AGENDA

Polypipe Middle East at a glance
The Case for SMART HEALTHY Cities
Green Urbanisation
Air Quality in Buildings
Q&A
Passionate about everything we do…

60 years in the Gulf region

20,000 Polypipe products available nationally

18 Sites operating internationally, with an expanding global presence

Almost 3,000,000 line items delivered every year

287 million metres of pipe manufactured per year

Over 100 product systems

356 Trademarks Registered

26 Trademarks Pending

81 Patents & Designs Granted

33 Patents & Designs Pending

Polypipe
Sustainable and Resilient Urban Environments

Challenges of modern urban development

- Population growth
  - Urbanisation
  - “Concretisation” of landscapes

- Climate change
  - Extreme weather events; Flood alleviation
  - Pollution; Air quality

- Capacity constraints of existing infrastructure

- PRICE vs COST
## Local Water Challenges...

<table>
<thead>
<tr>
<th>Too much – too little</th>
<th>Localised Flooding</th>
<th>Network Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>Duration</td>
<td>Event Frequency</td>
</tr>
<tr>
<td>Limited Networks</td>
<td>Rapid Urbanization</td>
<td>Water Table</td>
</tr>
</tbody>
</table>

### Catchment Area
- Detention

### Increased Impervious Surfaces
- Zero Discharge

### Discharge Rates
- De-Watering
165,000 years ago

11,000 years

50 years

now
26ºC

76ºC
What is the Urban Heat Island Effect?

Urban Heat Islands are urban areas that are significantly warmer than surrounding rural areas. A microclimate is created due to dense construction and high population.

- Pavements and rooftops absorb heat and their surface temperatures can be up to 50 degrees hotter than the temperature of the air.
- The heat is trapped in the polluted air.
- Narrow spaces between buildings trap air and heat it up.
- Buildings hinder the flow of cooler air from neighbouring areas into the city.
- Waste heat is created by energy from people and vehicle exhausts.
- Concrete absorbs heat during the day like a giant storage heater and releases it at night.
Water & Climate Cycles

- **Rate of water dispersion**
  - Water runs off almost instantaneously from impervious surfaces

- **Quality of water released**
  - In the natural state, run-off water is naturally filtered as it flows through foliage and soil

- **Quantity of water released**
  - Impervious surfaces increase the quantity of water released to water courses

- **Urban Heat Island Effect**
  - A city centre can be +10° warmer than the surrounding countryside

Towards optimised total network performance

- Enabling the recovery of the natural processes of the climate-water cycle
- Delivering resilience in the built environment
- Delivering multifunctional benefits associated with a sustainable built environment

Polypipe Water Management Solutions Make the Future Water Proof
Blue – Green Integrated urban design delivers multi-functional benefits to our urban environment

- Air & Water Quality Improvement
- Facilitate ‘Pre-developed’ Hydrology
- Habitat Creation/Protection
- Urban Amenity
- Wellbeing

Increasing tree cover and green spaces help combat heat island effect

Pollution Control

Flood Management

Green roofs reduce summer heat, provide insulation and reduce stormwater runoff
MAKING SPACE FOR WATER
A HOLISTIC, SUSTAINABLE APPROACH TO LAND USE, WATER MANAGEMENT AND BIODIVERSITY

EXTREME STORM EVENTS GREATER THAN 1 IN 200 YEAR REQUIRE OVERLAND FLOOD ROUTING

1 IN 5 YEAR EVENT

SOURCE CONTROL

REQUIREMENT
To effectively manage stormwater run-off within the development as close to source as possible.

SOLUTION
Pervious pavements ensure stormwater permeates into the ground. Shallow geocellular storage units collect the stormwater and increase ground storage capacity by a multiple of 3 times the volume, providing extra capacity within the same footprint.

BENEFIT
Stormwater run-off volumes and flows from the development are contained and controlled for the vast majority of storm events.

1 IN 10 YEAR EVENT

SITE CONTROL

REQUIREMENT
Effective management of stormwater not dealt with at source. Multiple benefits derived from drainage systems that reduce flood risk.

SOLUTION
Buried storage systems intercept water that exceeds source control levels. Flow control systems ensure water discharges are controlled at greenfield run-off rates. Pre-treatment systems provide water quality improvements prior to discharge to surface water features.

BENEFIT
Buried systems create space for water management below ground, freeing up space above to be utilised by the community for amenity and landscaped to improve biodiversity.

1 IN 100 YEAR EVENT

REGIONAL CONTROL

REQUIREMENT
Large scale regional control needed to ensure appropriate flood risk management strategy.

SOLUTION
Engineered solutions interfacing with wetlands and water courses in a holistic drainage system, further enhancing biodiversity and greening the environment. Evapotranspiration further reduces run-off volumes.

BENEFIT
Responsible amenity and a practical source of water management ensuring that even the more extreme events are contained and managed.
Solving the problem with Polypipe

We have already developed engineered water management solutions to help mitigate the impact of climate change and urbanisation in our environment.
Green roofs can retain up to 82% of annual rainfall.

Green roof surfaces are up to 30°C cooler.

The shading of 4 trees can save 25% of the energy needed for cooling a building.
Source Control…
Capturing water as close to where it falls as possible
Polypipe Green Infrastructure

With a culmination of climate change and severe weather events, our urban areas – cities in particular – are at risk of succumbing further to the effects of flooding, drought and the Urban Heat Island effect.

Geocellular systems provide an engineered approach, providing integrated water management solutions to improve quality of life and health of our major cities inhabitants.
Benefits of Trees in Urban Areas

- Trees prevent runoff & erosion, resulting in improved water quality & reduced stormwater runoff or flooding.
- Shade provided by trees reduces the urban heat island effect. Shaded surfaces may be 11-25°C cooler than the peak temperatures of unshaded materials.
- The beauty of trees & greenery can raise property values by up to 15%.
- Trees improve air quality by removing carbon dioxide, absorbing air pollutants, & producing oxygen.
- Roadside plantings & landscaping can reduce driver stress.
- Shoppers have indicated that they would be willing to spend up to 12% more for products in business districts with attractive urban forests.
- Studies show that living near trees & well-landscaped grounds can improve health, happiness & wellbeing.
- Trees properly placed around buildings can reduce air conditioning needs by 30%.
▪ Cyclical Water Management – zero waste
▪ Integration into existing structures – multifunctional
▪ Attenuation and flow control – climate change
▪ Shallow installations - economic and sustainable
▪ Building protection – urban resilience
▪ Integrated treatment – water quality
Green Space and Urban Design have a direct correlation to property values, occupancy rates and buying decisions.
Smart Cities of the Future

**GREEN URBANISATION:** Green areas and rooftops will be used more frequently to create inclusive amenity space for residents and improve water and air quality.

**BIG DATA**

New connective technologies and data platforms will manage energy resources, transport and urban administration.

Data-driven digital ecosystems will communicate with themselves to maximise efficiency.

**URBAN BIODIVERSITY**

Integrated smart infrastructure will revolutionise public transport and individual safety.

**LANDSCAPING SECURITY**

**ASSET PROTECTION:** Measures will build-in resilience to climate and population extremes.

**CIRCULAR ECONOMY**

Next generation sustainable water management systems will help mitigate the impact of climate change and population growth.

Capture → Store → Reuse → Treat

**URBAN OASIS**

Adoption of biophilic design principles will enhance the city living experience, improving health and wellbeing.

Wellbeing will be at the heart of urban planning and policy-making.
# Green Credits (LEED Rating)

A well-designed sustainable urban drainage system can potentially support over 25% of LEED requirements for certification.

<table>
<thead>
<tr>
<th>Ref</th>
<th>Section</th>
<th>Description</th>
<th>Green Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS Credit 6.1</td>
<td>Stormwater Design: Quantity Control</td>
<td>Reduce impervious cover, increase on-site infiltration, reduce pollution from stormwater runoff by eliminating contaminants</td>
<td>1 point</td>
</tr>
<tr>
<td>SS Credit 6.2</td>
<td>Stormwater Design: Quality Control</td>
<td>Stormwater treatment systems designed to remove 80% of the average annual post-development total suspended solids using rainwater recycling, vegetated roofs and swales, pervious pavement.</td>
<td>1 point</td>
</tr>
<tr>
<td>SS Credit 7.2</td>
<td>Heat Island Effect: Roof</td>
<td>Reduce heat islands to minimize impact on the microclimate and human and wildlife habitat by installing a vegetated roof</td>
<td>1 point</td>
</tr>
<tr>
<td>WE Credit Prerequisite 1</td>
<td>Water Use Reduction: 20% Reduction</td>
<td>20% reduction in water use for building using alternative on-site sources of water such as rainwater, stormwater and greywater</td>
<td>1 point</td>
</tr>
<tr>
<td>WE Credit 1.1</td>
<td>Water Efficient Landscaping, Reduce by 50%</td>
<td>Limit or eliminate the use of potable water for landscape irrigation by using captured rainwater, recycled wastewater, groundwater and other means</td>
<td>1 point</td>
</tr>
<tr>
<td>WE Credit 1.2</td>
<td>Water Efficient Landscaping, No Potable Water Use or No Irrigation</td>
<td>Use only captured rainwater, recycled wastewater or recycled greywater for site irrigation.</td>
<td>2 points</td>
</tr>
<tr>
<td>WE Credit 2</td>
<td>Innovative Wastewater Technologies</td>
<td>Reduce generation of wastewater &amp; potable water demand, while increasing the local aquifer recharge – use captured rainwater or recycled greywater to flush toilets and urinals or treat 50% of wastewater on-site to tertiary standards.</td>
<td>2 points</td>
</tr>
<tr>
<td>WE Credit 3</td>
<td>Water Use Reduction 30% - 40% reduction</td>
<td>Maximize water efficiency within building to reduce the burden on municipal water supply &amp; wastewater systems. Use alternative on-site sources of water such as rainwater, stormwater and greywater for non-potable applications such as toilet flushing and urinal flushing.</td>
<td>2-4 points (30% reduction 2 pts, 35% reduction 3 pts, 40% reduction 4 pts)</td>
</tr>
<tr>
<td>ID Credit 1-1.5</td>
<td>Innovation Design Credit</td>
<td>Projects that result in exceptional performance above the requirement set by LEED</td>
<td>1 point</td>
</tr>
</tbody>
</table>

NB: Significant benefits are also achievable for alternative green rating systems, such as Estidama, Dubai Green Buildings, QSA, BREEAM etc. Please ask for further information.
Green Urban Infrastructure Supports National Visions
Sewer gases contain a mixture of
Hydrogen Sulphide
Carbon Dioxide
Ammonia
Methane
Nitrogen
Hydrogen

Indoor air pollution is 2 - 5 times worse than outdoor air quality

90% of our time in a day is spent indoors

Prolonged low level exposure to sewer gases may cause

Pneumonia
Headaches
Irritability
Poor memory
Nausea
Dizziness

LIVING SPACE

Poor Air Quality in the office can lead to higher levels of

Fatigue
Stress
Absenteeism

How Is The AIR QUALITY IN YOUR Home?
Reduced riser space = increased floor area and ROI
Engineered to protect traps seal – prevent bad smells
Reduction in installation and materials by up to 40%
Welded drainage joint technology – leak free solution
WHICH COSTS MORE?
Any Questions?