

## Sludge and Biosolids

### Background

#### *What is wastewater?*

On average, each of us produces about 200 litres of wastewater or sewerage every day. This wastewater comes from our homes, our schools, our places of work, hospitals and other services and is more than 99.7% water.

Most comes from our homes - from showers, baths, sinks and washing machines as well as the toilet. It contains some pollutants, in the form of suspended and dissolved matter, some including oil, greases, detergents, nutrients, and potentially harmful bacteria and viruses.

Wastewater also comes from commercial and industrial premises. Limits are placed on pollutants in discharges from industries so that the wastewater quality is similar to that coming from a home.

Wastewater treatment plants remove much of the pollutant material from the wastewater. The wastewater that has been treated in a wastewater treatment plant and is suitable for discharge into the environment is called treated wastewater.

#### *What is sludge?*

Sludge is the general name given to solid material that is removed from the primary and secondary treatment processes. It is generally in the form of a liquid with about 0.5-4% solids content. In rough terms, the volume of sludge produced is about 1% of the total wastewater inflow.

Sludge is further treated (stabilised) to make it suitable for beneficial use and is called biosolids.

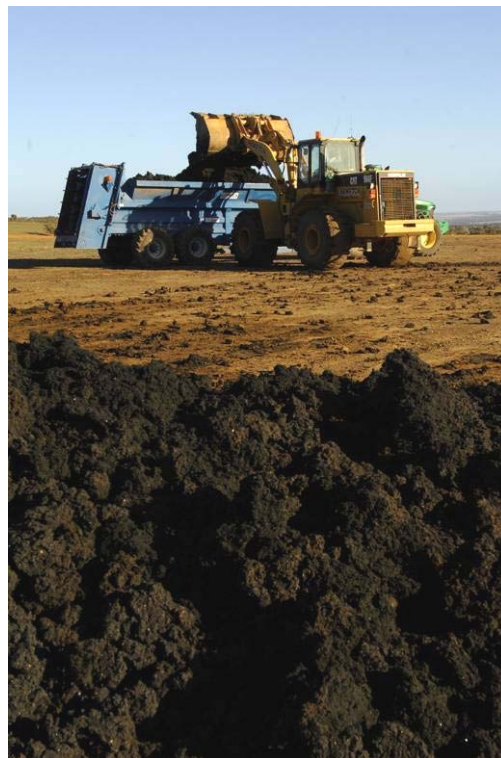
#### *How does it work?*

In Perth, most sludge is anaerobically digested (that means the organic part is broken down, or stabilised) in large enclosed tanks that are heated and mixed to enhance the biological decomposition of the organic material. The sludge remains in the digestion tank for 15 to 20 days with the temperature maintained at 32° to 35° C to optimise the digestion process. This process reduces pathogens (disease causing organisms) and other volatile products at the same time as producing *biogas* which is a valuable by-product.

Biogas, which is predominantly methane and carbon dioxide, is an energy source that can be compared with natural gas. Biogas is generally used at the treatment plant for heating the sludge in the digesters. It can also be used to generate electricity.

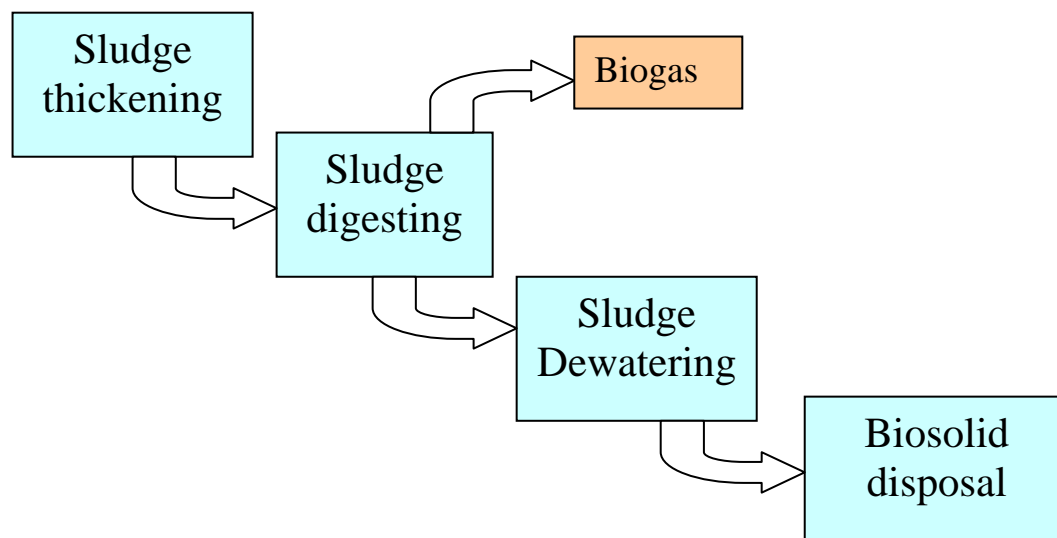
To optimize the efficiency of the digestion process, the sludge is thickened to reduce the water content (that is, to increase the solids content to about 4-6%).

After digestion, the stabilized end product called biosolids is about 3-4% solids content (still a liquid). To make it suitable for transporting for beneficial use or disposal, it is mechanically



de-watered. This de-watering produces a “cake” like material with about 20% solids content, which makes it suitable to be transported in tip trucks rather than tankers.

Each day in Perth, a total of 200 tonnes of biosolids are produced (around ten large truck loads).



Biosolids are similar to backyard compost except that it is stabilised human waste, rather than stabilised vegetation matter.

Biosolids are considered a valuable soil amendment that improves soil moisture retention and structure as well as containing many essential trace elements necessary for plant growth. The majority (in excess 70%) of the biosolids produced in Perth-Mandurah are land applied to broad-acre agricultural areas in the Victoria Plains and Moora Shires and Forestry plantations in the Harvey Shire

The remainder are composted and used in large scale landscaping projects such as golf courses, commercial building landscaping, roadside re-vegetation and nurseries. Biosolids are composted with greenwaste and sawdust over several weeks. The composting process is followed by several weeks of curing before the blend is ready for use. The final composted product can be further blended with sands and peat to produce a wider range of desirable products.

#### *How safe is it?*

Health risks are minimal. The Water Corporation processes biosolids to meet guidelines set by the Department of Health and the Department of Environment. The biosolids are monitored and regularly tested to ensure that any contaminants, such as heavy metals and pesticides, are within safe limits.

Before biosolids are used on land, a number of factors need to be considered. These include the contents of the biosolids, soil conditions, water sources around the site, and type of crops to be grown.

In Perth, biosolids are relatively clean and free of heavy metals because of our low level of industry and strict industrial waste controls.

When biosolids are used safely they facilitate soil conservation because they restore nutrients and organic matter to the soil. Burying of biosolids in landfills is generally a last resort as valuable space is used, and the benefits of the organic matter and nutrients are wasted.

### *How do we compare?*

As noted, about 70% of all of Perth's biosolids are used beneficially (by application onto agricultural or horticultural land). This compares favourably to lower levels of beneficial use in the USA (41%) and the European Union (37%).

### **The Future**

Demand for biosolids as a component of soil amendment products and compost fluctuates, and biosolids may have to be stockpiled. Stockpiling has a limited life so a strategy is required to deal with fluctuating demand for biosolids now, and for long-term use.

Everyone in the community can help in making sludge recyclable by being careful about what is put down the toilet and sink. Items such as personal hygiene products, cotton buds, grease and chemicals (such as pesticides and garden sprays) can cause problems with the beneficial use of biosolids or make them unsuitable for use.

The Water Corporation is committed to an ongoing program of monitoring and research to ensure that the management of biosolids complies with regulations, has a positive impact on the environment and public health and that biosolids continue to be used in the most sustainable ways available.