

CAPABILITY STATEMENT

Contaminated Land Remediation

WHO WE ARE

GWE Consulting Engineers is a company of highly experienced geotechnical, environmental, civil and process engineers that has an established and expanding capability in Contaminated Land and groundwater remediation. We work closely with architects, urban designers, planners and landscape architects to provide our clients with all the creative and technical resources they need to design and deliver their project.

Our staff have the skill and experience to deliver projects across a range of specialist areas, from **site investigation, land remediation, foundation engineering, earthworks, infrastructure engineering, stormwater management and pavement design.**

Our brand essence, ***Creative Thinking | Better Environments*** drives the approach to all our work. We always put a premium on the quality of our output, and its relevance to your needs.



Coastal Heavy Metal Remediation

We treat you as valuable team members, and we always keep you fully informed on how the project is progressing. We respect your time and your style of interaction,

and we are always sensitive to your inputs. We are flexible and work to your deadlines and treat your time requirements with the highest regard.

WHAT WE DO

GWE Consulting Engineers has built a reputable track record in Contaminated Land Remediation in recent years with the addition of accredited and certified engineers who have joined our team. This complements the skills and disciplines of many of our longer serving staff.



Commercial Detailed Site Investigation

We undertake the following Contaminated Land related work:

- **Preliminary and Detailed Site Investigations**
- **Remediation Action Plans**
- **Site Management Plans**
- **Site Validation and Certification**
- **Professional Evidence for Consent Hearings and Environmental Court**

Our company offers a diverse range of environmental specialist services, drawing on solid

professional experience across Residential, Commercial and Infrastructure projects. Team members have completed key remediation projects in New Zealand and the United Kingdom.

We collaborate closely with a select range of specialist companies and individuals, whose work meets our standards, to offer clients a unique consulting team with the highest level of skill required for each project.

OUR SERVICES

Preliminary and Detailed Site Investigations

The first stage of contaminated land investigation is to develop a thorough understanding of the site history and the level of soil contaminants. These reports draw upon a wealth of scientific knowledge relating to the effects of contaminants arising from historic land uses on human and ecological health. The Ministry for the Environment have a specific set of guideline documents outlining the process of contaminated land investigation and reporting.



Rural Sheep Dip Sampling, Coatesville

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CAPABILITY STATEMENT

Contaminated Land Remediation

GWE Consulting Engineers has significant knowledge and understanding of the National Environmental Standards and Council requirements to address the effects of ground contaminants to a proposed development, human health or environmental receptors.

Remediation Action Plans

Significant contaminant linkages between contaminant sources and receptors including humans and the environment must be addressed early in the consenting process. Once the requirement for remediation has been identified, GWE can provide detailed remediation design and methodology to match the nature of the development and to provide an environmentally sustainable outcome. In most cases we can avoid costly landfill disposal costs with in-situ remediation and management. Working closely with our Clients we can provide effective remediation based on budget and timeframe. The wide-ranging multidisciplinary nature of GWE gives us the advantage that our remediation design considers the concurrent development engineering requirements such as geotechnics, infrastructure and civil design.



Environmental Due Diligence

Site Management Plans

Remediation is not always required. Effective and well-considered site management is routinely adopted to manage the risk to human health when developing a contaminated site. GWE has a proven track record of achieving consent through effective site management protocols. Our diverse range of experience means we can provide a range of effective site management plans for land development. This works particularly well where marginal contaminant exceedances exist on land being developed for residential subdivision where Public Open Space or other acceptable receiving environments are available.



Site Management Planning, Auckland

Site Validation and Certification

Effective remedial design should be closely monitored and certified by a qualified professional. GWE is regularly involved with contaminated land and groundwater remediation projects with strict clean up goals and validation criteria. Site verification is commonly undertaken by visual walkover surveys and laboratory sample analysis. Our competent engineers can provide the advice to achieve validation with minimal variation and re-working. We can summarise our findings into a validation certifying report which is required to satisfy Council consent conditions.



Boat Yard Remediation Validation, Opua

Professional Evidence

Frequently, Resource Consent hearings or Environmental Court witness evidence is required to achieve Consent. The experience and qualifications that GWE senior staff hold enables us to represent our Clients and stakeholders in a legal setting. Our experience includes detailed responses to Council queries, Resource Consent hearing and Environmental Court attendance.

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CAPABILITY STATEMENT

Contaminated Land Remediation

RELEVANT PROJECT EXPERIENCE OF GWE PERSONNEL

Opuia Boat Yard Remediation

A historic boat yard designated for redevelopment was found to be contaminated with widespread Copper and Lead and localised hydrocarbons. GWE provided detailed remediation advice and validation and achieved the remediation goals in a single earthworks phase. The project is under strict remediation protocols following an Environmental Court hearing.

Commercial Units, Ponsonby

Investigation of deep hydrocarbon contamination from a historic on-site tank. Address corrosive effects on concrete, off-site disposal and contaminated land requirements for the development.

Krispie Kreme, Auckland

Preliminary and Detailed Site Investigation reporting of site with a highly variable industrial background revealed the potential for significant contaminant linkages.

Rural Subdivision, Coatesville

GWE provided a detailed site investigation and report for a proposed subdivision with a history of horticulture and livestock spraying. A detailed regulatory assessment enabled GWE to

mitigate the Contaminated Land requirements for the Client as we were able to determine that contaminants were below natural background threshold limits for the geological setting.

Site Management Plans for Multi-Unit Developments

Remedial design and long-term management of contaminated soils to minimise the requirements on the developer.

Retirement Villages, New Zealand

Contaminated land investigation and remediation design to enable Resource Consent.

Asbestos Remediation, Kerikeri

Detailed contaminated land investigation and remediation design for residential and commercial development. Included validation of remediation to strict clean-up goals.

Olympic Stadium, London

Detailed geotechnical investigation and design of ground remediation for hydrocarbon impacted soils and water.

Karaka Sports Park, Pukekohe

Development of a multisport clubhouse and changing room for the proposed redevelopment and expansion of the sports park.

KEY PEOPLE

Gareth Williams, Director

Gareth is a process engineer and specialises in water and wastewater infrastructure. Gareth has commercial oversight of all our projects and actively engages in client relationship management.

David Slack, Principal Environmental Scientist

David has worked on a wide range of contaminated land and environmental projects across NZ covering brownfield developments, oil industry, commercial/industrial, operational and closed landfills and large infrastructure sites.

Sandra Hamler, Environmental Compliance Manager

Sandra has solid industry experience in the environmental discipline from her master's degree in environmental Geology and experience with Stevensons Quarry, Drury as a testing Engineer. Her master's thesis was focussed upon heavy metal remediation.

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CAPABILITY STATEMENT

Geotechnical Engineering

WHO WE ARE

GWE Consulting Engineers is a company of highly experienced geotechnical, environmental, civil and process engineers that has an established and expanding capability in Geotechnical Engineering. We work closely with architects, urban designers, planners and owners/developers to provide our clients with all the creative and technical resources they need to design and deliver their project.

Our staff have the skill and experience to deliver projects across a range of specialist areas, from **site investigation, land remediation, foundation engineering, earthworks, infrastructure engineering, stormwater management and pavement design.**

Our brand essence, **Creative Thinking | Better Environments** drives the approach to all our work. We always put a premium on the quality of our output, and its relevance to your needs.



Manhinerangi Wind Farm

We treat you as valuable team members, and we always keep you fully informed on how the project is progressing. We respect your time and your style of interaction,

and we are always sensitive to your inputs. We are flexible and work to your deadlines and treat your time requirements with the highest regard.

WHAT WE DO

GWE Consulting Engineers has built a reputable track record in Geotechnical Engineering in recent years with the addition of accredited and certified engineers who have joined our team. This complements the skills and disciplines of many of our longer serving staff.



Novotel, Hamilton

We undertake the following Geotechnical related work:

- **Geotechnical Investigation**
- **Liquefaction Assessment**
- **Slope Stability**
- **Ground Support System Design**
- **Soil Interaction**
- **Groundwater Assessment**
- **Dams and Water Retaining Structures**
- **Site Supervision and Certification**

OUR SERVICES

Geotechnical Investigation and Interpretation

GWE has extensive experience in designing and undertaking site investigations that provide the right information in an economic way. We target investigation that will look after overall project budget and minimise surprises. We work closely with specialist subcontractors who provide drilling, cone penetration and other specialist site testing.

We take geotechnical interpretation seriously with our team of engineering geologists and engineers turning subsurface investigation and observations into meaningful and accurate ground models for geotechnical design.

Liquefaction Assessment



PJK Expressway, Wick Drains

We live in a seismically active country and liquefaction effects can be damaging. GWE uses the latest software technology combined with practical geologic assessment to evaluate the potential for liquefaction.

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CAPABILITY STATEMENT

Geotechnical Engineering

Solutions are developed to provide reliable and economic foundations for your project.

Slope Stability

Assessment of slope stability starts with solid geomorphic understanding of the landscape, where our engineering geologist team excel. Working with investigation findings we use cutting edge software to develop slope stability models and calibrate with our observations in the field. Where needed, a range of stability improvement methods are designed and detailed to fit in with our overall project needs.

Ground Support System Design

Where your development needs to be built in the ground, we can help with a full of ground retention systems. From modest timber walls to multi-level soldier piles we use Wallap, Finite element and in-house developed software to design and detail the retention systems that meet your needs.

Soil Structure Interaction

We can help your project take full advantage of the soil properties at your site by understanding the interaction between the structure and the soil using numerical analysis calibrated with site observation. This approach is critical in understanding effects on adjacent properties and how your

structure will perform over time and in extreme loading events.

Groundwater Assessment

Thorough understanding of the groundwater regime is critically important to your site's performance. GWE has the experience and skills needed to design monitoring installations, undertake monitoring, and model groundwater changes and effects on structures and neighbouring properties. This feeds into settlement effects assessment and related.

Dams and Water Retaining Structures



Opuha Dam, South Canterbury

GWE has significant experience in all civil/geotechnical aspects of dam engineering. Including managing and undertaking geotechnical investigations, feasibility level and resource consent design, detailed design, construction management and safety review and rehabilitation. Our staff have been in senior design roles for large dam and hydroelectric structures in New Zealand and in the Asia Pacific region.

Site Works Supervision and Certification

We can undertake specification, supervision and certification of site works, including earthworks compaction control and subgrade testing.

RELEVANT PROJECT EXPERIENCE OF GWE PERSONNEL

City Rail Link – Owner Compensation

GWE used our geotechnical, GIS and 3D solid modelling skills to develop underground models of basements and foundations as well as the proposed CRL works, and the complex NoR land transfer and restriction extents. We used the models to advise our clients of potential effects from the tunnel and underground station construction, and the consequences of future limitations on their property. This led directly into assisting assessing compensation for underground land requirement.



Eclipse Apartments, Auckland City

GWE Consulting Engineers

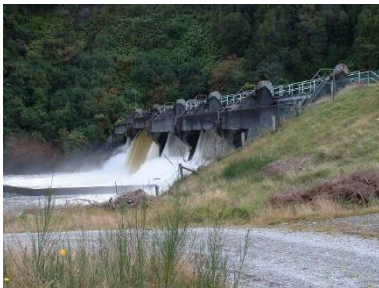
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CAPABILITY STATEMENT

Geotechnical Engineering

Arnold Hydropower Scheme Feasibility and Consenting

The Arnold scheme near Greymouth in New Zealand involved diversion of the Arnold River from the existing power station through canals and headponds to a new power station. Responsibility for all civil related design including layouts, hydraulics and preliminary design for the feasibility phase of the proposed hydroelectric scheme. Expert evidence for resource consenting.



Arnold Dam, near Greymouth

Wairau Hydropower Scheme Feasibility and Consenting

The Wairau scheme in Marlborough involved diversion of the Wairau River through a series of canals and power stations for power generation. Responsible for the civil safety and engineering for the Consents phase of the hydro project.

Mahinerangi Wind Farm Resource Consenting

The Mahinerangi windfarm is in Otago, New Zealand. Responsibility for presentation of

geotechnical conditions and development in Environment Court.

Opuha Dam Remedial Works

Opuha dam is a 50 m high rockfill dam in Canterbury. Responsibility as lead designer and design manager during design and construction of rehabilitation works due to filter incompatibility within the dam.

PJK Expressways Design and Construction

Seismic stability and deformation modelling of high expressway embankments over very soft ground and sand deposits. Liquefaction analysis of embankment foundations. Seismic analysis of bridge foundation piles including liquefaction effects. Full time on site for redesign of design-build components.

Novotel Hamilton Development

Development of a multi-level hotel on the steep banks of the Waikato River with complex and challenging foundation conditions. Responsibility as geotechnical advisor in charge of investigation, slope stability hazards, and foundation systems assessment.

Edgumbe Stopbank Failure Assessment

Following catastrophic failure of the stopbanks at Edgumbe an

analysis of reasons for failure was undertaken, including upstream dam operation, hydraulic characteristics of the river and geotechnical conditions and design. Responsibility for analysis, report preparation and provision of expert witness evidence and advice on legal action.



Edgumbe, Stopbank Failure

Auckland Airport Parking Building

Geotechnical investigation and foundation design for multi-level carpark building at Auckland Airport. Responsible for investigation management, foundation design and detailing.

Arvida Retirement Village, Kerikeri

Detailed geotechnical investigation and reporting for 300-unit retirement village in Kerikeri. Included geotechnical design of mechanically stabilized earth walls to form a culverted access road.

Opuha Marina Development, Bay of Islands

Geotechnical investigation and reporting for ancillary buildings and commercial units to the Opuha

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CAPABILITY STATEMENT

Geotechnical Engineering

Marina extended development. Geotechnical design included settlement and liquefaction potential analysis.

Rangitane River Park Subdivision, Kerikeri

Geotechnical investigation and reporting for a proposed 200 lot subdivision near Kerikeri. Work included preliminary settlement and stability analysis for roading cuts and fills of up to 6 m.

Landslip Remediation, Northland

Involvement with specific geotechnical engineering design of landslide remediation retaining structures and drainage across Northland and the Far North for various residential, commercial and infrastructure sites. Works were follow-on from EQC assessments and included geotechnical investigation, design and reporting.

KEY PEOPLE

Robin Dawson Technical Director

Robin is a highly experienced civil and geotechnical engineer who has practised extensively in the specialist areas of geotechnical and dams engineering with over 28 years' experience. He is a former director of one of New Zealand's largest consultancies where he worked on large projects in New Zealand, Australia, Asia and the Pacific.

Management of complex dam and hydroelectric engineering projects is a particular skill of Robin's, where he brings his practical and hands-on approach into play to simplify and streamline arrangements for faster and easier construction with fewer issues and delays. He enjoys working in varied environments, especially in new countries and cultures.

Tobias Francis Geotechnical Manager

Tobias is an experienced geotechnical engineer and geologist and has expertise in site investigation and stability analysis for land subdivision and industrial and commercial buildings.

Tobias has completed many land slip hazard/risk assessments, land deformation studies, foundation and retaining wall designs and designs for the land disposal of treated effluent and water sensitive

design for stormwater retention/detention.

Le Doan Senior Geotechnical Engineer

Le has a master's degree in structural engineering from the University of Wollongong and a PhD in geotechnical engineering from the University of Western Australia.

Le's work ranges from geotechnical investigations to design and construction monitoring for building and infrastructure projects. Le specialises in designing deep and shallow foundations, retaining walls, deep excavations, slope stability and seismic assessment.

Allen Dunn Senior Geotechnical Technician

Allen has over 20 years geotechnical engineering experience. He undertakes geotechnical investigations, stability analyses, foundation design, property inspections, construction inspections and supervision. He also completes assessment, design, and compliance monitoring of natural hazards and Resource Consents applications for Land use and Erosion and Sediment Control.

Allen undertakes site works inspections and contract supervision.

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CAPABILITY STATEMENT

Land Development Engineering

WHO WE ARE

GWE Consulting Engineers is a company of highly experienced geotechnical, environmental, civil and process engineers that has a wealth of development experience from large, multi-lot greenfield subdivisions to small scale, inner city brownfield developments. We work closely with developers, planners, architects, urban designers and landscape architects to provide our clients with all the creative and technical resources they need to design and deliver their project.

Our staff have the skill and experience to deliver projects across a range of specialist areas, from **site investigation, contaminated site remediation, foundation engineering, earthworks, infrastructure engineering, stormwater management and pavement design.**

Our brand essence, ***Creative Thinking | Better Environments*** drives the approach to all our work. We always put a premium on the quality of our output, and its relevance to your needs.



Peri-urban Subdivision

We always respect our clients, and we will keep you fully informed on how the project is progressing. We respect your time and your style of interaction, and we are always sensitive to your inputs. We are flexible and work to your deadlines and treat your time requirements with utmost importance.

WHAT WE DO

GWE Consulting Engineers has built a solid reputation in Civil/Land Development work with a range of projects successfully completed across New Zealand. Our capability is continuing to expand with highly regarded professionals who have joined the company in recent years, complementing an already established team of experienced engineers.



Housing Intensification

We undertake the following Civil/Land development related work:

- **Feasibility Assessment**
- **Due Diligence Advice**
- **Development Master Planning**

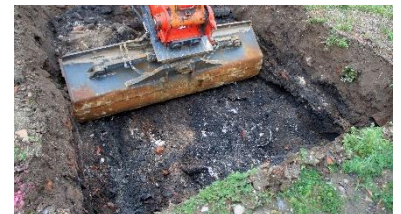
- **Commercial and Residential Development**
- **Land Development and Subdivisions**
- **Engineer to Contract Roles**

OUR SERVICES

Contaminated Land Assessment

GWE has extensive experience in guiding you through all stages of a contaminated land assessment. We undertake investigations to develop a thorough understanding of the site history and probable presence/absence of soil contamination through a Preliminary Site Assessment and subsequent Detailed Site Assessment, if required (refer our Contaminated Land Remediation Capability Statement).

In the event that contaminated soils are present on the site we would prepare a Remediation Action Plan that is consistent with the nature of the development, followed by a Site Validation Report to achieve an environmentally sustainable outcome for your project.



Redevelopment of a Brownfield Site

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CAPABILITY STATEMENT

Land Development Engineering

Geotechnical Engineering

We regularly plan and undertake site investigations that provide the design information to develop a range of solutions for complex geotechnical conditions that affect land development projects including slope stability, liquefaction, foundations, ground support systems and groundwater control (refer our Geotechnical Engineering Capability Statement).

Earthworks Design

GWE has extensive capability in earthworks design for various sized schemes under a variety of ground conditions. Our senior staff have designed large earthworks schemes for roads, subdivisions and clean fill sites, pursuing optimum outcomes such as cut fill balances. Many of these projects have necessitated detailed engineering analysis to overcome difficult ground conditions and ensure long term stability and serviceability.

GWE specialises in the design of earthworks over soft alluvial soils and in the design of ground improvement methods to accelerate settlement rates. In addition, careful design of earthworks with geotextile reinforcement can lead to the creation of near vertical walls and development platforms that can allow highly constrained sites to become developable.



Large-scale Subdivision Earthworks

Stormwater Management

GWE's approach to stormwater management incorporates identifying client and community needs, evaluating flood and stormwater discharge effects on the environment and developing Water Sensitive Design (WSD) solutions to manage those effects. Site specific, sustainable outcomes are achieved through a balanced use of conventional stormwater infrastructure, WSD devices and enhanced natural systems.

GWE has extensive experience with the hydraulic modelling and design of open channels and stormwater pipelines for greenfield and brownfield developments and with the design of stormwater management devices for the retention and detention of stormwater to minimize the effects of erosion and scour on stream environments.

Flood Impact Assessments

Flooding is a common hazard for many developments in urban and rural environments and is based on numerous factors including site topography, rainfall intensity,

climate change and soil conditions. GWE undertakes hydrologic and hydraulic modelling for sites that are prone to flooding. We identify the extent of flood and overland flow paths and advise our clients on how to develop sites and mitigate the effects of flooding.

Sewerage Reticulation

GWE has extensive experience with the design of wastewater pipelines and pump stations. Our team of engineers are highly experienced in pipeline route selection, hydraulic/mechanical/civil design, materials selection, water hammer analysis and construction techniques for pipelines and pump stations that are eventually vested in Council or privately owned and operated by industry or body corporates.



Pipe Network Modelling

Water Reticulation

We assist our clients with the design of water networks and pressure boosting pump stations. Our team of engineers are highly experienced in network modelling, reticulation layouts, hydraulic/mechanical/civil design,

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CAPABILITY STATEMENT

Land Development Engineering

materials selection, water hammer analysis and construction techniques for pipelines and pump stations that are eventually vested in Council or owned and operated by industry or body corporates.

Road/Pavement Design

GWE's provides engineering services for road and pavement design for subdivisions and commercial/industrial site development. We work with developers, private individuals and councils. We have the expertise to design public and private roads to meet local conditions and Council standards.

Our geotechnical engineers plan site investigations, undertake testing and provide earthworks designs and our civil engineers will design the road geometry and pavement strength accordingly. We work with urban designers and plan streetscapes and intersection design and integrate walking and cycling pathways into developments. On behalf of our clients we can procure and manage roading projects from start to finish.



Intersection Design

RELEVANT PROJECT EXPERIENCE OF GWE PERSONNEL

Scott Point Development, Hobsonville – Winners of the NZPE Supreme Practice Award

Scott Point is a coastal location on Hobsonville Peninsula with over 150 hectares of rural zoned land requiring rezoning for 3000+ new dwellings. Responsible for all infrastructure planning, development and implementation from Plan Variation (PV) to construction completion stages of individual developments. Challenges included attended hearings, working with complex and fragmented land owners, integration of key infrastructure and staged programmes. (Approximate civil cost \$400 million).

Auckland Trotting Club, Epsom

A commercial redevelopment of a major recreational/business zone 12 Ha site within Auckland, incorporating significant car parking/internal roading, vehicle and pedestrian tunnels, and significant upgrading and re-routing of existing services and drainage. Challenges included dealing with multiple clients, local and district authorities in achieving consents, critical timeframes in the racing calendar and complex engineering issues concerning existing features on site. (Approximate civil cost \$11 million)

James Hardie and Co Pty Ltd, Penrose

Industrial site development for the new building products division. Engineering design of warehousing layout, heavy duty pavements, all heavy machine foundations and rail siding, freight forwarding operation.

SH1 Intersection Upgrade, Redvale Sanitary Landfill

Design and upgrading of the intersection of the landfill access road and SH1. Works included pavement strengthening, upgrading sight distances, super-elevation and acceleration and deceleration lanes.

4 Laning, Sylvia Park Road, Auckland

Design and supervision of road widening (two to four lanes) and shape correction of major arterial route.

KEY PEOPLE

John Petrovic Technical Director Land Development

John is a Chartered Professional Engineer (CPEng) with 20 years' experience specialising in all aspects and sizes of land development and civil infrastructure. He has managed many significant projects throughout their lifecycles, acting

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CAPABILITY STATEMENT

Land Development Engineering

for a diverse range of clients and stakeholders.

John's highlights include being the principal/lead designer for the Scott Point and Hobsonville Point re-developments, both staged large scale multi-purpose projects, large commercial brownfield developments, and railways experience in the early part of his career.

Colin Cranfield **Technical Director**

Colin is a civil engineer who specialises in the design of infrastructure for large scale developments. He has been the principal designer on a number of residential and commercial subdivisions and also the SH1 intersection upgrade at Redvale Landfill, the 4 Laning of Sylvia Park Road and the expansion of heavy-duty pavements at the James Hardie site in Penrose.

Johann Brill **Civil Engineering Designer**

Johann is a civil designer with more than 15 years of experience in the design and documentation of large scale roading and 3 waters infrastructure and housing, school and hospital developments.

Johann is currently working on preliminary design of water and wastewater infrastructure for a 4,000 lot subdivision and the full civil design for a 237 apartment complex in suburban Auckland.

Alice Tindall **Civil Engineer**

Alice graduated from the University of Canterbury with an honours degree in civil and water resources engineering. She is experienced in the civil design of small to medium sized land/site development projects. Alice has a well-developed understanding of the Auckland Unitary Plan requirements relating to stormwater and flood management for inland and coastal environments.

Angela Li, **Graduate Civil Engineer**

Angela graduated from the University of Auckland with an honours degree in civil engineering. Since joining GWE she has gained experience in wastewater treatment and disposal and stormwater management. She supports the wider land development team on a range of civil engineering design tasks.

Miya Wang **Graduate Civil Engineer**

Miya graduated from Unitec with a degree in Civil Engineering Technology. Since joining GWE she has worked as a civil engineering designer and is experienced in the use of Civil3D. Miya is currently studying part-time at the University of Auckland for a Masters Degree in Civil Engineering.

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CAPABILITY STATEMENT

Drinking Water

WHO WE ARE

GWE Consulting Engineers is a company of highly experienced geotechnical, environmental, process, mechanical and civil engineers. The company's core services include geotechnical engineering, environmental services, 3 waters infrastructure, civil structures and land development engineering.

We work closely with councils, developers, planners and architects to provide our clients with all the technical and project management resources they need to plan, investigate, design and deliver their projects.

Our staff have the skills and experience to deliver projects across a range of specialist areas, from **site investigation, feasibility studies, consenting and assessment of effects on the environment, drinking water compliance, detailed design, safety in design, value engineering, procurement, asset management planning and construction management.**

Our brand essence, ***Creative Thinking | Better Environments*** drives the approach to all our work. We always put a premium on the quality of our output, and its relevance to your needs.



We treat you as valuable team members, and we always keep you fully informed on how your project is progressing. We respect your time and your style of interaction, and we are always sensitive to your inputs. We are flexible and work to your deadlines and treat your time requirements with the highest regard.

WHAT WE DO

GWE offers advisory, design and implementation services related to the provision of drinking water including water source selection, source water risk management plans, treatment, supply and water safety plans. Solutions are based on a range of processes and technologies and sized to meet community needs.



OUR SERVICES

Community Water Supply Schemes

GWE has the experience to design and develop community water supply schemes to meet the suppliers' needs, all regulatory standards and address environmental and cultural concerns. We can also provide our clients with advice on small supply schemes that are required to provide safe drinking water but subject to less rigorous compliance standards.



Sanitary Surveys

GWE can undertake sanitary surveys of the water supply scheme including the catchment, abstraction point, treatment plant, and distribution system on behalf of the water supplier as part of any programme of risk management. The surveys should be conducted with sufficient frequency to be useful in interpreting trends or sudden or significant changes in

CAPABILITY STATEMENT

Drinking Water

water quality as revealed by routine monitoring.

Source Water Risk Management Plans

As part of the NZ Government's Water Reform all suppliers will require a source water risk management plan. GWE has the expertise and experience in gathering all the information to produce these plans so they are relevant and useful to your water supply scheme.

Water Safety Plans

A key mandatory requirement of the Water Reform is that all suppliers regardless of their size must develop and implement a Water Safety Plan (WSP) for their supply. A WSP is a written document that covers every aspect of providing safe drinking water from catchment to treatment and distribution. The WSP aims to assess and manage risks, to identify if any barrier to contamination is missing and to establish a comprehensive plan to manage the drinking water supply. Our engineers have the experience to prepare a WSP for your community water supply scheme, in line with your goals and appropriate to your size and requirement.



Water Source Selection

A major consideration when designing a water supply scheme is the nature of the source water that is to be used which may be a stream or river, groundwater or rainwater collection. GWE will investigate potential sources and match treatment technologies to the source water to produce an abundant and economic supply.



Resource Consents

GWE will provide advice on the consenting requirements and produce technical and planning reports, including an assessment of environmental effects (AEE) to support applications for new or the renewal of water take applications. We tailor our services to your

organisation's environmental and social purpose.

Water Treatment Plants

GWE engineers have the experience to design a water treatment process to match the characteristics of the source water. The treatment process could range from a full-scale plant to a simple disinfection system.



Distribution Systems

GWE engineers can model and design all of the components of a distribution system serving a small community including trunk mains connecting treatment plants to service reservoirs and reticulation mains connecting reservoirs to consumers.

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GWE
CONSULTING ENGINEERS

CAPABILITY STATEMENT

Drinking Water

KEY GWE PEOPLE

Gareth Williams **Director**

Gareth is a process engineer and specialises in wastewater treatment facilities for small communities. Gareth has commercial oversight of all our projects and actively engages in client relationship management.

Colin Cranfield **Technical Director**

Colin is a civil/environmental engineer and has over 20 years' experience in the water and wastewater sector. He has been the project lead on a number of treatment plant upgrades including Tokoroa, Putaruru, Tirau, Te Kuiti, Kawakawa Bay, Kaitaia and Inghams Chicken processing plant at Waitoa. Colin is currently working on the design of water and wastewater schemes for a planned community at Beachlands, Auckland.

Maria Johnson **Water Sector Lead**

Maria is a Technical Project Manager and Water Quality and Compliance expert. She has over 10 years' experience in the water industry. She has been the project Manager and water treatment planner on a number of large projects for Watercare Services Ltd and various small Councils. She has also developed and automated multiple drinking water compliance monitoring and reporting systems. Maria is currently working on helping our clients with the new

mandatory requirements introduced by the Water Services Bill.

Jolivette Thompson **Process Engineer**

Jolivette has over 6 years' experience working for the Samoa Water Authority as a research scientist and as process engineer in the consulting industry in NZ. She has experience in the consenting and design of treatment plants for small communities.

Zoe Lightfoot **Environmental Scientist**

Zoe has over 4 years' experience in the drinking water industry. She worked as a Sampling and Laboratory Technician as well as an operator at one of the largest water treatment plants in New Zealand. She is familiar with drinking water treatment, monitoring and its associated regulatory compliance.

Daniel Kuruppu **Water/Wastewater Engineer**

Daniel has over 5 years' experience working across a variety of water and wastewater infrastructure projects for both municipal and industrial clients in New Zealand. His key areas of expertise include conceptual, preliminary and detailed design of treatment systems, land treatment site investigations, and assessment of environmental effects (AEE). Daniel also has experience in writing Water Safety Plans.

Angela Li **Graduate Engineer**

Angela is building up her experience in the water and wastewater industry. She is assisting the team working on a variety of projects from supply demand balance modelling to treatment design. She is also building experience in Water Safety Plans, resource consent requirements and regulatory compliance.

GWE Consulting Engineers

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CAPABILITY STATEMENT

Wastewater Treatment

WHO WE ARE

GWE Consulting Engineers is a company of highly experienced geotechnical, environmental, process, mechanical and civil engineers. The company's core services include geotechnical engineering, contaminated site remediation, 3 waters infrastructure, civil structures and land development engineering.

We work closely with councils, developers, planners and architects to provide our clients with all the technical and project management resources they need to plan, investigate, design and deliver their projects.

Our staff have the skills and experience to deliver projects across a range of specialist areas, from **site investigation, feasibility studies, consenting and assessment of effects on the environment, detailed design, safety in design, value engineering, procurement, asset management planning and construction management.**

Our brand essence, ***Creative Thinking | Better Environments*** drives the approach to all our work. We always put a premium on the quality of our output, and its relevance to your needs.



*Project Shotover WWTP,
Queenstown Lakes District Council*

We treat you as valuable team members, and we always keep you fully informed on how your project is progressing. We respect your time and your style of interaction, and we are always sensitive to your inputs. We are flexible and work to your deadlines and treat your time requirements with the highest regard.

WHAT WE DO

GWE Consulting Engineers' wastewater capability builds on the combined experience of Gareth Williams, our managing director and our professionals who have joined the company in recent years. This experience is complemented by the skills of many of our longer serving staff.



*Kawakawa Bay WWTP, Watercare
Services Ltd*

We undertake the following wastewater planning and design work:

- **Master planning of sewerage schemes**
- **New treatment plant facilities**
- **Plant process upgrades**
- **Plant capacity upgrades**
- **Sludge handling and treatment**
- **Pumping and pipelines**
- **Disposal of treated effluent to land and/or water**

Our company offers a diverse range of specialist services, drawing on solid professional experience in private practice consulting roles and local government. Team members have completed projects in New Zealand, Australia, Ireland and the United Kingdom.

We collaborate closely with a select range of specialist companies and individuals, whose work meets our standards, to offer clients a unique consulting team with the highest level of skill required for each project.

OUR SERVICES

Feasibility Studies

Including fatal flaw analyses and the identification of conceptual options, eliminating those that do not meet statutory requirements or service delivery timeframes

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CAPABILITY STATEMENT

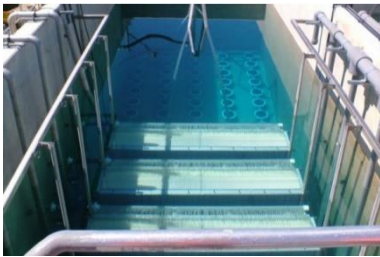
Wastewater Treatment

Options Studies

Developing a long list of options for a proposed wastewater scheme and investigating feasibility using a range of criteria including environmental effects, public health effects, cultural considerations, constructability and cost. Assessing a short list of options through an in-depth multi-criteria analysis (MCA) and selecting the Best Practicable Option.

Wastewater Characterisation Studies

Incorporating a plan for sampling and analysis of the wastewater in the collection system to obtain baseline data for an expanded list of pollutants of concern (POCs). The characterisation results will assist in identifying pollutants that may influence the process design and/or plant operations.



Turangi MBR, Taupo District Council

Resource Consents and Assessment of Effects on the Environment

Investigating and describing the effects of the activity on the receiving environment and developing methods of mitigating

or avoiding those effects through appropriate process and plant design

Preliminary Design Reports

Incorporating design calculations, process description, control philosophy and design parameters. P&ID's, PFD's and plant layout drawings. Preliminary Equipment and Instrument Schedules.



Tokoroa STP, South Waikato District Council

Detailed Design Reports

Revisions to the Preliminary Design Package incorporating detailed process functional description, P&ID's, PFD's and site general layout drawings, detailed general arrangements and layouts of plant equipment and equipment and Instrument Schedules.

Final Design Reports

Revised documents and drawings, Draft Operation and Maintenance Manual

Safety in Design

Managing a process that integrates hazard identification and risk assessment methods early in the design. The process considers how to eliminate, isolate or

minimise the risks of ill health, injury or even death to those who construct, operate, maintain, decommission or demolish an asset.

Value Engineering

An exercise to review a project during the design phase to reduce costs, increase functionality and add the project without taking away from its purpose.

Procurement Strategies

The primary objective of the procurement strategy is to obtain best value for money spent. In using a specific procurement method we ensure the client gives regard to the broad economic, environmental and social purpose of the organisation, and to the desirability of competition.



Edendale Dairy Factory, South Waikato District Council

Asset Management Plans

Develop and maintain the client's Asset Management System including creating asset schedules for the new facility and incorporation into the asset database to effectively support long term planning.

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CAPABILITY STATEMENT

Wastewater Treatment

SELECTION OF RELEVANT PROJECT EXPERIENCE OF GWE PERSONNEL

Project Shotover WWTP

Design of a new WWTP for Queenstown including, modifications to existing inlet works, new biological nutrient removal reactor, new clarifier, and a new UV plant.

Kawakawa Bay WWTP

Design of first-time sewerage scheme for Kawakawa Bay. Scheme included a vacuum sewage collection system and an MBR wastewater treatment plant.

Turangi MBR

Design of a new MBR treatment plant and discharge to wetlands and Lake Taupo. The new plant replaced oxidation ponds.

Tokoroa STP

Various process upgrades to the existing plant including inlet screening, refurbished clarifier, submerged aerated filters and UV disinfection. Discharge to the Whakaruru Stream.

Edenvale Dairy Factory

A process review of the existing treatment plant and characterization of the factory wastewater. Design of upgrades to the plant including modifications to the aeration lagoons, upgrade of aeration equipment, and upgrades to sludge thickeners and ancillary equipment.

Mangere WWTP

Final design, commissioning, and optimisation of two new sludge dewatering centrifuges and transfer conveyors at Watercare's Mangere treatment plant.



Mangere WWTP, Centrifuge and Conveyor Upgrades, Watercare Services

KEY GWE PEOPLE

Gareth Williams Director

Gareth is a process engineer and specialises in wastewater treatment facilities for small communities. Gareth has commercial oversight of all our projects and actively engages in client relationship management.

Patrick O'Riordan Wastewater Manager

Patrick is a mechanical engineer with over 10 years' experience in industrial and municipal wastewater treatment plant design. Prior to coming to NZ, Patrick completed numerous projects for Irish Water including sludge thickening and odour control projects at Dublin's Ringsend

WWTP. Patrick has significant experience in NZ and Australia on plant design using clarifiers, floatation systems and belt presses in the food and mining sectors.

Colin Cranfield Technical Director

Colin is a civil/environmental engineer and has over 20 years' experience in the wastewater sector. He has been the project lead on a number of treatment plant upgrades including Tokoroa, Putaruru, Tirau, Te Kuiti, Kawakawa Bay, Kaitaia and Inghams Chicken processing plant at Waitoa.

Dylan Walton Senior Process Engineer

Dylan is a process engineer with over 15 years' experience working for Wessex Water and in the consulting industry in the UK and NZ. Dylan's expertise is in process optioneering and design of treatment plants. He has worked on municipal plants in Queenstown, Mangere, Rolleston, Riversdale Beach and in the food sector on treatment plants for Fonterra. Dylan is experienced in the use of BLOWIN modelling software.

Jolivette Thompson Process Engineer

Joli has over 6 years' experience working for the Samoa Water Authority as a research scientist and as process engineer in the consulting industry in NZ. She has experience in the consenting and design of treatment plants for small communities.

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CAPABILITY STATEMENT

Stormwater and Flood Management

WHO WE ARE

GWE Consulting Engineers is a company of highly experienced geotechnical, environmental, civil and process engineers that has a wealth of development experience from large, multi-lot greenfield subdivisions to small scale, inner city brownfield developments. We work closely with developers, planners, architects, urban designers and landscape architects to provide our clients with all the creative and technical resources they need to design and deliver their project.

Our staff have the skill and experience to deliver projects across a range of specialist areas, from **site investigation, contaminated site remediation, foundation engineering, earthworks, infrastructure engineering, stormwater management and pavement design.**

Our brand essence, ***Creative Thinking | Better Environments*** drives the approach to all our work. We always put a premium on the quality of our output, and its relevance to your needs.

We always respect our clients, and we will keep you fully informed on how the project is progressing. We respect your time and your style of interaction, and we are always sensitive to your inputs. We are flexible and work to your deadlines and treat your time requirements with utmost importance.

WHAT WE DO

GWE Consulting Engineers has built a solid reputation in Stormwater Engineering and Flood Management with a range of projects successfully completed across New Zealand. Our capability is continuing to expand with highly regarded professionals who have joined the company in recent years, complementing an already established team of experienced engineers.



Low Flow Channel within a Managed Floodplain

We undertake the following Stormwater Engineering and Flood Management related work:

- **Flood Impact Assessments**
- **Stormwater Management Plans**
- **Water Sensitive Design**
- **Stormwater Networks Design**
- **Erosion and Sediment Control Plans**

OUR SERVICES

Flood Impact Assessments



Effects of a 1 in 100 Year Flood Event

Flooding is a common hazard for many developments in urban and rural environments. The magnitude and frequency of these events are related to numerous factors including site topography, rainfall intensity/duration and soil conditions. GWE undertakes hydrologic and hydraulic modelling of sites that are prone to flooding. We identify the extent of overland flow paths and flood plains and advise our clients on how to mitigate the effects on their developments and downstream properties.

Stormwater Management

GWE's approach to stormwater management incorporates identifying client and community needs, evaluating flood and stormwater discharge effects on the environment and developing Water Sensitive Design (WSD) solutions to manage those effects. Site specific, sustainable outcomes are achieved through a balanced use of conventional stormwater infrastructure, WSD devices and enhanced natural systems.

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CAPABILITY STATEMENT

Stormwater and Flood Management

GWE has extensive experience with the hydraulic modelling and design of open channels and stormwater pipelines for greenfield and brownfield developments. We also design stormwater management devices for the retention and detention of stormwater to minimize the effects on downstream catchments and the erosion and scour of stream environments.



Boardwalk through a Stormwater Management Area

Stormwater Management Plans

GWE has a long track record in preparing Stormwater Management Plans for our clients. Our methodology is to consider a variety of management options (treatment train approach) for the development and through an options analysis framework select the best practicable solution, taking into consideration the existing site features. The plan will present the proposed development layout and the water sensitive design applications. Ultimately, the plan will be used to inform future development at the site for the developer and the consenting process.



Raingardens in a New Housing Area

Water Sensitive Design

Water Sensitive Design (WSD) is a contemporary and regulated approach to freshwater management. It is applied to land use planning and development at regional, catchment and site scales. Water sensitive design seeks to protect and enhance natural freshwater systems, sustainably manage water resources, and mimic natural processes to achieve enhanced outcomes for ecosystems and our communities.



Grassed Swale Drain

GWE's approach to WSD is to reduce 'effective' imperviousness within a development, where possible, by directing stormwater runoff to pervious mitigation areas

in order to retain/detain and treat stormwater prior to entering reticulated networks or the receiving environment. This alleviates the potential downstream environmental effects from stormwater volumes, peak flows and contaminants. It also reduces the requirements for lower catchment stormwater infrastructure to manage these effects.

Stormwater Networks Design



Cultivated Stream Crossing in A Subdivision

We assist our clients with the design of stormwater urban drainage systems comprising pipe networks, open channels and overland flow paths. Our team of engineers are highly experienced in network modelling, reticulation layouts, culvert design and construction techniques for stormwater networks that are eventually vested in Council or privately owned and operated by industry or body corporates.

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CAPABILITY STATEMENT

Stormwater and Flood Management

Good drainage design must strive to maintain compatibility and minimise interference with existing drainage patterns; control flooding of property, structures and roadways for design flood events; and minimise potential environmental impacts from stormwater runoff. Stormwater collection systems must be designed to provide adequate surface drainage while at the same time meeting other stormwater management goals such as water quality, streambank channel protection, habitat protection and groundwater recharge.

Erosion and Sediment Control Plans

There are a number of fundamental principles that provide best practice guidance for Erosion and Sediment Control (ESC). These principles can minimise the adverse effects of erosion and sediment transport on the environment through the planning, design, construction and maintenance phases of a project.



Converting a Former Sediment Retention Pond

When preparing and implementing an ESC Plan GWE Engineers consider the following aspects of the development; minimising disturbance, staging construction, protecting slopes, protecting receiving environments, rapidly stabilising exposed areas, installing perimeter controls and diversions, employing sediment retention devices and adjusting the ESC Plan, as needed.

ESC measures should link to form the treatment train as each measure has a specific role. This approach can be a combination of structural (e.g. sediment retention ponds, perimeter controls) and non-structural (earthwork season, staging) practices. This treatment train approach should be considered during the project's early planning phases and followed through to project completion.

RELEVANT PROJECT EXPERIENCE OF GWE PERSONNEL

Omaru Creek Stormwater Management Plan

The Tamaki Housing Regeneration Area sits within the Tamaki North stormwater catchment which includes the Omaru Creek. The Stormwater Management Plan addresses stormwater management issues in the Omaru catchment and was designed to deliver an inter-disciplinary design approach, which considers stormwater management

interweaved with ecology, urban design, amenity, recreation, safety, community and cultural values in particular Te Aranga Design principles.

Firth Concrete, New Batch Plant, Manukau

Design of the stormwater treatment system for the new batching plant site including separate systems for clean stormwater and for run-off from operational areas and dirty areas of the site

Hingaia 2 Precinct SHA, Hayfield Way

Preparation of the stormwater management plan and the hydrologic and hydraulic design for this 57ha development in accordance with the stormwater attenuation and treatment requirements of the Unitary Plan. The stormwater concepts include the restoration/daylighting of a network of intermittent and permanent streams. WSD designs were based on GD01 and included permeable pavements, raingardens, tree pits and vegetative swales.

Huapai Triangle SHA, Huapai

Preparation of the hydrologic, hydraulic and WSD design for the 65ha residential development. Concept and preliminary designs include at source retention and

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CAPABILITY STATEMENT

Stormwater and Flood Management

detention according to the SMAF 1 requirements of the Unitary Plan. Treatment devices were designed for the main tree lined boulevard and included raingardens, tree pits and vegetative swales.

KEY GWE PEOPLE

John Petrovic
Technical Director Land Development

John is a Chartered Professional Engineer (CPEng) with 20 years' experience specialising in all aspects and sizes of land development and civil infrastructure. He has managed many significant projects throughout their lifecycles, acting for a diverse range of clients and stakeholders.

John's highlights include being the principal/lead designer for the Scott Point and Hobsonville Point re-developments, both staged large scale multi-purpose projects, large commercial brownfield developments, and railways experience in the early part of his career.

Colin Cranfield
Technical Director

Colin is a civil engineer who specialises in the design of infrastructure for large scale developments. He has been the technical lead on a number of residential and commercial subdivisions including Omaru Creek Stormwater Management

Plan, Firth Concrete Batching Plant and Freemans Bay School.

Alice Tindall
Civil Engineer

Alice graduated from the University of Canterbury with an honours degree in civil and water resources engineering. She is experienced in the civil design of small to medium sized land/site development projects. Alice has a well-developed understanding of the Auckland Unitary Plan requirements relating to stormwater and flood management for inland and coastal environments.

Angela Li
Graduate Civil Engineer

Angela graduated from the University of Auckland with an honours degree in civil engineering. Since joining GWE she has gained experience in wastewater treatment and disposal and stormwater management. She supports the wider land development team on a range of civil engineering design tasks.

Miya Wang
Graduate Civil Engineer

Miya graduated from Unitec with a degree in Civil Engineering Technology. Since joining GWE she has worked as a civil engineering designer and is experienced in the use of Civil3D. Miya is currently studying part-time at the University of Auckland for a Masters Degree in Civil Engineering.