROJECT INFORMATION SHEET

WIRI TO QUAY PARK

LOCATION	**PAPATOETOE, AUCKLAND**
CLIENT	**DOWNER CONSTRUCTION**
START & FINISH DATES	**JANUARY 2022 - MARCH 2022**
VALUE	**$3.5M**

PROJECT OVERVIEW

KiwiRail contracted CLL to take on a crucial role in the development of a third electrified train track running from Wiri to Quay Park. This complex project involved a series of tasks essential for the successful completion of the new track.

CLL executed the project with Down the Hole (DTH) piling as a central element. The project further involved establishing new foundations for existing masts, constructing protective pier walls to ensure the structural integrity of the new railway, and installing a temporary retaining wall in preparation for the subsequent construction of a permanent palisade wall.

CLL Capabilities
Marine Construction

SERVICE & SOLUTIONS

PROJECT INFORMATION SHEET

LYTTELTON WHARF

LOCATION	**SUTTON QUAY, LYTTLETON, WELLINGTON**
CLIENT	**TOTAL MARINE SERVICES**
START & FINISH DATES	**2018**

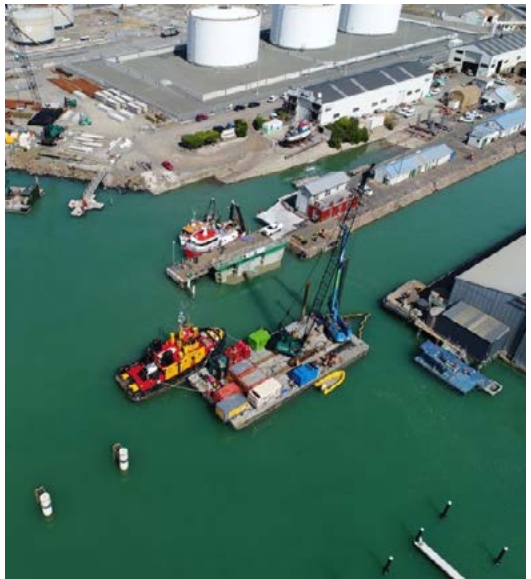
PROJECT OVERVIEW

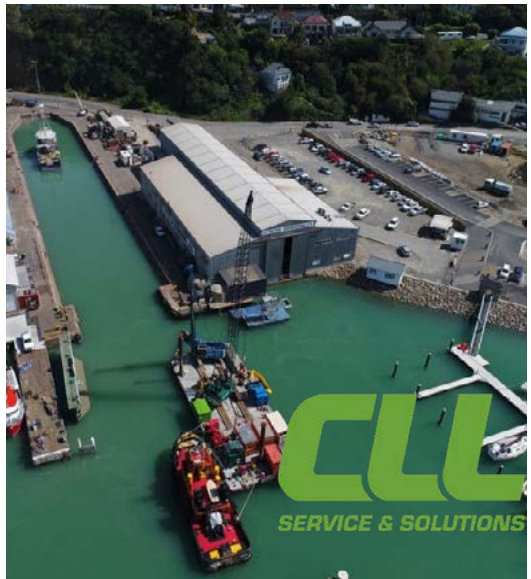
CLL successfully completed the piling works for the new buffer piles at the entrance to the dry dock at Lyttelton Port on behalf of Total Marine. This project required precision drilling in a marine environment to support the long-term stability and functionality of the port's dry dock facility.

The piling works were carried out from a barge using CLL's Bulroc 800mm Down-the-Hole (DTH) hammer, mounted on a Soilmec SR-45 drill rig. The SR-45 was lifted onto the barge using a 200-ton crane. The installation process involved drilling 4no 800 diameter piles through water up to 7m deep, silt up to 5m deep and 5m into bedrock.

One of the key challenges in this project was managing noise levels associated with rock drilling, particularly in a port environment. To minimise disruption, CLL scheduled piling activities during weekends, operating between 8:30 AM and 4:30 PM, thereby reducing noise impacts on weekdays while maintaining productivity.

Despite the complex marine and subsoil conditions, CLL successfully completed the full scope of work within eight days, adhering to the expected schedule and within budget. The client was pleased with the outcome of CLLs work.





PROJECT INFORMATION SHEET

HOBSONVILLE MARINE RECREATION CENTRE

LOCATION	**9 BOUNDARY ROAD, HOBSONVILLE**
CLIENT	**OXCON**
START & FINISH DATES	**2023**

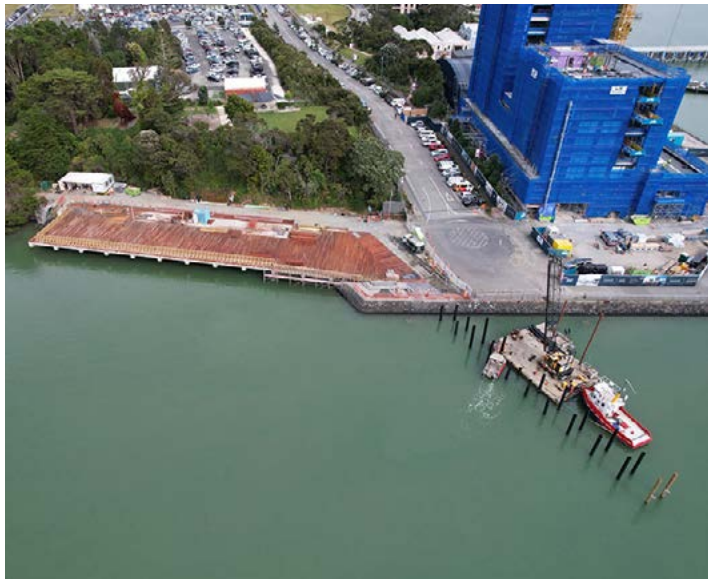
PROJECT OVERVIEW

This project at Catalina Bay within Hobsonville Point aimed to establish a cutting-edge aquatic centre for a sailing club, featuring a wharf structure extending into the tidal zone. The comprehensive design required a gangway leading to floating pontoons, ensuring direct water access for the community.

To address these challenges, CLL, in collaboration with our partner company Oxcon, carried out marine piling. We installed 48 concrete-encased timber SED poles (225mm diameter within a 450mm diameter hole) and 28 bored piles (750mm diameter, 8m deep), with 12 of these piles placed in the tidal zone using an amphibious excavator on a pontoon.

The bored pile construction methodology involved on-site cast in-situ piles with precisely measured pre-cast beams and structures manufactured in Tauranga. Each pile underwent thorough pre-surveying at critical construction phases, achieving an impressive 5mm tolerance for pile height and bolt placement.

We effectively navigated tidal challenges through meticulous time management and strategic use of casings and water pumping to prevent ground collapse. The project was completed on schedule, garnering high praise from the client.



PROJECT INFORMATION SHEET

HALF MOON BAY NORTH PIER EXTENSION CARPARK

LOCATION	**HALF MOON BAY, AUCKLAND**
CLIENT	**AUCKLAND MARITIME FOUNDATION**
START & FINISH DATES	**2019 - 2020**

PROJECT OVERVIEW

CLL/Oxcon CLL were engaged to complete a 200m-long by 12m-wide elevated concrete structure above the sea and basalt seawall to create a dockside parking area for the marina's new North Pier, whilst maintaining an operational boatyard. All works were constructed within the coastal marine area (CMA) and were built subject to stringent environmental controls.

The structure included consisted of 42 steel tube piles, each 38m long and 610mm in diameter, driven up to 34 metres into the seabed. These were then drilled out to the required depth and filled with reinforced concrete. Pre-cast pier heads, were offered over the top of the previously-installed piles and grouted into position. double-tee beams were spanned between the pier heads and formed the structure for and an in-situ deck. The client was very happy with how the project was delivered and completed.

Marine piling: CLL/Oxcon CLL installed a total of 871 lineal metres of 610mm diameter tube piles - all within the CMA. The piles were initially spliced into 18m sections, driven, then spliced and re-driven as needed to achieve to the required set. A drop hammer, a 120-tonne crawler crane, and a 50-tonne hydraulic crawler support crane were used to drive the piles up to 35m into the existing East Coast Bays Formation (ECBF) below.

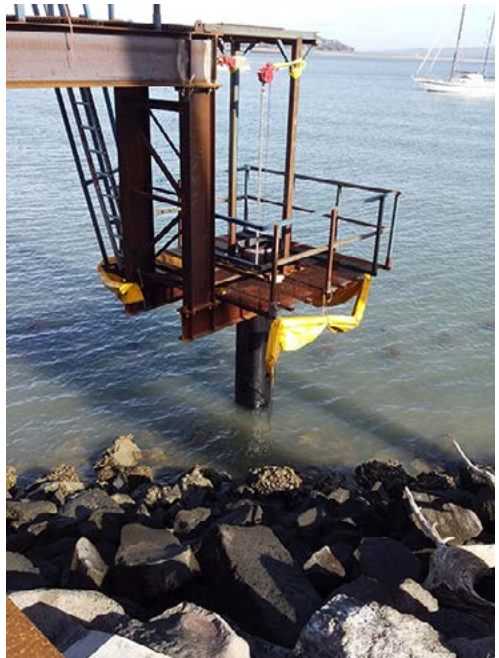
Dimensional accuracy was critical to the design as was reducing the impact of temporary works to the seabed. Oxcon/CLL developed a piling gate/access frame that was extremely successful in managing the dimensional risk and utilised the previously installed permanent piles which almost eliminated the need for temporary piles.

First, the pile starting position could be controlled within millimetres; and second, any incline developed during driving could be corrected or, as a minimum, controlled. The programme dictated that piling and pier head pre-cast works occurred in parallel, which removed any ability to adjust pre-cast dimensions post piling. All piles were installed within the required +/-20mm tolerance required by the design.

This attention to detail and of piling construction accuracy will be essential for the construction of the concrete and stonework works on the Seaside project to ensure a visually attractive finish.

In-situ concrete: CLL/Oxcon CLL completed all in-situ concrete works, including formwork, steel, and concrete placement (subcontracted) for the 2300sqm of concrete deck. Bespoke formwork systems were developed specifically to suit the design.

Pre-cast concrete: Our preferred pre-cast partner undertook the pre-cast scope with significant input from CLL/Oxcon CLL regarding modelling, shop drawing, and dimensional control. The pre-cast pier beams weighed up to 35 tonnes and required detailed lift planning. This was further complicated by the geotechnical conditions immediately behind the new structure. We developed lift plans and an install sequence that solved all presented issues.



PROJECT INFORMATION SHEET

MOUNT REX WHARF

LOCATION	**215 KAIPARA COAST HIGHWAY, HELENSVILLE**
CLIENT	**ATLAS CONCRETE**
START & FINISH DATES	**2019**

PROJECT OVERVIEW

The scope of works for CLL at the Mount Rex project included design and construction of critical repairs and maintenance for the Mt Rex Sand Supply Facility, including restoring the port/wharf, unloading docks, and conveyor systems. The project required developing a robust, efficient, and ecologically respectful retaining system and hard-stand design to repair the failing dilapidated wharf, and enhance the overall safety, efficiency, and capacity for berthing and unloading multiple sand barges and associated vessels.

Challenges included working within a live, operational port, conducting construction over water, preserving an environmentally sensitive ecosystem, managing timely procurement of materials, and adapting to a dynamic design-and-construct approach. Despite these complexities, CLL successfully delivered the project on time and within budget.

WHY CHOOSE CLL?

Atlas Concrete selected CLL as their preferred contractor for the project due to the following reasons:

- CLL has a long-standing, trusted relationship with Atlas Concrete.
- CLL has designed and constructed multiple facilities, batching plants, yards, pavements, and environmental solutions.
- CLL's expertise in retaining systems and property development, coupled with a collaborative and transparent approach, ensured seamless project execution.
- CLL worked closely with design engineers to rapidly implement solutions, securing the safety of port staff and vessels despite the facility's failing condition. Their strong industry connections allowed for efficient procurement of long-lead materials from offshore suppliers, optimising project time-lines.
- CLL has state-of-the-art technology, specialised plant and equipment, and innovative construction methods.
- CLL quickly and efficiently resolves all on-site challenges.

With nearly 40 years in the industry and a team boasting hundreds of years of collective experience, CLL continues to deliver high-quality construction solutions. The successful completion of the Mt Rex Wharf Upgrade reinforced safety, efficiency, and long-term functionality for the client.

CLL
SERVICE & SOLUTIONS

PROJECT INFORMATION SHEET

SENTINEL ROAD

LOCATION SENTINEL ROAD, HERNE BAY, AUCKLAND

CLIENT LINDESAY CONSTRUCTION

PROJECT OVERVIEW

The owner of this multi-million dollar property chose to repair a slip onto the beach as it came within the property line. Access to and from the site was only allowed via the sea, making the project logistically challenging.

CLL executed the slip repair using a comprehensive marine-based approach. A 100-tonne and a 30-tonne barge, a tug, and two diggers were utilised to access the site. All necessary materials and equipment were loaded at Sandspit or the Viaduct Basin. The primary task involved clearing the slip debris. CLL efficiently removed the debris from the slip face into a bin, which was then loaded onto the barge to prevent beach contamination.

The debris was transported to Viaduct Basin, craned off, and then trucked away. This process required at least 8-9 trips with the 100-tonne barge fully loaded with slip debris.

Additionally, a 6-meter crib wall destroyed in the slip was rebuilt from the bottom up, with all components barged in. CLL backfilled the area with scoria using helicopter bags, bringing in approximately 120 one-cubic-meter bags of scoria via the water. This meticulous approach ensured the repair was thorough and environmentally sensitive, addressing both the structural and aesthetic needs of the property.

PROJECT INFORMATION SHEET

HERNE BAY MARINE PILING

LOCATION	**PRIVATE RESIDENCE, HERNE BAY, AUCKLAND**
CLIENT	**PRIVATE**
START & FINISH DATES	**2022**

PROJECT OVERVIEW

The client required piling works for constructing a private boathouse and ramp at their Herne Bay residential property. The project involved precise drilling and the installation of concrete and steel structures into sandstone substrates, all while accommodating tidal variations.

Before starting the piling works, CLL positioned a barge at high tide to ensure optimal access to multiple pile locations during low tide. Drilling activities were carried out from the barge, and concrete and steel structures were installed into the sandstone substrates within the low tide window. Concrete was poured from land to ensure a steady and controlled pour process, and drill spoil was removed using crane operations.

CLL Capabilities
Slip Repairs

SERVICE & SOLUTIONS

PROJECT INFORMATION SHEET

MANGAMUKA GORGE SLIP REPAIRS

LOCATION	SH1 MANGAMUKA GORGE, KAITAI, NORTHLAND
CLIENT	NZTA WAKA KOTAHI
START & FINISH DATES	FEBRUARY 2023 - ONGOING
VALUE	$200M CIRCA

PROJECT OVERVIEW

The Mangamuka Gorge Slip repairs and rehabilitation project is a major infrastructure initiative located on State Highway 1 (SH1) within the Maungataniwha Ranges, an area of significant natural importance in New Zealand. This project involves the remediation of multiple large slips in a highly sensitive environment, focusing on stabilising the terrain, restoring safe road access, and mitigating environmental impact.

CLL has been engaged as the construction contractor for the entirety of this project, bringing our expertise in geotechnical solutions, complex piling, and environmental management to ensure the successful completion of these critical works.

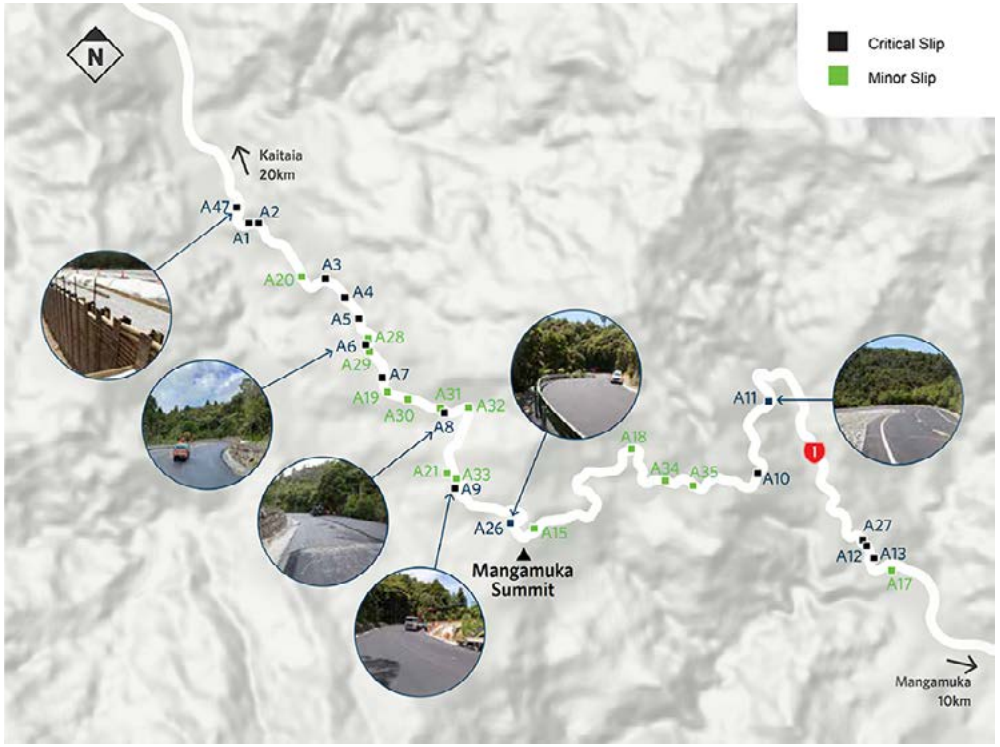
Another innovation on the site is a retaining wall that has now set the standard for such walls on other Waka Kotahi projects, according to Hendrik Postma, NZTA Senior Project Manager.

The wall was constructed by CLL as a subcontractor after the 2020 slips, and after the 2022 slips, the team was surprised to see the wall had held up far better than expected.

“It’s not a cheap fix, but it definitely works and is now being used on other projects because it’s so good,” Postma said.

Mark Ware, NZTA Project Director, highlighted the extreme weather challenges faced during the project: “The past year was one of the wettest on record, with over one metre more rainfall than the historical average in the area. Usually, the region gets approximately 1700mm of rain in 12 months – in contrast, over the past year there’s been over 2800mm of rain.”

Ware further explained the geological difficulties of the region: “Northland’s ground conditions (including through the Maungataniwha Range which surrounds Mangamuka Gorge) have always been fragile. Almost 70 per cent of the geological material which forms rocks in the region is made up of Northland Allochthon, better known as ‘Northland Problematic Rock.’ This type of material has long been challenging for construction and maintenance of roads, and means repairs to slips of this nature need to be carefully planned, since finding competent material to anchor the road to can be difficult.”



DESCRIPTION OF WORKS AND KEY FACTS

The project encompasses extensive earthworks to remove debris and reshape affected slopes, ensuring the long-term stability of the region. Pavement reconstruction involved milling damaged surfaces and installing new asphalt layers, with waterproof membranes applied to enhance durability.

A key component of the rehabilitation was the installation of permanent pile walls, reinforced with anchors to provide additional lateral support, distributing load forces effectively and ensuring slip areas remain stable. Given the project's proximity to waterways, strict environmental management practices were implemented, including erosion control, sediment containment, and ongoing environmental monitoring.

Collaboration with local iwi and environmental stakeholders was central to ensuring that cultural and ecological values were upheld.

30 August 2022 | **Slip A3** | 28 November 2024

30 August 2022 | **Slip A5** | 28 November 2024

30 August 2022 | **Slip A9** | 28 November 2024

11 October 2023 | **Slip A11** | 3 December 2024

30 August 2022 | **Slip A12** | 28 November 2024

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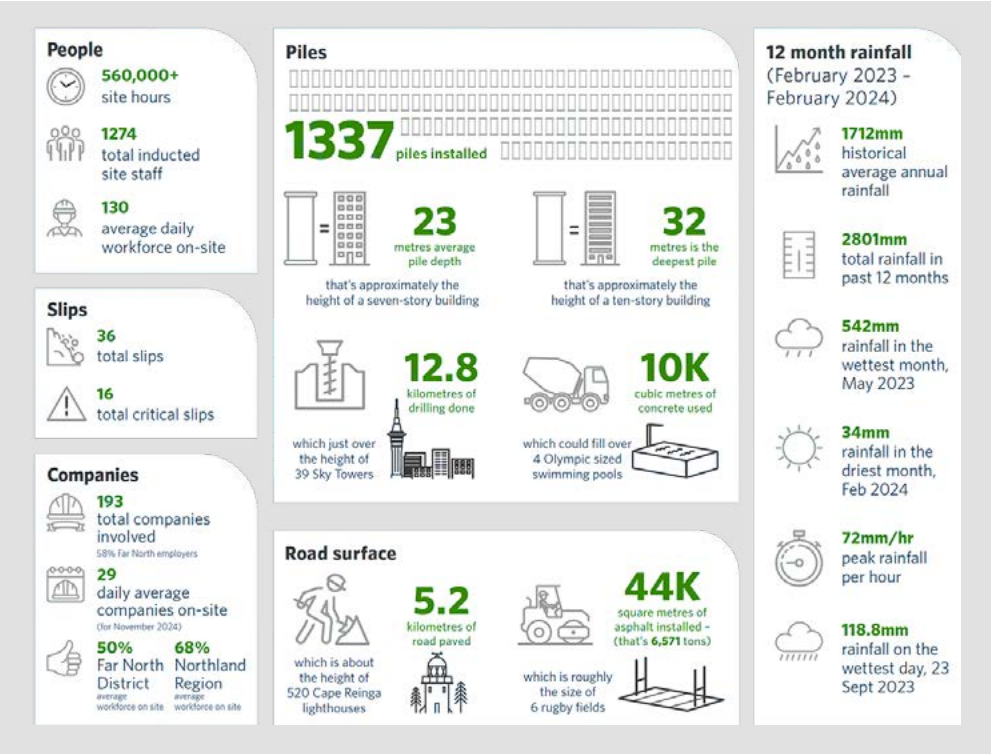
PROJECT FACTS AND FIGURES



ACCELERATED PROCUREMENT PROCESS

The accelerated procurement process used by NZTA for the Mangamuka Gorge project was designed to fast-track the selection of a construction contractor due to the urgency of the repairs. This approach is often used in situations where time is a critical factor, such as emergency road repairs after severe weather events.

Here's what it likely involved:

Key Features Of The Accelerated Procurement Process

1. Direct Engagement with Experienced Contractors – NZTA engaged directly with contractors who had proven expertise in geotechnical and slip remediation works.
2. Cost-Reimbursable Model – A flexible contract structure allowed work to commence before a fully detailed scope was established.
3. Early Contractor Involvement (ECI) – Contractors were brought in early to provide input into design and constructability, expediting the overall timeline.
4. Streamlined Decision-Making & Approvals – Reduced bureaucratic hurdles allowed for quick approvals and project initiation.
5. Collaborative Delivery Approach – Frequent communication and teamwork between NZTA, consultants, and CLL ensured efficient problem-solving and adaptability.

BENEFITS OF THIS APPROACH

- Faster Project Start & Completion – Critical infrastructure repairs progressed without lengthy procurement delays.
- Flexibility for Scope Changes – The ability to adapt to evolving site conditions without significant contract renegotiations.
- Stronger Contractor Commitment – Early engagement fostered a sense of ownership and accountability for successful delivery.

WHY THIS MATTERS FOR CLL MOVING FORWARD

Since this project was CLL's first as a Tier One contractor, the success of the accelerated procurement model strengthens the case for NZTA to continue using cost-reimbursable contracts and direct engagement with capable contractors like CLL for future projects. This model ensures agility, cost efficiency, and effective risk-sharing - key factors in delivering complex infrastructure repairs.

PROJECT EXECUTION AND COST MANAGEMENT

The project commenced as an emergency response under a cost-plus contract due to the absence of a predefined design. As design concepts evolved, procurement of long-lead items, such as 1,050mm-diameter steel casings, led to cost savings estimated at $1 million. Construction budgets were developed in alignment with the progressive design and reported to the Client's Quantity Surveyor (QS).

Throughout the project, financial oversight was maintained through:

- Monthly progress claims
- Cost forecasts
- Cashflow management to ensure budget adherence

Collaboration with the Client's QS ensured financial transparency and accuracy in reporting. Once the final scope was established, additional budgets were prepared to support funding applications.

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CHALLENGES AND INNOVATIONS

- Minimising SH1 Closure: To expedite the project and reduce the impact on local communities and freight operators, night shifts were introduced to enhance productivity while mitigating material supply constraints.
- Adapting to Weather and Site Conditions: The implementation of a Trigger Action Response Plan (TARP) meant construction had to be paused during heavy rainfall or when slip sensors detected movement. Despite these challenges, the team successfully navigated disruptions.
- Holiday and Weekend Works: Approval was granted to work through the Christmas break and long weekends to maintain momentum on critical-path activities. This strategic scheduling helped mitigate delays and ensured steady progress.

CONCLUSION

The SH1 Mangamuka Gorge Slip Repairs Project stands as a testament to CLL's ability to deliver complex geotechnical solutions while balancing environmental stewardship and community engagement. This project highlights our expertise in large-scale slip remediation, sustainable construction methodologies, and effective stakeholder collaboration.

With a commitment to safety, innovation, and excellence, CLL has successfully restored this vital transport corridor, ensuring long-term resilience and connectivity for the Northland region.

NZTA PROJECT REPRESENTATIVES

- NZTA Waka Kotahi Mangamuka Senior Project Manager, Hendrik Postma
- NZTA Waka Kotahi Mangamuka Project Director, Mark Ware
- NZTA Waka Kotahi Project Director, Norman Collier
- Mangamuka-born-and-bred, Tomo Otene, the project's Ngā Hapū o Mangamuka Representative.
- Far North District Councillor, Steve McNally
- Regional Transport Committee Chair, Joe Carr
- Steve Mutton, Director Of Regional Relationships for NZ Transport Agency Waka Kotahi

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PROJECT INFORMATION SHEET

RAWENE RESERVE LANDSLIP REPAIRS

LOCATION	BIRKENHEAD, AUCKLAND
CLIENT	DOWNER CONSTRUCTION
START & FINISH DATES	MAY 2020 - FEBRUARY 2021
VALUE	$4.6M

PROJECT OVERVIEW

Following a landslip at a Birkenhead car park in 2017, the main contractor faced urgent challenges in ensuring safe and efficient recovery operations. The landslip had damaged a sewer line, requiring immediate intervention to stabilise the area and restore functionality.

Our comprehensive approach included designing and installing temporary structures, constructing access points to the pipe location, installing timber poles with back-ties, conducting excavation work, and setting up temporary support for a trench measuring 4.5 meters deep and 2 meters wide.

As part of our scope, we also managed the backfilling process and safely removed back-ties and anchors.

The project encountered unique challenges related to slip debris, necessitating vigilant monitoring of temporary structures to ensure safety, retaining wall stability, and the well- being of personnel within the trench. Addressing concerns about ground stability, we proposed and implemented a revised plan that involved replacing a large excavation with a T&T-concept retained structure. This approach not only enhanced safety and stability but also accelerated the project time-line.

PROJECT INFORMATION SHEET

WAITAKERE ESTATE SLIP REPAIRS

LOCATION	573 SCENIC DRIVE, WAIATARUA, AUCKLAND
CLIENT	MCLARENS NZ
START & FINISH DATES	6 WEEKS IN 2021
VALUE	$500K

PROJECT OVERVIEW

This client required immediate and effective slip repair solutions for the Waitakere Estate during the Covid Level 4 lock-down. The project needed a custom design solution to address site-specific challenges, ensuring stability and safety.

Utilising early contractor involvement, CLL provided design input and collaborated closely with the design team to develop a custom design solution. The project scope included temporary works, piling, a capping beam, shotcrete, a new reinforced concrete (RC) slab, as well as kerb and channel and edge protection.

The plant used for the project included EK60 and EK40 drill rigs, 21T and 20T excavators with drill gear, a Bobcat, an SKP80 concrete pump, a Hiab, and 4/6-wheeler delivery trucks. The project required coordination across multiple work fronts, and access was restricted in some areas due to lock-down measures.

PROJECT INFORMATION SHEET

WAIKOWHAI ROAD SLIP REPAIRS

LOCATION WAIKOWHAI ROAD, MT ROSKILL, AUCKLAND

CLIENT DOWNER CONSTRUCTION

PROJECT OVERVIEW

CLL was approached to devise a solution for a landslip beneath Waikowhai Road in Mount Roskill, which had led to a public closure. In response, our team constructed a no-fines concrete retaining structure, a design courtesy of Andy O'Sullivan Geotechnical Engineering. The structure was reinforced with soil nail tie backs as an alternative to large piles, a strategy that yielded the same level of robustness while minimising the need for personnel and equipment, thereby significantly reducing the overall project cost.

The soil nails, which were permanent, were embedded using a 14-tonne excavator fitted with a drill mast.

Our team manually assembled the no-fines retaining structure, an interlocking modular scaffolding frame system provided by United Scaffolding. This frame was subsequently filled with a blend of concrete stones and cement slurry, intentionally without sand. Once the mixture solidified, the frame was disassembled and a layer of shotcrete was applied.

The unique composition of the concrete slurry, devoid of sand, results in a porous mixture which not only offers robust structural support but also allows for water permeation. This innovative approach promotes drainage and ensures the longevity and durability of the structure.

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PROJECT INFORMATION SHEET

ST MICHAELS AVENUE

LOCATION	ST MICHAELS AVENUE, POINT CHEVALIER
CLIENT	HAWKINS

PROJECT OVERVIEW

Auckland Council, through Hawkins Infrastructure, required slip stabilisation works at St Michaels Ave, Pt Chevalier. The project needed comprehensive solutions for drainage, pavements, retaining walls, ground anchors, and landscaping.

The overall works carried out by CLL included:

Drainage: Installation of storm-water pipework, manholes, catch pits, kerbs, channels, and the outlet structure to manage water flow and prevent future erosion.

Pavements and Surfacing: Laying of asphalt, construction of concrete footpaths, and installation of residential vehicle crossings and pram crossings to restore access and functionality.

Retaining Walls: Construction of retaining walls using 35 piles ranging from 750mm to 1000mm in diameter, along with capping beams. This also included the installation of 17 ground anchors, which involved drilling, grouting, and fitting galvanized steel plates and flange nuts to ensure structural integrity.

Ground Anchors: Installation of 17 ground anchors, including drilling holes, grouting, and the addition of galvanized steel plates and flange nuts for enhanced stability.

Hard and Soft Landscaping: Completion of all hard and soft landscaping as part of the reinstatement works, providing a cohesive and aesthetically pleasing finish to the site.

CLL SERVICE & SOLUTIONS

PROJECT INFORMATION SHEET

KARORI CRESCENT

LOCATION	**22 KARORI CRESCENT, ORAKEI, AUCKLAND**
CLIENT	**CLEARWATER CONSTRUCTION**
START & FINISH DATES	**JULY 2022 - MAY 2O23**
VALUE	**$2.2M**

PROJECT OVERVIEW

A waterfront residential plot in Orakei, Auckland required a robust and reliable retaining wall solution to secure the property for future development. The project presented several challenges, including difficult downhill access and complex entrance requirements.

CLL addressed this need by constructing piled retaining walls tailored to the specific requirements of the complex. We began by installing 57 reinforced concrete (RC) piles, with diameters ranging from 750mm to 900mm and depths of 6 to 12 meters. To further strengthen the structure, we erected 146 SED poles, standing between 1.2 to 1.5 meters high.

In addition to the pile and pole installation, our team executed the installation of a capping beam, and performed shotcrete and drainage works. Despite the challenging site conditions, our team efficiently ensured that all project objectives were achieved.

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PROJECT INFORMATION SHEET

CRITICAL LANDSLIP PROJECTS

LOCATION WAIKATO EXPRESSWAY, HUNTLY

CLIENT FULTON HOGAN

PROJECT OVERVIEW

CLL was commissioned by Fulton Hogan to construct debris protection racks for the culverts in the Huntly section of the Waikato Expressway.

The project involved driving poles into the ground next to the culverts beneath the future motorway to safeguard them from falling debris, such as trees.

The process included drilling holes, placing timber poles, and concreting the section to create debris control screens.

Navigating site traffic and access posed challenges due to crowding with large machinery and isolation. Many of CLL's machinery shifts and concrete deliveries had to be coordinated around the downtime of other contractors. However, through planning and professional communication with concrete suppliers and other contractors, the project was completed smoothly, on time, and within budget.

CLL SERVICE & SOLUTIONS

PROJECT INFORMATION SHEET

CRITICAL LANDSLIP PROJECTS

DESCRIPTION OF WORKS

308 STATE HIGHWAY 1, TE HANA | WELLSFORD | JOUBERT PILAT LTD | MARCH 2024 - APRIL 2024 | $140K

KiwiRail faced a critical issue with soil slippage threatening the stability of their rail infrastructure and posing a significant risk to the safety and operational efficiency of the rail line. The solution required the construction of a robust retaining wall to stabilise the soil and protect the rail line from potential slip threats. CLL, in collaboration with JPL as a sub-contractor, designed and constructed a retaining structure for KiwiRail.

The project involved the installation of UC beams and timber lagging to create a 40m long retaining wall capable of withstanding the slip pressures. We installed 39 units of 250 Universal Columns (UCs) as the primary structural elements of the retaining wall, using a vibro-hammer on a 30t Excavator in conjunction with pre-drilling techniques for placement of the beams. Timber lagging (150x50) was installed between the UC beams.

215 SHAKESPEARE ROAD, AUCKLAND | BUFTON CONSTRUCTION | 3 MONTHS | $730K

The client needed to stabilise a slip-prone area to ensure safety and prevent further rockfall or soil movement. To address this, CLL implemented a systematic approach involving the installation of fiber rod soil nails and rockfall mesh. This process included pre-drilling through overburden material, followed by installing casings into competent rock using a rotary hammer and the GEAX EK110 drill rig. The structure was then reinforced with cages and tremie-poured concrete. A significant challenge was ensuring the casings were securely anchored in competent rock to prevent the escape of compressed air, which would otherwise reduce hammer efficiency.

SENTINEL ROAD, HERNE BAY | LINDESAY CONSTRUCTION | 10 WEEKS | $700K

The owner of this multi-million dollar property chose to repair a slip onto the beach as it came within the property line. Access to and from the site was only allowed via the sea, making the project logistically challenging. CLL executed the slip repair using a comprehensive marine-based approach. A 100-tonne and a 30-tonne barge, a tug, and two diggers were utilised to access the site. All necessary materials and equipment were loaded at Sandspit or the Viaduct Basin.

CLL efficiently removed the debris from the slip face into a bin, which was then loaded onto the barge to prevent beach contamination. The debris was transported to Viaduct Basin, craned off, and then trucked away. At least 8-9 trips were required with the 100-tonne barge fully loaded with slip debris. Additionally, a 6-meter crib wall destroyed in the slip was rebuilt from the bottom up, with all components delivered by barge. CLL backfilled the area with scoria using helicopter bags, bringing in approximately 120 one-cubic-meter bags of scoria via the water. This meticulous approach ensured the repair was thorough and environmentally sensitive, addressing both the structural and aesthetic needs of the property.

PROJECT INFORMATION SHEET

CRITICAL LANDSLIP PROJECTS

12 CLARENCE ROAD, NORTHCOTE, AUCKLAND | PRIVATE CLIENT | APRIL 2023 - OCTOBER 2023 | $285K

Following Cyclone Gabrielle, the client's cliff-side property faced a severe threat of erosion due to significant bank slips and erosion on neighboring properties. Our solution required meticulous surveys and extensive de-vegetation to prepare the site. 103 soil nails, each 4 meters in length, were then installed within 100mm diameter holes to reinforce the slope and prevent further erosion. Additionally, 228m² of Mac Mat R was applied to enhance stability across the terrain. A notable challenge was the limited driveway access, necessitating innovative solutions. Access to the site was achieved via the beach at the base of the property, where we utilised an A-frame drill rig during low tide to navigate the cliff face effectively. The successful execution of these measures garnered significant praise from the client for the performance of CLL and its subcontractors.

123 RANGATIRA ROAD, BEACH HAVEN | PRIVATE CLIENT | APRIL 2023 - DEC 2023 | 300K

After Cyclone Gabrielle, our team effectively addressed slope instability issues at a residential site in Beach Haven. Despite the challenge of restricted access via a narrow driveway, we efficiently removed 400m^3 of slip material using three 6-wheeler trucks and two 14 t diggers and implemented structural solutions to mitigate further risks. We erected a timber palisade wall supported by 15 piles, established a drainage system, and backfilled the area with 400m^3 of compacted cross concrete. To stabilise the 30^o slope, we installed geoweb erosion matting filled with 150mm topsoil. We efficiently addressed all complexities, including the presence of watercare/sewage pipes and removal of asbestos.

8 TE AUTE RIDGE ROAD, BETHELLS, AUCKLAND | PRIVATE CLIENT | JULY 2023 - JANUARY 2024, $190K

After Cyclone Gabrielle, a residential driveway located atop a ridge on a rural property that had suffered a slip beneath the road surface, resulting in a crescent crack in the pavement and posing a significant risk to the stability of the driveway and safety of the property.

The team at CMW Geosciences developed a comprehensive design plan, and CLL executed the solution, which involved installing 62 soil nails, each 9 m in length, arranged in a staggered pattern within a 1.5 by 1.5-meter grid for optimal strength. These soil nails were reinforced with a combination of GRP bars and galvanized accessories, securely placed within the drilled holes and using 30mpa grout. MacMat was applied over the area, reinforced with galvanized wire, to provide a durable layer for erosion protection.

A 14-ton excavator equipped with a drill mast was used with an A-frame drill rig for areas inaccessible to the excavator. To optimize resources and minimize costs, support anchors for the A-frame drill rig were strategically positioned, serving a dual purpose by securing the matting and cable work upon project completion. This eliminated the need for trenching, which could have further compromised the stability of the narrow ridge. Despite the strict deadline, the project was completed on time, ensuring the safety and stability of the residential driveway.

CLL Capabilities
Bridge & Civil Construction

SERVICE & SOLUTIONS

PROJECT INFORMATION SHEET

NORTHSLIPS DRAINAGE

LOCATION STATE HIGHWAY 1, MANGAMUKA GORGE

CLIENT NZTA WAKA KOTAHI

PROJECT OVERVIEW

EMERGENCY WORKS (Prior To Contractor Confirmation)

Before the formal appointment of CLL as the construction contractor, emergency works were undertaken to stabilize the site and manage drainage. These works included:

- Installation of 12 cross road drains, all utilizing 800mm PE pipe, designed to act as a self-cleaning systems.
- Three of these drains featured a substantial run along the hillside of the road, requiring the installation of 8 manholes in total.
- All but one of these manholes were fitted with flumes to control water discharge.

CLL DRAINAGE & INFRASTRUCTURE EXPERTISE

Once the project progressed to the next stage, CLL's drainage teams executed extensive drainage improvements, including:

- Installation of 21 culverts, which were of the same 800mm PE pipe size as the cross road drains, ensuring consistent water flow management across the project.
- At two culvert locations, 1200mm PE pipe was used to facilitate fish passage, providing environmentally sustainable waterway connectivity.
- Implementation of swale drains in 10 locations to effectively divert water away from the piled walls, covering a total of approx. 2 lineal kilometre.
- Installation of 11 manholes, strategically placed where multiple bored drains were installed to improve site drainage and water management across the project.

KEY STRENGTHS

- Expertise in **critical slip rehabilitation** and geotechnical solutions.
- Advanced **drainage installation techniques** to improve long-term resilience.
- Commitment to **safety, environmental sustainability, and innovation**.
- Proven track record in delivering projects **on time and within budget**.

PROJECT INFORMATION SHEET

PEACOCKE BRIDGES

LOCATION	WHATUKOORURU DRIVE, HAMILTON
CLIENT	DOWNER CONSTRUCTION
START & FINISH DATES	MARCH - JUNE 2023
VALUE	$2.6M

PROJECT OVERVIEW

CLL successfully completed the construction of two bridges in Hamilton: the Eastern Gully Bridge and the Mangakotukutuku Gully Bridge, both situated on Peacocke Road. The project comprised the installation of a total of 28 piles, including abutment piles (900mm in diameter, 25m deep) reinforced with permanent casings and pier piles (1.2m in diameter, 30m deep) equipped with a permanent sleeve.

To accomplish this task, specialised equipment such as the LB24, a 110-ton crane, and excavators weighing 36T, 14T, and 8T were used.

Challenging access conditions meant manoeuvring this equipment down a steep ramp, which demanded exceptional efficiency from the team. The soft ground conditions, caused by the site's proximity to a river, also necessitated the use of a bentonite slurry system during the drilling process to bolster pile shaft stability. Stringent sediment control measures were implemented to mitigate pollution risks arising from this proximity to this river.

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PROJECT INFORMATION SHEET

LOOP ROAD

LOCATION	**SH1 OTAIKA BRIDGE GROUND STABILISATION AND PILING WORKS**
CLIENT	**OXCON CLL**
START & FINISH DATES	**JANUARY 2024 - NOVEMBER 2024**
VALUE	**$4M**

PROJECT OVERVIEW

CLL was subcontracted by Oxcon CLL (sister company) to carry out ground stabilisation and bridge piling works for the SH1 Otaika Bridge project. This project required a range of piling techniques to ensure the structural integrity of the bridge and surrounding infrastructure, particularly given the challenging proximity to the river. Despite the complexities, the project was successfully completed on time and within budget.

SCOPE OF WORK AND KEY FACTS

The project involved four distinct piling methods, each tailored to specific structural and geotechnical requirements:

- **Full Displacement Piles:** 189 piles, each 14 meters deep and 450mm in diameter.
- **Rammed Aggregate Piers (RAPs):** 586 RAPs installed at depths ranging from 12 to 16 meters, with a diameter of 600mm, using 2,400m³ of GAP40 material.
- **Bridge Piling:** 8 piles, each 1,500mm in diameter and 20 meters deep, forming the foundation of the new bridge structure.

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- **Retaining Wall Piling:** 50 reinforced concrete piles, averaging 11.5 meters in depth and 750mm in diameter, ensuring slope stability and long-term resilience.

CHALLENGES AND EXECUTION

- **Proximity to Waterways:** The site's location near and within the river presented environmental and logistical challenges. Mitigation measures were employed to ensure stability and minimize impact.
- **Varied Ground Conditions:** The use of multiple piling techniques allowed for tailored solutions to different soil and load-bearing conditions, ensuring structural integrity.
- **Timely Delivery:** Despite the challenges, CLL delivered the project efficiently, meeting all schedule and budgetary constraints.

CONCLUSION

The SH1 Otaika Bridge ground stabilisation and piling works demonstrate CLL's capability in delivering complex geotechnical solutions with precision and efficiency. By successfully implementing a variety of piling techniques in a challenging environment, CLL reinforced its reputation as a leader in foundation engineering, ensuring long-term stability for a critical piece of infrastructure.

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PROJECT INFORMATION SHEET

MEDALLION DRIVE LINK BRIDGE PROJECT

LOCATION	MEDALLION DRIVE LINK BRIDGE PROJECT
CLIENT	DEMPSEY WOOD CIVIL
START & FINISH DATES	AUGUST 2020 - JANUARY 2021
VALUE	$2.2M

PROJECT OVERVIEW

The Medallion Drive Link Bridge project is a critical infrastructure development aimed at improving connectivity and accommodating increased traffic flow. The project required the construction of key structural elements designed for long-term durability, stability, and functionality.

SCOPE OF WORK AND KEY FACTS

CLL was responsible for delivering core construction elements, ensuring structural integrity and adherence to engineering standards. The project was completed on time and within budget, exceeding client expectations.

KEY STRUCTURAL COMPONENTS

- **Bridge Piling:** Installation of eight piles, each 1,200mm in diameter and extending 11 meters deep, providing foundational support for the bridge abutments. These piles underwent Crosshole Sonic Logging (CSL) testing to confirm they were free of defects.
- **Abutments Construction:** Included excavation, reinforced steel installation, formwork placement, concrete pouring, and backfilling to ensure structural stability and load-bearing capacity.
- **Super T Beams:** Eight beams, each measuring 30 meters in length, 2.3 meters in width, and 1.3 meters in height, installed on rubber bearing pads to allow controlled movement and load distribution, mitigating thermal expansion and seismic activity.
- **Settlement Slabs, Wingwalls, and Retaining Walls:** Precision reinforcement and formwork placement, followed by concrete pouring, ensuring long-term resilience.
- **Scour Protection Measures:** Implemented to safeguard against erosion and potential water damage, enhancing structural durability.
- **Barrier Installation, Electrical & Drainage Works:** Completion of critical safety and functionality components, including pedestrian footpaths for improved accessibility.
- **Anti-Graffiti Protection:** Applied to maintain the bridge's long-term appearance and durability.

PROJECT EXECUTION AND KEY ACHIEVEMENTS

- **No Design, Construct-Only Approach:** CLL successfully delivered the bridge based on provided specifications, demonstrating construction expertise.
- **400-Tonne Super Lift:** Successfully executed as part of the bridge installation, requiring precise coordination and technical expertise.
- **Client Satisfaction:** CLL completed the project on time and within budget, surpassing client expectations in terms of quality, efficiency, and project execution.

CONCLUSION

The Medallion Drive Link Bridge project stands as a testament to CLL's capability in delivering complex bridge construction projects. With meticulous execution, rigorous quality control, and innovative construction techniques, CLL ensured the successful completion of a critical infrastructure project that will serve the community for years to come.

CLL SERVICE & SOLUTIONS

PROJECT INFORMATION SHEET

BAYFAIR TO BAYPARK

LOCATION	TAURANGA
CLIENT	CPB CONTRACTORS PTY
START & FINISH DATES	MARCH 2020 - 07 MAY 2021
VALUE	$4.5M

PROJECT OVERVIEW

The Bayfair to Baypark link (Baylink) project, situated on State Highway 2 south of Tauranga, required an upgrade of two major state highway intersections. This critical infrastructure development posed significant challenges, particularly the need for foundational work for bridge piers near a busy intersection with active traffic.

To address these challenges, CLL carried out a comprehensive foundation solution. 1,289 CFA piles were installed in double rotary mode, each with a diameter of 750mm and depths ranging from 10m to 15m. The use of double rotary drilling ensured that debris was contained within the shroud, allowing for safe and efficient drilling operations close to live traffic.

Our efficient site management was noteworthy, achieving a daily pumping capacity of approximately 250 linear meters. Our coordination of spoil removal and concrete delivery also culminated in an peak production rate of 468 linear meters per day.

CLL SERVICE & SOLUTIONS

PROJECT INFORMATION SHEET

AUCKLAND CYCLEWAY

LOCATION	GLEN INNES TO TĀMAKI DRIVE, AUCKLAND
CLIENT	NZTA - AUCKLAND
START & FINISH DATES	JULY 2020 - APRIL 2022
VALUE	$30.8M

PROJECT OVERVIEW

The Glen Innes to Tāmaki Drive Shared Path - Te Ara Ki Uta Ki Tai (the path of land and sea) was a collaborative project with Oxcon-CLL that delivered a 7km-long pathway connecting Auckland's eastern suburbs to the city centre.

The project comprised two pre-cast concrete bridges totalling 300 meters, with one spanning the Eastern Line of the rail network.

Additionally, it included over 800 meters of timber board walks and nearly 2 kilometres of 4-meter-wide concrete pathways.

We successfully completed Section 2 of the total project, extending from St Johns Road to the Orakei Basin, along with an additional connection to John Rymer Place. Approximately 20% of the work was carried out by selected subcontractors.

This impressive project was delivered ahead of schedule and under budget, representing a significant achievement for both CLL and Waka Kotahi. It now stands as an enduring asset, ready to be enjoyed by the public and local communities for years to come.

PROJECT INFORMATION SHEET

NELSON STREET CYCLEWAY BRIDGE

LOCATION CANADA STREET, AUCKLAND (OLD NELSON STREET)

CLIENT HAWKINS

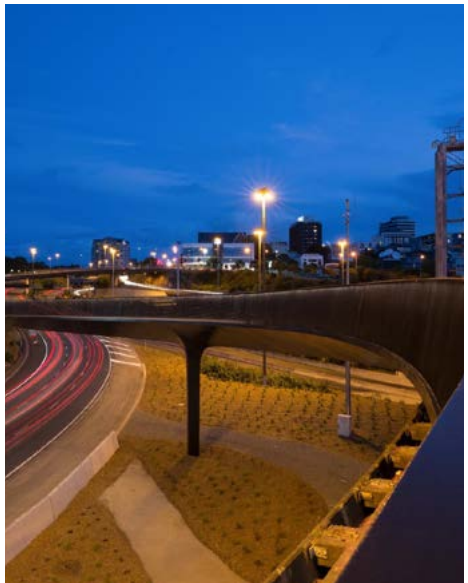
PROJECT OVERVIEW

The project aimed to transform Auckland's old Nelson Street off-ramp into an iconic shared footpath and cycle way, connecting upper Queen Street via a new bridge off Canada Street and continuing through to Nelson Street with a separate cycle way.

CLL played a pivotal role in the project, completing all piling works, grouting the joins of the bridge panels, and constructing the settlement slabs at both the Eastern and Western ends of the bridge (Canada Street and Nelson Street ends).

The renovated off-ramp has become a shared footpath, enhancing connectivity and promoting cycling in the area.

The cycle way earned the prestigious Chicago Athenaeum Museum of Architecture and Design Award, recognising it as one of the world's top international distinguished building, landscape architecture, and urbanism projects.



PROJECT INFORMATION SHEET

WELLESLEY STREET BRIDGE, CYCLEWAY AND UNDERPASS

LOCATION AUCKLAND CITY

CLIENT HAWKINS

PROJECT OVERVIEW

On behalf of Hawkins Infrastructure CLL completed works for the Wellesley Street Bridge cycleway and underpass.

The works involved constructing an underpass beneath Wellesley street, which is one of Auckland's busiest streets.

All works were to be completed between Anzac Long weekend and Easter weekend working seven days a week, 15 hours a day to meet the required program.

The scope of work included UC retaining wall along the cycleway, the underpass and wing walls involved with this was 8no reinforced concrete piles, 2,500m3 of bulk excavation placing 2no 60T pre-cast abutments, placing bridge hollow core beams, in-situ deck and placing TL4 barriers.

The project was successfully completed within the allocated time and budget.

PROJECT INFORMATION SHEET

COWIE STREET BRIDGE

LOCATION	COWIE STREET, NEWMARKET
CLIENT	AUCKLAND TRANSPORT
START & FINISH DATES	NOVEMBER 2017 - JULY 2018
VALUE	$7.9M

PROJECT OVERVIEW

This project involved removal of a level crossing and construction of a new dual lane single span hollow-core bridge over live rail. Associated works included comprised MSE Stone Strong faced abutments, internal piling, road works and landscaping. The primary goal was to boost the efficiency of the AT Train Network by enhancing connectivity between Britomart and Newmarket train stations, two vital segments of the Auckland rail corridor.

In partnership with Fraser Geologics, we redesigned Auckland Transport's initial design, resulting in a solution that saved the client over $500,000 while significantly reducing environmental impact. As the lead contractor, we managed all aspects of the bridge construction, and carried out 95% of the construction work, subcontracting the installation of handrails.

The constructed bridge was a 22 metres long and 10 metres wide featuring Urban Design embossed concrete-faced MSE wall bridge abutments, with six 750mm diameter reinforced piles drilled 19 metres deep within the abutments.

Extensive collaboration with KiwiRail and engagement with local residents and stakeholder groups were essential. Despite the complexity of the urban environment, the project was completed with minimal disruption to stakeholders, and on-time within an accelerated time-line to facilitate AT's Public Transport time table changes.

In close partnership with KiwiRail, stringent Safe Systems of Work were implemented to facilitate operations near their critical 25,000V OLE structures, supported by a robust 'Permit to Enter' process.

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Additional Project Components Include:

- Bridge beam and barrier procurement
- Typical bridge detailing including TL5 barriers, Texas rail, wing wall tie-ins, etc.
- Timber board-walk
- Timber & Steel Architectural Fencing
- New Stormwater assets and connections, including rain gardens and planted swale
- Seeded Rip-Rap and Gabion rock gardens
- Footpaths & stencil applied patterns
- Basalt Handcut Cobble Thresholds
- Re-vegetation and Specimen Tree planting

Client Feedback:

"The construction environment adjacent to the rail corridor and the consent conditions culminated in a challenging construction environment and it is unlikely a different contractor would have provided the same outcome to Auckland Transport to meet the project requirements. It is also noted that feedback from the community, reiterated throughout construction, was extremely positive regarding both CLL's performance and communication."

- Melissa Feather (AT Project Manager)

CLL SERVICE & SOLUTIONS

PROJECT INFORMATION SHEET

WAIRERE-COBHAM BRIDGE

LOCATION	HAMILTON, WAIKATO
CLIENT	FULTON HOGAN
START & FINISH DATES	JANUARY 2021 - FEBRUARY 2021
VALUE	$860K

PROJECT OVERVIEW

Fulton Hogan required the installation of large-diameter reinforced concrete (RC) bridge piles for the Wairere-Cobham bridge construction.

CLL installed 17 reinforced concrete bridge piles, each with a diameter of 1200mm and reaching 30 meters deep. Challenging ground conditions necessitated the use of the IMT Drilling Rig paired with bentonite slurry for effective pile shaft stabilisation. The operation also involved a 24-ton excavator and an 80-ton crawler crane for vibrating the 6-meter temporary casing and lifting the pile cage and tremie pipes.

Despite the challenges posed by the COVID-19 pandemic, including delays in material and labour deliveries from Auckland, the project for the Wairere-Cobham bridge construction was completed successfully.

CLL SERVICE & SOLUTIONS

PROJECT INFORMATION SHEET

WOODCOCKS ROAD BRIDGE

LOCATION	WOODCOCKS ROAD, WARKWORTH
CLIENT	NORTHERN EXPRESS GROUP CONTRACTOR
START & FINISH DATES	SEPTEMBER 2020 - OCTOBER 2020
VALUE	$600K

PROJECT OVERVIEW

Our client enlisted CLL to carry out bridge piling and groundwork for the construction of the new bridge on Woodcocks Road in Warkworth, as part of the Puhoi to Warkworth motorway initiative. The project faced several challenges, including high groundwater levels and varying founding rock depths.

Using the SR45 crane and a 14T excavator support machine, we installed ten bridge abutment piles, each measuring 900mm in diameter and 26m-34m in depth, using temporary steel casings with an additional sleeve outside the casing. Addressing the challenges posed by high groundwater levels and varying rock depths, each pile was installed with sonic tubes for sonic logging testing, ensuring the bridge's structural integrity.

PROJECT INFORMATION SHEET

DAIRY FLAT ROUNDABOUT

LOCATION	**CORNER OF DAIRY FLAT HIGHWAY & COATESVILLE-RIVERHEAD HIGHWAY**
CLIENT	**DEMPSEY WOOD CIVIL LTD**
START & FINISH DATES	**AUGUST 2019 - NOVEMBER 2020**
VALUE	**$1.3M**

PROJECT OVERVIEW

The construction of a new roundabout at the intersection of Dairy Flat Highway and Coatesville-Riverhead Highway was initiated to address safety concerns at one of New Zealand's top 100 high-risk intersections. CLL was responsible for installing ground improvement piles at seven distinct locations, with Dempsey Wood subsequently erecting MSC walls to establish the road construction foundation.

The piles varied in depth and required different socket configurations into the East Coast Bays Formation (ECBF). All ground improvement piles were constructed without reinforcement, using 10 MPa concrete. During the project, Wall 3 was found to have a historic slip, necessitating additional remedial work. This phase involved constructing a 30-meter palisade wall comprising 30 piles of 750mm diameter and reaching depths from 15m to 18m. Additionally, a 1250mm x 715mm ground beam was installed, accompanied by 15 13-strand cables ranging from 30m to 40m in length, with bond lengths between 10m and 15m.

The project required multiple set-ups and dismantling due to the diversion and relocation of existing roads as it progressed. Each location presented unique challenges, necessitating the allocation and adaptation of plant machinery to optimise drilling operations.

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CLL Capabilities
Rock Anchor and Soil Nailing

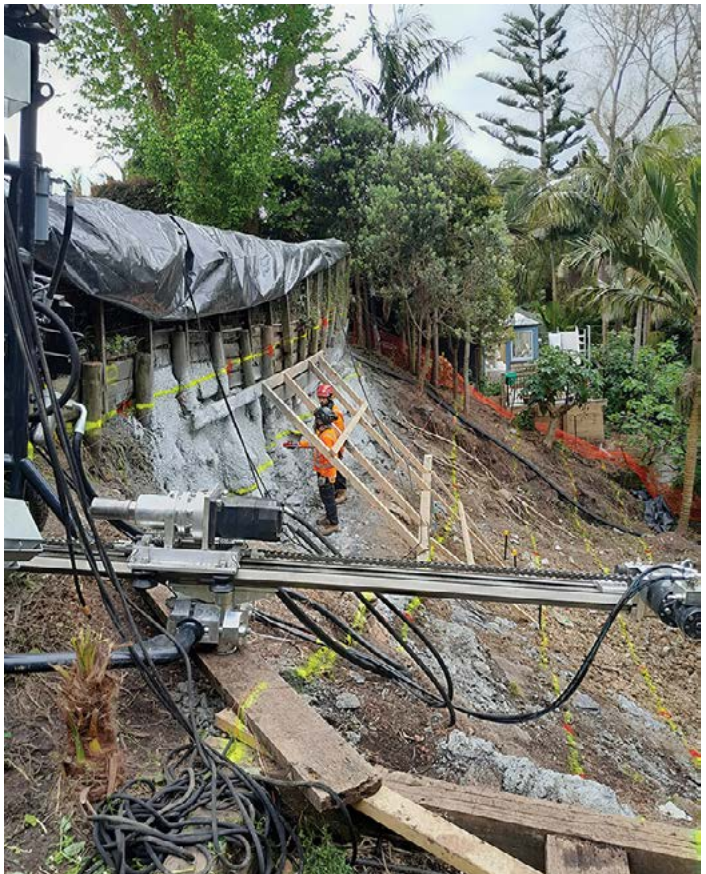
SERVICE & SOLUTIONS

BANK STABILISATION AND SLIP AND CLIFF REPAIR

We specialise in bank stabilisation and slip and cliff-face stabilisation and our expert teams can identify both the cause, and ways to repair and secure unstable slopes. Our slip repair process is an integrated service from design and costing, consents, construction, and reinstatement of landscape, and our experienced abseil team will help you get to those hard to reach places.

CLL‘s development of innovative techniques used in previous projects enables us to offer cost effective solutions at the design stage - streamlining and reducing the cost of repairs.

We also deploy rapid-response teams for emergency situations. In these distressing conditions our depth and breadth of skills and technology allows us to quickly assess and respond to the specific needs of each situation.



SOIL NAILING AND ROCK ANCHORS

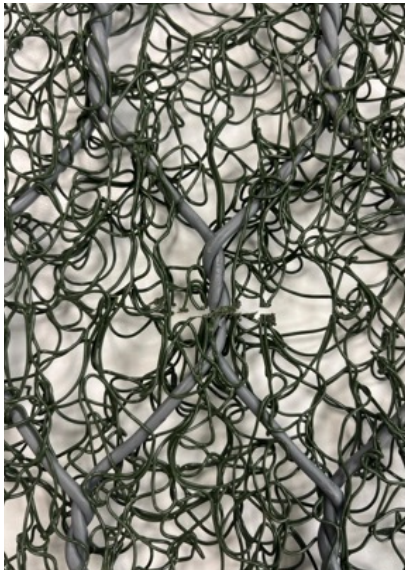
Soil nails, and their bigger cousins, soil anchors are a remedial measure to treat unstable natural soil slopes. As a technique it can also allow the safe over-steepening of new or existing soil slopes. Soil nailing inserts relatively slender reinforcements, such as rebar, into pre-drilled holes in the slopes. The bar is then grouted into place.

CLL is a leading specialist in horizontal drilling and grouting, and we run up to four crews skilled in percussion, and auger, bits. Our auger bit capability means very little mess is created, allowing remedial work close to houses, and in environmentally sensitive areas. Our rigs are very mobile, and able to be deployed on the side of cliffs or steep slopes.

MATERIALS USED

CLL provides a wide range of different drilling and anchoring solutions that require with a variety of materials:

- RB25, RB32 Galvanised Steel from local suppliers
- GRP - R25, R32 and 40x9 Flat Bar from Italy and China
- R32, R38, R40 Hollow Bar drilling with sacrificial heads of 100mm or 137mm from China
- Rockfall Mesh from Geofabrics
- MacMat R from Geofabrics
- Trec and coconut matting from Geofabrics
- No-fines concrete bulk embankments anchored back or shotcrete
- Lantern spacers from China



CLL SERVICE & SOLUTIONS

MAGNI RTH 6.30 MOUNTED DRILL RIG

The Magni RTH 6.30 is a tough, high-performance rotating telescopic handler. It can lift loads up to a height of 30 m, and is equipped with scissor stabilizers to ensure greater safety and stability during 360° working manoeuvres.

It also includes an RFID system for automatic attachment recognition and load chart creation, making it extremely versatile for construction and industrial applications.

EXCAVATOR MOUNTED DRILL RIGS | 14T

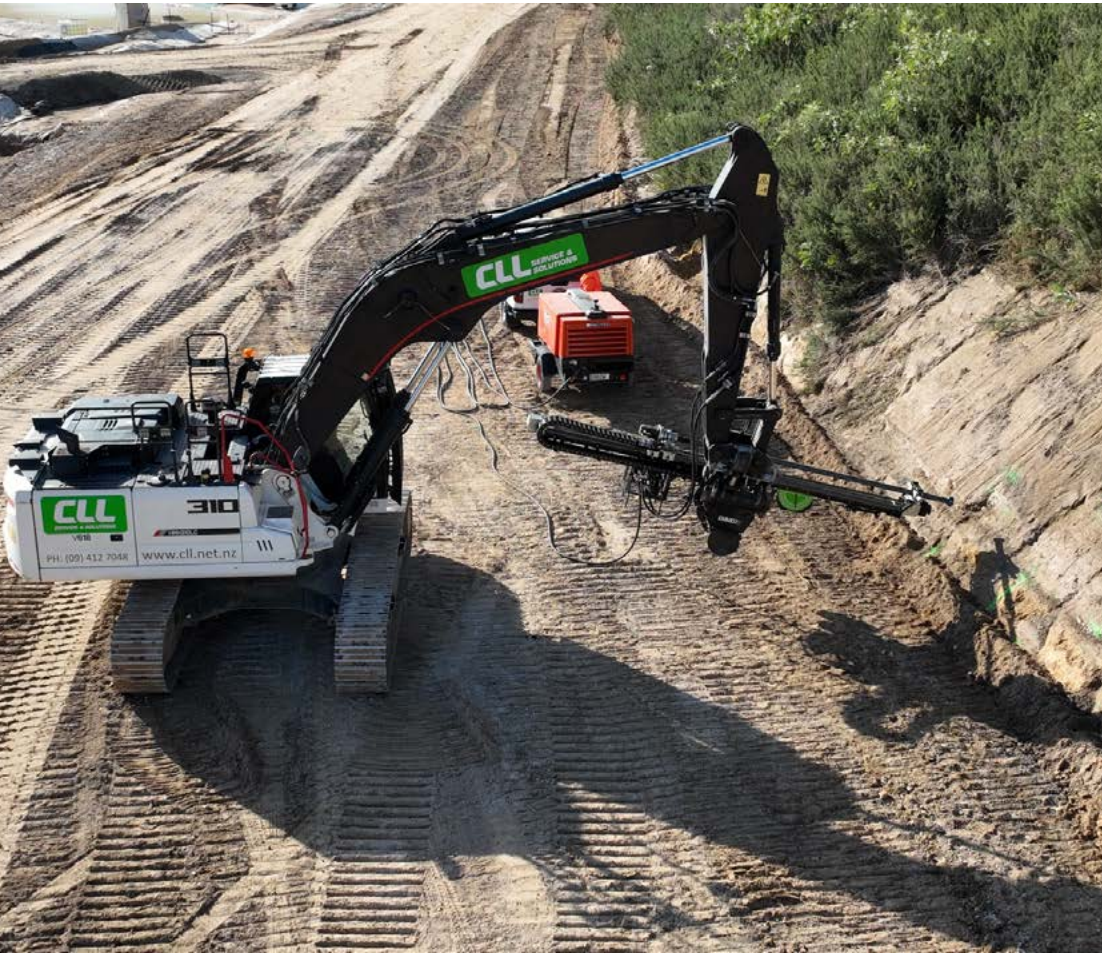
Our excavator-mounted drills are versatile tools used in various construction projects and civil engineering tasks, including:

- **Drilling for Anchors and Soil Nailing** to stabilise slopes and foundations.
- **Micropile Drilling** which are small-diameter piles used for ground improvement and foundation support.
- **Retaining Wall Pile Drilling**

EXCAVATOR MOUNTED DRILL RIGS | 14T - 32T

Our machines have directional drilling capability, known as Horizontal Directional Drilling (HDD), which is an advanced drilling technique used in construction to install underground infrastructure, such as pipelines, cables or piling, and underpinning materials.

This technique is extremely accurate and has significant environmental advantages compared to traditional cut and cover excavating as it creates minimal soil disturbance.



ABSEIL DRILL RIGS, TESTING & MATTING

ABSEIL RIG DRILLING

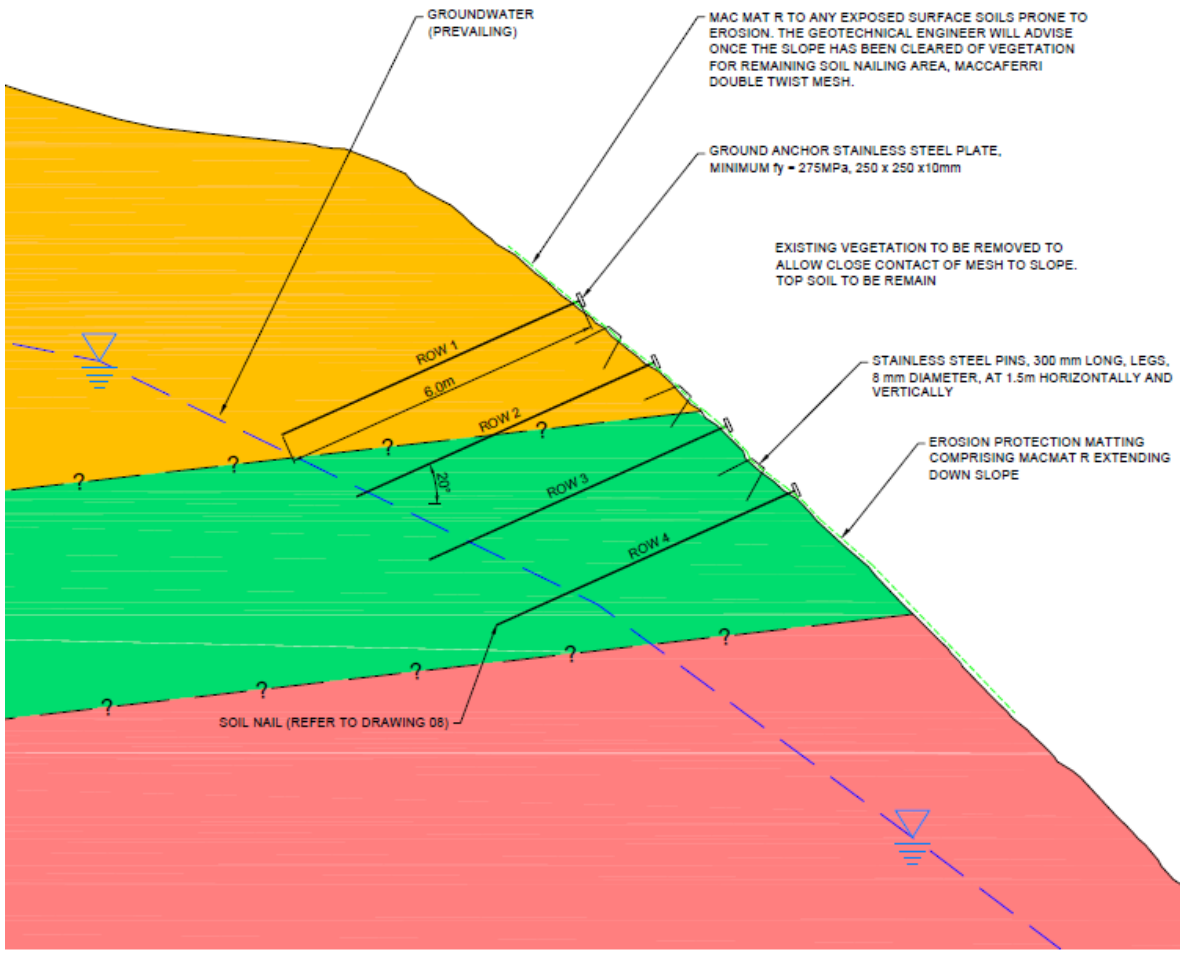
TEST SETUP

MACMAT-R MATTING

TREC MATTING

CLL SERVICE & SOLUTIONS

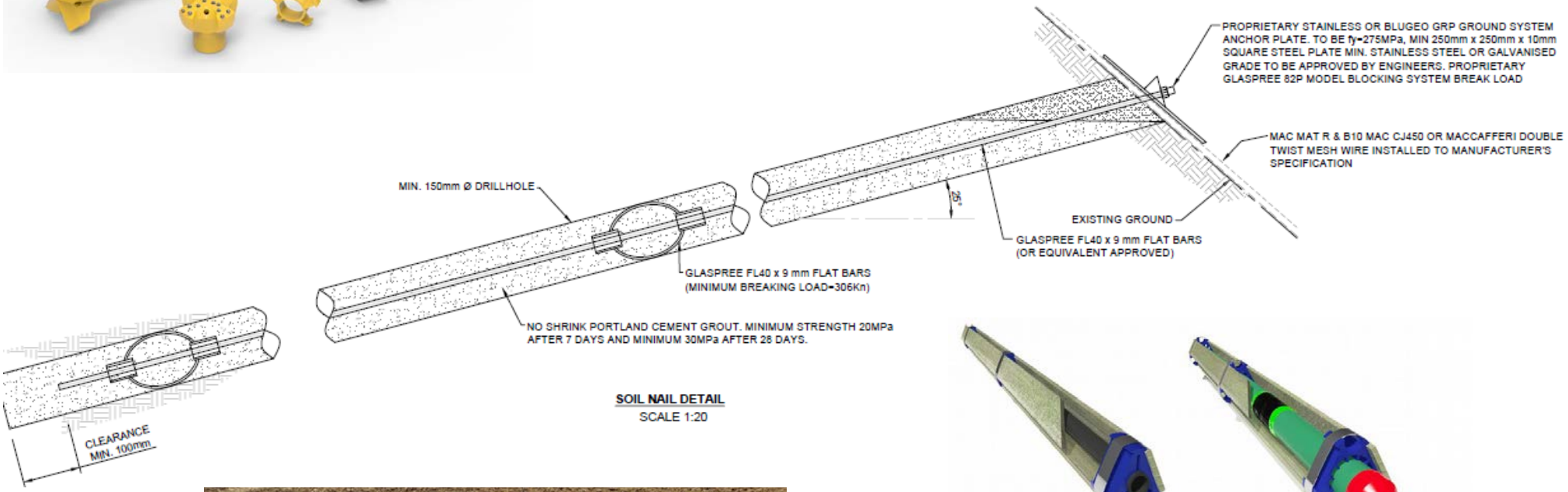
ECI AND DESIGN BUILD



1. CLL does a lot of design build with CMW, T&T and KGA for slip repairs from cradle to grave.
2. We completed ECI with Fletcher Living and T&T at Stonefields, that included trial works and then the main works once the design was finalised. The project was $7m.
3. CLL provides planting using various species to cover the matting including regular hydro-seeding.

CLL SERVICE & SOLUTIONS

TYPICAL DETAIL OF SOIL NAILS AND ROCK ANCHORS



SOIL NAIL DETAIL
SCALE 1:20

Unified Groting Pressure (GUI)
ES with grouting pipe.
Spacers: code 272/35

Repetitive and Selective Injections (RSI)
ES with TAM pipe.
Spacers: code 272/24

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CLL Ground Improvement Conventional Vs Alternatives

SERVICE & SOLUTIONS

GROUND IMPROVEMENT - CONVENTIONAL VS ALTERNATIVE TECHNIQUES

CONVENTIONAL vs ALTERNATIVE - RAPS

TE KAHA STADIUM

LOCATION	**220 MADRAS STREET, CHRISTCHURCH CBD**
CLIENT	**BESIX WATPAC**
START & FINISH DATES	**AUGUST 2022 - MARCH 2023**
VALUE	**CIRCA $10M**

CONVENTIONAL

The original design report recommended Ground Improvements (GI) for the main structure and was tendered as a Design & Build contract. GI methodologies were proposed including soil mixing and stone columns. CLL proposed Rammed Aggregate Piers (RAPs) due to the confidence that they would be far more cost effective than the alternatives.

ALTERNATIVE - RAPS

CLL engaged T+T as their geotechnical designer in combination with Geopier as our internal reviewer. CLL was duly selected as preferred and worked with the main contractor and their designers to develop the detailed design for consent. Interestingly, there were significant uplift loads which needed to be taken into the RAPs for which we used steel tendons that were anchored to a heavy steel plate driven to the base of the RAPs prior to the construction of the RAPs. The program was demanding and CLL was required to supply multiple rigs to complete the works on time. The project was a huge success, finishing on time and within budget using 20,400m3 of stone compacted up to 13m deep in the ground. The work was progressively validated using Cone Penetration Testing (CPT), and lab testing in the variable geology below the stadium. The results were excellent, and work was signed off soon after completion.

GROUND IMPROVEMENT - CONVENTIONAL VS ALTERNATIVE TECHNIQUES

CONVENTIONAL vs ALTERNATIVE - RAPS

MCLAUGHLINS ROAD, WIRI

LOCATION	**69 MCLAUGHLINS ROAD, WIRI, AUCKLAND**
CLIENT	**MACRENNIE COMMERCIAL CONSTRUCTION**
START & FINISH DATES	**APRIL 2023 - MAY 2023**
VALUE	**CIRCA $3.5M**

CONVENTIONAL

The original design consisted of driven steel universal columns (UCs), 18-20m depth. RCP went to market with this design, with the resulting tenders in the order of $12M. At this point, they were over budget and approached CLL for advice. CLL requested budget for additional Geotech testing so that they could effectively evaluate the alternatives.

ALTERNATIVE - RAPS

CLL chose CMW as their design partner and subsequently presented the option of RAPs. The job required the installation of 1,970 RAPs at variable depths up to a maximum of 8m. CLL successfully completed the job 3 weeks ahead of program with the RAPs solution for a total of $3.5M.

Note that the advantage to the client was not limited to the difference in the tendered prices. RAPs eliminate the need for test piling to confirm pile lengths, long lead times for supply of production piles, pile testing such as Pile Dynamic Analyzer (PDA), pile caps, cutting piles to height, pre-drilling and removal of pre-drilling spoil, removal of waste piles, and supply and removal of piling mat.

GROUND IMPROVEMENT - CONVENTIONAL VS ALTERNATIVE TECHNIQUES

CONVENTIONAL vs ALTERNATIVE - RAPS

NORTHERN QUARTER

LOCATION	**68 WILLOW STREET, TAURANGA**
CLIENT	**WATTS & HUGHES**
START & FINISH DATES	**AUGUST 2023 - DECEMBER 2023**
VALUE	**CIRCA $3M**

CONVENTIONAL

The initial design concept consisted of stone columns with a very high Area Replacement Ratio (ARR) of 25%. CLL was approached for pricing, and pointed out that they weren't confident that the design as proposed could be constructed and if it was attempted, warned that there would be potential for collateral damage to adjacent structures due to ground heave.

ALTERNATIVE - RAPS

CLL worked with Geopier and CMW to produce a design, taking advantage of the circa 12,000no. recorded performance tests on RAPs jobs around the world. With the confidence provided by the data collected by Geopier and CLL, we were able to reduce the ARR by more than half. The client was unsurprisingly delighted, and the job is a success.

GROUND IMPROVEMENT - CONVENTIONAL VS ALTERNATIVE TECHNIQUES

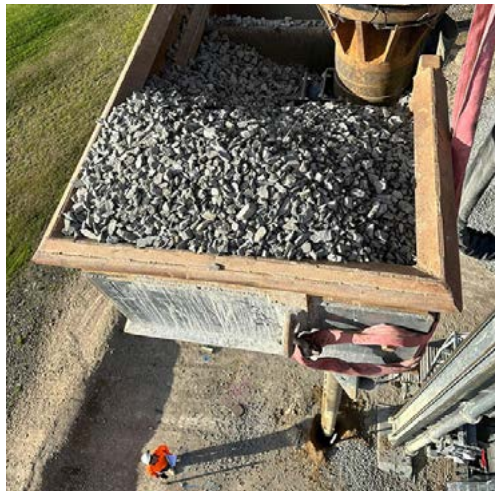
CONVENTIONAL vs ALTERNATIVE - RAPS

ST JOHN EVANGELIST SCHOOL

LOCATION	**14B OTARA ROAD, OTARA, AUCKLAND**
CLIENT	**ACCENT CONSTRUCTION**
START & FINISH DATES	**JANUARY 2021 – FEBRUARY 2021**
VALUE	**CIRCA $300K**

CONVENTIONAL

The St John Evangelist School is a Catholic school on a property owned by the Catholic Church, on which was also located an historic Whai Ora Marae. The resource consent conditions therefore resulted in the restriction of vibration and noise in this location. The designers, after evaluating bored piles, Continuous Flight Auger (CFA) piles, driven timber and driven steel had opted for driven steel and developed that design. The driven steel piles needed to be embedded up to 30m deep. The project was tendered, and the Catholic Church approached CLL through T+T for advice as the tender prices were well outside their expectations.



ALTERNATIVE - RAPS

CLL worked with Geopier and T+T to develop the RAPS design and within 2 weeks were able to provide the client with a 50% cost reduction and a program saving of approximately 5 weeks. The vibration and noise associated with the chosen driven steel option were yet to be resolved onsite, however, RAPs produced no such issues. Further, one of the biggest advantages in using RAPs GI instead of Conventional Piling is that base shear forces may be taken out through friction generated between the gravel Load Transfer Platform (LTP), concrete foundations and the ground. In conventional pile design, it is usually the case that base shear forces control the diameter of the piles and the connections of the piles into the foundations at significant time and cost, whereas, in RAPs design, none of this applies.

CLL SERVICE & SOLUTIONS

GROUND IMPROVEMENT - CONVENTIONAL VS ALTERNATIVE TECHNIQUES

CONVENTIONAL vs ALTERNATIVE - RAPS

RYMAN HEALTHCARE NORTHWOOD

LOCATION	**486 MAIN NORTH ROAD, CHRISTCHURCH**
CLIENT	**RYMAN HEALTHCARE**
START & FINISH DATES	**JULY 2022 – NOVEMBER 2022**
VALUE	**CIRCA $4M**

CONVENTIONAL

Ryman Healthcare are well aware of CLLs GI capabilities and approached CLL well ahead of time to consider alternatives. Ryman carefully considered pre-loading, as it was ostensibly less expensive, however on balance, the time required for the consolidation to take place and the lack of an absolute guarantee that it would take place within that time, caused them to dismiss it as a viable option.

ALTERNATIVE - RAPS

RAPs were chosen from a T+T design with a Geopier review, and CLL constructed the RAPs on time and on budget. The Ryman team consisting of T+T and MV engineers took advantage of the associated benefits of GI for the balance of the design, namely, no pile caps, base shear taken out with friction, no long lead times, no piling mat to be supplied and removed, and a significantly shorter production program, ect. Overall resulting in a highly successful project that contributed to the development of a new retirement village.

GROUND IMPROVEMENT - CONVENTIONAL VS ALTERNATIVE TECHNIQUES

CONVENTIONAL vs ALTERNATIVE - RAPS

KMART NAPIER

LOCATION	**120 PREBENSEN DRIVE, NAPIER**
CLIENT	**STEAD CONSTRUCTION**
START & FINISH DATES	**MARCH 2019 - APRIL 2019**
VALUE	**CIRCA $400K**

CONVENTIONAL

The initial design called for the method of pre-loading as the primary technique. Approximately 1/3 of the site was within 10m of a river and this posed the risk of lateral spread during an earthquake. It was considered by T+T that ground densification alone was not adequate to prevent lateral spread, so RAPs were chosen through the lateral spread area.

ALTERNATIVE - RAPS

The application of 48 no. x 6m long RAPs to address lateral spread along the river was executed by CLL. The works were successfully completed on time and on budget.

CLL SERVICE & SOLUTIONS

GROUND IMPROVEMENT - CONVENTIONAL VS ALTERNATIVE TECHNIQUES

CONVENTIONAL vs ALTERNATIVE - RAPS

WAIPIPI WIND FARM

LOCATION	**WAVERLEY, WANGANUI**
CLIENT	**HIGGINS**
START & FINISH DATES	**AUGUST 2019 - SEPTEMBER 2020**
VALUE	**CIRCA $10M**

CONVENTIONAL

The original design aimed to employ dynamic compaction. Dynamic compaction was carried out on 3 wind tower foundations and was unable to achieve the required performance by a significant margin. CLL was approached under urgent time frames to assist with design, costing, and probable mobilisation within 3 months of notification.

ALTERNATIVE - RAPS

CLL was able to perform in accordance with the client requests and mobilised at the end of the 3-month period. CLL completed the installation of 12,000 RAPs varying between 5 and 13m long for 27 no. wind turbine foundation pads. Making this the largest RAP job ever carried out in New Zealand.

GROUND IMPROVEMENT - CONVENTIONAL VS ALTERNATIVE TECHNIQUES

CONVENTIONAL vs ALTERNATIVE - RAPS

TAURIKO CROSSING

LOCATION	**TAURIKO, TAURANGA**
CLIENT	**HAWKINS**
START & FINISH DATES	**SEPTEMBER 2017 - FEBRUARY 2018**
VALUE	**CIRCA $1.7M**

CONVENTIONAL

Tauriko Crossing is a shopping mall located in Tauranga undergoing extensions. Screw piles, driven timber, driven concrete, and driven steel were all considered by the client during the early evaluation. Golders and Geopier proposed RAPs after a meticulous review by Aurecon.

ALTERNATIVE - RAPS

The RAPs were successfully constructed and tested. Aurecon carried out additional static load testing because RAPs at this time were relatively new in the North Island of New Zealand for similar applications. The static load test proved to be good, and the project was signed off. Many of the RAPs on this project were grouted, which was the first time this had been done in New Zealand. Some of the RAPs were up to 17m deep which was the deepest ever constructed at the point in time in New Zealand. Overall, a highly successful job executed by CLL.

GROUND IMPROVEMENT - CONVENTIONAL VS ALTERNATIVE TECHNIQUES

CONVENTIONAL vs ALTERNATIVE - RAPS

TASTI WHOLEFOODS

LOCATION	755 TE ATATU ROAD, AUCKLAND
CLIENT	COOK BROTHERS CONSTRUCTION
START & FINISH DATES	OCTOBER 2018 - NOVEMBER 2018
VALUE	CIRCA $1M

CONVENTIONAL

The original choice for the construction of this Tasti Wholefoods manufacturing building involved driven timber pile foundations. As usual, with driven piled foundations, the embedment depth remains uncertain until test piling has been carried out. Only at this point can production piles be ordered without significant supply risk. CLL was approached for pricing and offered RAPs as an alternative which eliminated test piling and associated long lead times for supply. RAPs also eliminated the cost of pile caps, cutting piles to length, removal and disposal of waste piles, pre-drilling, removal of drill spoil, backfilling the pre-drilling annulus with sand, and supply and removal of a piling mat.

ALTERNATIVE - RAPS

Subsequently, the original design was replaced with Grouted and Ungrouted RAPs, CLL had to take tension loads into the RAPs with steel or composite tendons. Overall, RAPs were more than 10% less expensive and approximately 5 weeks faster, needless to say, the client was satisfied.

CLL SERVICE & SOLUTIONS

GROUND IMPROVEMENT - CONVENTIONAL VS ALTERNATIVE TECHNIQUES

CONVENTIONAL vs ALTERNATIVE - RIGID INCLUSIONS

HOSPITAL ROAD

LOCATION	**30 HOSPITAL ROAD, OTAHUHU, AUCKLAND**
CLIENT	**TE WHANAU O WAIPAREIRA TRUST**
START & FINISH DATES	**EARLY 2024**
VALUE	**CIRCA $1.7M**

CONVENTIONAL

Initially, this project was developed at the design stage using 40-45m deep large diameter bored piles. The ground conditions were such that the piles needed to be constructed under bentonite or polymer. CLL was approached for pricing for this scope. During the pricing it became evident to CLL that GI should be investigated because there were significant cost savings.

CLL requested a budget of 60K to carry out lab testing and seismic CPT testing. The budget approved and the testing confirmed that the foundation system could be designed as GI using Olivier Piles or both uplift and compression loads with a savings to the client in the order of 50% of the original piling cost.

ALTERNATIVE - RIGID INCLUSIONS

CLL in the previous 2 years had been approached by the European manufacturer of the Olivier system, with a view to adopting the Olivier system as part of its foundation offering. Olivier had noted that CLL were running a number of Liebherr rigs. Olivier and Liebherr had a history of working together as the Liebherr rigs suit very well with demands of installing the Olivier system. CLL looked at the pros and cons of bringing the Olivier system in New Zealand and assessed that the large capital outlay would be worth it in the medium-long term and therefore went ahead with the arrangement. The big advantages of Olivier over other displacement systems is that the steel may be installed prior to the concrete being poured and that for equivalent friction and end bearing capacities. The Olivier system removes 40% less spoil and uses 40% less concrete. This substantial price reduction enabled the client to remain within the budget constraints and to ensure the project's timely completion.

GROUND IMPROVEMENT - CONVENTIONAL VS ALTERNATIVE TECHNIQUES

CONVENTIONAL vs ALTERNATIVE - RIGID INCLUSIONS

STAGE 1 LOOP ROAD

LOCATION	LOOP ROAD, WHANGAREI
CLIENT	FULTON HOGAN
START & FINISH DATES	JUNE 2019 - AUGUST 2019
VALUE	CIRCA $1M

CONVENTIONAL

The tendered methodology for producing a stable base for the new highway was driven timber piles approximately 30m long. CLL was asked to price this option but during the process of pricing it, CLL learned very quickly that Full Displacement Piles (FDP) would be faster and less expensive.

ALTERNATIVE - RIGID INCLUSIONS

CLL offered to provide Fulton Hogan with a design and build method. Which eliminated test piling, long lead times, and removal of waste timber. Fulton Hogan was quick to see the benefits and opted for CLLs idea of FDPs and therefore, completed the job successfully on time and on budget.

GROUND IMPROVEMENT - CONVENTIONAL VS ALTERNATIVE TECHNIQUES

CONVENTIONAL vs ALTERNATIVE - RIGID INCLUSIONS

80 MT WELLINGTON HIGHWAY

LOCATION	**80 MT WELLINGTON HIGHWAY, AUCKLAND**
CLIENT	**SIMPLICITY LIVING**
START & FINISH DATES	**JANUARY 2024**
VALUE	**CIRCA $5M**

CONVENTIONAL

CLL was approached for early advice to guide the foundation concept for the Simplicity funded Kianga Ora partnership for affordable housing. CLL assessed the Geotech fee proposals received to date by Simplicity and advised that there was a significant opportunity to save money if sufficient information about the soil structure was available. In the end, they recommended an additional scope for Geotechnical investigations which Simplicity agreed to carry out with haste. As a result of this, it became clear in the additional Geotech information that the originally assessed necessity for 40-50m deep piles for the 11-storey building did not apply.

The costs for the conventionally designed system of bored piles, pile caps, ground beams, hard fill, and reinforced concrete slab was in the order of 100% more expensive than the alternative developed by CLL with their designer CMW.

ALTERNATIVE - RIGID INCLUSIONS

Several other buildings are planned for this site, and they vary in height and load. All buildings will be founded on a GI type system at considerable savings to the project.

GROUND IMPROVEMENT - CONVENTIONAL VS ALTERNATIVE TECHNIQUES

CONVENTIONAL vs ALTERNATIVE - RIGID INCLUSIONS

RYMAN HEALTHCARE LINCOLN ROAD

LOCATION	**211-229 LINCOLN ROAD, AUCKLAND**
CLIENT	**RYMAN HEALTHCARE**
START & FINISH DATES	**NOVEMBER 2017 - DECEMBER 2018**
VALUE	**CIRCA $5M**

CONVENTIONAL

CLL was approached by Ryman Healthcare to work with T+T and optimize the foundations in the very soft wet marine sediments that were prevalent on this site.

ALTERNATIVE - RIGID INCLUSIONS

Several options were considered, however, FDP were chosen as being the most effective as the alternative of bored piles 40-45m deep was more than twice the price.

GROUND IMPROVEMENT - CONVENTIONAL VS ALTERNATIVE TECHNIQUES

CONVENTIONAL vs ALTERNATIVE - RIGID INCLUSIONS

MR APPLE

LOCATION	**16 GROOME PLACE, WHAKATU, NAPIER**
CLIENT	**MR APPLE NZ**
START & FINISH DATES	**MAY 2020 - JUNE 2020**
VALUE	**CIRCA $1.15M**

CONVENTIONAL

The initial project design for Groome Place contemplated two alternatives: piles or preload. However, the piles option proved to be excessively costly, while the preload approach had to be ruled out due to the limited time available and the project's inability to accommodate the associated risks of not actually achieving the densification in the allocated time.

ALTERNATIVE - RIGID INCLUSIONS

CLL was hired by Mr. Apple to supply and construct the GI technique of FDPs instead of the alternatives. This choice presented a substantially lower cost compared to piles and carried minimal risk when contrasted with the pre-loading method. The site required 1,066 FDPs that were an average of 7.25m long and were set out in a triangular grid with 2.8m centres, covering a building footprint of 6,736m2 (105m x 64.16m). Overall, the CLL team successfully completed the installation of FDP piles for a new apple cool storage facility.

CLL Capabilities
Seismic Upgrades

SERVICE & SOLUTIONS

SEISMIC UPGRADES

The need for ‘safe’ and resilient workplaces remains a top priority, as clients require assurance that their buildings are fit for purpose and comply with acceptable seismic safety standards, as defined by the New Building Standard (NBS).

Earthquake Ratings – What Do They Really Mean?

The NBS rating (% NBS) reflects a building’s expected seismic performance compared to a new building designed and built under current building standards and codes. This rating is calculated as part of a seismic assessment.

Understanding the Basics

A 50% NBS rating indicates that the building is expected to perform similarly to a new (100% NBS) building, but only under half the level of seismic shaking - assuming all other conditions are equal.

At 50% NBS, a building should be able to withstand a moderate earthquake, such as a one-in-100-year event, with comparable level of reliability (note: the seismic scale is exponential).

The New Zealand Society for Earthquake Engineering (NZSEE) considers a building rated above 67% NBS to be acceptable in terms of seismic risk.

What About Buildings with Lower Ratings?

Buildings rated below 34% NBS meet one of the criteria for being classified as Earthquake-Prone Buildings (EPBs) under the Building Act 2004. Those rated below 67% NBS are considered Earthquake Risk Buildings (ERBs).

Recent legislative changes have introduced measures to identify EPBs and set mandatory time frames for necessary seismic strengthening.

CLL CAPABILITY

CLL has significant experience in seismic strengthening, underpinning and reinforcing an existing structure’s foundations.

The underpinning and strengthening is performed in stages to avoid compromising the overall integrity of the structure.

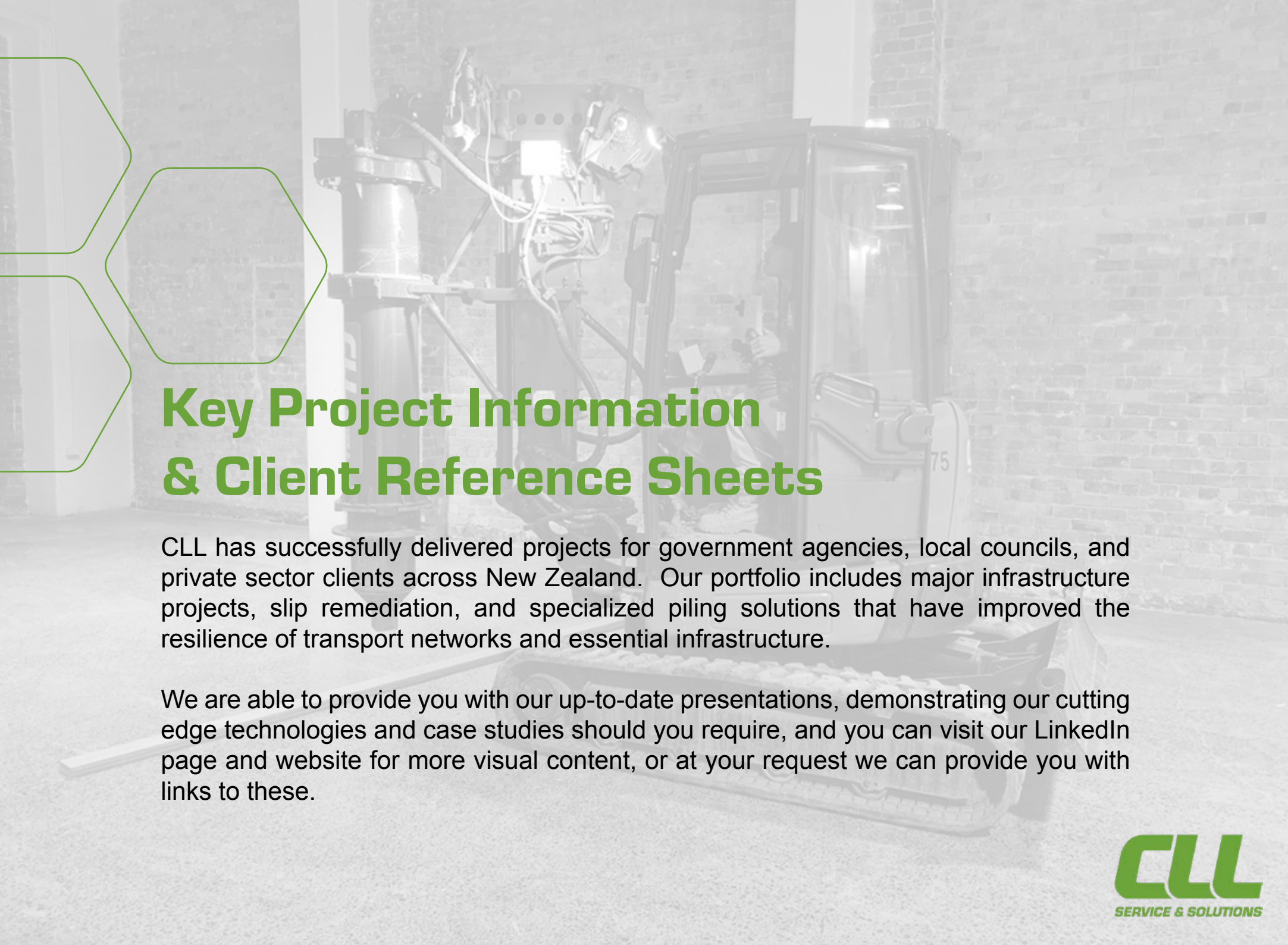
Underpinning reinforces existing foundations and strengthens the soil by introducing an expanding filler or extends the foundation to redistribute the load over a greater surface area.

CLL has extensive experience in the five main methods of underpinning:

- Mass concrete
- Beam and base
- Mini-piled
- Expanding resin injection
- Screw pile

CLL will advise on the most appropriate solution depending on the requirements, the site and the specific situation.

Whatever the situation, whatever the space constraints CLL has the equipment and expertise to underpin any structure.



Key Project Information & Client Reference Sheets

CLL has successfully delivered projects for government agencies, local councils, and private sector clients across New Zealand. Our portfolio includes major infrastructure projects, slip remediation, and specialized piling solutions that have improved the resilience of transport networks and essential infrastructure.

We are able to provide you with our up-to-date presentations, demonstrating our cutting edge technologies and case studies should you require, and you can visit our LinkedIn page and website for more visual content, or at your request we can provide you with links to these.

CLL SERVICE & SOLUTIONS

PROJECT INFORMATION SHEET

CHELSEA SUGAR FACTORY

LOCATION	BIRKENHEAD, AUCKLAND
CLIENT	CHELSEA SUGAR
START & FINISH DATES	DECEMBER 2021 - APRIL 2022
VALUE	CIRCA $500K

PROJECT OVERVIEW

The Chelsea Sugar Factory required seismic strengthening beneath its bulk silos, presenting significant challenges due to unfamiliar soil strata, a narrow single-lane road workspace, and the factory's operational demands.

The project involved reinforcing five distinct pads by installing four anchors, each drilled 12 meters deep into the unfamiliar soil. To facilitate the installation, the Melthouse was stripped down, and excavation was conducted with a 14-tonne digger.

The confined workspace was successfully managed, ensuring all sugar residues were steam-cleaned to prevent interference with the concrete. Despite needing to work beyond operational hours and navigate Covid-19 restrictions, the team successfully completed the project on time.

PROJECT INFORMATION SHEET

205 HOBSON STREET

LOCATION	205 HOBSON STREET, AUCKLAND CBD
CLIENT	HOBSON GARDENS BODY CORPORATION
START & FINISH DATES	FEBRUARY 2023 - MAY 2023
VALUE	CIRCA $366K

PROJECT OVERVIEW

In Auckland's bustling CBD, CLL were tasked with addressing the structural integrity issues of a sinking building plagued by subsidence of up to 21mm in certain floor sections. The site location on Hobson Street presented additional complexities, including confined dimensions (7.4m x 6.5m) and limited parking space, making conventional structural reinforcement methods impractical.

The project commenced with the careful removal of the buildings concrete slab which required removal of the front window and doorway to facilitate access. Our team then deployed our TD75 micropiling rig to install 12m anchors (micropiles). This state-of-the-art compact rig was crucial in navigating the restricted space and efficiently drilling through the substrate.

PROJECT INFORMATION SHEET

THE STRAND PARNELL

LOCATION	THE STRAND, PARNELL, AUCKLAND
CLIENT	WAIDE CONSTRUCTION
START & FINISH DATES	MAY 2021 - JUNE 2021
VALUE	CIRCA $100K

PROJECT OVERVIEW

Our client required a comprehensive structural retrofit and seismic upgrade to enhance the integrity of their Parnell building and enable potential expansion. The project involved preserving and reinforcing the existing eight columns supporting the structure, amidst constraints of limited headroom and engineering risks.

CLL's solution focused on preserving and reinforcing the existing eight columns. This intricate process involved excavating the ground beam and pad to pour new piles on two opposing sides of each column. We collaborated with a specialised subcontractor to carry out core-drilling of the 800mm deep concrete pad.

CHALLENGES AND INNOVATIONS

To address the challenge of limited headroom (4.5 meters), we used our specialised GEAX XD8 drilling rig, which operates efficiently within the confined spaces.

To mitigate engineering risks associated with column stability, we performed drilling on one side of each column at a time, ensuring at least one pile connection to the building's structure throughout the process. The 5.5m piles were poured with mid-installation cage splicing to navigate spatial limitations. A one-week curing period was carefully observed for the drilled areas before progressing to the other side of the column.

The Parnell project site presented challenges in size and location. Limited parking on the busy street required careful manoeuvring of concrete trucks into the narrow building entrance and concrete coring took place during night-time hours to minimise disruptions to nearby workplaces.

Throughout the piling process, we prioritised the protection of polished floors, exercising utmost care to avoid any damage.

Strata material was meticulously bagged for removal, and diesel fumes were effectively extracted to adhere to strict adherence to air quality regulations.

Despite the complexities, the project was successfully completed, delivering a stable foundation and setting the stage for future expansion.

PROJECT INFORMATION SHEET

94-96 QUEEN STREET

LOCATION	94-96 QUEEN STREET, AUCKLAND CBD
CLIENT	WAIDE CONSTRUCTION
START & FINISH DATES	20 WEEKS
VALUE	CIRCA $320K

PROJECT OVERVIEW

CLL's challenge was to lay the foundations in a low headroom confined space underneath an historical building requiring a seismic upgrade.

The design had to be changed because the ground conditions were found to be extremely dense with hard rock beneath the buildings. The design was changed from 32 micropiles of 150mm diameter to 12 conventional piles of 400mm diameter. CLL assisted in the redesign to make it faster and easier for the client.

A low headroom piling rig, capable of drilling up to 600mm diameter piles to 15m deep in 2.7m headroom, was used. This is a unique piece of equipment which CLL owns specifically for this type of low headroom project.

This was an extremely difficult job with the CLL team working in a confined space with contamination, fumes and water. The location in Queen St was an additional challenge due to the restrictions on hours, parking and traffic management. Despite the challenges, CLL successfully completed the project.

PROJECT INFORMATION SHEET

MELANESIAN MISSION BUILDING

LOCATION	**40-44 TAMAKI DRIVE, MISSION BAY, AUCKLAND**
CLIENT	**SALMON REED**
START & FINISH DATES	**2017**

PROJECT OVERVIEW

The Mission building underwent significant upgrades to the structure, architecture, and services under the supervision of Salmon Reed Architects. The structural improvements achieved a minimum of 67% NBS and included:

- The installation of new concrete ground beams within the existing floor.
- A steel framework integrated into masonry walls, roof construction secured to the tops of masonry gable walls.
- A reinforced concrete core added to the chimney.
- A plywood diaphragm attached to the existing ceiling.

Mitchell Vranjes, structural engineers, were responsible for the seismic strengthening of the Melanesian Mission and developed a lime injection solution to bond the inner and outer skins of stone and rubble core together preventing them from collapse in an earthquake. The strengthening also involved some discretely placed structural steel members and existing sarking and plywood diaphragms.

CLL worked with Mitchell Vranjes to assess the situation and design the most appropriate method for underpinning the heritage wall.

The solution required a controlled excavation, then stiffening the ground with a cement and mortar mix to strengthen the soft sand beneath the wall and stabilise the structure. This was performed by carefully excavating sections beneath the wall and filling the excavation with a mix of cement and mortar to support the existing structure.

Careful planning was required for the excavation and backfill, to ensure the specific characteristics of the heritage wall and surrounding area were preserved.

CLL Capabilities
Concrete Pumping Solutions

SERVICE & SOLUTIONS

CONCRETE PUMPING CAPABILITIES

CONCRETE BOOM PUMPING

This method places the concrete using a truck-mounted pump with a remote-controlled long-reaching boom. It can reach over obstacles or deliver concrete to very high or hard-to-reach locations, making it an essential asset in complex construction projects.

Our versatile concrete boom pumps, operated by experienced professionals, can meet the demands of any project, whether it's a large-scale commercial site or high-rise building. Our boom pumps will handle the job with precision and efficiency.

CONCRETE LINE PUMPING

This application uses flexible hoses that can be manoeuvred to pour concrete in a specific location. They are ideal for tight or hard-to-reach places, such as around buildings or in tight alleyways, and are employed in both commercial and residential projects or where equipment and materials are limited.

Our range of truck-mounted static pumps and stationary pumps enable us to tackle the most challenging of pumping projects with ease, ensuring the concrete is delivered accurately and efficiently.

CONCRETE PUMPING CAPABILITIES

SHOTCRETING

This construction technique involves pneumatically spraying concrete or mortar onto any surface shape, both vertically and overhead. The force of the spray compacts the sprayed concrete in place.

Our Aliva® Quick Connect Dynamo rotary concrete spraying machine is state-of-the-art technology, that we use on a wide range of construction projects, such as slope stabilisation, retaining walls, sea walls and tunnels. Shotcreting can apply concrete much faster and is more cost-effective compared to traditional application methods.

HIGH-RISE CONCRETE PUMPING

This is a specialised high-rise concrete pumping service is specific for construction projects involving tall buildings and structures.

Our high-pressure pumps and long-reaching booms can deliver concrete to the upper floors of tall buildings.

Clients benefit from this depth and breadth of services in key areas

VERSATILE EXPERTISE

CLL offer a comprehensive suite of services beyond piling and ground stabilisation, as our company excels in a wide range of civil construction disciplines.

Whether it's foundation work, structural engineering, or infrastructure development, we offer a one-stop solution for all your civil construction needs.

PROVEN TRACK RECORD

Rely on our established reputation backed by a track record of successful projects.

From intricate piling assignments to complex infrastructure developments, our expertise has consistently delivered quality results, earning the trust of our clients.

COST-EFFECTIVE SOLUTIONS

By consolidating various civil construction services under one roof, our clients experience streamlined project management, reducing the need for multiple contractors. This not only enhances overall project efficiency but also leads to potential cost savings.

AT CLL, we extend our footprint across New Zealand, operating seamlessly through specialised divisions strategically established in key regions such as Northland, Tauranga and Christchurch with our head office based in Auckland. Our centralised approach from Auckland allows us to efficiently coordinate and manage projects throughout the country, ensuring a consistent and high-quality service delivery.

INNOVATION AND TECHNOLOGY

Stay ahead in the industry with our commitment to innovation and technology. Our company embraces cutting-edge advancements, ensuring that your projects benefit from the latest methodologies, materials, and equipment, leading to increased efficiency and project success.

ADAPTABILITY TO PROJECT SCALE

With over 200+ employees, whether you're undertaking a small-scale project or a large-scale development, our team is equipped to adapt to the unique requirements of each endeavour. Enjoy the flexibility and scalability of our services to match the specific needs of your civil construction projects.

CLIENT-CENTRIC APPROACH

Experience personalized service with our client-centric approach. We prioritize open communication, collaboration, and a thorough understanding of your project goals, ensuring that our solutions are tailored to meet your expectations and contribute to the overall success of your endeavours.

CLL SERVICE & SOLUTIONS

SERVICES & SOLUTIONS

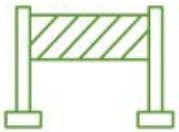
CLL SERVICE & SOLUTIONS

NON-NEGOTIABLES

NO LIFT IS TO BE DONE WITHOUT A LIFT PLAN IN PLACE

GEOTECH APPROVED PILING PLATFORMS MUST BE IN PLACE

NO MACHINE OR VEHICLE MOVEMENT WITHOUT A SPOTTER



ISOLATE PILING ZONE USING SIGNAGE AND BARRIERS

NEVER LEAVE OPEN HOLES UNCOVERED

DO NOT BREAK GROUND UNTIL PERMIT TO DIG HAS BEEN ISSUED

NO CELL PHONE USE WHILE DRIVING OR OPERATING

CLL SERVICE & SOLUTIONS

CORE VALUES

Integrity

We are straight forward and ethical.
We are astute and considerate.

Courage

We take personal responsibility.
We are confident in our ideals.

Selflessness

We put service and people first.

We respect and share knowledge with each other.

We give others confidence and promote growth.

Innovation

We are strive to think, feel and act - rather than react.

Weare innovative and receptive to new ideas.

Respect

We have respect for ourselves, each other, our clients, the environment, and our plant & equipment.

CLL
SERVICE & SOLUTIONS

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