Horticulture is the science, art and practice of growing plants. It includes the establishment and management of turf, ornamental trees, shrubs, vines and groundcovers as well as fruit trees, fruiting vines and vegetables. Horticulture requires an understanding of plant biology, ecology, meteorology, engineering, soil science and agronomy.

2.3.1 HOW PLANTS USE WATER

Understanding how plants use water is vital for achieving water sensitive landscapes. Water is essential for plant health. During daylight hours, the plant’s leaves make food for growth and reproduction by combining water with carbon dioxide. Water also transports essential minerals from the soil and is used to protect plants from stress and disease.

Plants take water from the soil via a network of tiny root hairs. The water is taken up by sap that flows to leaves, flowers and fruits via roots, trunks, branches and stems. Most of this water is then transpired to the air via tiny openings in the leaves. This loss of moisture through the leaves forces the plant to take more water from the soil.
The amount of water that plants transpire to the air depends on exposure to the weather as well as the type of plants used in the landscape design. In general, on hot windy and dry days, plants transpire the most water and therefore take the most water from the soil. On cool still and cloudy days, plants give the least water to the air and therefore take the least water from the soil.

As water is lost from plants to the air, the soil’s water storage must be topped up occasionally. In designed landscapes, this is usually achieved via rainfall, hand watering and/or an irrigation system. Too much water causes waterlogging which displaces all the air from the soil. Waterlogging is harmful because plants need the air to maintain health, and worms and other soil life that benefit plants may drown.

This guideline aims to create landscapes where plants receive the amount of water required to achieve optimal health and growth.

2.3.2 THE ROLE OF SOIL

Soil is the primary water storage for plants in both natural and urban areas. Soils have a mix of large and small gaps between the soil particles. The large gaps – called macropores – allow water to infiltrate and drain through the soil. The small particles – called micropores – hold onto the water that is used by plants. Figure 3 illustrates this relationship. The amount of water that can be stored in soil for plants is largely dependent on soil type. Soil management for water conservation aims to ensure that soils have a balance of macropores and micropores, allowing water to infiltrate the soil and be held there for use by plants.

Good soil management of a site will depend on its structure, depth, mineral and chemical properties. Initial investigation for the landscape design should include these analyses. By including the landscape concept design at the early stages of a project, this work can be undertaken with the engineering geotechnical investigations and the reports made available to the landscape designers. Where necessary, landscape designers should seek the appropriate level of advice from a suitable, qualified soil scientist.