Green Roofs
Environmental Considerations and Plant Selection

SWT DESIGN
Klaus-Dieter Rausch, RLA
Extensive Green Roofs

- Self Sustaining
- Reduced Fertilizing
- Limited Watering
- Limited Maintenance

Intensive Green Roofs

- Watering
- Fertilizing
- Typical Maintenance
Benefits

- Aesthetic Improvement
- Storm water Management
- Reduce Urban Heat Island Effect
- Improved Air Quality
- New Amenity Spaces
- Energy Efficiency
- Increased Roof Membrane Durability
- Fire Retardation
- Noise Reduction
- Job Creation
Effects of Environmental Conditions on Plant Selection

- Wind
- Daylight Exposure
- Temperature
- Precipitation

\{ Non-Controllable \}

- Substrate
  - Soil Mix
  - Soil Depth
- Watering
- Fertilizing

\{ Controllable \}
Wind
- Consistent Direction
- Turbulences
- Vents

Concerns
- Drought
- Partial Plant Damages through Wind Nozzle Effects
- Breakage
- Uprooting
- Erosion of Substrate
Daylight Exposure

- Extended Exposure
- Light Reflection of Facades and Pavements

Shading from adjacent Buildings

June 10.00 am  December 10.00 am
Temperature:

- In General Higher Temperatures During Daytime
- Less Cooling at Night Time
- Higher Extremes in Summer
- Higher Extremes in Winter
Water / Precipitation

- Unpredictable
- Extreme Conditions

Oversaturated  Dry
Plant Selection / Consideration:

• Reduction of Potential Plant Height with Increasing Elevation of Roof Height
• Plant Scale Considerations to Work with Architecture
• Small Compact Forms of Plants
• Loose Plant Forms to Minimize Wind Resistance
• Consideration of Plant Height to Minimize Wind Impact / Leverage
• Use of Multi-Stems
• Avoid Known Breach Susceptible Plant
• Minimize Use of Evergreens
  • Less Frost Resistant
  • Susceptible to Winter Sun / Frost Drought
• Maintain Nutrients and Watering Below Optimum Levels
- Canopy Trees >36”
- Small Shrubs / Trees >24”
- Dwarf Woody Plants 24”
- Perennials 8”
- Grasses 5”
- Bulbs 3”
- Sedum / Succulents 1”-2.5”
- Moss 1”

Intensive
Extensive
Sedums

- Plugs
- Cuttings
Bulbs

• Majority of Bulbs Dependent on Soil Moisture
• Various Species Need Various Soil Depth
• Very Limited Selection for Extensive Green Roof Application
  • Allium
  • Muskari armeniacum
  • Tulipa silvestris
Grasses

• Limited Drought Tolerance

• Wind Susceptible

• Limited Usage

......These Type of Grass Roofs do not work in our temperate Environment
Perennials

- Aster ‘Wood Purple’
- Coreopsis lanceolata
- Delosperma kelaidis
- Liatris spicata ‘Kobold’
- Oenothera speciosa
- Salvia ‘Mainacht’
- Thymus vulgaris
- Miscanthus sinensis ‘Adagio’
- Schizachyrium scoparium ‘The Blue’s’
Woody Plant Material / Shrubs

• Buddleija davidii ‘Blue Chip’
• Buxus ‘Green Gem’
• Caryopteris clandonensis ‘Longwood Blue’
• Amelanchier ovalis
• Nandina domestica
Trees

- Magnolia virginiana
- Gleditja triacanthos var. inermis
- Ulmus parvifolia ‘Dynasty’
- Chionanthus virginicus
- Cotinus obovatus