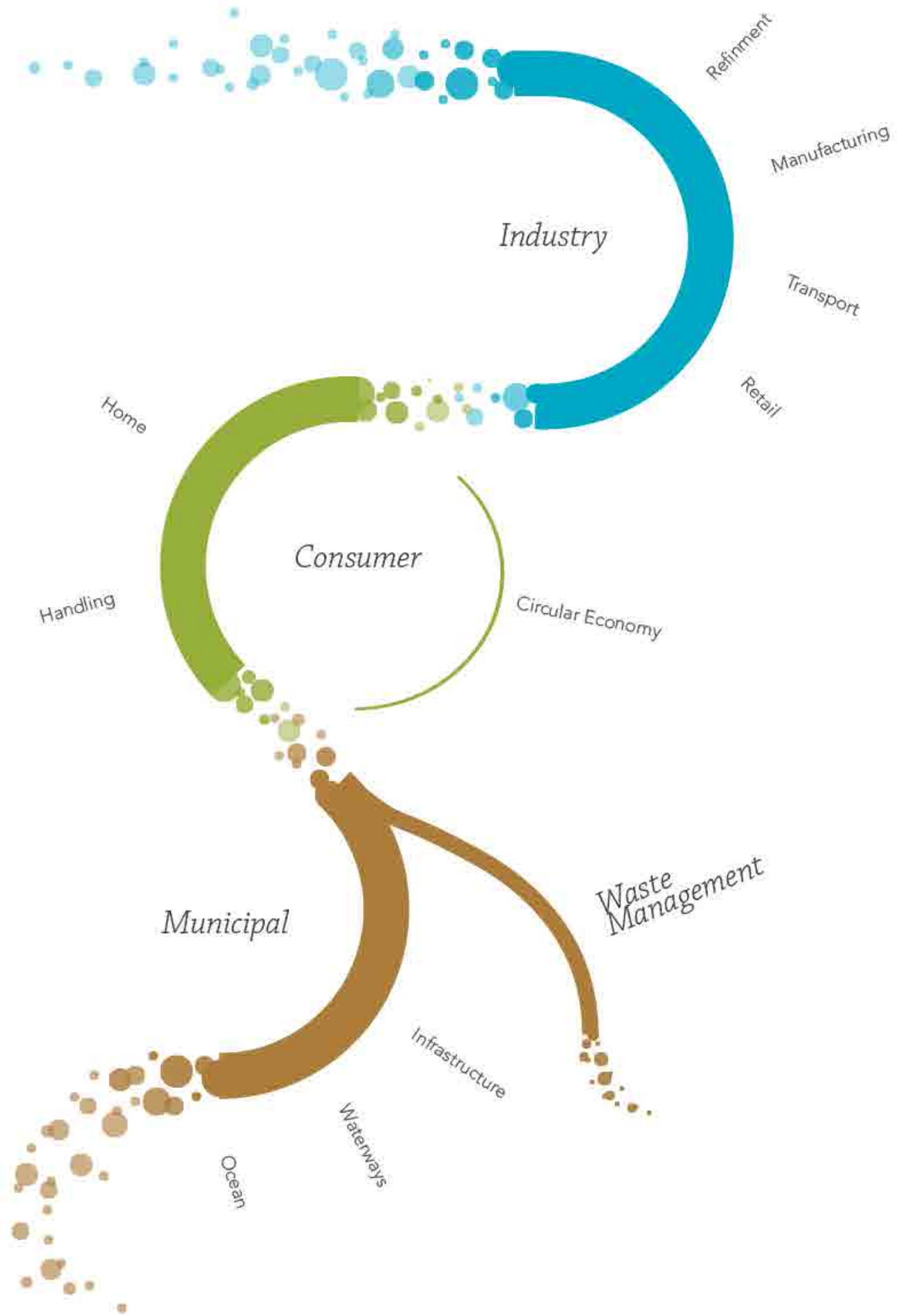


## 3.1 *The Life Cycle of Plastics*

### *From oil, to hand, to the water*

The life cycle of plastics is a complex one. They all begin in the same way, being refined from petrochemicals into various forms, usually tiny pellets, and then are bought by manufacturers before being turned into parts and then products. From here, the plastics enter retail stores and restaurants and are subsequently passed into the hands of consumers. From one specific source, the plastics are now spread all over the world, being consumed in unimaginable amounts. But they eventually reach the end of their “useful” life and are thrown away, either responsibly or irresponsibly. The responsibly disposed of material going into the countries waste management systems, but those carelessly disposed of ends up passing through our infrastructure and into our waterways. From there, only few interventions are in place to capture the litter before it enters the world’s oceans.



## 3.2 Sources of litter

### *Dominant Sources of Litter*

According to The Ocean Conservancy, all the litter in our water shares a common origin: "...at a critical decision point, someone, somewhere, mishandled it, either thoughtlessly or deliberately." Most of the litter we find in the Yarra River comes from land-based sources, via storm water drains, or through surface run-off and wind transport. Once introduced into rivers, litter may sink, be deposited on river banks and/or be transported to the marine environment.

#### Stormwater Drains

Storm water drains service the entire Yarra catchment, which spans approximately 4000km. Litter that has escaped around the catchment, either accidentally (e.g. litter leakage during waste removal and transportation to

landfill) or deliberately (e.g. littering) gets swept down stormwater drains. The draining process occurs in the following order:

Stormwater (and leaked litter) enters house gutters and downpipes, and flows into residential drains

Residential drains connect to council drains along streets and roads

Council drains connect to Melbourne Water's regional drains

Regional drains direct stormwater into the nearest river or creek, or directly to the bay via piped beach outlets

Rivers and creeks flow into Port Phillip Bay or Western Port Bay

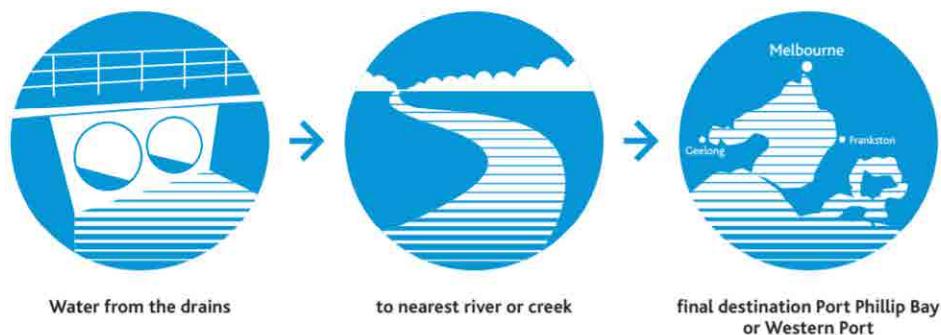
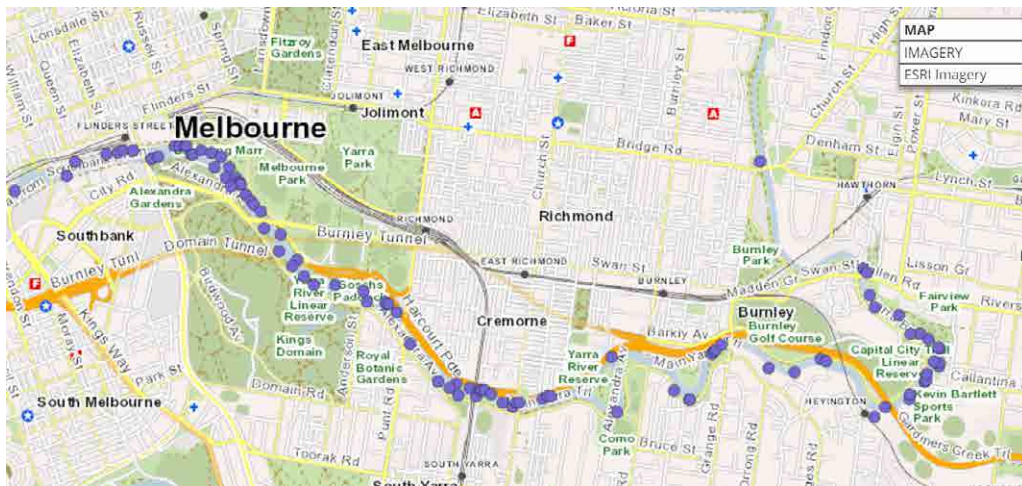


Figure 9  
Stormwater drain movement  
within the Yarra catchment



Figure 10  
Pahran main drain flowing  
into the Yarra River

Figure 11  
Stormwater drain outlets discharging into  
the Yarra River between Bolte Bridge,  
Melbourne and Swan Street, Richmond



Thousands of stormwater drains discharge into the Yarra River. The EPA reports that stormwater washes 14,000 tonnes of sediment, 650 tonnes of nutrients such as nitrogen from fertiliser, litter, heavy metals and bacteria into the Yarra River each year. The Yarra Riverkeeper Association identified 92 storm water drains in 10 km of the lower Yarra River, from Bolte Bridge, Melbourne to Swan St Bridge, Richmond. Each storm water drain services a catchment area of varying size, population density and land usage. Consequently, each storm water drain empties a unique assemblage of pollutants into the Yarra River.

### Illegal Dumping

Human consumption of waste is enormous which inevitably leads to vast quantities of waste that are not efficiently recovered in the waste management sector. Many items classified as waste are often large, non-recyclable and are

often disposed of in an irresponsible manner through illegal dumping. Within Victoria, illegal dumping is defined as the disposal of waste on public or private land or into the water without a license or formal approval. Waste deposited near waterways pollutes rivers through surface run-off and wind transport.

Despite heavy fines for illegal dumping behaviour, many people continue to dump rubbish, particularly along rural roadsides, public parks, roadside rest areas and sometimes along waterways including the Yarra River or creeks and tributaries that feed into the Yarra. Household waste, garden waste, and construction and demolition waste are common categories of waste that are illegally dumped (Sustainability Victoria). Items are illegally dumped to avoid paying disposal costs, transporting material to landfill/transfer station sites as well as a lack of certain waste facilities areas.

## Littering along waterways

According to the Environmental Protection Act (1970) 'litter' includes any solid or liquid domestic or commercial waste, refuse, debris or rubbish and, without limiting the generality of the above, includes any waste glass, metal, plastic, paper, fabric, wood, food, soil, sand, concrete or rocks, abandoned vehicles, abandoned vehicle parts and garden remnants and clippings, but does not include any gases, dust or smoke or any waste that is produced or emitted during, or as a result of, any of the normal operations of the mining, building or manufacturing industry or of any primary industry.'

More commonly, littering behaviour is viewed as making a place untidy with rubbish. Negative disposal behaviours have been categorised into numerous categories such as '90%ing' where most items are put in the bin but some are left behind, 'flagrant flinging', throwing or dropping items with no apparent concern, 'foul shooting', a missed throw at a litter bin and 'grinding', grinding items into the ground & leaving them there. A significant proportion of plastics along the river are comprised of food wrappers/containers and plastic cutlery most likely associated with recreational activities along the Yarra River.



Figure 12  
Cartoons depicting flagrant flingers, foul shooters, grinders and improvisers by cartoonist Kerry Millard