



# CUPOLEX®

BUILDING SYSTEMS



# CUPOLEX RIALTO

## THE SOLUTION FOR

Crawl Spaces • Aerated Floors • Structural Weight Limits  
Root Protection Cells • Underground Water Tanks • Structural Fill



## What is CUPOLEX-RIALTO

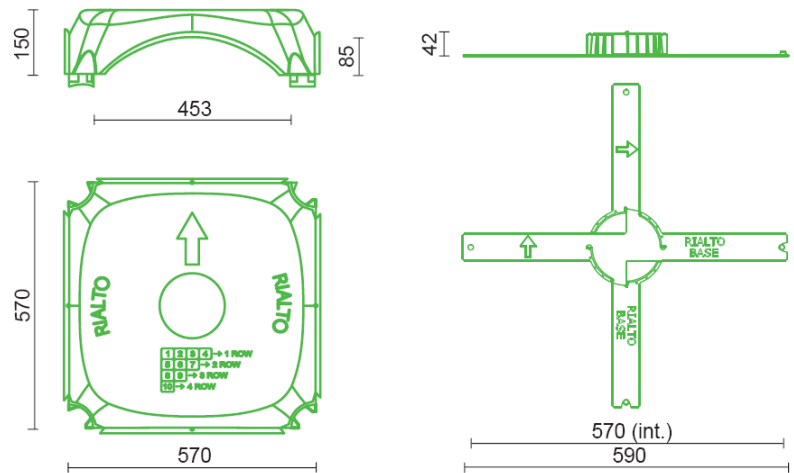
CUPOLEX-RIALTO is a forming system for providing an easy, efficient and fast solution for constructing an aerated floor with heights from 500mm (20 inches) to 2500mm (100 inches). This cutting edge forming system comprises of CUPOLEX domes, pipes and bases that quickly interlock and connect to each other composing a self bearing structure ready for the placement of a concrete slab. The elevated CUPOLEX slab supported by the matrix of columns formed by the pipes allows the system for high load-bearing capacities and the elevated CUPOLEX-RIALTO structure and the void created below the slab can be used for various purposes and applications.



## Common uses and Applications

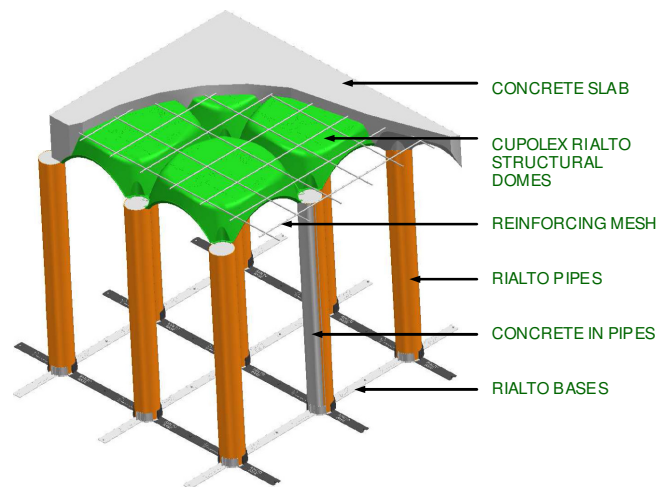
- ▶ A sustainable and cost effective alternative to Structural Fill
- ▶ Creating Rain water/Grey Water Underground Storage tanks and Collection Systems
- ▶ A Cost effective and a more structural performing alternative to Structural cells
- ▶ Creating under slab soil layers for Tree Pit Root Protection
- ▶ Creating Crawl Spaces
- ▶ A Solution for Structural Weight limits and for post-construction settlement of sub grades.

## Dimensions



## Material Requirements for 1m<sup>2</sup>

- ▶ 3 Rialto Bases;
- ▶ 3 Rialto Pipes of 125mm in diameter;
- ▶ 3 CUPOLEX Rialto units;
- ▶ 0.052m<sup>3</sup>/m<sup>2</sup> of concrete consumption to fill pipes and to the top of the CUPOLEX dome elements;
- ▶ Welded Wire Mesh type as to design specifications;
- ▶ 0.01m<sup>3</sup>/m<sup>2</sup> of concrete for every 10mm of concrete above the CUPOLEX Rialto domes.



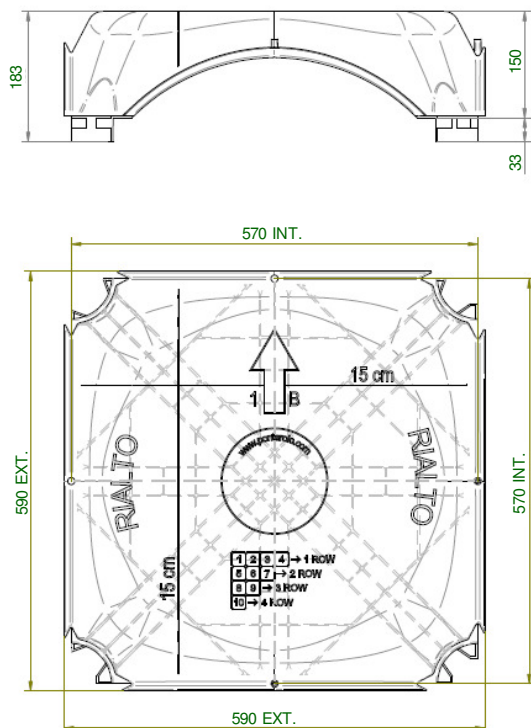


CUPOLEX RIALTO is permanent formwork made from 100% non toxic recycled polypropylene. It comprises of three elements: Column-forming pipes, a cup integrated in a base grid which acts as spacer of the column-forming pipes, and a Cupolex form which fits on the top of the vertical pipes which represents the slab forming element of the system.



## TECHNICAL CHARACTERISTICS

### CUPOLEX RIALTO STRUCTURAL DOME



#### DIMENSIONS

INT: 570mm x 570mm x h.150mm

EXT: 590mm x 590mm x h.183mm

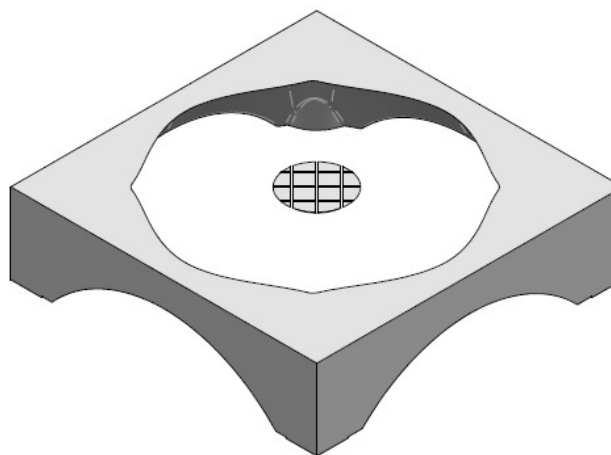
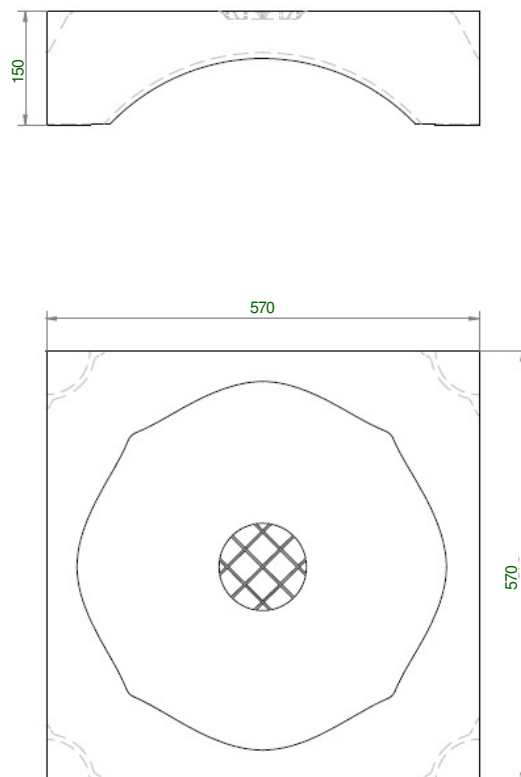
#### AREA

SINGLE UNIT.....0.3249m<sup>2</sup>

4 UNITS.....1.2996m<sup>2</sup>

(3.0778 CUPOLEX DOMES = 1.0m<sup>2</sup>)

### CONCRETE VOLUME



#### DIMENSIONS

INT: 570mm x 570mm

HEIGHT: 150mm (to top of CUPOLEX dome)

#### SURFACE COVER (to top of CUPOLEX dome):

SINGLE UNIT.....0.3249 m<sup>2</sup>;

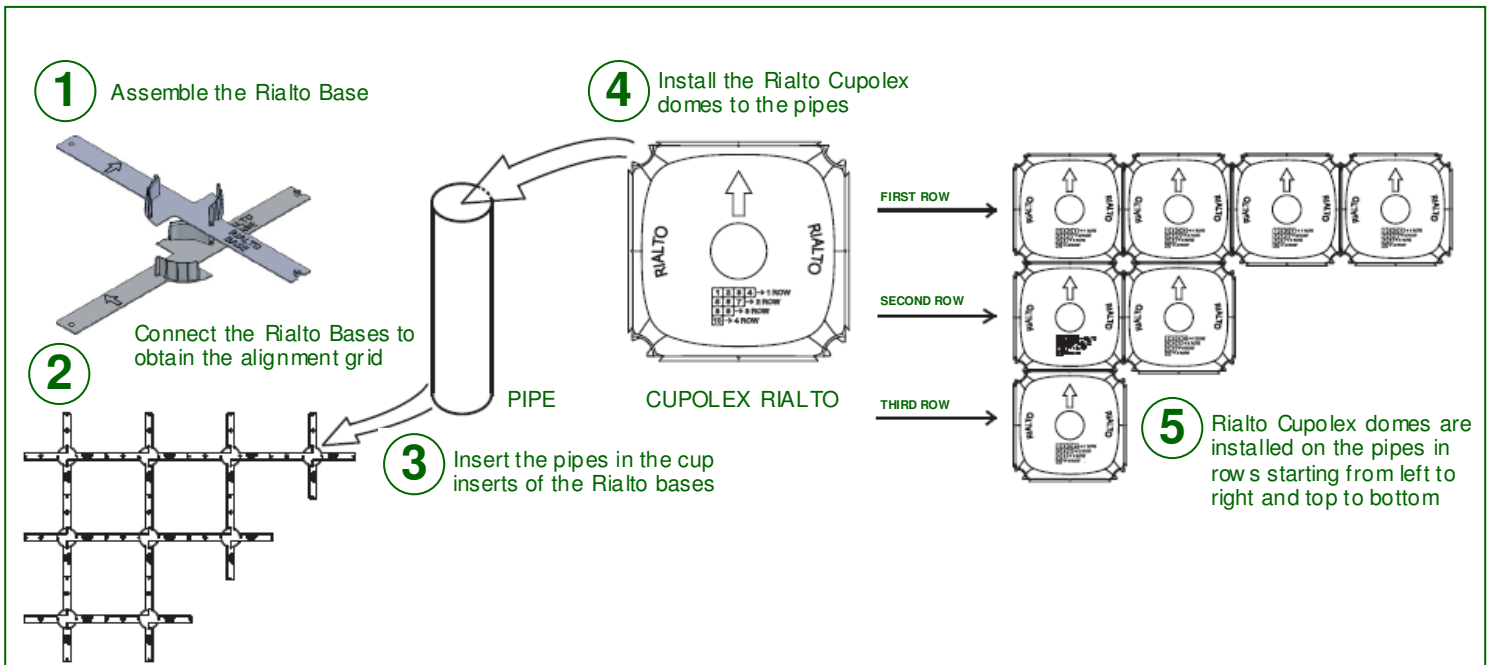
4 CUPOLEX UNITS.....1.2996 m<sup>2</sup>;

#### CONCRETE CONSUMPTION

SINGLE CUPOLEX DOME.....0.00734 m<sup>3</sup>

(Weight of concrete for single element....17.605 kg)

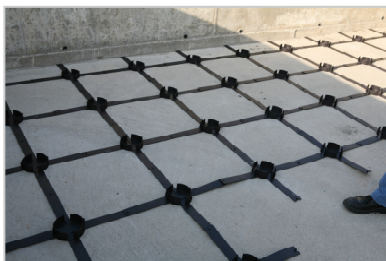
## ASSEMBLY PROCEDURES



Assemble the bases with the two elements as shown on figure 1 above



Connect starting row of Cupolex domes to perimeter. Refer to the details on the various options for support and connections to perimeter walls or foundations.



Connect the assembled bases in order to obtain the alignment grid. Assemble the bases on the prepared subbase horizontally in rows starting from left to right and top to bottom, with the arrows on the bases pointing up and to the right.



Rialto Cupolex domes are installed on the pipes in rows starting from left to right and top to bottom. Ensure that all connections to the pipes are securely connected.



Insert the pipes cut to the specified heights into the cup inserts of the bases. Ensure that the pipes are completely inserted in the bases.



Install the Welded Wire Mesh and steel reinforcing as to design specifications and the system is ready to receive the placing of the concrete. Always exercise caution when walking on the assembled Rialto forming system.

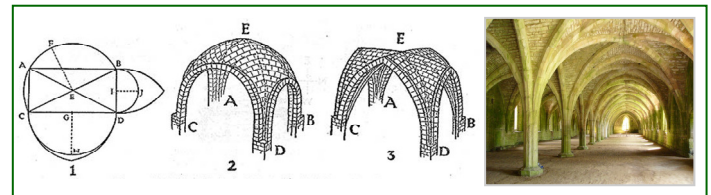
## STRUCTURAL SLABS

- ▶ Crawl Spaces
- ▶ Aerated floors
- ▶ Structural Fill
- ▶ Weight Limits

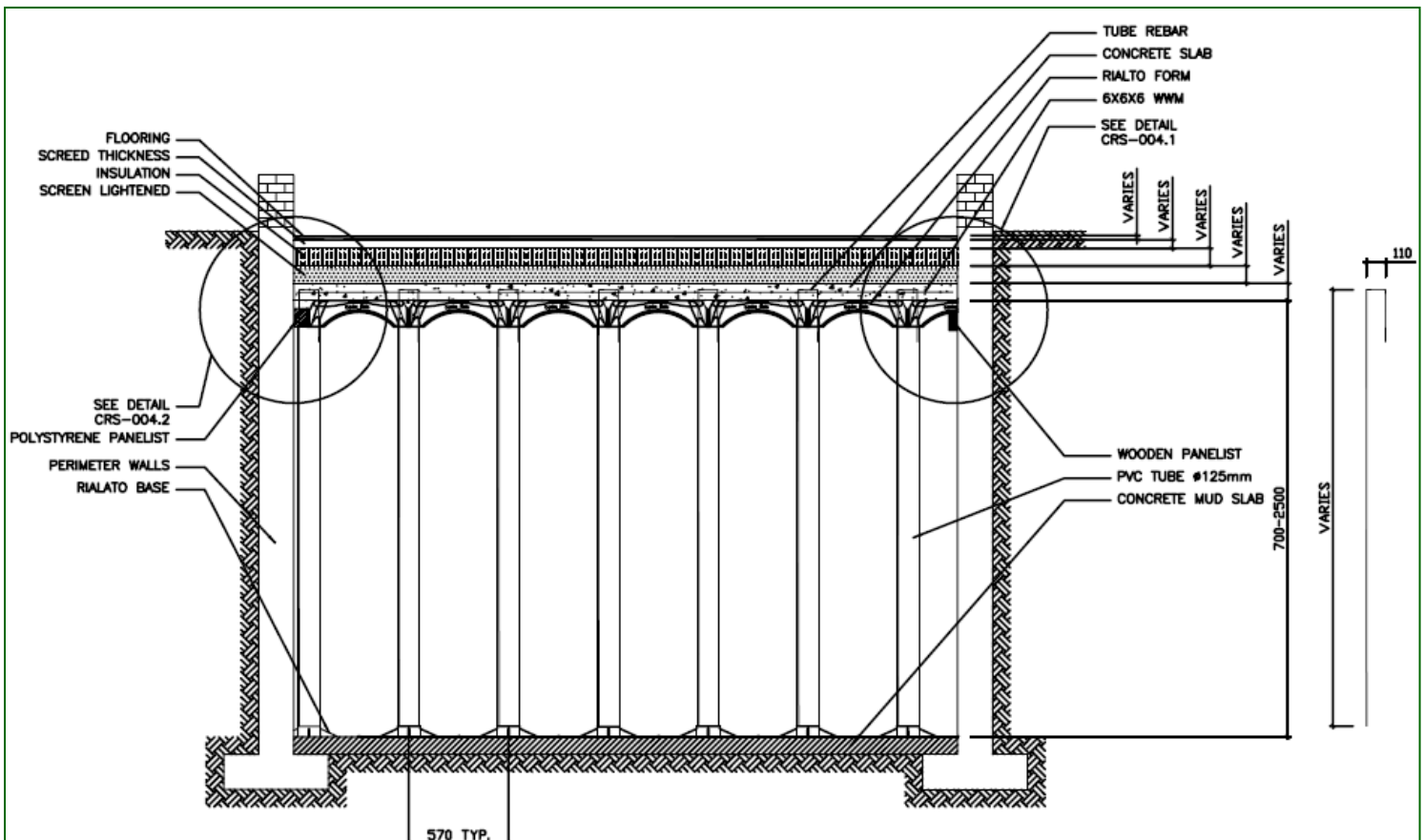
CUPOLEX RIALTO slab on grade systems provide the most cost effective and sustainable solutions to conventional thickened slab designs. RIALTO crawl space foundations provide solutions to moisture, mold, and venting problems that have been common to old fashioned crawl space foundation designs. RIALTO slabs replace gravel or any other fill typically required below slabs constructed on native or engineered sub-grades consisting of low to non expansive characteristics. RIALTO slabs also replace expensive rigid insulation typically used for creating floating concrete slabs on existing structures when weight limit is a factor.

## THE STRUCTURAL DOME

Structurally, Cupolex relies on stress arching principles that have been employed for thousands of years. The ancient Roman used arches to support aqueducts, miners have used arches to support tunnels for hundreds of years, and Cupolex uses patented dome shaped forms to introduce arches into concrete slabs. The arches make the slab stronger by putting the concrete under compression, rather than tension, and distribute live loads across a larger area than slabs on grade. No other aerated floor systems can provide an under-slab void with the same structural advantages.



ROMAN DOME ENGINEERING



CUPOLEX-RIALTO CRAWL SPACE DETAIL



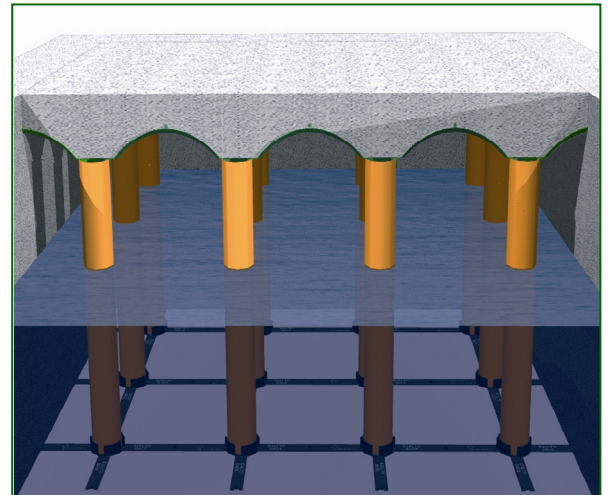
## CUPOLEX-RIALTO WATER TANKS

- ▶ Rain Water Harvesting
- ▶ Hidden Rain Water Harvesting
- ▶ Storm water Detention
- ▶ Shallow and Deep Storm water Detention
- ▶ Grey water Recycling
- ▶ Rain water Tanks and Collection Systems

*Water...harvest it, store it, Conserve it,  
Recycle it...respect it!*

Once optional, rainwater harvesting is now a necessity and choosing a Cupolex Rialto system is a major step in securing water for your building site. They are discreet and do not encroach on living areas. Specifying Cupolex or Cupolex Rialto systems is also a great way for a building company to lift its market profile as an environmentally conscious business.

Cupolex Rialto Slab Tanks and Cisterns offer drought-beating rainwater storage that's out of sight and doesn't take up valuable real estate. Available in almost any capacity, Cupolex Rialto Slab Tanks and Cisterns are hidden within the slab of the building, under parking areas or beneath landscape areas, allowing you to harvest, store and use your rainwater around the home or building without restriction. Cupolex Rialto Slab Tanks and Cisterns are economical, fast and simple to construct. Cupolex Slab Tanks don't require deep holes or shoring which can be costly and messy, or cause interruptions or risk workplace safety on the building site.



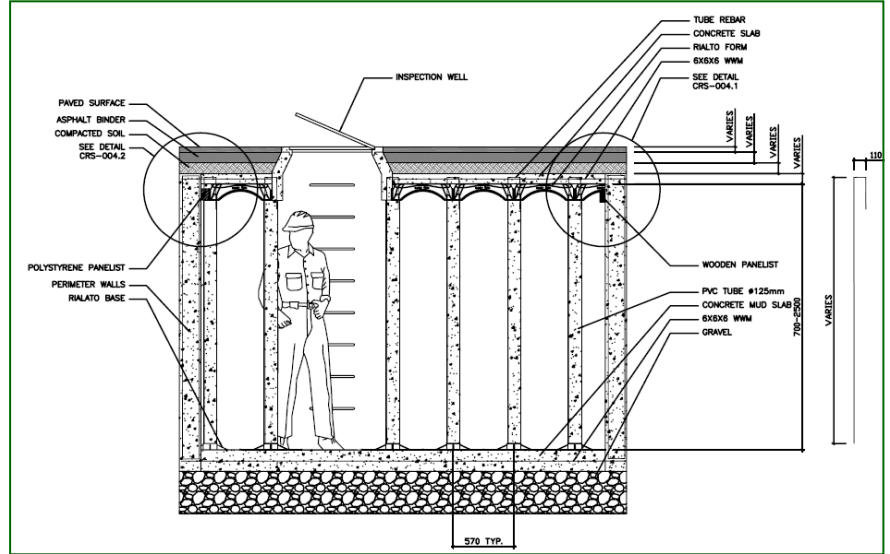
## ADVANTAGES

- ▶ **The use of rain water tanks guarantees:**
  - Less waste of water (and therefore money), particularly potable drinking water,
  - Reduction of the costs for the purification of smaller quantities of the reflow that reach the clarifiers, thanks to the separation of the component impurities,
  - Insertion of the rain water in the natural cycle of water rejuvenation,
- ▶ **In particular for private dwellings, the rain water retention could satisfy 50% of the household's daily water use including:**
  - the irrigation of green areas (lawns and gardens),
  - the refilling of the toilet flush box,
  - the cleaning of the house and the supply of water for the washing machine (rain water is low in salts and thus low in the formation of calcium, limestone and other deposits)
  - car washing
- ▶ **In the industrial sector water retention could be used for:**
  - the cooling of the production process,
  - the washing process,
  - the rinse process,
  - in any other workshop except food preparation,
  - fire fighting employment,
- ▶ **In the agricultural sector water can be used for irrigation.**

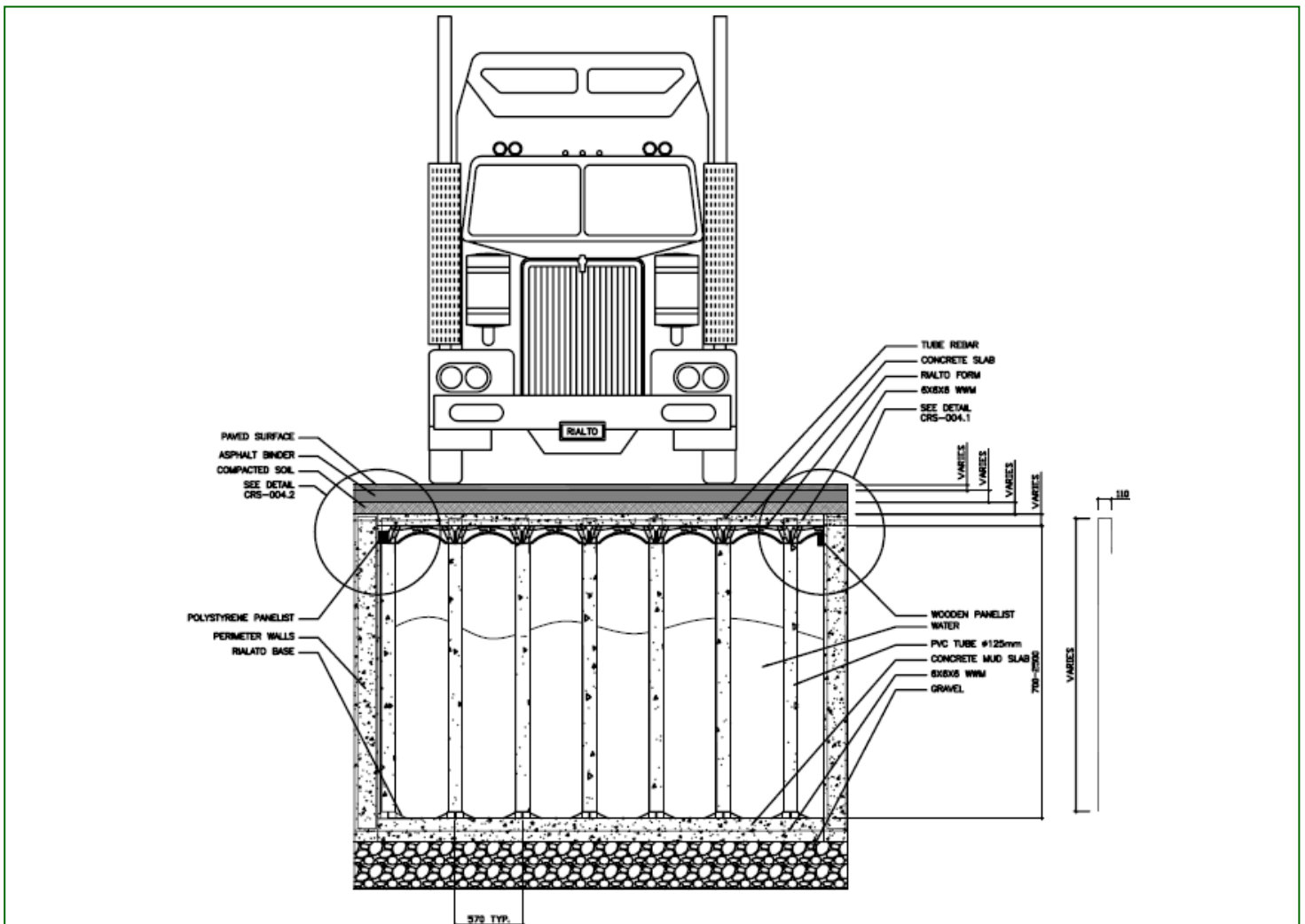


## CUPOLEX-RIALTO WATER TANKS

- ▶ Custom design and layout
- ▶ Streamlined installation
- ▶ Resistant to aggressive environments
- ▶ Suitable in minimum cover situations
- ▶ Simplified inspection and maintenance
- ▶ Cost-effective installations



CUPOLEX-RIALTO INSPECTION WELL DETAIL



CUPOLEX-RIALTO SLAB TANK DETAIL



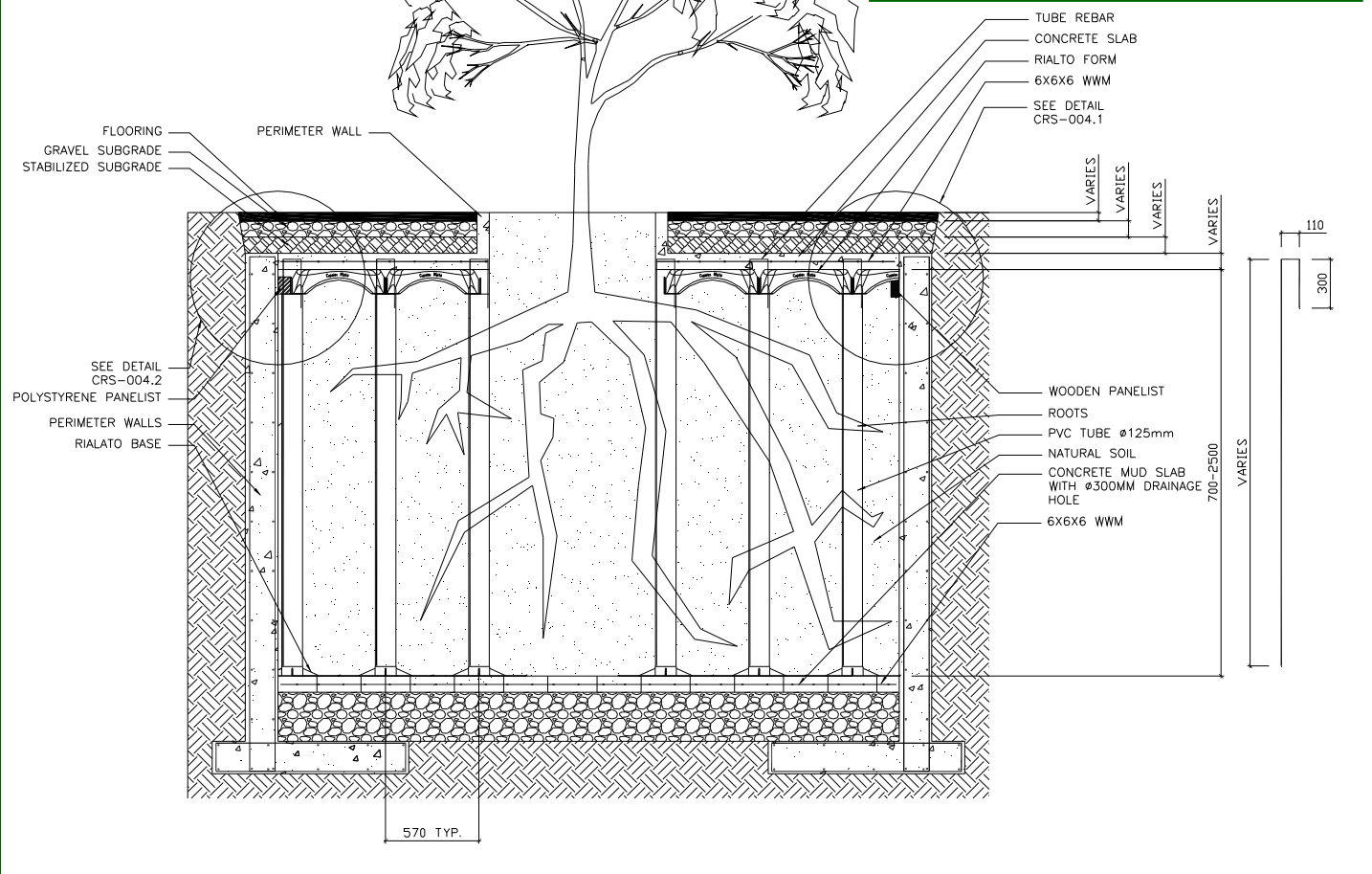
## CUPOLEX-RIALTO FOR TREE PIT ROOT PROTECTION

Trees in cities are almost universally seen as a very desirable, indeed hugely beneficial part of our lives. And probably the most critical factor in tree health and longevity, is the provision of enough quality soil for the tree roots. Providing for this volume of non compacted soil beneath pavements is an issue that arborists, landscape architects and engineers have been debating for decades. The CUPOLEX-RIALTO system employs advanced Concrete design geometry to produce the latest generation of underground tree root protection cells.

*CUPOLEX-RIALTO has been designed to support work loads and form a monolithic structure with excellent modular strength, both vertically and laterally.*

*Essentially, Rialto tree pits may be utilized wherever trees are being planted in paved areas. There are many areas where the application of this system can assist with the healthy growth of trees in cities: Parking Lots, Roadways, Footpaths, Plazas & Medians.*

**Advanced engineering and design provides 100% non compacted soil volume"**



## TIME-TESTED AND PROVEN TECHNOLOGY

The CUPOLEX-RIALTO advanced concrete geometry has been "time-tested" with millions of square feet installed and proven by Finite Element Analysis, as well as physical Ultimate Load tests at universities and at the Research counsel. These test results have been verified by structural engineers to provide adequate support for dynamic loads of vehicle traffic.

The placement of the concrete represents one of the last procedures to be completed. There remain a number of operations that are completed directly above the plastic forming system before the placement of the concrete. This is what is termed "impact resistance". The positioning of the elements and the layout of the reinforcement are tasks that require the workers to walk on top on the elements with various loads, and sometimes in difficult situations. CUPOLEX-RIALTO, therefore, guarantees superior characteristics of stability and resistance in its structure. Pontarolo Engineering guarantees these characteristics through scrupulous and systematic quality control procedures.

*The following table contains the concrete consumption and the dead load of the structure with a typical 75mm concrete topping above the Cupolex-Rialto domes.*

TOTAL HEIGHT OF REALTO SLAB (mm)	CONCRETE CONSUMPTION w/75mm ABOVE REALTO DOMES (m3/m2)	TOTAL DEAD LOAD OF STRUCTURE (kPa)
500	0.106	2.62
550	0.108	2.67
600	0.110	2.72
650	0.112	2.77
700	0.114	2.82
750	0.116	2.87
800	0.118	2.92
850	0.120	2.97
900	0.122	3.02
950	0.124	3.07
1000	0.126	3.12
1050	0.128	3.17
1100	0.130	3.22
1150	0.132	3.27
1200	0.134	3.32
1250	0.136	3.37
1300	0.138	3.42
1350	0.140	3.47
1400	0.142	3.52
1450	0.144	3.57
1500	0.146	3.62
1550	0.148	3.67
1600	0.150	3.72
1650	0.152	3.77
1700	0.154	3.82
1750	0.156	3.87
1800	0.158	3.92
1850	0.160	3.97
1900	0.162	4.02
1950	0.164	4.07
2000	0.166	4.12

