

FMG Research

**Geotechnical and materials
testing services**

**Engineering
your success.** | ADELAIDE
MELBOURNE
SYDNEY



Today's Engineers for tomorrows infrastructure

For more than 45 years' FMG Engineering and FMG Research have supported infrastructure development across Australia. Providing materials testing services and civil, structural and geotechnical engineering.

Predominately South Australian, privately owned, FMG has offices in Adelaide, Melbourne and Sydney. Our industry leading multi-disciplinary team provides timely, reliable services from initial documentation through completion.



Overview

With industry leading capability and extensive accreditation (in the fields of soil, aggregate and concrete testing) FMG Research has been delivering testing services to the building, construction and earth moving industries, as well as quarries and premix concrete suppliers, for 50 years.

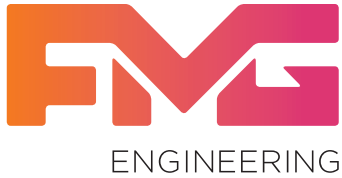
We have particular experience undertaking complex analyses to assess strategies and presenting results in a clear, non-technical manner to allow debate among all stakeholders.

Our mobile annex laboratory services are fitted out with state-of-the-art virtual capabilities, allowing our field technicians to operate in many of Australia's remote locations and efficiently provide dependable results and clear advice.

Our experienced project teams specialise in materials testing, civil, structural, geotechnical and environmental engineering. Our specialised service sectors work closely together within your project, allowing FMG to offer a holistic approach to the unique engineering requirements of each project.

FMG Research has successfully delivered major infrastructure projects such as the Southern Expressway Duplication, Northern Connector, South Road Superway and the new Royal Adelaide Hospital.

FMG is pleased to provide this proposal outlining our broad experience, delivery capacity and service capability.



FMG Engineering is able to offer the following consultancy services to support your team...

FMG Research

Our NATA accredited soils, concrete and materials testing laboratory FMG Research offers a full range of testing facilities. Our large team of fully trained technicians and mobile annex fleet means we can turn around test results within 48hr even in some of Australia's most remote area's.

Laboratory testing

- Compaction testing (modified & standard)
- Gradings & hydrometer analysis
- Plasticity index & Atterberg limits
- Suction testing
- Soaked & unsoaked CBRs
- Estimated CBRs
- Soil logging
- Concrete core testing / crushing
- Aggregate & source rock testing
- On-site annex laboratory

Field services

- Supervision to AS3798 including Level 1 Controlled Fill Certification
- Field testing by nuclear density meter
- Construction compaction advice
- Plate load testing up to 500KW
- Pavement investigations

Geotechnical

Our geotechnical division has been in the business of ground investigation for over 40 years. We have the knowledge and capability to investigate and report on all projects from residential site classifications to major commercial and industrial developments.

We have worked on a broad range of projects including mining infrastructure, major multi-story buildings, infrastructure projects, industrial and commercial buildings, housing developments, airfields, wind farms and pavements. Our advice and response in emergency situations such as ground collapse is invaluable.

- | | |
|---|--|
| • Geotechnical site investigations | • Pavement design and investigation |
| • On-site and laboratory measurement of soil properties | • Forensic investigations (reasons for failure) |
| • Footing design and investigation | • Piling platform investigation. design and certification - BRE470 |
| • Retaining wall design | |

Service capability



nRAH remediation

Our team has a strong track record of delivering high quality outcomes for a number of clients across a broad spectrum of projects.

Structural

Structural consulting often becomes the catalyst for reviewing the performance requirements of the building or project. It brings together the knowledge of new materials and the latest processes – it's about life cycles and economics. We are nationally recognised specialists in the design, construction and maintenance of community, commercial and residential swimming pools. We provide rationalized structural systems to reduce cost and maximise performance from conception to completion.

Pavement design

Design of road pavement rehabilitation projects and pavement design is a core capability of FMG Engineering. Utilising our materials testing laboratory, FMG Research, we coordinate pavement investigations including managing traffic control during the investigation, locations of existing services then conducting push tube sampling, test pit investigations and reinstatement, sampling materials and carrying out geotechnical tests on materials.

Road infrastructure

FMG Engineering has completed numerous road reconstructions, kerb and water table reconstruction, footpaths and stormwater management. We have skilled operators in both Civil 3D and 12D software packages, enabling us to provide the best design delivery method depending upon the project requirements.

Environmental

FMG Engineering has a significant environmental science and engineering capability. FMG Engineering's environmental expertise, industry experience and knowledge of regulatory requirements allows us to facilitate innovative and cost effective assessments/investigations, remediation, treatment and redevelopment strategies.

- Waste soil classification
- Environmental site history
- Site assessment and remediation
- Groundwater testing and remediation
- Environmental impact statements
- Environmental management plans
- Decommissioning of service stations
- Environmental incident response

Service capability

Mining and energy

FMG Engineering offers an experienced team of engineers and scientists able to provide engineering and environmental services to mining at any point in the resource development and operational life cycle.

We are responsive to your needs, agile and quick to respond where circumstances dictate. Our broad range of services means we can provide value input at every phase of project delivery and operation.

In addition, FMG Research provides on-site compaction and materials testing.

In the case of the unforeseen, we have a dedicated forensic engineering team capable of performing expert investigations for insurance claims.

At the end of the operations - our environmental scientists and civil engineers can offer assistance with mine closure planning.

Materials handling

- Structural modifications
- Footing systems - plant and machinery
- Industrial buildings
- Steel fiber reinforced concrete

Environmental

- Environmental assessments
- Soil investigations
- Surface water and groundwater investigations
- Environmental (operations) reports
- Environmental monitoring
- Waste water and waste management

Audits

- Materials testing
- Geotechnical compliance
- Non destructive testing
- Forensic investigations
- Structural assessment
- Land suitability assessment
- Environmental assessment

Infrastructure

- Town and camp site infrastructure
- Camp site amenities
- Waste water treatment and reuse
- Stormwater harvesting and reuse
- Civil infrastructure
- Bulk earthworks
- Tailings dams
- Environmental services
- Airport civil works
- Compaction and quality control services

Structural design

- Building design
- Structural modifications to existing structures
- Footing systems to plant and machinery
- Industrial buildings
- Steel fibre reinforced concrete design



Iron Duke to Iron Baron Tramway South Australia

FMG Engineering was engaged as consultants on a project to build a new 31km railway line to the crushing plant at Iron Duke. As well as carrying out site investigation for the plant, we were engaged to use our expertise to simplify construction of the railway line, which was essentially a "cut and fill" project.

We sampled the critical terrain areas and classified all soils and materials. We constructed a trial embankment using typical soils, and determined the most efficient method of building support roads and embankments. We also developed special compaction techniques for the rail bed, and devised simple control testing procedures for the contractor to carry out on site. The entire project was completed in a 12-month time-frame due to the on-site techniques increasing efficiency and allowing the contractor to proceed with certainty.



Quick thinking and sound soil knowledge saved our client over \$300,000...

FMG Research was engaged to perform geotechnical testing and investigation for a major project in the far north of South Australia.

FMG Research undertook QA & QC testing on samples of sand intended for future use and proved lime stabilisation would not be beneficial if sand material with a minimum of CBR15% was sourced and used as clean fill. A proposal was put forward to the design engineer stating that CBR15% sand could be used in lieu of lime stabilised material with no disadvantages.

After careful consideration of the site specification, lime stabilisation would be required in fill layers where the material didn't meet a minimum CBR of 15%. FMG Research with our client, dug burrow pits to ascertain where material with a CBR of greater than 15% was located on site.

The proposal proved to be successful which saved our client an estimated \$135,000 in lime costs and a further estimated \$200,000 in labour costs.

Dublin Land Fill

Project description...

FMG Engineering has completed the civil engineering design and documentation for a number of landfill cells at IWS Dublin. Our materials testing laboratory has been responsible for site testing and surveillance of earthworks construction as well as completion reports to the EPA.



St Clair Housing Development, Cheltenham

Project description...

FMG Engineering was engaged to undertake level 1 compaction control in the construction of clay liners in 2 main wetland areas, 3 minor wetlands, 2 inlet ponds, stormwater drainage and development of land.

FMG provided advice ranging from choosing suitable material for clay liner, insitu stabilisation suitability and ensuring the project was completed in accordance with design engineer's specification.





Company experience

Project description...

Oaklands Park Wetlands - Stormwater reuse scheme

The award-winning Oaklands Stormwater Reuse Scheme is an exceptional example of FMG Engineering leading multiple consultant teams to achieve site Master Plan objectives.

The project included a site Master Plan – with consideration to future development, community engagement, statutory approvals, wetland treatment injection for Aquifer Storage and Recovery (ASR), and 10km of distribution mains to irrigation sites across the City of Marion.

Simultaneously, a functional design was undertaken of the wetland treatment system, harvesting of water from the Sturt Drain, modeling of the ASR bore field and a functional design for the external distribution works. FMG Research completed detailed geotechnical investigations of the site.

FMG Engineering managed the design delivery process including engineering design and documentation of the civil and structural components, coordinating and interfacing the ASR, mechanical and electrical, and external distribution works.

Client: City of Marion

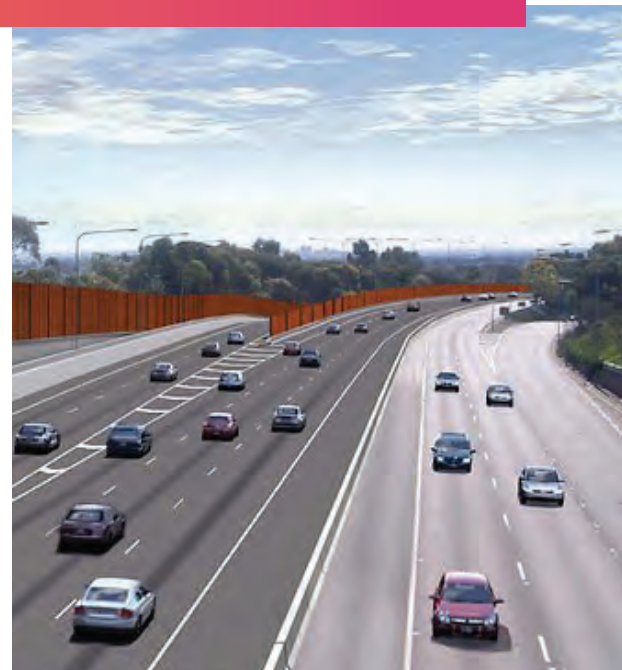
Project description...

Southern Expressway Duplication

FMG Research provided compaction and materials testing accurately and on time during construction of the 18.5km roadway. The project included seventeen bridges and approximately two million tonnes of cut to fill.

FMG Research's previous experience in the south of Adelaide was invaluable for this infrastructure project. FMG played a substantial part in deciphering which materials on site would meet the criteria for "Fill Type A" utilising previous knowledge of these soils to give accurate advice.

Client: Abigroup Contractors and Boulderstone





Company experience

Project description...

Iron Duke Mine - South Australia

The expansion of the Iron Duke Facility included building pads for new hardstand areas, fuel storage pads, a tyre change bay and a new bituminised access road for improved efficiency and safety to the mine site.

As the access road and tyre change bay will have significant volumes of trafficable weight passing over them, it was necessary to undertake nuclear density tests underneath the bitumen and concrete to make sure the ground was properly compacted to handle such hard loads.

FMG Research worked closely with the Contractor constructing the access road. FMG Research advised the project managers and operators on site, to determine how much water to add to the stockpiled 20mm Quarry Rubble, thus allowing a much easier and more time efficient method of achieving the compaction that had been stipulated. FMG Research was also based on site whilst backfill took place around a new spiral footings tower for a large conveyor belt. FMG Research worked hand in hand with the Contractor whilst they backfilled to approximately 1.5 meters in height.

South Road Superway

Project description...

Constructed above one of Adelaide's busiest roads, the South Road Superway is a 4.8 km, multi-lane, non-stop roadway featuring 2.5 km of raised road platforms - one of the longest in Australia and South Australia's first.

FMG Research was initially engaged to overcome soft soil issues for crane platforms being constructed for large piling rigs. After this was rectified, FMG Research was engaged to undertake the compaction and materials testing for the project.



Adelaide Oval Redevelopment

Project description...

FMG Research has undertaken various soil and compaction testing for multiple clients throughout the life cycle of this project.





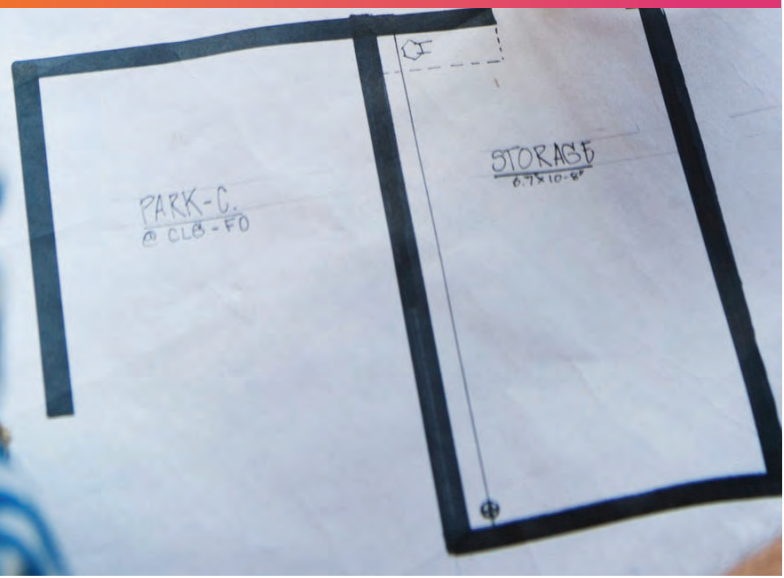
**Our people
have the
knowledge
and
experience
to provide
our clients
with reliable,
timely and
cost effective
solutions...**

Founded in South Australia by South Australians and operates primarily within this state. As a local company FMG Engineering naturally has a unique understanding of what is required to operate in the South Australian environment, including natural, regulatory, commercial and social aspects.

FMG Engineering has a history of delivering innovative solutions during our 45 years in business. FMG Engineering has assembled a strong, committed team to cover all of the components of this project.

FMG Engineering has many years experience working within South Australian regulations and guidelines and local councils, and boasts an excellent relationship with State Government and its agencies, making the process of any project planning and development approval managed by FMG Engineering a smooth one.

Quality is paramount to everything that FMG Engineering does, and this is reflected in the excellent standard of field work, report writing and a dedication to open and timely communication that clients expect of its service providers.



At FMG Engineering we believe our product is only as good as the team behind it, as such we ensure that our engineers receive expert training, resources and support to complete your project to the highest possible standards.

Peter Bayetto

Managing Director

Peter Bayetto has extensive experience in site contamination and the identification and remediation of soil and groundwater contamination having carried out more than 700 environmental assessment and remediation programs since 1989. He has broad experience in integrating major earthworks and soil remediation programs within the framework of the overall construction program for a project and in managing projects within the context of the regulatory environment to achieve client's project outcomes.

Peter has a strong and practical experience in the geotechnical aspects and quality control requirements for remediation to meet both foundation and environmental requirements. He has the practical experience of designing and implementing many projects, and also headed FMG Engineering's Research & Development team developing and implementing the Vibro-Dynamic Compaction process. Peter has written a number of papers and presentation on the quality control and certification of bulk earthworks processes.



Jeremy Clapp

SA Manager - Buildings and Infrastructure

Jeremy's extensive skill set is weighted towards management, problem solving and value adding. These skills were key to the success of the Homebush Bay Olympic development in Sydney where he was responsible for the delivery of the Olympic Boulevard and its environs. His background of 12 years in civil construction as a project manager, coupled with 12 years consulting experience provides him with a unique balanced approach understanding both the technical and construction requirements for projects.

At FMG Engineering, Jeremy has managed most of FMG Engineering's large projects, including the award winning Oaklands Stormwater Reuse Scheme, Glenelg Golf Club Wetland and ASR scheme, Racetrack redevelopments at Morphettville incorporating a wetland and ASR Scheme and the \$13M Gawler Racetrack Redevelopment.



Gary Turnbull

FMG Research Manager

Gary has an Associate Diploma in Civil Engineering, 25 years' experience in soil testing ranging from Australian Standard, Queensland Dept of Transport and DPTI SA test methods. He is experienced in providing soil testing services for numerous key infrastructure projects throughout Australia.

Gary began his career with McIntyre & Associates in 1989 as a trainee soil technician. During his time with McIntyre & Associates he worked on several large infrastructure and mining projects.

In 1996 Gary joined Pioneer Pty Ltd as a Quarry Laboratory Manager. This diverse role included operating pugmill, crusher, weigh-bridge, loaders, dump trucks and shotfiring.

In February 2000 Gary was employed by FMG Engineering as a Senior Soil Technician and in 2005 was promoted to Lab Manager. As the Lab Manager, responsible for maintaining the high quality of all test results.



Key personnel

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Matthew Platt

Laboratory Technical Manager

With over 17 years' experience in civil construction, Matthew has worked his way through the ranks - from trainee soil technician to laboratory manager. Matthew's extensive experience of the processes and procedures within compaction and materials testing, and laboratory operations give him the practical insight and strong knowledge base required to support the FMG Research teams.

Matthew leads the NATA accredited laboratory in delivering high quality compaction and materials testing for civil construction projects throughout South Australia, on a number of major key infrastructure projects.



Aleks Wysocki

Field Work Supervisor

Aleks has over 10 years' experience in testing soils, concretes and aggregate materials for a range of key infrastructure projects throughout South Australia.

Aleks has worked on many high profile key infrastructure projects across South Australia, including the Southern Expressway Duplication, Adelaide Desalination Plant, Torrens to Torrens project and Queen Elizabeth Hospital. Aleks has been an approved signatory since 2014 for various testing methods including nuclear density testing.

Aleks is also a key member of our on-site team, operating an annex laboratory.



Luke Schleidgen

Soils Technician

Luke has over 7 years' laboratory experience with FMG Engineering, specialising in soil testing services. He has a Diploma of Laboratory Technology (Construction Material testing) and his certificate IV in Laboratory Technology.

Luke has been involved with numerous projects, including sub-divisional works, roads and building construction. He has recently managed all the field testing and sampling for the Southern Expressway Duplication. His professionalism ensures clients receive accurate results in a timely manner.

Luke is a versatile and valuable technician with vast experience with Australian soils and sound understanding of standardised testing.



Maurits Brookman

Senior Soils Technician

Maurits has over 27 years' experience in soils testing. He was appointed to Senior Soils Technician in 2005. Maurits is involved in soil testing AS3798 from small projects to large projects and oversees the quality of work carried out.

Notable projects that Maurits has been involved in include:

- Obahn bus project – concrete testing
- Woomera Airport Upgrade – Alice Springs, Airport upgrade
- Numerous – Pipeline and salt interception pipelines in the river land
- Numerous – Pug hole redevelopments
- Large No. of DPTI projects

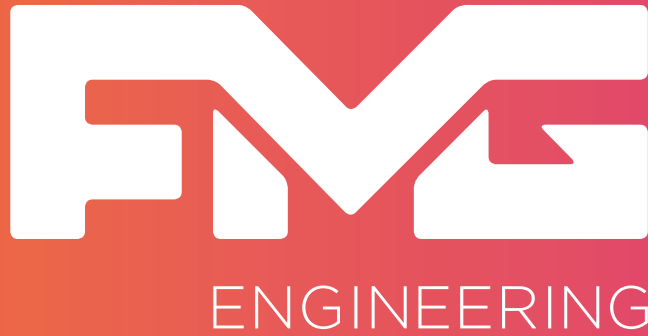


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