NATURE
POOLS & LANDSCAPES

THE ROOF TOP/PODIUM
POOL BUILDER'S GUIDE

A Technical Handbook by Ryan Piconi,
Nature Pools & Landscapes

Everything you need to know to design, build, and maintain
a roof top or suspended pool — **the right way**

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Preface

I've been building pools most of my life. I come from a family of builders and grew up on construction sites. As I obtained my builders license, I had learned what works, fails, and gets missed when people rush through the process (it's a lot).

Roof top and podium pools are a standout feature in modern development - a lifestyle statement, a value-add, and a structural challenge all rolled into one. But while they look good in renders, the truth is they can easily become a source of massive cost blowouts, ongoing defects, and years of strata complaints.

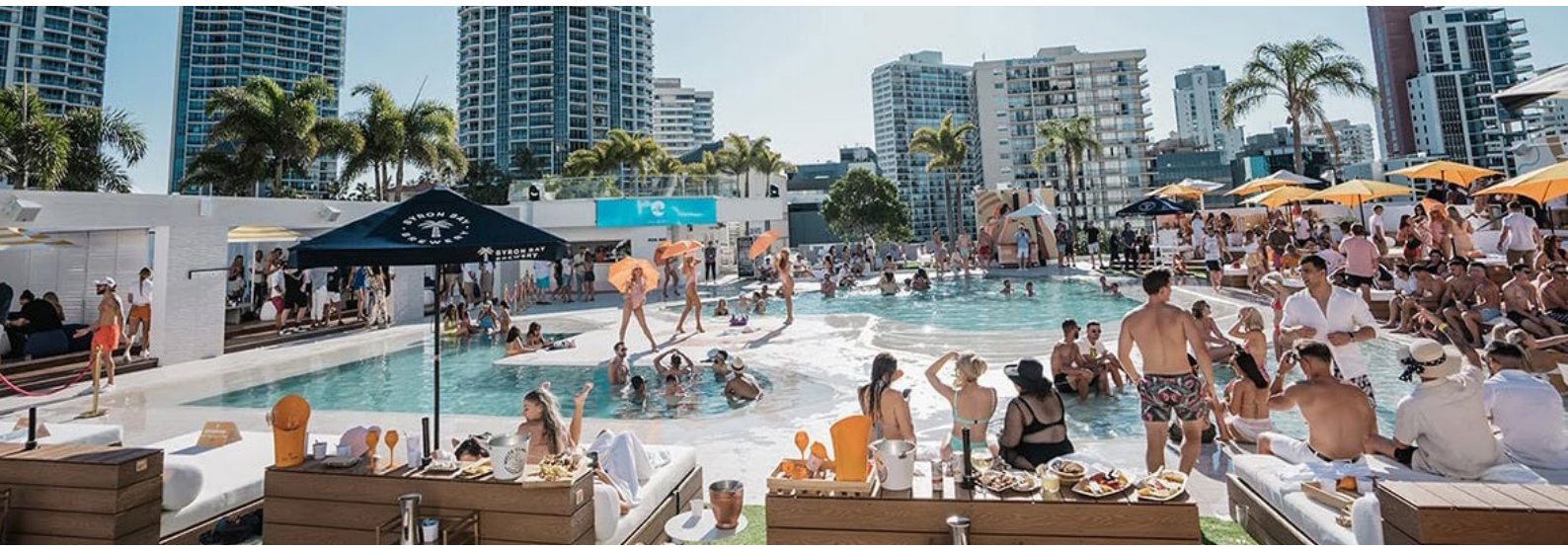
I started Nature Pools and Landscapes to focus on roof top, commercial and architectural pools that are built properly from day one. Over the years, I've fixed plenty of problems on jobs that were overdesigned, underbuilt, or just not thought through carefully.

This book is designed for developers, architects, engineers, and builders to understand what matters when building roof top pools - based on my experience.

Some of this content might help my competitors, and that's fine. Because this isn't a shortcut - it's a standard and a benchmark. A resource that helps teams plan better, build better, and avoid the painful stuff that usually gets discovered too late.

If this guide helps you deliver a better result, that's a win for everyone involved. And if you want to work with someone who's been through it all and still sweats the details, I'd be glad to help.

Ryan Piconi
Owner, Nature Pools and Landscapes



Chapter 1:
Planning Roof Top Pools

Roof top pools are among the most exciting and misunderstood features in modern high-rise design. However, from a construction perspective, they're a minefield if not planned properly from day one. In order to protect from the planning mistakes discussed further, Nature offers design reviews and early builder engagement to help teams catch these issues before they hit site. If your design isn't signed off yet, let us look it over and we'll tell you what's missing, and what will cause pain later.

1. Know Your Load

Water is heavy. Concrete is heavy. People are heavy. Put them all on top of a 20-storey building and you've got serious engineering implications.

Most roof top pools will weigh 20 to 35 tonnes when full before coping, landscaping, or people start showing up.

When planning, your engineer needs to factor in:

- Static load from water and concrete
- Live loads from usage and maintenance
- Load concentrations (e.g. benches, spas, planter boxes)

This means you need to get your pool builder involved early to provide load estimates before structural sign-off.

2. Access

Most builders try to figure out access after the slab is poured and it's already too late.

If there's no clear lift path or crane strategy, the pool becomes a logistical nightmare, especially at the concreting stage. We've seen this delay jobs by weeks and cost thousands in crane hire alone. Remember that above 13 storeys or higher, you can't use a boom pump. That means concrete will have to be poured via kibble. That changes how fast we can pour, how long we need the crane, and how the job is sequenced; snowballing into higher costs rapidly.

3. Structural Integration During Planning and Preventing Structural Movement

You need to triangulate ideas with builders, engineers, and architects as early as the design process to prevent structural issues further on. Too often, Nature sees pool designs dropped onto architectural plans without input from structure or services. In other words, pools are designed in isolation which results in the following issues:

- Conflicts with columns, shear walls, and penetrations
- Inadequate bearing zones
- Service clashes (especially electrical and hydraulic risers)

To avoid these problems, you need to involve a pool builder during the early design phase. Their expertise will help in coordinating loads with existing slab thicknesses, post-tensioning cables, and penetrations.

Finally, every roof top or podium pool must be laterally restrained to prevent movement during seismic events or building shift. If the shell isn't restrained properly, cracking or failure at the waterline is likely — especially with tiled finishes or water features.

4. Waterproofing Before You Build

Waterproofing is not something you choose after the pool is built because it needs to match the interior finish.

Some helpful terminology:

- A pebble finish = cementitious waterproofing (e.g. Mapei Mapelastic Smart) + scratch coat
- A tiled interior = flexible membrane (e.g. LATICRETE HYDROBAN)

And here's the part no one tells you: The concrete shell must be wet-cured (as per Australian Standards) to avoid cracks and cold joints. No curing = no membrane warranty.

This often goes wrong and many times we've been brought in to re-waterproof entire pools that failed due to poor curing or incompatible products. It's one of the most expensive mistakes you can make.

5. Acoustic Isolation

If your pool is over residential space, you must acoustically isolate it. That usually means acoustic pads or stainless-steel spring mounts.

But here's what's missed: these springs need to be cleaned and inspected. In the past, we've had to jack up pool shells to replace rusted springs because no one left any access.

A note on steel - just because it's stainless doesn't mean it won't corrode. This is especially true when it comes to pools because chlorine gasses are always present. Therefore, we advise designing in service access from day one - and Nature offer inspection services and reports to help body corporates manage this long term.

6. Drainage Below the Pool

You need drainage below and around the pool to protect your investment and comply with standards.

Adequate drainage is important because standing water affects acoustic systems and waterproof membranes. We advise our clients to install drainage layers under every roof top pool. We also always advise engineers to allow for waterproofing beneath the pool as well - including slab waterproofing and around any blockwork or permanent formwork walls.

7. Equipment and Plant Rooms

Pool equipment, such as inverter heat pumps are unable to be stored in fully enclosed spaces; they need fresh air flow to operate. Otherwise, they'll recirculate cold air and end up not being able to heat the pool/spa properly. If this is not established during the build, you will eventually need to cut into finished plant rooms just to get airflow into a heat pump system.

To protect against this common issue, give your builder and HVAC consultant enough room and ventilation to specify this properly. It's cheaper than retrofitting later.

We 100% prefer open-air plant rooms whenever the design allows it. They're easier to access, naturally ventilated, and don't turn into heat/cold traps. Make sure the platform is weatherproofed, elevated, and sound-isolated if it's near residences.

Enclosed plant rooms are fine, but require the following factors:

- Proper cross-ventilation or mechanical airflow
- Enough room to walk around the equipment
- Service hatches big enough for a human, not a snake

If we get a say in the design early, we always push for open-air. Cheaper, simpler, and more reliable.

Chapter 2:
Engineering and Structural Load Considerations

Pools are deceptively heavy. A 6x3 metre roof top pool can easily exceed 27 tonnes when full, and that's before you add in tiles, coping, paving, people, and planter boxes. It should be a no-brainer: before you build anything on top of a multi-storey building, you need to understand what the structure below it can support. Your engineer needs to clarify this information early and ensure that it's accurate.

There are three types of loads to get familiar with: a) static load, b) live load, c) point load.

1. Static Load — What the Pool Weighs When It's Full

The static (or dead) load includes:

- Water weight (1,000 kg/m^3 - roughly 1 tonne per cubic metre)
- Pool structure: concrete shell, reinforcing steel
- Interior finish: pebble or tiles
- Coping and surrounding paving

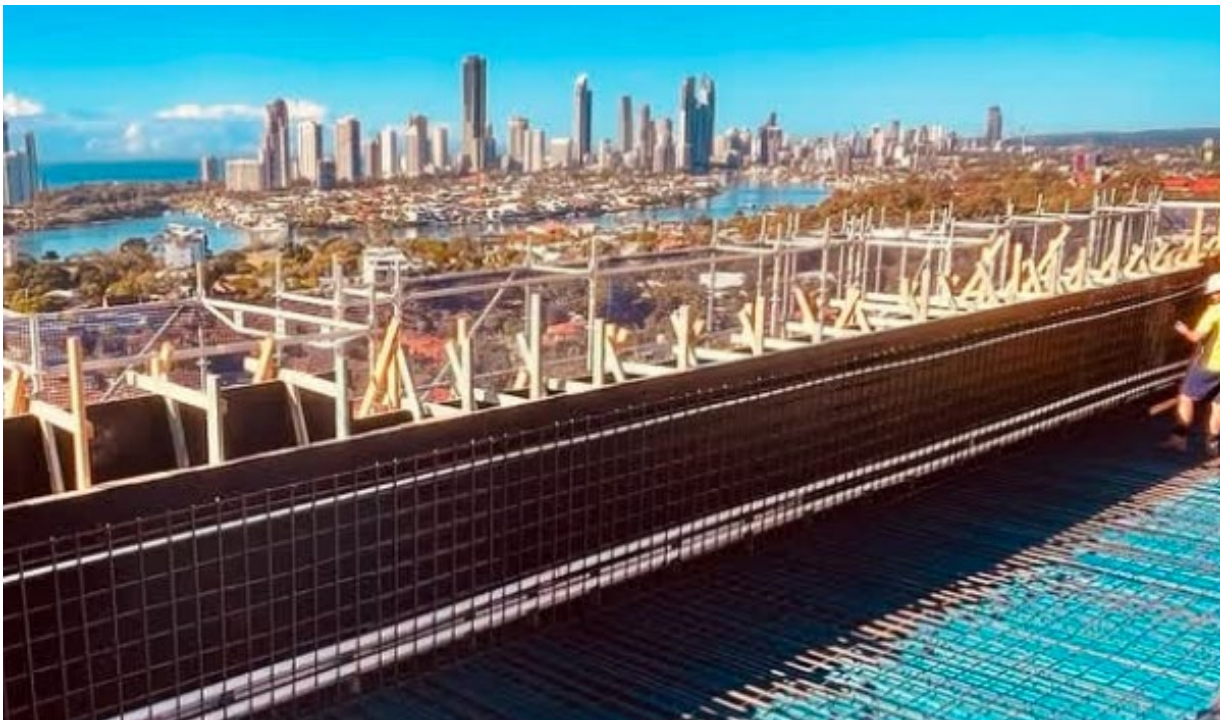
This should be calculated based on the full volume of the pool including spas, benches, and any water features or catch pools.

2. Live Load - What People and Usage Add to the Structure

Live load accounts for occupants, maintenance staff, equipment, and movable furniture. On commercial roof tops, live loads can spike during parties, events, or maintenance cycles - especially if water is sloshing over edges or moving into surge tanks. This must be coordinated between the structural engineer and the hydraulic designer.

3. Point Loads - Where All the Weight Ends Up

Pools don't distribute load evenly. Often, footings, stairs, spas, or mechanical risers concentrate load onto small slab areas or beams. These zones must be accounted for during the engineering phase. It is important to work closely with structural consultants to model the bearing points of spring systems, hob walls, and pool footings accurately. We have a trusted team of acoustics consultants to ensure this stage goes smoothly.



Chapter 3:
Crane Access and Concrete Pouring

Roof top pools create a unique logistical challenge: how do you get concrete, reinforcing steel, waterproofing, and finishes 20 or more storeys into the air?

On low-rise sites, a boom pump can easily reach the pool deck. But once you're above 12 to 13 storeys, things change. That's where crane-lifted systems like kibbles come in and as aforementioned, where careful access planning becomes critical.

1. Boom Pump vs Kibble

- **Boom pump:** Fast, efficient, but limited by height and reach. Generally, only viable up to ~13 storeys with a 60 metre Boom.
- **Kibble:** Concrete is lifted in batches by crane, poured manually into forms or sprayed from above.

Kibbles require more crane time, more labour on the deck, and a slower pour cycle. But on high-rise sites, it's the only reliable option.

2. The Impact on Project Sequencing

When you use a kibble system:

- You're limited in how much concrete can be poured in one day, sometimes leading to pool concreting taking 2 days and the addition of expansion joints in the pool.
- Your crane becomes a bottleneck (shared with other trades)
- Pour planning must align with site lifts, core jump schedules, and weather

Failure to coordinate this properly causes major delays. Nature works with site teams to sequence pours and batch kibbles based on site access windows.

3. Prepping for Formwork and Reinforcement

Roof top formwork must be designed not just for strength but for access. Formwork also needs fall protection and tie-in details for penetrations and hobs. Nature bends and fix all steel onsite, which requires clear access paths, safe working zones, and deck bracing that can support wet concrete loads.

4. Communication with the Crane Crew

The crane crew needs to know exactly what's coming up the hook:

- Weight of each kibble (calculated precisely)
- Time needed between lifts
- Deck clearance and safe zone policies

Nature provides pour schedules and crew coordination tools to keep lifts safe and efficient.

Chapter 4:
Seismic Restraints and Lateral Containment

When a roof top pool is placed on a high-rise structure, it needs vertical support and lateral stability. During wind loads, thermal expansion, or seismic activity, unrestrained pool shells can shift, crack, or shear away from their slab. To prevent this, lateral restraint systems must be designed into the structure and installed correctly before the pool shell goes in.

Seismic codes (and even moderate building sway) require structural components like pool shells to be laterally restrained. Without containment, the shell can move relative to the slab, especially around the waterline. This is a common point of failure in poorly restrained roof top pool builds.

1. Hob Walls and Block Containment

In accordance with AS 1170.4:2024 – Structural Design Actions, Part 4: Earthquake Actions in Australia, all rooftop and podium pools must be laterally restrained to prevent structural damage during seismic events or building movement. This involves designing and constructing lateral supports - such as hob walls, block walls, or full-height structural containment integrated with the slab to resist seismic forces. Ensure that these restraints are detailed and installed as per the structural engineer's specifications to maintain compliance with the standard.

Important: Remember to include lateral restraint pads. Lateral restraint pads must be:
- Sized and spaced based on structural engineer's requirements
- Installed with proper access for inspection and replacement
- Isolated from direct water exposure to prevent degradation over time

Design and install restraints before shotcrete. Do not rely on the pool shell itself to provide lateral stability - that's a guaranteed defect waiting to happen.

A common solution to containment are hob walls around the base of the pool, tied into the slab. These prevent lateral movement, create a recessed containment cavity and can be built from reinforced concrete or blockwork. The block walls must be grouted and reinforced per engineering specifications.

3. Wall Systems

Wall systems can also be used as structural containment. They must be sealed at joints, waterproofed, and tied to the slab properly to be effective. Nature recommends early coordination with the wall supplier and engineer to ensure full compliance.

4. When and Who Installs Restraints

Lateral restraints are not part of the pool scope. They must be installed by the builder before the pool contractor begins. Nature advises on layout, timing, and sequencing — but it's critical this isn't left to the last minute or assumed to be part of the shotcrete/pool construction phase.

Chapter 5:
Waterproofing - The Most Expensive Failure

If there's one part of a roof top pool build that cannot afford shortcuts, it's waterproofing. It's the one element that, if it fails, can cause hundreds of thousands in damages, disrupt dozens of tenants, and ruin your project's reputation. And it's also the one part of the build that most people get wrong because it was rushed or designed without the finish in mind.

1. Why Roof Top Pools Are High-Risk

Waterproofing failures on a roof top don't stay contained. They leak into apartments, lift shafts, corridors, and slab cavities. They also often go unnoticed until major damage has occurred and investigation into the cause is necessary. Unlike a ground-level pool, you don't have the luxury of 'let's patch and see'. You have one shot to get it right before the interior goes in.

2. Match the Membrane

The waterproofing membrane needs to match to the finish. Pebblecrete requires a cementitious membrane (e.g. Mapei Mapelastic Smart) and a scratch coat before the pebble application. On the other hand, tiled pools require a flexible liquid membrane product (e.g. LATICRETE HYDROBAN), suitable adhesives and grout systems. At Nature, we have fixed pools where the pebble was installed over tile membranes and tiles had been laid over cementitious products; both resulted in failure.

The builder must also waterproof under the pool:

- Slab beneath the pool zone
- Lateral restraint walls
- Any planter or adjacent water-exposed structures

Nature coordinate with the builder to ensure no weak points exist outside the pool shell itself.

Once waterproofing is complete, Nature pressure test and conduct adhesion checks before allowing any finishes to proceed. This lets us catch failures early, not after tiling or pebble has locked it in. It also gives the developer peace of mind and warranty protection.

3. Wet-Curing the Shell

Wet curing is often ignored. However, according to the AS 3600 – Concrete Structures, proper curing is essential to ensure that concrete achieves its intended strength and durability. The standard recommends that concrete be kept moist for a minimum of 7 days after placement. This curing period allows for the ongoing hydration of cement, which is crucial for the development of concrete's structural properties.

The National Construction Code (NCC) 2022, which references AS 3600, also emphasizes the importance of curing. Specifically, it states that "concrete in slabs must be adequately compacted, and slab surfaces, including edges, moist cured for 7 days."

Proper curing methods include:

- **Water curing:** Keeping the concrete surface continuously wet through methods like ponding, sprinkling, or using wet coverings.
- **Sealing:** Applying plastic sheeting or other impermeable covers to prevent moisture loss.
- **Curing compounds:** Using liquid membrane-forming compounds that comply with **AS 3799** to form a barrier against moisture loss.

Maintaining adequate moisture during the curing period is vital to prevent issues such as reduced strength, increased permeability, and surface cracking. Ensuring compliance with these standards will contribute to the longevity and performance of the concrete structure.

Chapter 6:
Pool Interiors | Pebblecrete, Tile, Hybrid

1. Pebblecrete Pools

Pebblecrete is a cement-based pool interior that includes small, natural stones. It's a popular choice in residential and some commercial builds due to its affordability and speed of application. While it is suited for tight budgets, a fully pebbled pool is unaesthetic, hard to clean, and can be rough underfoot.

Pros:
- Cost-effective
- Non-slip texture
- Natural, earthy appearance
- Faster install than tiling

2. Fully Tiled Pools

Fully tiled pools use ceramic or glass mosaic tiles to create a smooth, high-end interior. They're the gold standard in luxury pool construction.

Pros:
- Premium look and feel
- Custom patterns and colours available
- Easier to clean than pebblecrete
- More uniform surface finish

Best suited for:
- High-end residential towers
- Hotel and resort pools
- Architecturally designed pools

Considerations:
- Higher upfront cost
- Longer install time

3. The Hybrid Approach

For clients wanting the best of both worlds, we often recommend what we call the hybrid approach. This is:
- A 300mm waterline tile band around the pool perimeter
- A 100% glass bead pebble interior below the tile line

This is what you most commonly see in a residential or commercial pool and this option gives the pool a smoother overall feel compared to traditional pebblecrete, while also delivering a premium aesthetic at the waterline. The waterline tile band not only looks sharp, but also makes it much easier to clean water stains caused by evaporation — a common issue in commercial and roof top pools.

The hybrid approach strikes a smart balance between cost, appearance, and maintenance, and it's one of the most popular finish options Nature recommend for modern developments.

4. Approximate Cost Comparison

- Pebblecrete: ~$300–$500/m² (installed)
- Tile: ~$600–$1,200/m²+ depending on tile type and complexity

On a large commercial pool, the difference in finishes can easily add $100,000+ to the total project cost.

For prestige developments or projects needing clean, modern lines, fully tiled interiors deliver the best result. There is a monumental difference in appearance between a fully tiled and waterline (hybrid tiled) pool. For mid-tier projects or clients who want durability and visual appeal without going full tile, the hybrid approach is often the perfect fit.

5. Summary

We help clients balance priorities and select a finish that works with their budget, site conditions, and design intent.

Don't lock in your waterproofing or finishes before speaking with a specialist. At Nature Pools and Landscapes, we'll review your plans, advise on waterproofing compatibility, and quote based on your actual layout.

Contact us for a free specification review or to compare interior finishes for your next project in Brisbane, Sunshine Coast, Gold Coast, or Sydney.

Chapter 7:
Spa Jets — Suction and Return Plannings

Spa zones and integrated water features are another gold-standard feature in roof top pool builds and they come with their own set of plumbing and performance considerations. This chapter breaks down how to design and install spa systems that actually perform well, avoid noise complaints, and last over the long term.

1. Spa Jets — Suction and Return Planning

Proper jet performance depends on a dedicated loop for both suction and return. Nature always:

- Install multiple suctions for safety and balanced draw
- Use dedicated pipe runs for jets (not shared with pool returns)
- Use high-flow, low-noise pumps with check valves to maintain prime

Jets should be laid out before steel fixing, with flexible risers secured to the formwork or cage to avoid movement during concrete spraying.

2. Air Blowers — Design for Silence and Power

Blowers inject air into the spa jets or bubble zones. But without proper pipe planning, they can be incredibly noisy — especially on a roof top.

Nature recommends:

- Minimum 40mm air lines with gentle sweeps (not elbows)
- Blower location outside the plant room or in sound-insulated enclosures
- Dedicated air manifolds mounted behind spa walls for even pressure distribution

3. Bubblers and Bench Zones

Bubblers look simple, but if they're not pressure-balanced, they'll either shoot too high or barely gurgle. Remember your bubbler systems in school?

Design tips:

- Use individual valves to balance flow to each bubbler
- Allow for a balance line or overflow in case water collects
- Ensure they're isolated from spa jets to allow independent control

4. Automatic Pool Top-Ups

An often overlooked but essential feature on roof tops. Auto top-up systems:

- Maintain water level without needing manual filling
- Prevent pump starvation or air entry during evaporation periods
- Must be connected to a compliant RPZ valve if connected to potable water

Install the top-up pipe and sensor niche before shell spray. Always confirm pressure rating and pipe sizing for roof-level elevation.

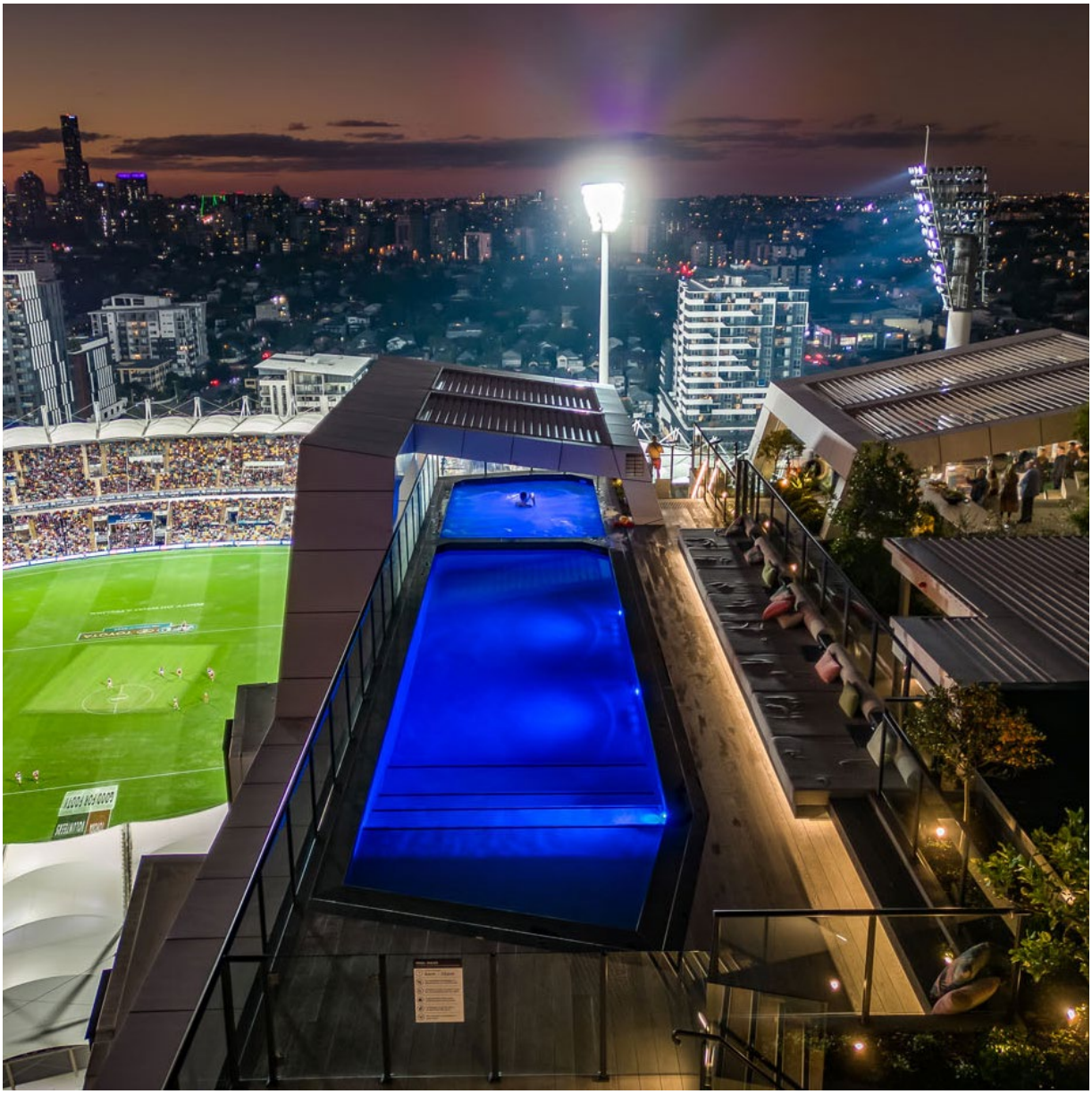
5. Electrical Considerations

All blowers, jet pumps, and automation wiring must:

- Be rated for outdoor/wet environments
- Be wired by a licensed electrician
- Include access zones for servicing controllers, valves, and actuators

6. Our System Design Approach

We work with builders and engineers to lay out spa plumbing during the early steel fixing phase. All jet lines, blower pipes, and top-up sensors are mapped out and pressure-tested before shotcrete. This avoids rework, poor performance, and waterproofing penetration issues later.



Chapter 8:
Acoustic Isolation - Springs, Pads and Maintenance

Why Acoustic Isolation Gets Overlooked

Most roof top pools sit on acoustic isolation systems. These are typically spring mounts or elastomeric pads to prevent structure-borne vibration. But here's the truth: no one maintains them. Once the builder hands over the job, the system is often forgotten. Body corporates don't inspect them, there's no trigger for maintenance, and eventually they seize or rust.

That's a problem but it's also a business opportunity. Nature recommend annual inspections of spring systems and acoustic components, and Nature offer this as a service. If you're not checking your isolation hardware every year, you're just waiting for a costly failure.

1. The Hidden Enemy: Chlorine Gas

Springs corrode faster than most people realise, mostly due to chlorine gas. Chlorine gas is heavier than air, and on roof tops it tends to sit under the pool shell or in low-ventilation zones. Over time, this trapped gas speeds up corrosion, especially in tight spaces. Add in the presence of chloramines (the nasty byproduct of chlorine reacting with organics), and even stainless steel starts to suffer. We've seen spring systems completely seized with rust in less than five years because no one accounted for gas accumulation.

Research-backed note:

- Chlorine gas is 2.5x heavier than air and tends to settle in low-lying areas
- Chloramines are chemically aggressive and known to degrade stainless steel
- Poor ventilation = faster failure

2. What to Use and Avoid

Nature only use marine-grade stainless steel springs and hardware. Cheap Chinese imports don't last. We've seen too many failures due to low-grade, offshore components that weren't designed for harsh roof top environments. Saving a few bucks on springs isn't worth the risk when the replacement means jacking up a full pool shell.

3. No Australian Standard — So Use Good Judgement

There's currently no Australian Standard for acoustic isolation in pool construction. The NCC has some general rules on sound transmission, but it doesn't get specific about vibration isolation under pools.

That means the system has to be tailored to the project:

- Above bedrooms or sensitive spaces? Go with low-deflection spring mounts (like C8 or XDRP).
- On commercial roof tops with fewer acoustic concerns? A high-damping pad system might be sufficient.
- Tight budget? There are value options that still provide good isolation without over engineering.

Bottom line: there's no one-size-fits-all solution. Acoustic performance must be balanced with budget, pool size, and serviceability.

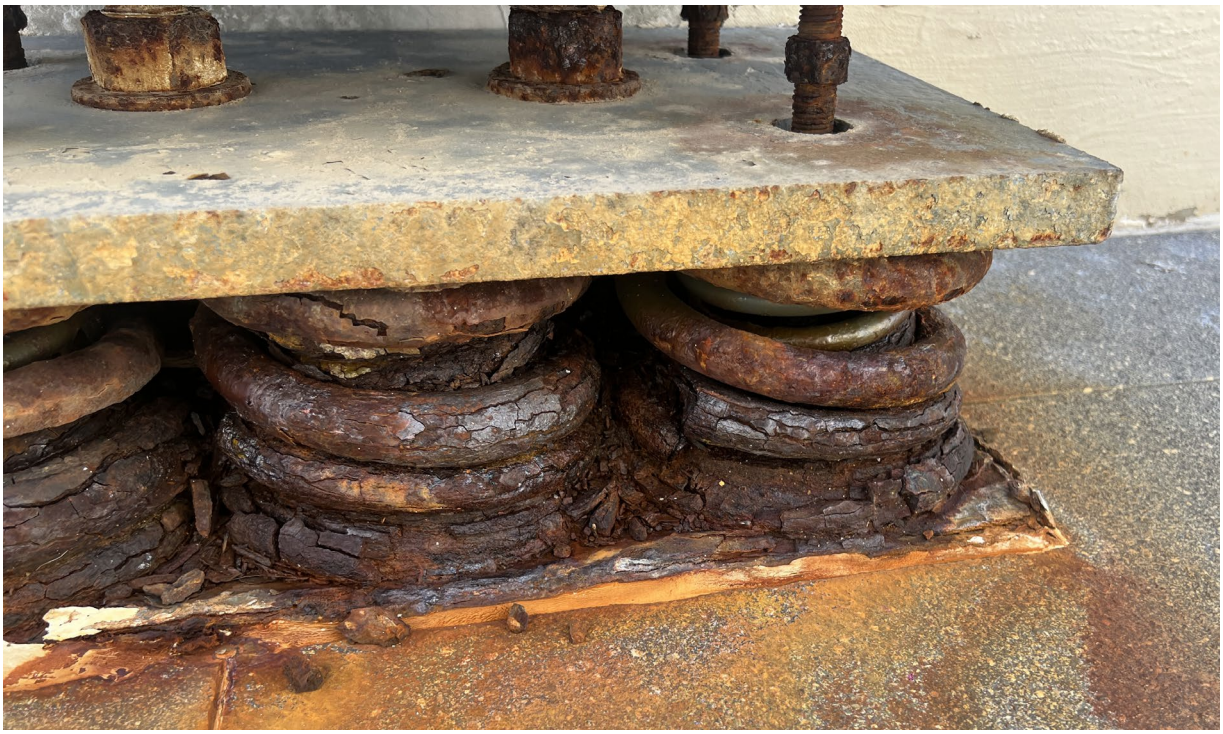
4. Our Golden Rule: Make It Maintainable

If you can't access it, you can't inspect it - and that's where 90% of failures start.

Nature always designs in clear access to spring systems. If the architect wants the pool to "float over the building," that's fine, but someone still needs to get under there every 12 months to check for rust, movement, or alignment.

We follow a simple rule: Minimum 400 mm clearance is the code baseline (as referenced in the NCC for subfloor inspections), but we always recommend at least 600 mm wherever possible. That gives a real person enough crawl space to inspect and service the system safely.

It's a detail that often gets missed in early design - and a nightmare to retrofit later. Build it right, build it serviceable, and you'll avoid nasty surprises five years down the line.



Chapter 9:
Equipment Location, Ventilation & Service Access

1. The Most Common Mistake

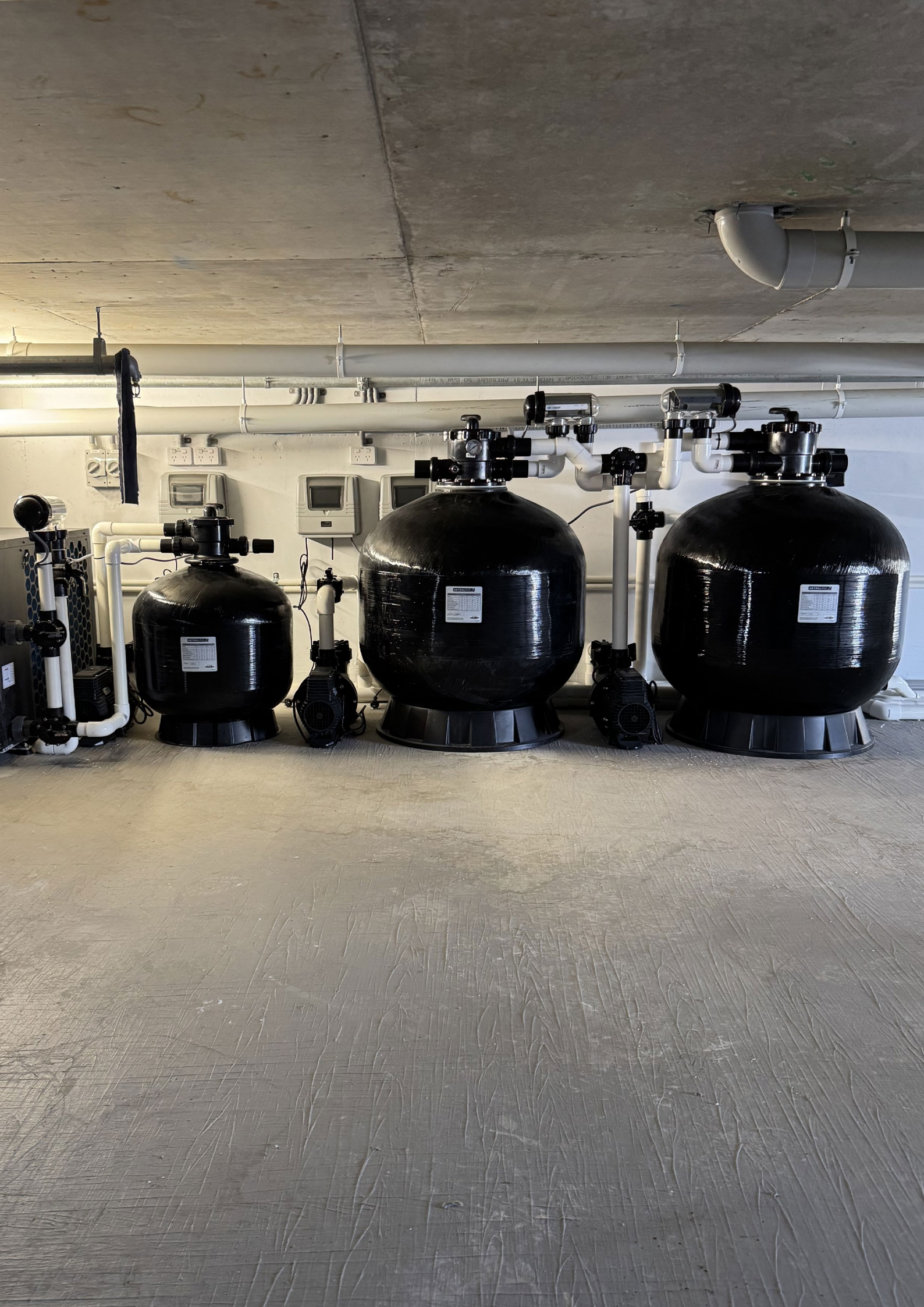
The biggest stuff-up? Cramming equipment into tiny spaces with no airflow.

I've lost count of the times I've walked onto a job and seen heat pumps or chlorinators boxed into a corner where they're basically suffocating. No space to breathe, no clearance for servicing, and no thought for future access. Worse still - they pour the slab, frame up the walls, and *then* ask where the gear should go. By that point, it's a game of Tetris, not a design. Heat pumps need ventilation as they don't generate heat - they move it. And they can't do that if they're boxed in, recirculating their own cold discharge air.

Here's what we recommend based on real specs:

Ideally Outdoor installation
- 2500 mm clearance in front (for airflow and service access)
- 600 mm clearance on each side
- 800 mm clearance at the rear

If you can't give it that, you need forced ventilation and it's best to design it in early, because retrofitting ducting or cutting vents after the riser is framed and an expensive inconvenience.



Chapter 10:
Pipework, Penetrations & Pressure Testing

1. Our Process for Pressure Testing Before Shotcrete

Nature pressure tests every line before the pool shell gets sprayed. Each circuit consists of spa jets, blower lines, and returns, and each one is tested individually to 1800 kPa (based on PN12 pressure pipe rating). We do a 24-hour hold and monitor for any pressure drop. If it drops more than 5 kPa, we find the issue and fix it before anything goes near shotcrete. We also log everything - photos of gauges, timestamps, and notes as part of our QA process and handover docs.

As builders, we do not budge on this. If it's not tested, it doesn't get sprayed. Finding a leak after shotcrete means you're cutting concrete and that's an expense nobody wants.

2. Pipe Penetrations: Sleeves, Boots, and Lagging

Every single pipe that passes through concrete gets treated properly — not just shoved in and hoped for the best. If there are pressure lines through the pool shell, there is a need for Mapelastic swell waterproofing.

Important note: We don't lag pipes inside the pool shell. Shotcrete needs to fully encapsulate those lines to maintain structural integrity. Lagging inside the shell creates air gaps and weak points. Nature only uses lagging where pipes penetrate slabs or are exposed to movement outside the pool shell.

3. Managing Long Risers and Suction Runs on High-Rise Pools

Once you're pushing water for long distances, friction loss and head pressure become real problems.

- We upsize suction lines first - bigger pipe = lower velocity = less resistance.
- We might run 100 mm suction from the pool to the plant even if the return is only 50 mm.
- Pump selection matters. We don't just throw in the biggest unit and hope - Nature calculates total dynamic head, elevation, velocity loss, and backpressure. Always oversized to account for filter dirt loads and future performance drop-off.

Chapter 11:
Drainage, Overflow & Backwash Management

1. Backwash Management — Why It's Non-Negotiable on Roof Tops

Backwash flows can hit 1,000 litres per minute — and almost no roof top drainage system can cope with that volume. If you try to dump it straight into building stormwater or sewer, you'll flood risers, trigger alarms, or blow out containment systems.

That's why Nature always spec a dedicated backwash tank on high-rise jobs. It gives us controlled discharge, helps meet council requirements, and avoids peak-load flooding.

When is it optional?
Only on very small pools (under 20,000 litres) with cartridge filters or private-use setups. Even then, we'll often install a basic balance tank with an overflow just to be safe — it's cheap insurance.

2. Overflow Systems - Where Roof Top Pools Fail Hard

Overflow design gets ignored more than it should - and it's one of the fastest ways to screw up a roof top pool.

Heavy rainfall, big bather loads, or people cannonballing into a tight-edge pool all displace water fast. If your overflow system can't handle the surge, you'll see:

- Flooded plant rooms
- Water running into façade cavities
- Acoustic spring damage from pooling

We've had to retro-cut overflow outlets on finished shells where the pipe was undersized. It's a brutal fix and usually involves retiling or cutting coping.

Golden rule: Overflow isn't just about aesthetics — it's a stormwater protection system. Design it like one.

3. Sub-Pool Drainage

Under the pool, Nature always request a drainage layer including floor wastes with minimal fall to avoid point loading the pool and a full membrane.

This stops water from sitting under the shell, which can cause:

- Acoustic spring corrosion
- Membrane breakdown
- Hydrostatic pressure issues

Nature also coordinates with the builder to waterproof the slab under the pool; not just the shell. Too many jobs get this wrong and pay the price 12 months later when the slab's leaking.

4. Filtration Systems

We typically spec glass media filters with backwash valves. They're efficient, low-maintenance, and handle roof top commercial use better than cartridges.

Why glass?

- Better filtration quality (down to 5 -10 microns)
- Lasts 5-10 years
- Works great with auto backwash systems

When do Nature use cartridges?

- On small roof top/podium pools with no sewer or stormwater connection
- Where council won't allow discharge
- Or on ultra-tight installs with no space for a media tank

But they're more labour intensive to clean and usually not suited to commercial or high-traffic residential buildings.

Chapter 12:
Compliance, Handover & Documentation

Our minimum handover pack includes:
- Form 15 and 16 (or engineering sign-offs for structural elements)
- Waterproofing certificate and membrane warranty
- Pressure test reports and photo log of pipework
- Filter, heater, and controller manuals
- Startup values for water balance, pressure, and flow
- Maintenance instructions tailored to the specific system

1. Final Walkthrough — Who's There and What Nature Checks

Nature always run a formal walkthrough before signing off.

Ideally, this includes:
- The builder or site supervisor
- The developer or owner rep
- Sometimes a strata or facilities manager (if it's a multi-unit build)

We walk through every part of the system:
- Check tile lines, water levels, equipment layout, valve positions
- Confirm automation is working
- Run the heater, lights, blowers, and jets
- Confirm overflow and backwash systems are functioning properly
- Water balance

Nature also verify barrier compliance - fencing height, gate latches, and CPR signage because if that's not done, you can't legally fill the pool.

2. What Other Builders Miss

Here's what we've seen too many times:
- Pools handed over without water balance
- No startup values logged
- Automation not programmed
- Filter pressure unreadable because the gauge is buried or faulty
- Equipment rooms with zero ventilation

Chapter 13:
Long-Term Maintenance Planning

1. Setting the Client Up for Success

We don't just build the pool and walk away - we make sure the people running it day-to-day actually know what they're doing.

At handover, we include:

- A maintenance guide tailored to the equipment installed
- Recommended service intervals for cleaning, testing, backwashing, and inspections
- A clear list of what needs professional attention vs. what building staff can handle

Nature also brief the building manager or facility rep on how the system works - no jargon, just plain English.

2. Maintenance Advice That Actually Matters

Here's the standard schedule Nature recommends for roof top and commercial pools:

- Weekly water testing (automated dosing ≠ foolproof)
- Monthly system check — pumps, heaters, valves, controller logs
- Quarterly backwash and inspection
- Annual acoustic spring check and service (especially critical)

Also: make sure every component is accessible, or no one's going to inspect it. Out of sight = out of mind = expensive failure later.

3. What Happens When It Gets Ignored

At Nature, we have seen systems fail hard just from basic neglect. This includes: chlorine gas sitting in sealed risers, corroding springs and fittings, controllers left on manual dosing for 6 months, filters never backwashed, choking flow and burning out pumps. We have also seen overflow lines blocked with leaves, flooding plant rooms.

Chapter 14:
Pool Depth & Disability Access

If you're building a roof top or commercial pool that will be shared by residents, the public, or guests, you may be required to make it accessible under the Building Code of Australia (BCA) and Disability Discrimination Act (DDA).

But when do those rules apply and what do they actually mean for your pool's design?

1. When Is Disability Access Required?

If your pool is part of:

- An apartment complex
- A hotel or short-term accommodation
- A public roof top venue
- A health club or gym

...you'll generally need to provide at least one accessible way to enter and exit the water. This is laid out in the NCC Specification D3.10.

To be compliant, you need to provide one of the following compliancy options:

- A ramp into the pool (1:14 slope, handrails, resting platforms)
- A pool hoist (landing zone must not exceed 1300 mm depth)
- A zero-depth beach-style entry into the pool

2. The 1.3–1.4 Metre Depth Rule

If you're using a hoist or lift, the pool floor where it lands must not exceed 1300 mm depth. That means you must provide a flat section (usually near the shallow end) where the hoist can safely place someone in the water. It also impacts how quickly the pool floor can slope away, especially in plunge pools or lap pools with steep gradients.

Keep in mind that if you install a fully compliant ramp, you generally do not need to also install a hoist. Given that a ramp has a 1:14 slope, extends into water between 900 mm and 1100 mm deep, has handrails on both sides and includes resting platforms every 9 metres. In practice, most roof top pools skip the ramp because they take up too much space, they complicate formwork and waterproofing, and they are more expensive.

A pool hoist (fixed or mobile) is usually simpler, more compact, and easier to maintain compliance with.

However, you generally don't need to provide disability access if the pool is for private use (e.g. roof top pool for one penthouse), in a facility that already provides access elsewhere and/or exempt under the BCA (check with your certifier). But even when not strictly required, including access early can save a major cost later and make your development more inclusive.

We always ask the developer and certifier whether access is required then work with them to maintain the correct landing depth (≤1300 mm) and ensure there's a compliant zone for hoist installation. Generally, for the aforementioned reasons we avoid ramps unless the site truly supports them. We can also recommend hoist systems, structural tie-down methods, and help coordinate compliance documents at handover.

Chapter 15:
Pipe Runs, Flow Efficiency & Equipment Longevity

1. Pipe Runs

Shorter, straighter pipe runs improve flow efficiency and reduce the workload on pumps. Long risers, tight corners, and excessive bends increase friction loss, which causes pumps to work harder and potentially fail prematurely.
Proper sizing for suction lines (larger diameter for more flow) vs return lines ensures balanced pressure and prevents cavitation. Undersized suction lines are a common cause of pump failure.

2. Plant Room Location

We have already discussed the importance of a cautiously designed plant room. In addition to this, planning plant room locations early can help avoid unnecessary friction loss in piping and ensure adequate space for maintenance. Cramped plant rooms often lead to compromised pipe runs and difficult servicing. Consider the long-term implications of plant room layout.

The Hidden Costs of Poor Pipework Design:

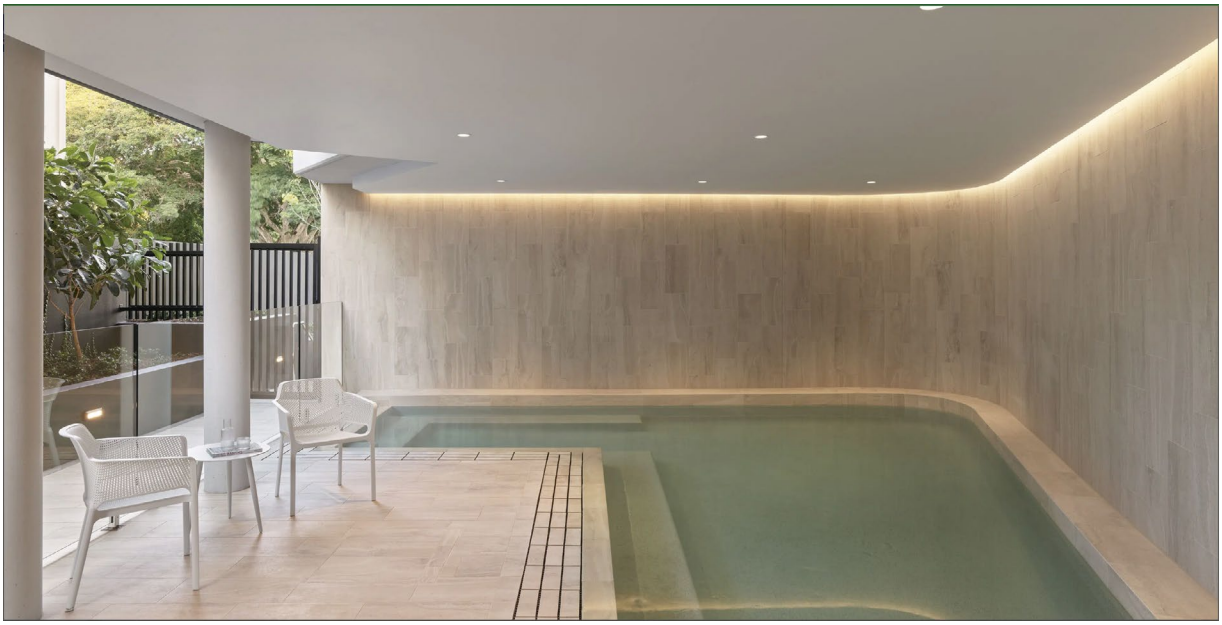
- Increased Energy Consumption: Inefficient pipe runs force pumps to work harder, increasing energy bills.
- Premature Equipment Failure: Overworked pumps have a shorter lifespan, leading to costly replacements.
- Difficult Maintenance: Complicated pipe runs make it harder to diagnose and repair problems.
- Noise and Vibration: Turbulent flow in poorly designed pipework can generate excessive noise and vibration, potentially impacting residents.

3. Best Practices for Roof Top Pool Pipework:

- Minimize Bends and Fittings: Use sweeping bends instead of sharp elbows whenever possible.
- Proper Pipe Sizing: Consult with a hydraulic engineer to determine the optimal pipe size for each section of the system.
- Strategic Plant Room Placement: Locate the plant room as close to the pool as possible to minimize pipe runs.
- Consider Future Maintenance: Design pipe runs with access in mind, allowing for easy inspection and repair.
- Insulate Pipes: Insulate pipes to reduce heat loss and prevent condensation.

Our real-world scenario:
We were called to a roof top pool where the pump was constantly overheating.
The problem? The plant room was located on the opposite side of the building from the pool, and the pipe runs were filled with sharp bends and undersized sections. The friction loss was so severe that the pump was working at maximum capacity just to circulate the water. The solution involved rerouting the pipework, which required significant demolition and reconstruction. The cost of the repair far exceeded the initial savings from the poor design.

Key Takeaway:
Efficient pipework is not just about saving a few dollars on materials. It's about ensuring the long-term reliability, efficiency, and maintainability of the entire roof top pool system. Invest in proper planning and design to avoid costly mistakes down the road.



Chapter 16:
Pool Fencing Compliance

Pool fencing is one of the most regulated and frequently misunderstood aspects of pool construction, especially on roof top and high-density sites. This chapter distills the critical requirements from AS 1926.1 and state-based safety laws into clear, site-ready guidelines.

1. Fence Height and Structure

- Minimum fence height: 1200 mm from finished ground
- No gap greater than 100 mm under the fence
- No opening wider than 100 mm between vertical bars

2. Non-Climbable Zones (NCZ)

- 900 mm clearance from climbable objects (furniture, plants, ledges)
- Applies to the outside of the fence or top of boundary wall
- Boundary fences must be 1800 mm high if part of the barrier

3. Gates and Latches

- Gates must self-close and self-latch from any open position
- Must open away from the pool
- Latches must be 1500 mm above ground or inaccessible to children

4. Doors and Windows

- No direct access from a dwelling to the pool area (unless exempted by older laws)
- Windows must be restricted to a 100 mm opening or have compliant security screens

5. Maintenance and Signage

- CPR sign must be clearly displayed
- Gates, hinges, and latches must be maintained regularly
- Vegetation and objects near fences must be managed to maintain NCZ

6. Raised Pools as a Barrier

If your pool is built 1200 mm or more above ground, the pool structure itself may serve as a compliant barrier - as long as the wall is non-climbable and there are no footholds or braces within the 900 mm NCZ. You must also ensure clear access control to any stairs or deck areas.

7. Chamfered Pool Edges

A chamfered edge of the pool wall at 30 degrees may be deemed non-trafficable, meaning it's not considered walkable and therefore not a climbing risk. This can help satisfy NCZ or barrier requirements where space is tight but must be verified with the certifier.

Chapter 17:
Pool Tiling, Coping, Interiors & Slip Compliance

1. Coping Tile Installation

Whilst coping tiles offer an opportunity to showcase the pool area, they are not just decorative - they serve as a critical transition between the pool shell and the surrounding deck. They help shed water, protect the pool edge, and create a comfortable surface for swimmers.

Coping tiles are typically 20 mm thick and bullnosed, with a 30 mm overhang to direct water away from the shell. When installed, the bedding mortar should be 10-15 mm thick to ensure proper adhesion and levelling. The substrate must be clean, level, and free of dust or loose material. The builder needs to also use adhesive to achieve a minimum 90% coverage beneath each tile to prevent voids and future cracking.

Pool surrounds must also meet Australian slip resistance standards. For coping tiles and wet areas around pools, a minimum P4 slip rating is recommended. For high-traffic areas like decks, stairs, and walkways, a P5 rating is ideal. Smooth or polished finishes should be avoided at all costs in any wet zone.

2. Interior Pool Tiling

On roof top and high-rise pools, tiling interiors comes with extra risk — so best practice is non-negotiable. Always use epoxy-based adhesives and grouts. They are chemically resistant, waterproof, and far more durable under submerged pressure. Standard cement-based grouts are prone to staining, softening, and water migration; especially on exposed roof tops. Interior adhesive should be applied with a notched trowel to ensure full coverage and avoid hollow spots behind tiles. Finally, epoxy grout should be pressed into all joints, completely filling the voids. It must be cleaned while wet for ease of finishing.

Allow the full manufacturer-recommended curing time before filling the pool with water rushing this step compromises bond strength and waterproofing integrity.

Chapter 18:
Pool Water Quality & Ongoing Maintenance

Water balance matters because poor water chemistry isn't just unhealthy - it's destructive. Roof tops get more evaporation and heat compared to in-ground pools - leading to faster pH drift and chlorine loss. Windborne dust and pollutants can also spike demand.

On roof top pools, unbalanced water can:

- Etch or stain the interior finish (tile or pebble)
- Shorten the life of pumps, heaters, and pipework
- Cause grout breakdown or tile delamination
- Trigger surface roughness and discolouration

1. Ideal Chemical Ranges (Australian Standards)

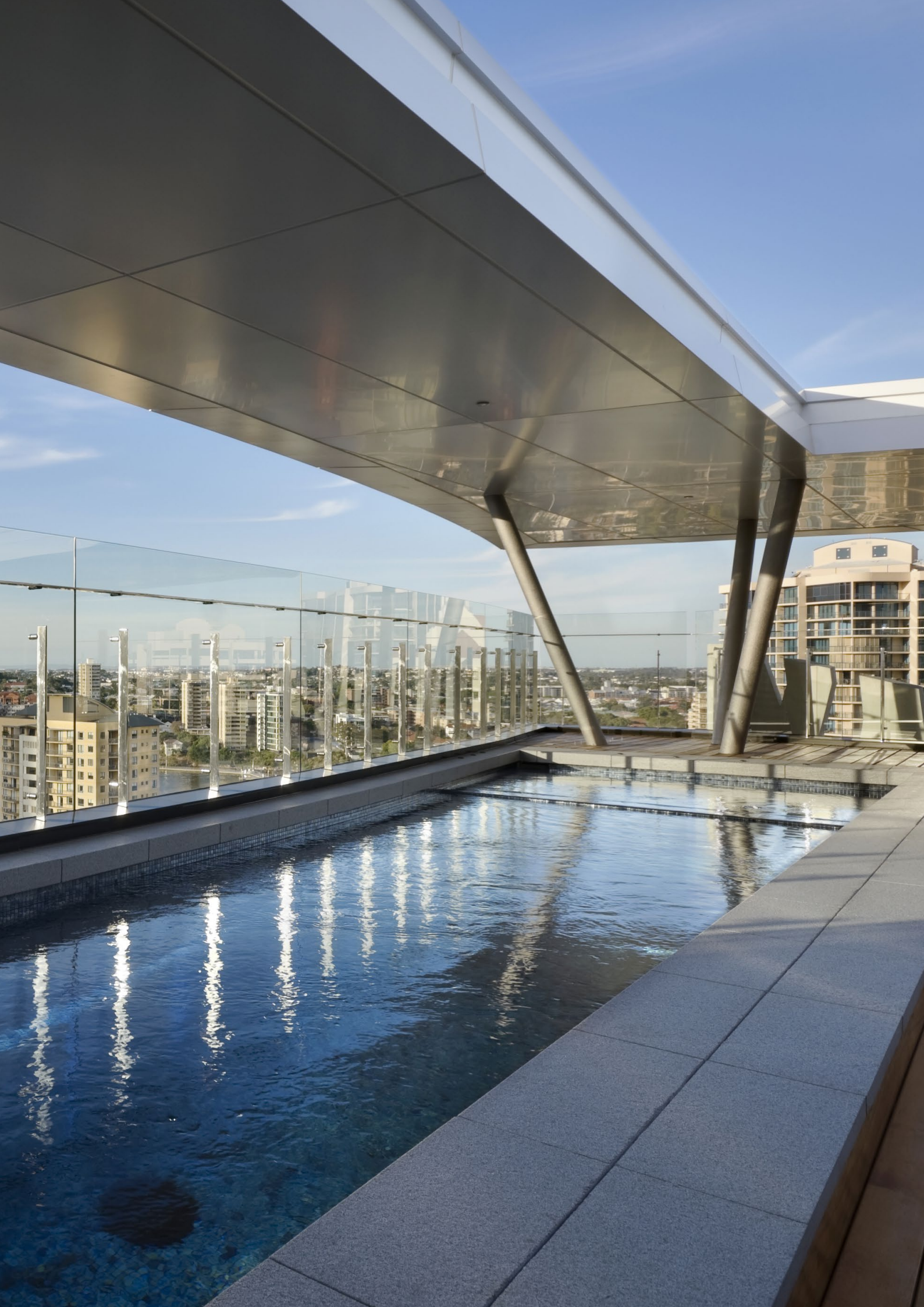
Parameter	**Ideal Range**
Free Chlorine	1.0 – 3.0 ppm
pH Level	7.2 – 7.6
Total Alkalinity	80 – 120 ppm
Calcium Hardness	200 – 400 ppm
Cyanuric Acid (if used)	30 – 50 ppm
Salt (for salt chlorinators)	4,000 – 5,000 ppm (check system spec)

Nature recommend automated dosing or ORP control systems for roof top commercial setups.

2. Commercial Pool Servicing Schedule

For a roof top or strata pool used daily:

- Test water daily (pH, chlorine, and temp minimum)
- Professional service weekly
- Backwash glass media filters every 2–4 weeks (or based on pressure gauge)
- Inspect tile grout and joints quarterly
- Clean waterline tiles monthly
- Balance tank and overflow inspections monthly
- Full system audit annually (heaters, pumps, control systems)



Appendix A:
Roof Top/Podium Pool Planning Checklist

Planning & Design Stage

- ❑ Define pool size, depth, and location on slab
- ❑ Determine live and dead loads for engineering
- ❑ Coordinate early with structural and hydraulic engineers
- ❑ Engage acoustic and waterproofing consultants if required
- ❑ Check zoning and compliance (barrier regs, pool setback)
- ❑ Plan waterproofing system based on interior finish (tile or pebble)
- ❑ Allow time for wet-curing the shell (required by Australian Standards)

Accessibility Compliance

- ❑ Determine if disability access is required (shared or public use)
- ❑ If required, choose access method: ramp, hoist, or beach entry
- ❑ If using hoist, confirm landing zone is less than or equal to 1300 mm deep
- ❑ If using ramp, ensure 1:14 slope, handrails, and landings are included
- ❑ Verify compliance with NCC Spec D3.10 and disability standards

Structural & Engineering Considerations

- ❑ Engineer slab to support full water load + finishes + users
- ❑ Design lateral restraints: hobs, block walls, Dincel system
- ❑ Ensure seismic requirements are addressed
- ❑ Include craneage or kibble planning (13 storey limit for boom pumps)
- ❑ Include acoustic isolation: pads, springs, or structural decoupling

Access & Crane Strategy

- ❑ Determine if boom pump is viable — if not, plan for kibble system
- ❑ Coordinate crane access and lift zones with site manager
- ❑ Allow access points for steel, formwork, concrete, tilers, etc.

Concrete & Shell Build

- ❑ Tie and bend all steel onsite (concrete pool only)
- ❑ Spray shotcrete shell to engineered thickness
- ❑ Wet-cure the shell for 7–14 days to reduce cracking (AS recommended)
- ❑ Install blockwork or Dincel walls around the pool base if required

Waterproofing

- ❑ Grind and clean shell before waterproofing
- ❑ Install correct membrane system: Mapei Mapelastic Smart (pebble) or LATICRETE HYDROBAN (tiles)
- ❑ Apply scratch coat over Mapelastic before pebble
- ❑ Pressure-test membrane before any finishes go in
- ❑ Ensure builder waterproofs slab and retaining walls under pool

Interior Finish

- ❏ Pebble interior: apply over scratch coat, allow curing
- ❏ Tile interior: use correct adhesive and grout systems rated for pools
- ❏ Install 300mm waterline tile (hybrid finish) if applicable
- ❏ Use glass bead pebble for premium smooth feel

Acoustic Isolation

- ❏ Install pads or springs beneath pool shell
- ❏ Ensure spring hardware is high quality
- ❏ Design in access to inspect and clean springs
- ❏ Avoid trapping moisture around acoustic components
- ❏ Schedule future spring inspections as part of maintenance plan

Drainage & Hydrostatic Relief

- ❏ Install proper drainage layer beneath pool to avoid water build-up
- ❏ Ensure drainage doesn't compromise acoustic pads or waterproofing
- ❏ Verify fall to floor waste or drainage channel

Equipment & Services

- ❏ Position equipment in well-ventilated area
- ❏ Avoid placing heat pumps in enclosed risers without airflow
- ❏ Confirm noise isolation from apartments/offices
- ❏ Install access hatches or plant room with service space
- ❏ Test all pipework under pressure before backfilling or concreting
- ❏ Seal all pipe penetrations through the shell with boots or puddle flanges

Backwash & Overflow Management

- ❏ Include backwash tank if building drainage can't handle flow
- ❏ Ensure tank is slow-draining and sized appropriately
- ❏ Confirm council requirement: discharge to stormwater or sewer
- ❏ Ensure sewer/stormwater connection is available at pool equipment location
- ❏ Use cartridge filter only if no sewer/stormwater connection is available and pool is small
- ❏ Preferred system: glass media filter with backwash line to approved discharge point

Compliance & Handover

- ❏ Obtain Form 15/16 or equivalent engineering sign-off
- ❏ Provide waterproofing certification and membrane warranty
- ❏ Test and balance water chemistry
- ❏ Install compliant pool barriers per AS 1926.1 (fence height, gate latching, NCZ)
- ❏ Confirm gate opens away from pool and self-closes/latches
- ❏ Ensure latch is 1500mm above ground or shielded if lower
- ❏ Verify CPR sign is installed and visible from the pool area
- ❏ If pool is raised ≥1200mm above ground, check if structure can act as compliant barrier
- ❏ If pool edge is chamfered at 30 degrees, confirm it is non-trafficable with certifier
- ❏ Deliver maintenance manual and service access guide

Long-Term Maintenance Access

- ❏ Provide access points to inspect acoustic springs and pads
- ❏ Ensure drainage can be cleaned or flushed
- ❏ Maintain spring inspections every 1–3 years
- ❏ Ensure exposed membranes are inspectable

Appendix B:
Roof Top Pool Construction Checklist

Pre-Pour

- ❑ Confirm all plumbing cast-ins are in correct locations
- ❑ Lag all pipe penetrations through slab (minimum 20mm closed-cell)
- ❑ Install sleeves where required
- ❑ Pressure test pipework before pour
- ❑ Take photo evidence of pipe lagging and penetrations

Shell Construction

- ❑ Steel tied to engineer spec and clear of penetrations
- ❑ Install lateral restraint elements (hobs/block walls recommended)
- ❑ Install spa jet, bubbler, blower, and suction pipes
- ❑ Install earth bonding (to be done by licensed electrician)
- ❑ Wet cure shell for minimum 7 days
- ❑ Obtain engineer sign-off (Form 15 or equivalent) before waterproofing
- ❑ Take photo evidence of steel, penetrations, and shell condition

Shotcrete

- ❑ Confirm steel and plumbing placement before spray
- ❑ Ensure nozzle operator has clear access and correct mix design
- ❑ Form spa bench heights and step edges cleanly
- ❑ Finish pool shell surface with correct fall to drain
- ❑ Take photos of fresh sprayed shell including spa walls and seat returns

Waterproofing

- ❑ Grind shell before waterproofing
- ❑ Apply Mapei Mapelastic Smart (pebble) or LATICRETE Hydroban (tile)
- ❑ Install scratch coat (if pebble finish)
- ❑ Flood test waterproofing before finishing
- ❑ Take photos of membrane and test results

Interior Finish

- ❑ Install coping tiles before filling
- ❑ Fill pool and spa simultaneously to avoid cracking
- ❑ Allow for settlement before tiling surrounding paving
- ❑ Install interior finish (glass bead pebble or full tile)
- ❑ Record water level and check for shell movement

Plant Room Setup

- ❑ Install filters, pump, chlorinator, and backwash tank
- ❑ Check all unions greased and valves accessible
- ❑ Install equipment labels and secure dosing lines
- ❑ Pressure test plant plumbing
- ❑ Install control panel and test automation (if applicable)

Final Setup & Handover

- ❏ Balance water chemistry to standard levels
- ❏ Backwash and prime filters
- ❏ Inspect acoustic springs and take photos
- ❏ Log startup pressure, temp, and flow values
- ❏ Confirm overflow system works during rain event
- ❏ Take final handover photos and submit documentation