

## OUR PARTNERS



Creators of ceramic innovation



Producers of distinctive brick slips and clay profiles

### POWER-SPRAYS

Manufacturers of GRC production equipment

### FIBRE TECHNOLOGIES INTERNATIONAL

Leading suppliers of GRC fibres and polymers



Suppliers of rubber and moulds for GRC panels and profiles

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Telling Architectural



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Excellence in Glass Fibre  
Reinforced Concrete

Under licence to Byggimpuls AS

# Telling Architectural

# Telling Lime Products

## About Telling

Telling Architectural have established a modern facility at their plant in Four Ashes, Wolverhampton to manufacture glass fibre reinforced concrete (GRC)

Established in 2002 Telling have a reputation for the design and supply of innovative forms of façade cladding.

Our modern facilities, handling equipment and methods enable us to offer off site manufactured GRC panel including pre-fabrication where required.

Our skilled operatives are capable of producing GRC ranging from the most basic flat panel forms, to complex 3D and curved forms, pre-fabricated and sometimes pre-finished with ceramic or brick

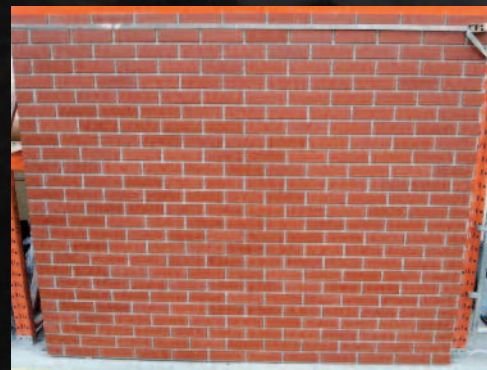
Our production is undertaken under license with Byggimpuls Fiberbeton whose systems have been proven in use over 25 years in the harsh climates of Scandinavia.



Telling Architectural manufacture all grades of GRC recognised by GRCA International, the industry's governing body, hold ISO9001 accreditation and are moving towards ISO14001 in early 2015.

Our extensive storage facilities enable panels to be manufactured in advance and stored in readiness for delivery to site.

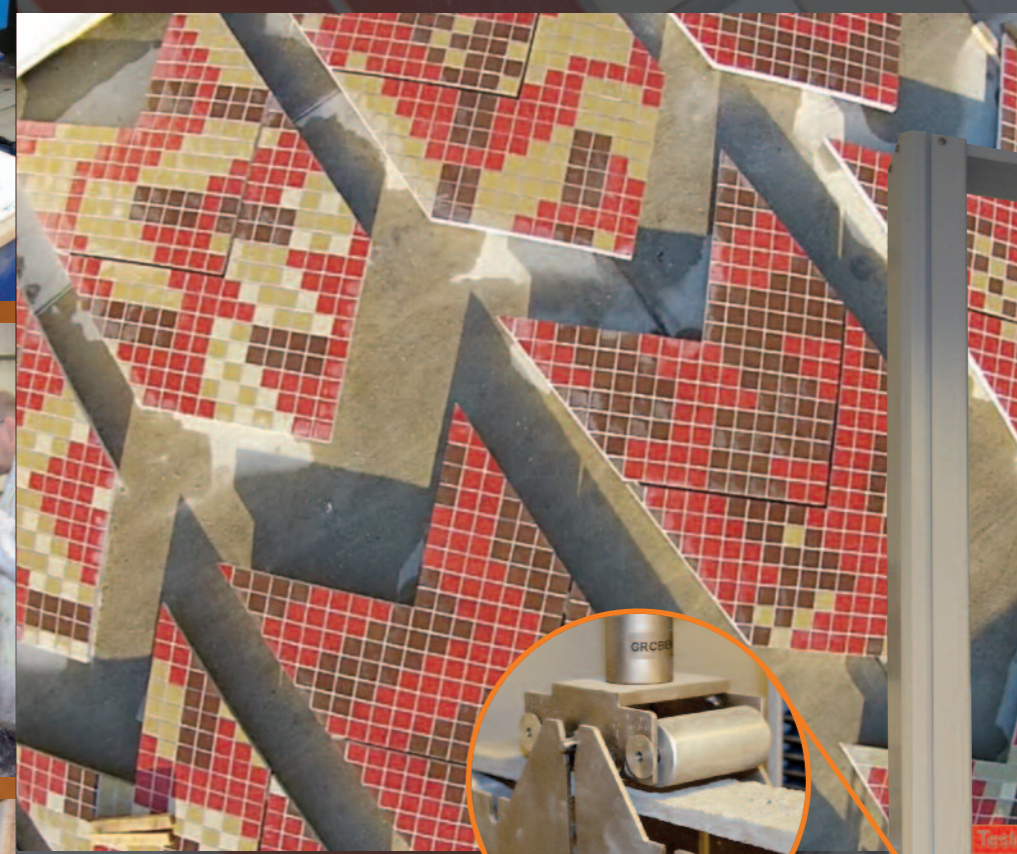
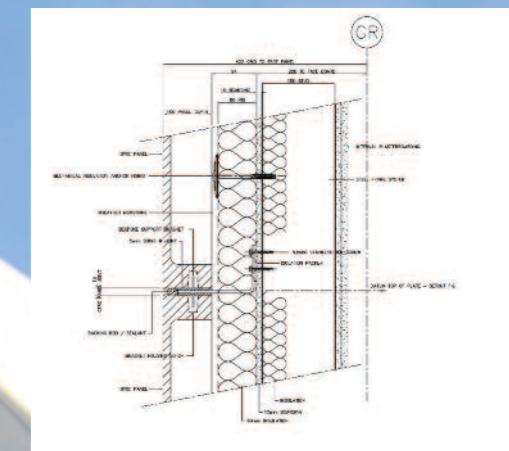
The majority of our façade projects require the specialised grade 18 GRC which is the highest technical performing of the GRC grades. This allows Telling to manufacture large format panel systems as standard or bespoke façade total solutions.



Telling have developed pre-fabricated brick columns and spandrels panels which at 80 kgs per m2 will offer optimum savings to clients in weight, speed and installation.

Brick slips are profiled on the rear face to receive mechanical anchors embedded in the GRC panels providing pull out values in excess of 2 kN per anchor

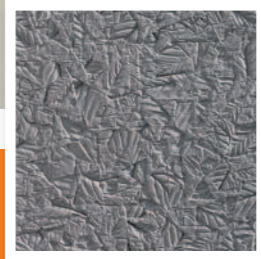
Below and right- The company can undertake specialised projects such as the 'chevron' shaped roof panels of GRC under production in which the Cumella ceramic tiles from Barcelona were both adhesively bonded and mechanically attached to GRC in turn mounted on prefabricated aluminium frames. 180 panels each with a different tile configuration were produced.



Telling have an in house testing facility which in addition to the daily calibration and quality control measures enables them to test in isolation panels produced on any given day.

Design of our GRC facades is undertaken by our in-house team of draughtsmen and engineers. Our laboratory carries out daily analysis to ensure that our GRC meets the design performance for the selected project in terms of MOR and LOP





## What is GRC?

GRC is a fibre reinforced pre-cast concrete with a 50-50 sand cement matrix in a typical wall thickness of 12 to 15mm thick. Hollow rib profiles created around the perimeter and across the rear face at designed centres, provide the structural integrity of the components. These ribs are between 50 and 100mm in depth and are not visible once the façade is assembled.

Whilst GRC is made in thin concrete sections created by a proprietary process of machine spraying an enriched OP cement and aggregate mix within which alkali resistant glass fibres provide the reinforcement. Unlike steel, glass fibres will never rust and are consistent throughout the thickness of the profiles. GRC is approximately 80% lighter in relation to normal pre-cast steel reinforced concrete cladding, it offers greater versatility due to its superior compressive strength and most importantly its flexural properties. It is environmentally preferred due to its reduced energy use and reduction in CO2 emissions during manufacture. GRC receives a BREEAM A+ material rating. It is lightweight creating less load on the building frame and thereby producing economies in structural sections and foundations.

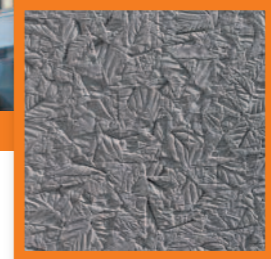
It is fast to erect due to its lightweight and can be mounted on a range of support systems for ease of installation. GRC is suitable for use in refurbishment and new construction. There is virtually no limit to the shape or profile that can be created in a variety of smooth or textural finishes. Mouldings can be created to replicate the most complex of profiles in restoration, renovation and new construction. Support systems can be adapted to meet the demand for unitised off site construction.

## Who are Byggimpuls AS?

Byggimpuls AS has its headquarters in Oslo Norway, with regional offices in Norway, Sweden and the UK supporting their operations in Europe. They manufacture exceptionally high quality vertical and horizontal linings for the exterior and interior building envelope in GRC [Glass Fibre Reinforced Concrete] and have a reputation for delivering premium quality profiles in short timelines, to exacting standards all within budget.

They have delivered complete solutions where it was believed one did not exist. The national Opera House in Oslo, The Kilden Centre for Performing Arts in Kristiansand and the Scandic Vulcan Hotel are examples of their expertise.

'By the transfer of production process, engineering technology and management, Telling Architectural have licensed the manufacturing of the Byggimpuls Fibrebeton processes in the UK, developing and testing them where necessary to meet the requirements of British Standards and the GRCA'



## Technical

In broad terms Telling GRC envelope solutions will fall into four categories;

- Bespoke GRC façade solutions
- M4 unitised GRC façade system
- NÔRSKREEN™ GRC rainscreen façade system
- Unitised 'I' frame columns and panels

All GRC components are manufactured at a purpose built factory in Four Ashes, Nr Wolverhampton in England.

The GRC components are manufactured in all cases to the current guidelines laid down by the GRCA International specification for the manufacturing and curing of GRC components.

ISO 9001 internal quality control systems are rigorously applied at all times, with support from external and independent quality assurance systems.

Components are designed using first principles under the guidance of the GRCA international limit state design guide and the application of Finite Element Analysis Techniques again used in line with the limit state design guide. Some of the standard systems such as the M4 unitised system and the NÔRSKREEN™ system are designed and tested in line with CWCT guidelines and the recommendations of the BS codes or relevant bodies.

The thickness and weight of the systems will vary according to the system design:

For Bespoke and Unitised solutions the weight per m2 will be project specific.

M4 unitised solutions weigh approx. 50-70kg per m2

NÔRSKREEN™ solutions weigh approx. 40-50kg per m2

GRC is a versatile pre-cast concrete material creating façade elements from as small as 450X450mm up to storey height panels. Manufacturing seamless cast corners, returns to windows, integral window cill, coping and soffit details, all promote a widescale reduction in unsightly panel joints on the elevations.

The surface of our GRC is closed and extremely dense ensuring the units are fully waterproof and easily maintained.

Since the Telling GRC is manufactured from natural materials colours and textures can be produced using natural pigments and ochres that are UV stable. There is a subtle mineral variation in each unit providing a natural warmth and softer aesthetic than can be achieved with man made synthetics and metals.



## PERFORMANCE DATA

### Characteristic Mechanical Properties of Byggimpuls Grade 18 GRC at 28 days

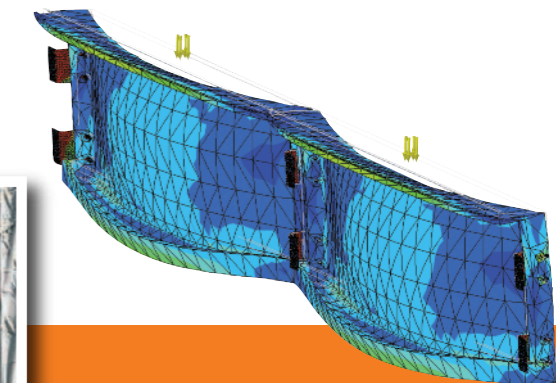
(MOR <sub>28</sub> )	18-30 N/mm <sup>2</sup>
(LOP <sub>28</sub> )	5-10 N/mm <sup>2</sup>
(UTS <sub>28</sub> )	8-12 N/mm <sup>2</sup>
(BOP <sub>28</sub> )	4-6 N/mm <sup>2</sup>
Interlaminar Shear	2-4 N/mm <sup>2</sup>
In-Plane Shear	7-12 N/mm <sup>2</sup>
Punching Shear	25-25 N/mm <sup>2</sup>
Charpy Impact Strength	15-25 N/mm <sup>2</sup>
Dry Bulk Density	18-21 Kg/m <sup>3</sup>
Water Absorption	8-13%
Apparent Porosity	16-25%

**MOR** - Modulus of Rupture (flexural), the ultimate bending stress obtained from the four point bend test.

**LOP** - Limit of Proportionality (flexural) ie the point at which the stress/strain curve deviates from a straight line.

**UTS** - Ultimate Tensile Strength - Stress at which GRC fails in pure tension.

**BOP** - Bend over point (tensile), namely, the stress at which the stress/strain curve deviates from a straight line variation when a sample of GRC is tested in direct tension.



## Façades

Telling Architectural offer a range of façades ranging from spanning storey height units in their M4 range to thin section panels using the NÖRSKREEN™ system. GRC cladding can be used in traditional construction, within unitised curtain walling or as a ventilated cavity rainscreen.

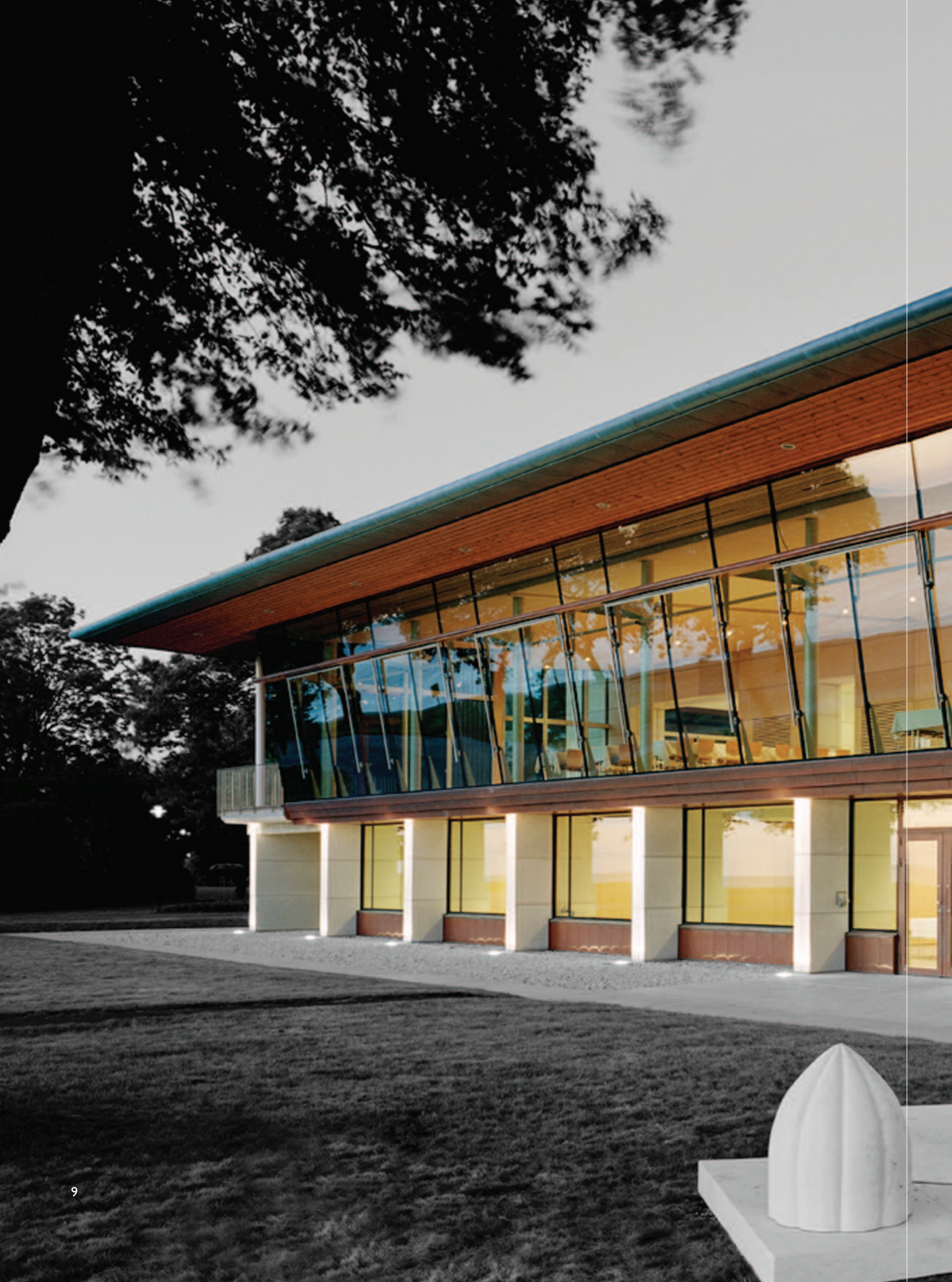
Telling are a leading European manufacturer of GRC and their transfer of technology, management and manufacturing expertise has enabled us to be creative in the design of our modern day façades. Whether a pigmented colour or natural in grey or white, textural or smooth faced, pre-mixed GRC can be cast in moulds made from GRP, rubber or timber to produce the most consistent detail and quality available.

These formers allow GRC to closely replicate smooth natural stone or travertine, split face and 'hammered' effects. For refurbishment cornices, columns, parapet features and other mouldings can be replaced with excellent accuracy and consistency of profile. Decorative columns or other classical features can be added to existing or new buildings.

### Off Site Modular Construction

Telling Architectural manufacture their GRC in large format panels which are lightweight and can be mounted on aluminium or steel frames. These can also be used in modular construction, for roofs and for walls.





## Support Systems

Telling Architectural has in house engineering facilities to design support systems varying from the most simple and economical to bespoke solutions, each designed to withstand loadings applicable to the individual structure.

Support systems vary from lightweight rail and clips systems to suit the weathering profile of the NORSKREEN™ panels which are available in a range of natural colours in a maximum height of 1.0 metres and length of 6.0 metres.



## Weathering and Life Expectancy.

GRC will perform equally as well as pre-cast concrete and there is guaranteed to be no maintenance or degradation associated with rusting or spalling of steel reinforcement.

Telling Architectural have adopted the most advanced techniques developed by GRC companies since the introduction of the process in the 1980's. Developments in the fibre sizing, mix proportions and applications expertise have been ongoing in this much studied industry. Supported by accelerated aging analysis the performance of GRC is now widely acknowledged enabling designers to engineer with confidence for 40+ years life expectancy.

The weathering of the panels will greatly be dictated by local environmental conditions. Based on the performance of GRC over the last 25 years weathering is assessed to be little different from that of natural materials of equivalent porosity such as stone.