

## Swimming Pool Construction QA Programme

To: \_\_\_\_\_ Council

Customer Name: \_\_\_\_\_ Lot \_\_\_\_\_ DP \_\_\_\_\_

Site Address: \_\_\_\_\_ Val # \_\_\_\_\_

\_\_\_\_\_ Mob: \_\_\_\_\_

### 1.0 Construction Methodology

Cascade swimming pools are a production line prefabricated steel-wall pool with a plastered concrete floor and vacuum fitted vinyl liner. They are commonly referred to as a "Vinyl Liner Pool".

The hollow galvanised steel formers ("Wall Panels" 1,200 Height x 2,400 Length x 150 mm Width) are assembled into an appropriate excavation in a level rectangle or freeform which will correspond to the final pool shape. The 250 mm gap between the back of the panels and the excavation will be backfilled with a suitable lightweight drainage material which incorporates a 110 mm perforated drainage pipe encircling the pool wall to eliminate any localised hydrostatic pressure build-up. This feature must not be directed into any existing or planned stormwater drains on the pool site as back-pressure may be created which may affect the positioning of the waterproof membrane to be fitted in Stage IV (see below).

Deformed 10 mm reinforcing steel is installed in the 150 mm x 100 mm top bond beam channel area connecting at right angles to "hot-dip" galvanised 12 mm vertical "Panel Location Pins" deformed steel pins into alternating 150 mm x 150 mm and 100 mm x 100mm square tubes set at 600 mm centres. These galvanised panel pins are driven into the substrata to locate the panels until the pumped concrete is introduced. Temporary stays may also be employed to keep the panels aligned and straight until the concrete cures.

Optional "above ground" installation where the desired finished pool height > 500 mm above existing ground level, each 150 x 150 mm square vertical tube at 1,200 mm centres shall have a 250 mm pile hole drilled to 800 mm depth with a suitable length 12 mm galvanised panel location pin used to locate the panel. These piles are formed when the concrete pumped into the panel moulds fill the voids, lower bond beam and pile holes thus forming an extremely rigid structure.

Pumped shotcrete of 25 mpa strength is introduced into the hollow panel cavities and spread uniformly to 70 mm depth over 40 mm of drainage metal on the pool floor to form the base on which the waterproof membrane or bladder (the "Pool Liner") will rest. When the concrete has thoroughly cured any temporary positioning stays may be removed and the pool structure internal volume accurately measured in order to manufacture the internal finish bladder. The .77 mm thick waterproof "Pool Liner" is a vacuum-formed close fit into pool shell creating the internal finish of the swimming pool.

Edging stones ("pool copings") are cemented in place on the top bond beam, and 50 mm PVC Class C suction and 40 mm return PVC low pressure pipelines are installed to connect the pool to the filtration system which consists of either a "high-rate" sand pressure vessel, or a "Cartridge" type septum filter. A backwash line incorporating a 150 mm air gap may be used to discharge foul water over a gully trap from a "sand" filter. A Cartridge type filter does not require a backwash facility as the septum units are easily replaceable with a new or clean unit as required.

## CASCADE SWIMMING POOLS - QUALITY ASSURANCE PROGRAMME

The Cascade Aquagenie water skimmer incorporates a built-in overflow feature 150 mm below ground level which directs overflow water to the outside of the pool perimeter where it dissipates. This area is backfilled with drainage material which allows overflow water to be dissipated into the natural aquifer in the manner of a “soak pit”. This system eliminates the need for any additional drainage lines to cope with overflow into Council stormwater systems thus the Cascade pool may be considered to be “as permeable” as the grass it replaces, as effectively the pool is constructed within a soak pit.

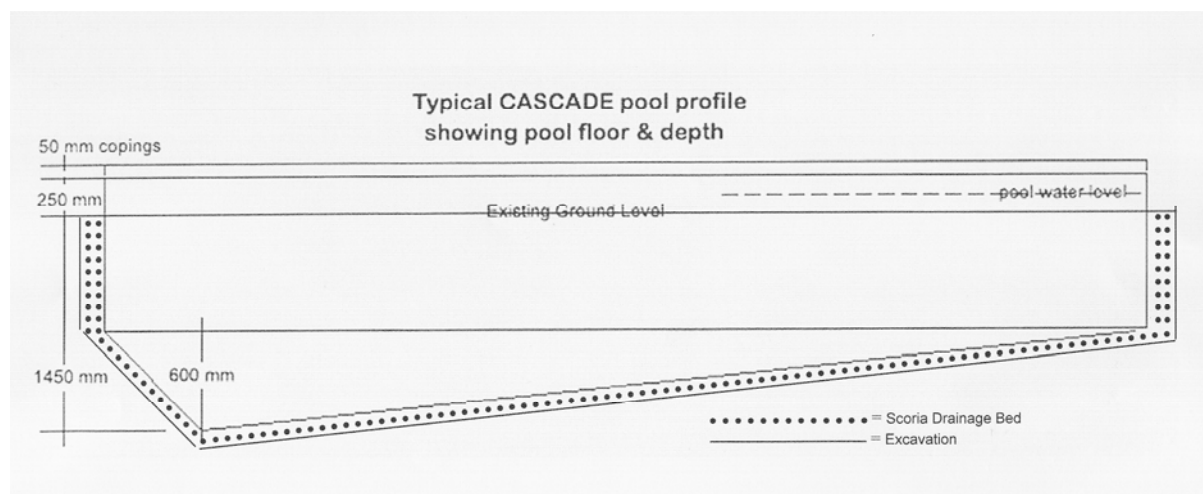
### 1.1 Construction sequence

#### Stage I: Excavation

The pool excavation is marked out with “Dazzle” fluorescent biodegradable paint in accordance with the distances to boundaries as shown on the Building Approval, taking into consideration the minimum clearance required behind the pool wall structure allowing access by the installers. This is customarily 250 mm from the panel front (the water of the pool) which will eventually contain the drainage material backfill and the encircling perforated hydrostatic pressure relief drain .

The excavation commences with the removal of the block of soil comprising the basic dimensions of the pool by 850 mm in depth. This coincides with the pool depth at the walls which are customarily located 250 mm above the existing grade to accommodate future copings, paving or decking.

A gently tapered floor is then excavated giving a deep end of (typically) 1,750 mm at the deepest point measured from the top of the installed edging stones (“copings”) or an effective excavation depth of 1,450 mm below the existing grade.



After allowing for the walls protruding above grade plus the addition of 50mm copings, if a deeper pool is required, either the pool wall height above grade must be increased to compensate for the extra depth, or – where permitted by the local Territorial Authorities District Plan – the excavation may be increased slightly in depth at the termination point of the base to meet the customer’s requirements. As the profile of the excavation is minor, the area of incursion is relatively slight.

#### Stage II: Panel installation & Filtration wall fittings

Installation of the wall panels into the pool excavation now may take place. The 2,400 mm long panels are connected in a continuous series in accordance with the desired pool shape, and firmly bolted together. Some pool dimensions require the use of interim length panels to achieve the required perimeter length of pool wall. The pool walls are backfilled with drainage material (Scoria where available) thus ensuring that overflow through the Aquagenie system from rainfall or splash-

## CASCADE SWIMMING POOLS - QUALITY ASSURANCE PROGRAMME

out from the pool re-enters the natural aquifer without the need to pump excess water to the stormwater system thus there is a zero impact on existing Council stormwater systems.

Typically, a 3.60 x 7.20 size pool requires 6 x 2,400 mm panels and 4 x 1,800 mm panels. Using a combination of panel sizes enable pools of varying sizes to be constructed, but everything else remains the same. Temporary bracing is used to keep the correct pool shape, and the D10 and D12 reinforcing steel is installed and “wire tied” together.

Where the pool is installed on a sloping site and the downhill sidewall is predominantly above the grade, 250 mm pile holes must be drilled 1,500 mm beneath the 150 x 150 mm vertical tubes to contain the concrete to be poured in Stage III. These piles shall be reinforced with a D12 galvanised Panel Location Pin and located at 1,200 mm centres.

In this stage, the pool wall fittings – Aquagenie Skimmer(s), pool light niches, solar heating suction & return lines etc. - are mated to the pool walls and the PVC recirculation lines are fitted.

### **Stage III: Pumping the concrete**

The concrete must be of 25 mpa strength, 10 mm and less size aggregate gravel and no more than 100 mm slump. The concrete is introduced into the top channel bond beam area, flowing down the vertical 100 x 100 and 150 x 150 mm tubes to spread out at the bottom of the tubes, forming the 250 mm x 200 mm lower bond beam which is added to from above between the columns from behind the panels. The pool perimeter is pumped in one continuous pour. When the walls are filled, the pump crew then moves into the pool floor excavation and – joining with the outflow of concrete at the bottom of the panels, fills the entire pool floor area in a continuous pouring. Two or more solid plasterers are following this process and spreading the concrete to form a continuous 70 mm thick floor. When the concrete starts to “go off” or partially cure, steel floats are then employed to provide a smooth and bump-free finish.

### **Stage IV: Measuring and fitting the pool liner (waterproof membrane or bladder)**

Great care is taken to accurately represent the internal measurements of the finished pool shell. End to end and cross measurements are taken and points at .600 mm separations are measured around the perimeter from a fixed point at both ends of the pool. This ensures an accurate representation of what is required from the Pool Liner manufacturer.

The concrete is allowed to completely cure – a process that generally takes fourteen to twenty days, depending on the weather and season. At the end of this time, the pool liner is carefully fitted and several vacuum pumps are connected to previously installed vacuum points around the pool perimeter at the bottom of the vertical walls. The air beneath the liner is evacuated and the liner shrinks back against the pool walls and floor forming a skin-tight like membrane. Water is then introduced into the pool by means of an adjacent Fire Hydrant or Tanker Fill if a hydrant is not available. Unlike other types of swimming pools, it is essential that the pool is filled as quickly as possible due to the sound and reliability of the vacuum pumps being used, and usually takes from four to six hours depending on the pool size and water volume.

### **Stage V: Connection of pool equipment and commencing filtration**

As the pool is being filled, the final pool pump and filtration connections are made and pressure tested for leaks. Once the pool is filled, the filtration is started and the initial pool sterilisation chemicals are introduced into the pool. It is common these days to use an automatic sterilisation system, and the most commonly used system by Cascade is Ozone (O<sup>3</sup>) which we find superior to saline generators (“Saltys”) or chlorine dispensers . The pool copings are the last to be installed.

# CASCADE SWIMMING POOLS - QUALITY ASSURANCE PROGRAMME

## Stage VI: Commissioning pool and handover to customer

Once the filtration is running and drip tests completed, the pool water is “balanced” by the addition of calcium chloride, sodium bicarbonate, cyanuric acid and a super-chlorination by liquid or powder calcium hypochlorite. Once stabilised, the Ozone unit is started. The customer is provided with a comprehensive Pool Owner’s Manual and on-site training in the care and maintenance of the swimming pool and the guarantees are signed and handed over.

### 1.2 The Quality Control Process

The swimming pool installation is carried out by Cascade Certified Installers in a team usually comprising two members. The process – which generally takes five days for Stages one through three, then another two days for stages four to six - is closely monitored by an Installation Supervisor and digital photos are taken of the pool construction in process. Overseeing of the Installation Supervisor is carried out by Cascade management on a spot-check basis.

#### 1.2.1 Experts to be engaged

The contact details of the Structural Engineer employed by Cascade to provide the engineering design and calculations for the steel reinforced sections of the pool, B1 & B2 P1 P2 and PS4 are:

Mehmed Hasanbegovic - BE, MIPENZ (Struct), CPEn, Reg # 219269  
Structural Consulting Engineers & Chartered Professional Engineer  
Level 1, 2 Tuarangi Road, Grey Lynn  
AUCKLAND 0121 T (09) 361 3620 F (09) 361 3630 mhdesign@ihug.co.nz

#### 1.2.2 Documentation to be provided by:

MH Design (Mehmed Hasanbegovic BE, MIPENZ (Struct), CPEn, Reg # 219269  
Structural Consulting Engineers  
Chartered Professional Engineer  
Level 1, 2 Tuarangi Road, Grey Lynn  
AUCKLAND 0121 T (09) 361 3620 F (09) 361 3630 mhdesign@ihug.co.nz

#### 1.2.3 Photographic records

A Photographic Record of the swimming pool installation is taken and is available to authorised persons in the PRIVATE section of the Cascade Swimming Pools web site using the password provided which is a combination of the customer’s lastname and the job number issued by Cascade such as : 8162doub for job number 8162 and customer lastname Doubleday. This information is available on-line to the Engineers MH Design at all times.

#### 1.2.4 Guarantees provided by Cascade Swimming Pools

Providing the components are installed by an Authorised Dealer in accordance with the provisions of the Building Approval issued by the Local Territorial Authority, in accordance with the Plans and Specifications of the Designer and Registered Structural Engineer, and installed in geotechnically sound, stable non-acidic and well drained soils and subsequently maintained in accordance with the guidelines for correct chemical and sterilisation procedures contained in the Pool Owner’s Manual supplied, the vendor (in accordance with the provisions of the Consumer Guarantee Act 1992) warrants and guarantees the following components will perform to their expected lifetime.

**25 Yrs: ULTIMATE CONCRETE POOL SHELLS** carry a twenty-five year structural suitability guarantee. Subsidence, Slips, Earthquake damage or Force Majeure are not covered by the structural guarantee

**20 Yrs: ULTIMATE WALL MODULES** manufactured from zinc-electroplated steel will remain structurally sound and/or suitable for the intended use for a minimum period of twenty years.

## CASCADE SWIMMING POOLS - QUALITY ASSURANCE PROGRAMME

Metallic Wall Module Guarantees are voided if the pool is subsequently fitted by others with a Saline Chlorinator and/or installed in (known or unknown) acidic soil conditions, **unless a further treatment** of Polyester Powdercoating of metal wall components and electrical earthing to counter “voltage leak” is undertaken. An Earth Link is included with every Cascade pool kit and shall be installed by Cascade or its Agent prior to installation of the component.

**20 Yrs: ABGAL POOL LINER** will remain free of defect and remain structurally intact for a period of 20 years. The warranty **does not cover** physical damage, piercing or cutting, inappropriate chemical treatment or abuse, fading or colour change, chemical wrinkling, low pH symptom, or any other effect resulting from mistreatment or causes beyond the control of the vendor.

**10 Yrs: POOL FILTER** The pool filtration unit is unconditionally guaranteed against Manufacturing defect for 10 years providing that it is housed in such a manner as to be protected from weather & elements.

**3 Yrs: INTERIOR MOSAIC TILE BANDS, PLASTER FINISH SURFACES, WORKMANSHIP & INSTALLATION** and pool edging stones carry three year workmanship guarantee and will remain free of non mechanical defect for a period of three years

**2 Yrs: POOL PUMPS** are unconditionally guaranteed against Manufacturing Defect for TWO YEARS providing that (it/they)( is/are) housed in such a manner as to be protected from sunlight, inclement weather & the elements.

**1 Yr: POOL LIGHTS, OZONE PLANT** and Transformers are guaranteed for ONE YEAR. LED & QH Light Bulbs carry no warranty, but will be replaced by us if they fail within ONE YEAR of installation

### 2.0 Inspections and producer statements to be provided

The following inspections and documentation are requested in order to establish compliance with the building consent and enable Council to issue a Code Compliance Certificate on the completion of the project.

Inspection type	Inspection code
Foundation	IFO
Residential Final & Pool Fencing	IF1

To enable the building inspector to undertake inspections, we will ensure that a full copy of the approved building consent is on site at all times, together with the previous inspection records.

Where a PS4 is required by the Design Engineer prior to the issuance of a Compliance Certificate, a record of digital photographs of the installation will be kept by the Certified Cascade Installer (and made available on the Cascade Web Site) who shall issue a PS3 (Structural Review) both of which will be available to the Design Engineer for his review and acceptance. A note to this effect will be available on site for the Council Inspector.

We accept that the Building Inspector may require additional inspections which will be discussed and agreed to by us.

### Compliance with Manufacturers Specifications

Products and systems incorporated in the building work proposed in this consent must be installed as approved in this consent and in compliance with the manufacturer’s specifications.

## CASCADE SWIMMING POOLS - QUALITY ASSURANCE PROGRAMME

### **Producer Statement (PS3 – Construction Review) Swimming Pool**

The Cascade Qualified Installation Supervisor is qualified under the ALPE conditions of the NZMPB Inc Pool Builder's License (Accepted Levels of Prior Experience) and Certification by Cascade Industries to issues a PS3 (Construction Review) and PS4 by the Design Engineer by virtue of his regular inspections and the photographic records available on the Cascade web site.

### **Producer Statement (PS4 – Construction Review) Swimming Pool**

The generic "Cascade" type prefabricated in-ground swimming pool has been granted "Standard Design Approval" by the Dept of Housing & Building and with site-specific Building Consents shall be assessed as meeting the Building Code without the need for a Producers Statement (Construction Review) or PS4 from the Design Engineer.

### **Engineering Producer Statement (PS4) Excavation near boundary**

Producer Statement Construction Review (PS4) is to be submitted by a Cascade Qualified Installation Supervisor for the observation of the excavation near a boundary and to provide certification confirming that the adjoining property and any building thereon have not been adversely affected by the site excavation and that the requirement of the New Zealand Building Code in respect to clauses B1 have been complied with.

### **Geotechnical Producer Statement (PS4)**

Producer Statement Construction Review (PS4) is to be submitted by a Cascade Qualified Installation Supervisor for the Observation of the Construction of the Cascade swimming pool and certification that the installation meets the requirements and/or recommendations of the Design Engineer MH Design Limited.

### **Construction Producer Statement (PS3 – Construction Review) Balustrades**

Producer Statement Construction (PS3) is to be submitted by the Fencing Contractor for the construction of proprietary balustrades and certification that those comply with the design and manufacturers specifications as approved in this building consent.

### **Energy Works Certificate – Electrical (Producer Statement)**

The electrical contractor shall provide an Energy Works Certificate, to certify that all electrical installations meet the requirements of Clause G9 (Electricity) of the New Zealand Building Code and the acceptable solutions prior to the Compliance Certificate being issued.

\_\_\_\_\_  
(Signed) (Name)

\_\_\_\_\_  
(Company Name)

Date: \_\_\_\_\_ 20\_\_

-end-

NZ Master Pool Builder

Diploma Pool Technology

Certified Builders License

No \_\_\_\_\_