WATER AND LANDSCAPE VEGETATION RELATION

1. Landscape Vegetation Water Requirement
2. Planting Medium Factor And Water Requirement
3. Planting Base Factor – Planter Against On Ground
4. Water Saving Species
5. How To Identify Water Saving Species
6. Over Water And Water Logged Consequences
7. Species For Water Logged Area
8. Case Study - Information Of Drought Effect In Singapore Landscape Vegetation
9. Conclusion
## LANDSCAPE VEGETATION WATER REQUIREMENT

<table>
<thead>
<tr>
<th>LANDSCAPE TYPE</th>
<th>WATER REQUIREMENT (L/DAY)</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>TYPE OF IRRIGATION</th>
<th>IE</th>
<th>TPWA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHRUBS</td>
<td>6.3</td>
<td>M2</td>
<td>100</td>
<td>Drip</td>
<td>0.9</td>
<td>700</td>
</tr>
<tr>
<td>SHRUBS</td>
<td>6.3</td>
<td>M2</td>
<td>100</td>
<td>Sprinkler</td>
<td>0.625</td>
<td>1,010</td>
</tr>
<tr>
<td>TURFING</td>
<td>3.1</td>
<td>M2</td>
<td>100</td>
<td>Sprinkler</td>
<td>0.625</td>
<td>500</td>
</tr>
</tbody>
</table>

- Irrigation Efficiency (IE) used is 0.9 for drip system and 0.625 for sprinkler system.
- Formula used is "Area (m2) x L/day / IE efficiency"
- The watering requirements are taken from proposed figures by ILAM
LANDSCAPE VEGETATION WATER REQUIREMENT

- Trees are assumed not to require watering after establishment in 2-3 years so need not be considered in green buildings.

- Landscape irrigation basics, 25mm of water able to cater for one week of the plant’s watering requirement i.e if plants are irrigated with 25mm of water, we do not need to water the plants for the next 6 days.

- So to conserve water, plants need not be water everyday! However to be conservative, we may consider every 2 or 3 days of watering only.

- And most important is we do not water the plants on rain event days!
PLANTING MEDIUM FACTOR AND WATER REQUIREMENT

Source: Internet
PLANTING MEDIUM FACTOR AND WATER REQUIREMENT

Source: Internet
PLANTING MEDIUM FACTOR AND WATER REQUIREMENT

a. Well-structured soil

- Air
- Soil
- Large pores

Air, water and nutrients stored in pores

Water remains near surface

Water and nutrients move very slowly down profile; air may be excluded

b. Poorly structured soil

- Air
- Soil
- Very small pores

Source: Internet
PLANTING BASE FACTOR

PODIUM FLOOR PLANTING DETAIL

100mm stainless steel floor trap with maximum 6-6m distance connected to main pipe by Architect.

100mm GI Dome floor trap with maximum 6-6m distance connected to main pipe by Architect.

Shanghai plaster
Softscape cont. to provide filter membrane (Terram root guard / equivalent)

Screeding & waterproofing to Engr's detail

Drainage system with geotextile over laid folded upside wall and 50mm thk. coursed sand over to LA approval

FFL 0.10

HODA Design
PLANTING BASE FACTOR

GROUND FLOOR PLANTING DETAIL

A PIECE OF PROTECTIVE WRAPPING MATERIALS
(Geotextile / Gunny sack) WRAPPED AROUND
PLANT BEFORE TYPING TO PREVENT DAMAGE TO
PLANT.

150mm x 50mm x 50mm HARDWOOD TIMBER
FRAME
(REFER DETAIL A)

HARDWOOD GREED 8 SIZE:
50mm x 50mm x 2.4m
NAILED TO HARDWOOD 25mm x 50mm

100mm

ROOT BALL
50MM THK. MULCHING USING COCONUT HUSK

SOIL MIXTURE:
MIXTURE OF TREES, PALMS AND OR SHRUBS / GROUND COVERS
PLANTING COMPRISING OF 3 PARTS TOP SOIL, 2 PARTS OF RIVER
SAND, 1 PART OF ORGANIC MATTER/ MANURE AND 1 KG OF C.I.R.P
PER CUM OR OTHER MIX APPROVED BY S.O INCLUDING LOADING,
UNLOADING, MIXING ON SITE, FILLING INTO EXCAVATED PLANTING
HOLES (MEASURED SEPARATELY), LIGHTLY RAMMED AND ALL OTHER
WORKS IN CONNECTION TO THE APPROVAL OF THE S.O

COMPACTED SOIL TO PEDESTAL AND
PREVENT SETTLING WITH TOP SOIL.

3 POINT STAKING (TRIPOD STAKING)

50mm X 50mm X 3 NOS WOODEN STAKES
OF 2400mm LENGTH MIN 500mm
GROUND AND 1900mm EXPOSED
GROUND AND TIED TO GROUND
TO PLANT SPACED AT EQUAL DISTANCE
APART AND ACHOR FIRMLY SLIGHT
FROM THE ROOTBALL.

CREATE A 150MM HEIGHT MOUND TO
ENHANCE DRAINAGE

NOTES:
1. STAKING BE ANCHORED FIRMLY BEFORE
BACKFILLING WITH TOPSOIL.
## WATER SAVING SPECIES

Table 12: Roadside Planting - For Width of 12m and 20m Medium and Small Trees

<table>
<thead>
<tr>
<th>Roadside Plants</th>
<th>Roadside Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenanthera pavonina (Pokok Saga)</td>
<td>Bauhinia blakeana (Hong Kong Bauhinia)</td>
</tr>
<tr>
<td>Calophyllum inophyllum (Penaga Laut)</td>
<td>Cassia fistula (Rajah Kayu)</td>
</tr>
<tr>
<td>Cassia siamea (Kassod Tree)</td>
<td>Cinnamomum iners (Kayu Manis)</td>
</tr>
<tr>
<td>Erythrina glauca (Dedap)</td>
<td>Erythrina variegata (Dedap Batik)</td>
</tr>
<tr>
<td>Gardenia carinata (Cempaka Hutan)</td>
<td>Jacaranda filcifolia (Jambul Merak)</td>
</tr>
<tr>
<td>Lagerstroemia spp (Bungor)</td>
<td>Tamarindus indica (Assam Jawa)</td>
</tr>
<tr>
<td>Melia indica (Mambu)</td>
<td>Mesua ferrea (Penaga Lilin)</td>
</tr>
<tr>
<td>Michelia champaca (Cempaka Kuning)</td>
<td>Peltophorum pterocarpum (Batai laut)</td>
</tr>
<tr>
<td>Mimusops elengi (Bunga Tanjung)</td>
<td>Pithecellobium dulce (Duri Medras)</td>
</tr>
<tr>
<td>Tabebuia pentaphylla (Tecoma Big Leaf)</td>
<td>Fillicium decipiens (Kiara Payung)</td>
</tr>
<tr>
<td>Lapisanthes rubiginosum (Mertajam)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Lembaga Lebuhraya Malaysia
# WATER SAVING SPECIES

Table 13: Plants In Median At Roadside

<table>
<thead>
<tr>
<th>i) High shrubs</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Botanical Name (Local Name)</strong></td>
<td><strong>Botanical Name (Local Name)</strong></td>
<td></td>
</tr>
<tr>
<td>Bougainvillea spp. (Bunga Kertas)</td>
<td>Caesalpinia pulcherrima (Peacock Flower)</td>
<td></td>
</tr>
<tr>
<td>Calliandra surinamensis (Red Powder-Puff Plant)</td>
<td>Calliandra emarginata (Pink Powder-Puff Plant)</td>
<td></td>
</tr>
<tr>
<td>Cassia biflora (Kasia Rembun)</td>
<td>Cassia surattensis (Yellow Cassia)</td>
<td></td>
</tr>
<tr>
<td>Thevetia peruviana (Trumpet Flower)</td>
<td>Hibiscus spp. (Bunga Raya)</td>
<td></td>
</tr>
<tr>
<td>Ixora javanica (Siantan)</td>
<td>Lagerstroemia indica (Crepe Myrtle)</td>
<td></td>
</tr>
<tr>
<td>Mussaenda spp. (Janda Kaya)</td>
<td>Nerium oleander (Oleander)</td>
<td></td>
</tr>
<tr>
<td>Stenolobium stans (Yellow Bells)</td>
<td>Duranta plumier (Golden Dew Drop)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Lembaga Lebuhraya Malaysia
### WATER SAVING SPECIES

#### Table 14: Plants In Median At Roadside

<table>
<thead>
<tr>
<th>ii) Medium Shrubs</th>
<th>Botanical Name (Local Name)</th>
<th>Botanical Name (Local Name)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acalypha hispida (Ekor Kucing)</td>
<td>Acalypha wilkesiana (Copper Leaf)</td>
</tr>
<tr>
<td></td>
<td>Allamanda cathartica (Golden Trumpet)</td>
<td>Codiaeum spp. (Puding)</td>
</tr>
<tr>
<td></td>
<td>Ixora Sunkist (Siatan)</td>
<td>Justicia betonica (White Shrimp Plant)</td>
</tr>
<tr>
<td></td>
<td>Lantana Camara (Bunga Tahi Ayam)</td>
<td>Tecomaria capensis (Cape Honey Suckle)</td>
</tr>
</tbody>
</table>

Source: Lembaga Lebuhraya Malaysia
HOW TO IDENTIFY WATER SAVING SPECIES

Source: Internet
HOW TO IDENTIFY WATER SAVING SPECIES

Source: Internet

WAXLEAF
HOW TO IDENTIFY WATER SAVING SPECIES

Source: Internet
HOW TO IDENTIFY WATER SAVING SPECIES
HOW TO IDENTIFY WATER SAVING SPECIES

SACCCULENTS

Source: Internet
OVERWATER AND WATER LOGGED CONSEQUENCES

Source: Internet
OVERWATER AND WATER LOGGED CONSEQUENCES

ROOTROT

Source: Internet
SPECIES FOR WATER LOGGED AREA

MELALEUCA (Cajeput)

Source: Internet
SPECIES FOR WATER LOGGED AREA

ONCOSPERMA TIGILLARIUM (Nibung)

Source: Internet
SPECIES FOR WATER LOGGED AREA

TYPHA ANGUSTIFOLIA
(Cattail)

Source: Internet
# CASE STUDY - INFORMATION OF DROUGHT EFFECT IN SINGAPORE LANDSCAPE VEGETATION

## Records of Climate Station Extreme

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfall</td>
<td>818.8</td>
<td>566.7</td>
<td>528.3</td>
<td>454.9</td>
<td>386.6</td>
<td>378.7</td>
<td>527.3</td>
<td>526.8</td>
<td>440.4</td>
<td>497.1</td>
<td>521.5</td>
<td>765.9</td>
</tr>
<tr>
<td>Lowest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15.4</td>
<td>0.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: National Environment Agency Singapore
CASE STUDY - INFORMATION OF DROUGHT EFFECT IN SINGAPORE LANDSCAPE VEGETATION

EUGENIA OLEINA (Kelat)

Source: Internet
CASE STUDY - INFORMATION OF DROUGHT EFFECT IN SINGAPORE LANDSCAPE VEGETATION

CITHAREXYLUM SPINOSUM

Source: Internet
CONCLUSION

- Water requirement for vegetation should be well controlled to reserve the water resources.
- The vegetation you planted actually is very much clever than we thought.