W.A. PREMIX

WORKS APPROVAL APPLICATION

(Category 77)

Concrete Batching Plant

277-279 Collier Road, Bayswater

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Report: 206.R003.Rev0 1 December 2014

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Bayswater Concrete Batching Plant
277-279 Collier Road, Bayswater

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Document Control

Reference	Status	Date	Prepared	Reviewed	Authorised
206.R009	Rev 0	1 December 2014	RHS	WL	WL

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1.0 BACKGROUND

WA Premix is proposing to construct a concrete batching plant on 277-279 Collier Road, Bayswater. The site is within an existing and established industrial area and planning approval for the project has already been obtained. The plant will produce various standard grades of pre-mixed concrete as well as other specialty products of a similar nature for a variety of structural and architectural uses.

Pre-mixed concrete has a workable life of approximately 60 minutes, giving a supply radius of approximately 25km. In order for WA Premix to service the Perth Metropolitan Area a series of plants is required. This plant is necessary for WA Premix to service the Perth CBD, northern and eastern metropolitan area, and supplement WA Premix's existing plants in Mandurah and Bibra Lake.

In 2010 WA Premix undertook a six month investigation of suitable site(s) for a concrete batching plant in proximity to the Perth CBD however sites that satisfy all environmental, town planning and commercial factors are rare and in most cases prohibitively expensive. Following the exhaustive search and favourable preliminary discussions with the City of Bayswater regarding the suitability of the site, 277 Collier Road, Bayswater was identified as the most suitable option and acquired by WA Premix in November 2010.

Concurrently an application for planning approval was lodged with the City of Bayswater based on a standard "off the shelf" concrete batching plant design. However early in the approvals process it became apparent that a "typical" plant design would not be appropriate in this location due to the proximity of the residential area to the north and level of community interest in the project.

A major "rethink" to the project was required with WA Premix taking a longer term view of the project. To provide greater certainty of long term operation at the site and to address the concerns of the local community, the WA Premix board substantially increased the budget for the project in order ensure the plant will exceed all current environmental and town planning requirements as well as any potential future regulatory changes and tightening of operating requirements.

Between 2011 and 2014 WA Premix consulted extensively with the City of Bayswater, a team of expert plant design, town planning and environmental consultants, and undertook a series of international study tours examining world's best practice plant design and operation. The resulting plant design incorporates as many best practice features as possible.

At the same time a full 12 month ambient air quality assessment was commissioned to quantify dust emission levels in the local airshed in order to model any cumulative impact of the plant on the local community.

The proposal presented in this application is the culmination of more than four years of development and refinement by WA Premix with the aim to construct the most efficient and environmentally responsible plant possible within the constraints of the premises location and town planning framework.

1.1 Ownership

The subject land is owned and by Ransberg Pty Ltd, and the proposed plant will be operated by WA Premix, a subsidiary of Ransberg Pty Ltd.

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1.2 Premises Details

The subject site is located at 277-279 Collier Road, Bayswater near the intersection of Collier Road and Tonkin Highway and within the Bayswater Industrial Area.

Ransberg Pty Ltd purchased the property in 2010. The previous use of the site was for a fuel depot until 2006 when the fuel storage tanks were removed and the site remediated.

LOT	OWNER	VOLUME	FOLIO	PLAN	AREA (ha)
2	Ransberg Pty. Ltd.	1513	683	D 55129	1.2322

Table 1: Land Ownership

For the purposes of assessment under Part V of the Environmental Protection Act 1986, the cadastral boundary of Lot 2 is assumed to be the premises boundary.

1.3 Company Overview

The WA Limestone group of companies, which includes WA Limestone, WA Bluemetal, and WA Premix, is a local (Perth based) family business which has been operating for more than 30 years.

WA Premix has two existing concrete batching plants in Mandurah and Bibra Lake, with additional plants currently in the development stage in Bayswater and Neerabup.

WA Limestone is ISO 9001:2008 certified and utilises ISO 14001:2004 certified environmental consultants for the preparation and compliance of site specific environmental management plans. As part of the companies continual improvement programme, WA Limestone is currently in the process of obtaining full ISO 14001:2004 certification for all sites and operations.

WA Limestone's environmental performance has been recognised with a number of recent awards:

- Cement Concrete and Aggregates Australia
  2014 Environmental Best Practice Award for Extractive Industry Operations (WA)
  Augusta Boat Harbour Project Quarries and Breakwater

- Civil Contractors Federation
  2013 CCF Earth Award (WA) (Category 3)
  Augusta Boat Harbour Project Quarries and Breakwater

- Cement Concrete and Aggregates Australia - 2012 Environmental Best Practice Award for Extractive Industry Operations (WA)
  Flynn Drive Quarry

- Civil Contractors Federation
  2012 CCF Earth Award (WA) (Category 1)
  Catherine Point Breakwater

- Civil Contractors Federation
  2010 CCF Earth Award (WA) (Category 5)
  Southern Gateway Alliance

WA Limestone is a member of the following professional and industry organizations and an active contributor to regulatory reform and the development of industry best practice standards.

- Chamber of Commerce & Industry
- Civil Contractors Federation
- Quarrying Institute of Australia
- Cement Concrete and Aggregates Australia
- Sand Producers Association of WA
- Sand and Limestone Association of WA

2.0 PROJECT DESCRIPTION

2.1 Throughput

Both the maximum theoretical capacity and expected throughput have been modelled to assess the plants environmental impacts.

Pre-mixed concrete is measured in cubic metres and has an average density of 2.35 (for N20 concrete), which is used to convert quantities to tonnes.

Category number	Category description	Category production or design capacity	Approved production or design capacity
77	**Concrete batching or cement products manufacturing:** premises on which cement products or concrete are manufactured for use at places or premises other than those premises,	100 tonnes or more per year.	365,000 tonnes per year (design capacity) 100,000 tonnes per year (expected production)

Table 2: Plant Throughput

2.1.1 Maximum Plant Capacity

The proposed plant will consist of a single 4.5m^3 twin shaft mixer. The maximum throughput is limited to the rate at which the mixer can be supplied with sand and aggregates, the rate at which the concrete agitator trucks can manoeuvre into the loading position, be loaded, and then exit the loading area. WA Premix estimates that the proposed plant design will theoretically be capable of sustained production of 125m^3/hour with bursts of up to 150m^3/hour for short periods.

To estimate annual theoretical maximum production rate further constraints must be considered such as restrictions on operating hours, plant maintenance requirements, and the ability to resupply the plant with concrete constituent materials. When these factors are taken into consideration the proposed plant is estimated to have a maximum theoretical production rate of 500m^3 per day or 156,000m^3 per year. With an average density of 2.35 (for N20 concrete), this equates to 365,000 tonnes per year.

2.1.2 Expected Plant Capacity

Theoretical maximum production rates are an over-estimation of actual production rates. This is particularly the case for concrete batching where the dominant constraint is market demand and customer requirements. These factors not only govern the quantity of concrete produced but also the rate of concrete production throughout the day.

To predict throughput of the plant, average production rates from WA Premix's existing plants has been compiled from the past two years of production data and shown at Figure 1. The Bayswater plant is anticipated to produce similar quantities of concrete to WA Premix's existing plants with average actual production anticipated to be 135m^3 per day / 42,000m^3 per year, or 100,000 tonnes per year.

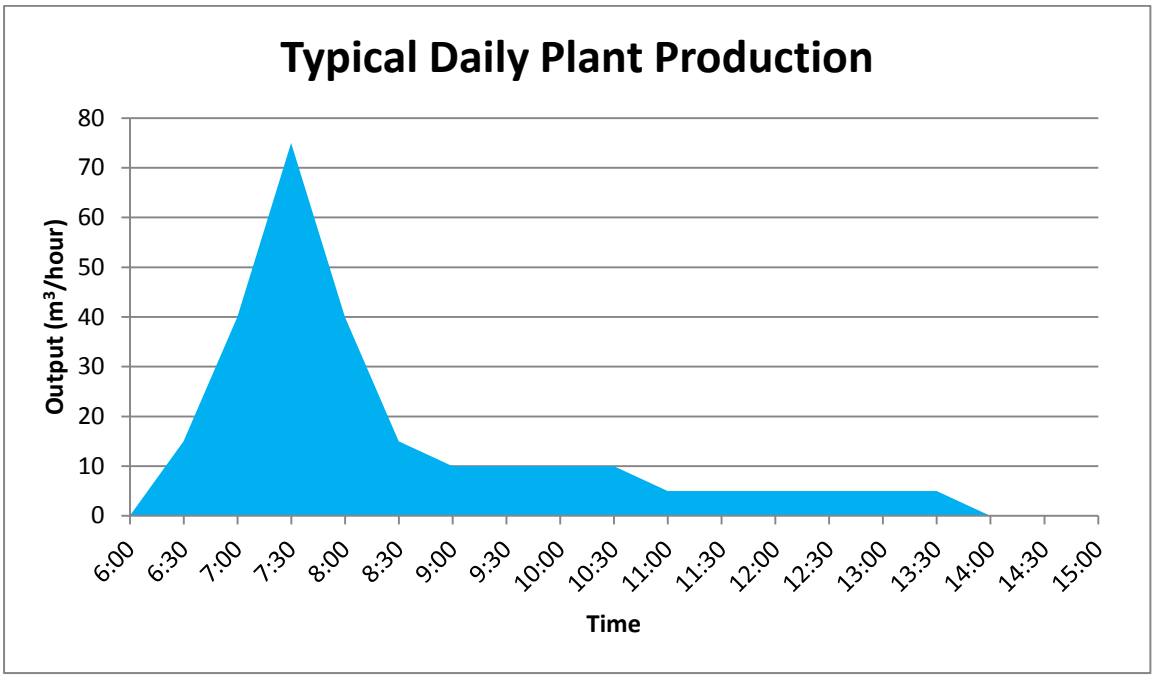


Figure 1: Plant Daily Production Distribution

2.2 Plant Design Principles

The plant will be of new construction and will incorporate the latest best practice features, exceeding industry standards for emissions and fail-safe systems for materials handling. It will utilise the "wet-mix" (also known as "central-mix") concrete manufacturing process as opposed to the traditional "dry-mix" (also known as "truck-mix") process, used by the majority of plants within Western Australia.

A dry-mix plant combines all the dry ingredients (aggregates and cement) and discharges into an agitator truck. Water is then added to the mixture inside the truck and the concrete is mixed by the agitator truck. A wet-mix plant combines all the dry ingredients and water into a central mixer, which mixes the concrete before loading the prepared concrete into an agitator truck.

Wet-mixing is a more water efficient process with substantially lower dust emissions than for a dry-mix plant. Additionally wet-mix plants are able to produce superior quality concrete in terms of increased consistency, homogeneity, workability, strength and permeability.

The wet-mix process was first developed in the United States during the Second World War however wet-mix plants are substantially more expensive than equivalent dry mix plants and early central mixers were plagued by reliability issues, which has been the primary barrier to their adoption by industry. These reliability issues were resolved in the 1980's with the development of affordable computerised plant control systems.

Over the past decade Europe in particular has seen a significant trend towards wet-mix plants, largely driven by market demand for higher specification concrete as well as more stringent environmental management. Australia has been slower to adopt "wet-mix" plants however demand is increasing.

At present there is only one other wet-mix plant operating within the Perth Metropolitan Area, this being the Technologically Designed Concrete plant in Bibra Lake, constructed in 2011. Notably this plant has similar separation distances to sensitive receptors as WA Premix's proposed Bayswater plant.

2.2.1 Concrete Batching Process

- Sand and aggregate material will be principally sourced from WA Limestone's quarries. Aggregates will be delivered to the plant by WA Limestone's fleet of covered road truck with the material in a dampened state to minimise dust. By controlling the entire supply chain WA Premix is able to ensure that material deliveries are undertaken safely and environmentally responsibly.
- Sand and aggregates will be unloaded at the site into drive-over bins enclosed within a shed and transferred to fully enclosed overhead storage bins via enclosed conveyor and bucket elevator.
- Cement will be delivered by sealed tankers and pneumatically transferred to sealed storage silos attached to the batching plant and fitted with overflow protection and reverse pulse filters to vent the silo.
- Sand and aggregates will be transferred from the overhead storage bins to the aggregate holding hopper and mixer via the main conveyor which will also be enclosed.
- Cement is transferred from the cement storage silos to the cement weigh hopper via sealed screw auger conveyors.
- The cement and aggregates are transferred into the mixer where water is added, the batch mixed and then discharged into the agitator truck via a rubber chute.
- The agitator truck then moves from the loading area to the slump stand where the load and truck, and cleanliness of the vehicle are inspected prior to departing the site to the customer.

2.3 Major Plant Components & Design Elements

The proposed plant will utilise the latest and best practice technologies internationally. Australia has typically been slow to adopt new technologies in concrete production. Many of the WA Premix's plant components are yet to be widely adopted in Western Australia but are based on proven technologies and design principles in operation in Europe and other regions throughout the world for many years.

The location and connectivity of components described in this section are shown on the plans provided at Appendix 2.

2.3.1 Mixer

The plant will be equipped with a single 4.5m^3 twin-shaft "wet-mix" mixer. The "wet-mix" process is superior to the traditional "dry-mix" process as used by virtually all concrete batching plants currently operating in Western Australia, not just in terms of concrete quality and consistency but also environmental performance.

One of the major dust emission sources in a "dry-mix" plant is where the dry sand, cement and aggregate mix is discharged from the plant into the agitator truck. This emission source is eliminated in a "wet-mix" plant as fully prepared, wet concrete is discharged from the plant into the agitator truck.

In a dry mix plant the dry materials are transferred to the agitator truck, requiring the truck to run at high-RPM to spin its bowl at full speed as water is added and for several minutes afterwards as the concrete is mixed prior to leaving the plant. In such plants during busy periods multiple trucks can

be in the yard mixing and causing a significant amount of noise. By comparison WA Premix's wet-mix plant eliminates this process as fully prepared and mixed concrete is discharged into the agitator truck, enabling the truck to depart the plant immediately. This provides substantial noise reductions as well as significant fuel and carbon emissions savings.

The mixer is housed in a 9m x 6m fully enclosed platform area located directly above the truck loadout area. The mixer receives the concrete ingredients, mixes and discharges the mixed concrete in batches of 90 second cycles. The mixer is fitted with automatic rinse and lube systems ensuring it can remain fully closed in normal operating and service modes.

2.3.2 Cement storage silos

The plant will be equipped with 4 cement storage silos, with a combined capacity of 360m^3. The design of the silos allows mass flow discharge and guarantees first material in – first material out. Each silo is fitted with a domed and sloping lid, internal ladder, quick release inspection hatch, handrails, internally fitted drain pipe from the silo lid, and internally mounted and tangentially set fill pipe.

To satisfy City of Bayswater town planning requirements the height of the silos has been limited to 12.5 metres (excluding filters and handrails).

2.3.3 Silo filters and overfill protection

A reverse jet pulse filter will be installed on each silo and fitted with ducting for the final discharge point from the filters to within one metre of ground level. The silo filtration system has an efficiency rate of better than 99% for all particulate matter including PM_{10}.

In addition the silos will be fitted with approved overfill protection equipment. A weatherproof box, mounted on the silo legs at the fill pipe access point, will be supplied containing control circuitry with an audible alarm and/or light attached and a test circuit facility. A monitor high-level switch will be mounted in the lid of each silo to signal the control box. When filling the silo if the silo high level is reached this signal initiates the alarm or light and timer. If the filling process is not stopped within a prescribed time, a valve in the fill pipe (operated by the control circuitry) will automatically close and prevent any further filling of the silo.

The cement silos fail-safe systems and dust control equipment exceed the requirements of the *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998* and *EPA (WA) Code of Practice for Concrete Batching Plants 1991*.

2.3.4 Cement silo discharge valve protection

Cement is discharged from the cone end of the silo via screw auger. The screw-auger transfers the flowing cement to the cement weigh-hopper via a flexible rubber sock, This silo discharge system is commonly used in concrete batching plants but some plants still operate with cement air-slides where no height restrictions are imposed. The proposed screw system and low-profile design offers better emissions control. The cement weighing and dispensing system is located in the fully enclosed mixer platform structure directly above the mixing unit itself

2.3.5 Drive-over aggregate delivery bins

The plant will use two side by side drive-over bins for the delivery of sand and aggregates. The bins will be covered with a metal grate, which the delivery truck drives over and tips through into the bin in the tunnel section below. The bins have a capacity of 58 tonnes each, which is sufficient for a road train to unload both trailers into the same bin. This system also allows a road train to unload without having to unhitch trailers thereby substantially reducing unloading time.

The bins will be enclosed within a shed to reducing noise and dust emissions and prevent rainwater from falling into the underground structure. The delivered material in the drive over bins is then conveyed to the overhead storage bins via enclosed conveyor and bucket elevator. This is a completely different design to the open ground storage bins originally proposed to the SAT where trucks reversed back and tipped their load onto an apron in front of the ground bins.

2.3.6 Overhead aggregate storage bins

Sand and aggregates will be stored in a series of overhead storage bins.

6x 200m^3 bins for the standard sand and aggregate materials, and 8x 20.6m^3 bins for less frequently used sand and aggregates for decorative and special purpose concrete mixes.

The bin structure will be completely enclosed with a dust extraction system and filter fitted to the top of the structure to capture dust from the loading of the bins and to provide a safe working environment for plant personnel.

The bins are fed from the drive over bins via the bucket elevator or by the loading hopper. The bins will be computer controlled and automatically discharge the required quantities of material onto the weighing belt, which feeds to the main conveyor.

This is a completely different and improved design to the open ground storage bins originally proposed to the SAT.

2.3.7 Temporary aggregate temporary storage bins & loading hopper

A series of 3 (4m x 8m) storage bins will be used for the emergency storage of aggregate and or re-use of what may otherwise be considered as waste materials from the truck washout system . The bins will be constructed with a concrete floor and sides, with a colorbond roof. Sprinklers will maintain the stored aggregate materials in a dampened state to minimise dust emissions. This eliminates the need for storage of any materials in exposed stockpiles.

Under normal operating conditions these bins will not be used. They are an emergency provision to prevent the temporary storage of sand and aggregate in open stockpiles in the event of:

- Where an aggregate delivery arrives at the plant and there is insufficient capacity within the overhead storage bins for the load; or
- Malfunction or breakdown of the drive-over truck unloading bins.

If such an event occurs the bins are to be cleared and loaded into the overhead storage bins as soon as practicable. The long term storage of materials in these bins is not proposed.

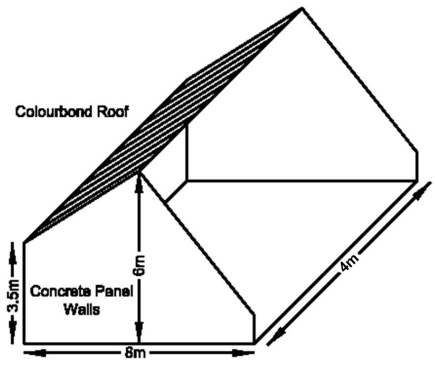


Figure 2: Temporary aggregate storage bin detail

The front end loader will empty the temporary storage bins into the adjacent 6m^3 loading hopper connected to the bucket elevator. This will feed the material into the overhead storage bins.

2.3.8 Aggregate reclaimer

The plant will utilise a concrete re-claimer to recycle any returned concrete. The unit is an EcoFrog RE_X 24, capable of processing up to 24m3 of returned concrete per hour. 100% of the returned concrete is able to be recycled for re-use by the plant. These units are widely used in Europe and represent world's best practice in waste concrete and water reclamation. Refer to Appendix 3 for detailed specifications of the unit.

The Concrete agitator trucks will wash out their bowls into the collection pan of the unit with any returned concrete being collected.

The concrete agitator truck discharges the water and any excess concrete into the collection pan, which directs the waste into the reclaimer drum. The drum spins the material, which separates the solids and liquids.

The solids comprises the sand and aggregate materials within the concrete from the water, cement and fine particles. The sand and aggregate material is discharged into a holding bin where it is collected by the front end loader and recycled in subsequent batches of concrete.

The remainder of the concrete being a slurry containing water, cement and fine particulate matter (<0.25mm diameter) is collected in storage tanks as a fine slurry. The storage tanks are fitted with stirrers to maintain the slurry in a suspended state. The slurry water is then able to be used to either wash trucks or used as batching water in subsequent batches of concrete. Throughput, density and pH meters are used to monitor and adjust the slurry mixture by adding additional water if required to maintain the consistency of solids content, density and pH of the slurry for reuse by the plant. No grey water, slurry or washout waste will need to disposed off site.

2.3.9 Agitator truck wash bays

An EcoFrog RE_X_24 concrete reclaimer unit will be used to process returned concrete and the washing out of agitator trucks. These and similar units are widely used in Europe and are considered the current best practice for concrete waste recycling and water management. The EcoFrog unit is capable of processing up to 24m^3 of returned concrete per hour and allows two agitator trucks to clean out the inside of their bowls at the same time. The capacity of the EcoFrog allows the entire plant agitator truck fleet to wash out in short succession (i.e. at the end of the day) without overloading the system. The EcoFrog unit also has a waste collection point at ground level which will collect any material spilt on the ground surface within the wash bay area.

When washing out the agitator truck bowls, the driver will generally take on more water to thoroughly rinse out the agitator bowl and its contents and then proceed to discharge the bowl contents into the EcoFrog unit. The additional water will be reclaimed water from the EcoFrog unit.

Two separate wash bays will be provided for the cleaning of the outside of the agitator trucks. The wash bays will be shaped to drain all water into the EcoFrog unit and elevated walkways will be constructed around the bays to provide safe and ergonomic access to the upper areas of the trucks. Company policy is that any concrete spilt on the outside of the truck during loading must be washed off prior to leaving the site and agitator trucks are required to be cleaned at the end of each day.

Part of the six monthly maintenance regime for agitator mixer trucks involves the scrubbing down of the outside of the bowl's surface with a diluted acid solution (1 part in 10 of water). The acid is of a

hydrochloric base designed to break up any cement matrix sticking to the agitator paintwork. The wash-out area is a separate area where run-off is collected by the EcoFrog unit where the acidic (low pH) water mixes with the alkali (high pH) water from the concrete washings, neutralising any remaining acid.
All solid and liquid waste and truck washings will be recycled by the EcoFrog unit and reused by the plant. The unit separates the sand and aggregate materials (>0.25mm) from the liquids (and fine particulate matter). The reclaimed sand and aggregates are then reused in subsequent batches of concrete. The reclaimed water slurry of hydrated cement powder in water is either used in subsequent batches of concrete or reused for the washing of agitator trucks in a closed loop system. Given the efficiency of the EcoFrog unit minimal additional water is required to be added to the washout system other than to replace the water taken for concrete production.

2.4 Plant Operation

2.4.1 Operating Hours

The operating hours for the plant will be 06:00am to 06:00pm Monday to Saturday inclusive with no operation on Sunday's or public holidays. Additionally the front-end loader will not operate before 07:00am, as per the conditions of planning approval.

2.4.2 Workforce Requirements

Two personnel are required to operate the plant, a plant controller and a front-end loader operator. In addition the plant will be serviced by a fleet of 10-15 concrete agitator trucks to deliver the prepared concrete to customers.

2.4.3 Facilities

The plant will have a control room for the operation of the plant, and a site office/lunchroom and ablution facilities for the plant operators and drivers.

2.4.4 Energy

Electricity will be sourced from the Western Power grid. Energy demand calculations and infrastructure design for the plant is well progressed, with no significant issues anticipated in securing adequate electricity for the plant.

Electricity is used to drive the air compressor needed to operate and control the batch plants mechanical systems. Power is also used to operate the water recycling pumps, filter system on top of each silo and for general office use.

The despatch operator will rely on telephone and two-way radio communications to maintain contact with customers and delivery drivers.

2.4.5 Water

Based on an average production of 90m^3 per hour, water demand is calculated to be:

The plant will utilise groundwater for the majority of the plants water requirements. WA Premix has a groundwater Licence (GWL 172394) for the abstraction of 25,000kL per year from the Perth – Superficial Swan aquifer.

Significant water savings will be achieved through the use of recycled water reclaimed by the EcoFrog unit. Water from returned concrete, washing of agitator trucks and the mixer unit will all be collected, stored in tanks and reused either for subsequent batches of concrete or the washing down of agitator trucks.

Scheme water will be used by the plant for potable water requirements and as a backup water supply for the plant.

2.4.6 Machinery and Equipment

The proposed plant requires a small rubber-tyred front end loader (CAT 938 or similar) to transfer material from the storage bins to the weigh hoppers. Unlike the majority of concrete plants, where a loader is required to transfer sand and aggregate for each batch of concrete, WA Premix's plant is almost completely automated. The loader will only be used for general cleaning around yard, transfer of palletised products, the transfer of reclaimed sand and aggregate from the EcoFrog unit to the loading hopper and in the rare event that the temporary aggregate storage bins are required to be used.

The plant will be serviced by a fleet of 10-15 concrete agitator trucks, which will be parked within the premises when not in use.

A street sweeper will be used to clean the yard surface on an as-required basis.

2.5 Local Government Authority

The premises are located within the jurisdiction of the City of Bayswater.

The site is currently zoned "Industrial" under the Perth Metropolitan Region Scheme and the proposed use for Concrete Batching Plant is consistent with this zoning.

The subject site is zoned "General Industrial" under the City of Bayswater District Planning Scheme No.24 (DPS No.24). Under the landuse definitions of DPS No.24, concrete batching is defined as an "Industry – Noxious" use due to its requirement for registration under Part V of the *Environmental Protection Act 1986*, which is a discretionary ("D") landuse within the General Industrial zone requiring development applications to be publically advertised for comment and approval by council.
"Industry – Noxious means an industry which is subject to licensing as "Prescribed Premises" under the Environmental Protection Act 1986 (as amended)" (City of Bayswater DPS No.24 Appendix 1 p72)

Planning approval was originally refused by the City however this decision was overturned on appeal by the State Administrative Tribunal (SAT) in decision [2014] WASAT 12, in July 2014. A copy of the SAT Orders issued 15 July 2014, which form the conditions of planning approval are enclosed at Appendix 7.

The plant is not subject to any additional offensive or noxious registration requirements by the City of Bayswater.

During the planning approval process the main issues raised were:

- Potential noise emissions
- Potential visual impact of the plant
- Potential dust emissions

2.5.1 Noise Emissions

WA Premix engaged Herring Storer Acoustics to model the predicted noise emissions from the plant. The modelling found that the plant would comply with the Environmental Protection (Noise) Regulations 1997.

Vehicle noise was assessed and found to comply with the noise regulations. Access to the plant will be from Collier Road, a major arterial road servicing the Bayswater Industrial Area. Main Roads traffic count data shows that vehicle traffic generated by the plant will account for less than 0.2% of daily traffic on Collier Road and 0.1% on Tonkin Highway (Main Roads, 2011).

Noise emissions were rigorously examined during the SAT hearing. During the joint witness examination of the noise experts (Herring Storer Acoustics appearing for WA Premix and Lloyd George Acoustics for the City), it was jointly agreed that the proposed plant would comply with the *Environmental Protection (Noise) Regulations 1997* (Refer to Appendix 7). The proposed re-alignment of Collier Rd and Tonkin Hwy will result in a shift of traffic movements and noise further south as the access road to the concrete plant is converted to a Cul-de-sac.

2.5.2 Visual Impact

The City of Bayswater District Planning Scheme No.24 (DPS No.24) requires discretionary approval by the City for all industrial structures greater than 12 metres in height. The original plant design proposed three 17 metre high cement storage silos. In refusing planning approval the City argued that the height of the silos would cause undue visual impact to the surrounding area.

Visual impact is highly subjective with individual's perceptions of the 'visual impact' of a feature varying considerably. The premises location is within an established industrial area that predates the establishment of the residential area to the north. Concrete batching plants are found in virtually all industrial areas within Western Australia and therefore compatible with the surrounding landscape of the site. Two existing concrete batching plants operate within the same industrial area with silo heights similar to that originally proposed by WA Premix. Additionally within the area surrounding the premises location are numerous industrial buildings and structures exceeding 12 metres in height with much greater bulk and scale compared to WA Premix's proposed plant.

Due to the local topography, existing and proposed vegetation and landscaping the original design would not have been visible from any nearby residence, with only partial glimpses between vegetation from within Joan Rycroft Reserve.

The current design with the reduction in silo height will be less visible than originally proposed and substantially less visible than the existing surrounding premises, including the City of Bayswater's Waste Transfer Station adjacent to the premises location.

However in response to the City's objection, WA Premix reduced the height of the silos to 12.5 metres (excluding the silo filter and handrails), which was accepted by the City and the SAT.

2.5.3 Dust Emissions

The City raised concerns about perceived elevated dust emission levels within the local area caused by existing nearby industrial uses. The City's concern was that WA Premix's proposal would negatively contribute to this existing problem. Anecdotal evidence generally supported the need for a baseline dust level study and a predicted emissions modelling study of the proposed development, which the SAT ordered of the proponent in a two-stage approach involving experts from both sides. A SAT Panel Member (Mr Curry) steered the experts through the science gathering process through mediation.

As a result WA Premix undertook a full 12 month baseline air quality assessment to quantify existing background dust emission levels in the local airshed.

3.0 PREMISES DETAILS

3.1 Current Land Use and Existing Facilities

From the mid 1970's to 2007 the site was used for a commercial vehicle refuelling and bulk fuel depot, operated by the Shell Corporation. The rear of the site was used for bioremediation and landfarming soils excavated from local Shell retail sites (URS, 2009).

The fuel tanks and buildings have been completely removed and remediated by Shell prior to purchase by WA Premix. No existing facilities remain within the premises.

3.2 Flora and Fauna

The site has been historically cleared with no native vegetation remaining. Minimal landscaping exists and is in poor condition. The little vegetation within the site is highly unlikely to provide any habitat resource for native species.

WA Premix intends to retain and repair the existing landscaping and increase the landscaped area to more than 10% of the site, predominantly with native species indigenous to the region where practicable.

3.3 Hydrology

3.3.1 Surface Water

No surface water flow exists within the site or surrounding area and the site is not within a Public Drinking Water Source Area.

The closest water bodies are ponds 150 metres to the south down gradient (within an industrial scrap metal recycling facility) and 250 metre to the east (surrounded by industrial premises. No other surface water features are located within a 1km radius of the site.

3.3.2 Groundwater

Groundwater sampling by URS in 2009 as part of the sites remediation recorded depths to groundwater of between 7.38 to 10.44m (16.06 to 19.2m AHD), with flow inferred to be southwest (URS, 2009).

Total Dissolved Solids (TDS) concentration is expected to be between 500 to 1,000 mg/L (Davidson, 1995), which is suitable for concrete production. URS water sampling recorded an average TDS value of 429mg/L.

3.4 Topography

The site is generally flat with an average elevation of 27m AHD (Australian Height Datum), with a slope from south to north. At the northern end of the site there is a steep slope that drops approximately 5 metres down to a drainage reserve and Joan Rycroft Reserve further to the north.

3.5 Geology & Soils

Based on the 1:50,000 scale Environmental Geology Series mapping, subsurface geology consists of very light grey Bassendean Sand at the surface and yellow at depth, composed of fine to medium grained sub-rounded quartz, moderately well sorted and of aeolian origin overlaying Guilford Formation. A peaty clay, dark grey and black with variable sand content of lacustrine origin may cover the Northern part of the site.

The 2004 Perth Groundwater Atlas identifies the northern end of the premises as "High-Medium Risk" for acid sulfate soils with the remainder of the site as "Medium to Low Risk". The northern area of the site has previously been filled as part of the original development and is several metres above natural ground level. WA Premix does not propose any significant earthworks within this area. Construction of the preliminary earthworks (e.g. retaining walls) prior to the construction of the plant will involve sufficient earthworks to identify any potential acid sulfate soils should they occur within the premises.

In the unlikely event that acid sulfate soil is encountered, construction work will be suspended and appropriate remediation works and/or design changes will be undertaken as deemed necessary by appropriately qualified experts.

WA Premix is part of the WA Limestone group of companies, who are experienced with this material and remediation requirements.

3.6 Heritage

There are no registered Aboriginal or European heritage sites within the premises site. Two unregistered "other" heritage sites where artefact scatter have been recorded are located within Joan Rycroft Reserve. Due to the previous disturbance of the site including deep excavation it is highly unlikely that any unrecorded sites remain within the premises.

WA Premix recognises that it has obligations under Section 15 of the *Aboriginal Heritage Act 1972* to inform the Department of Aboriginal Affairs should any archaeological material be encountered during ground disturbance.

3.7 Climate

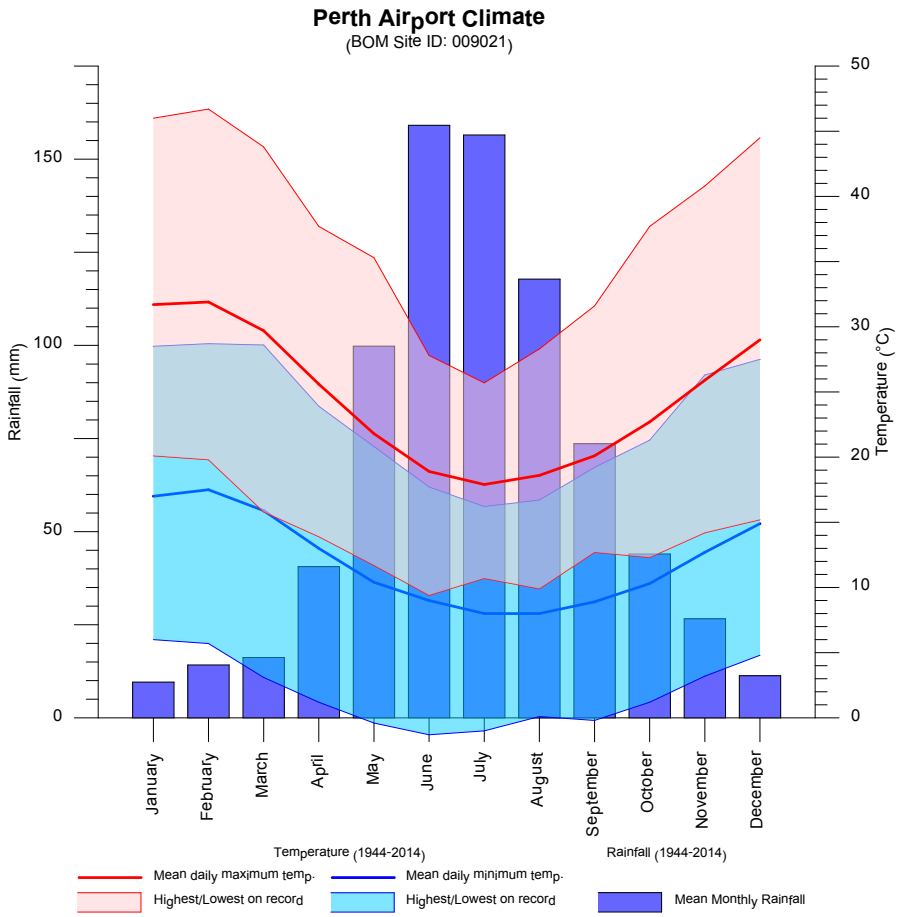
The climate of the area is warm Mediterranean with cool wet winters and hot dry summers. The summer months are controlled by the low pressure heat troughs which develop southwards between the highs.

Rain falls mainly in winter with 80% falling between May to September inclusive. Evaporation exceeds rainfall in all but the four wettest months May to September.

In summer the prevailing winds are easterly in the morning and south-westerly in the afternoon. In winter the dominant wind direction is less distinct.

Statistic	**Perth Airport** BOM Site ID: 009021 (5.3km ESE)
Mean annual max. temp. (°C)	24.5
Highest max. temp. recorded (°C)	46.7 (23 Feb 1991)
Mean annual min. temp. (°C)	12.1
Lowest min. temp. (°C)	-1.3 (17 June 2006)
Mean annual rainfall (mm)	773

Table 3: Climate Statistics



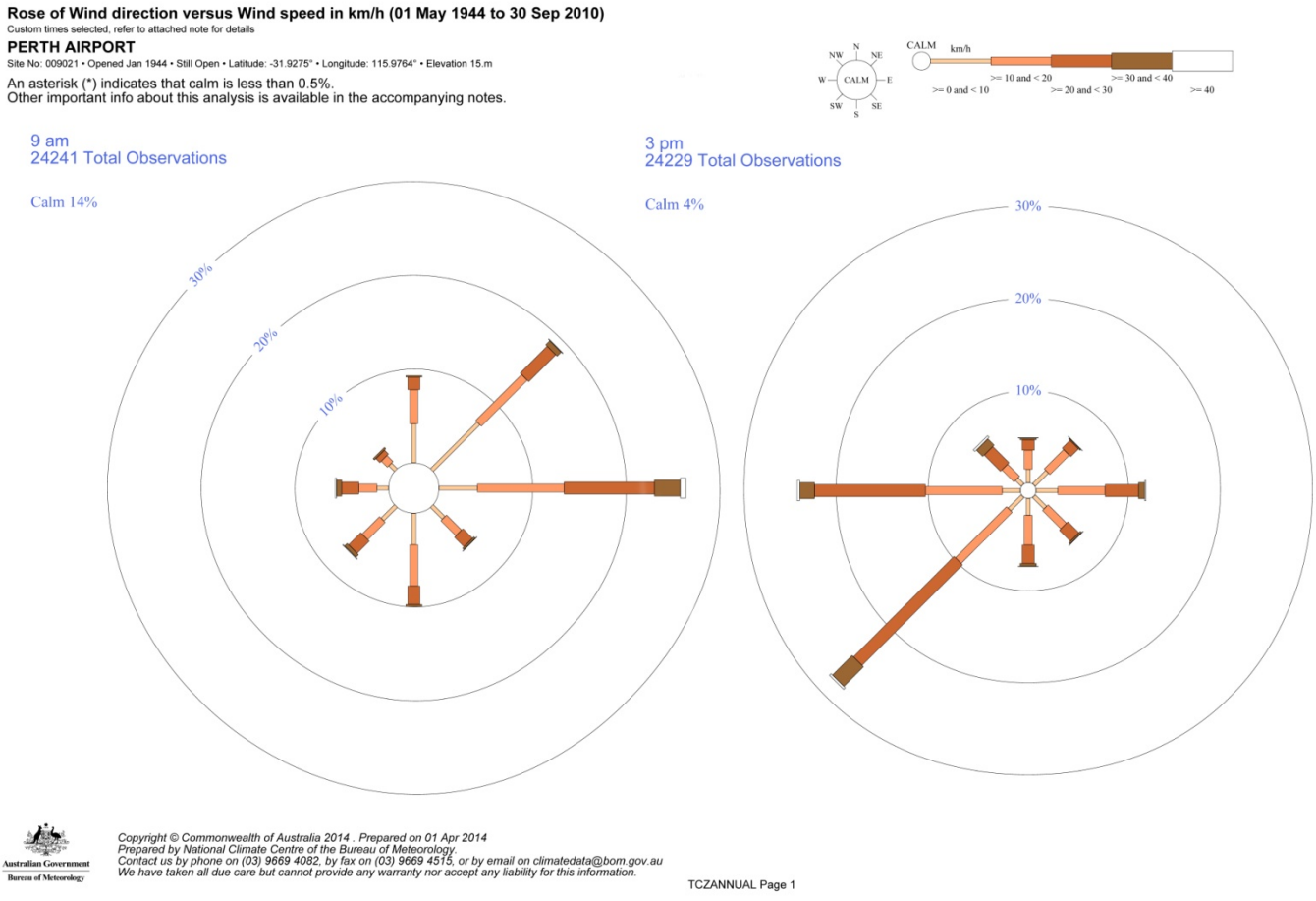


Figure 3: Climate Statistics

3.8 Contaminated Site Identification

The premises site is classified under the *Contaminated Sites Act 2003* as "possibly contaminated – investigation required" and a memorial placed on the Certificate of Title. From the mid 1970's until 2007 the site was operated as a bulk fuel depot and service station by the Shell Company of Australia Ltd.

Prior to the purchase of the property by WA Premix the underground fuel tanks were removed and the site remediated by the previous landholders. The site is currently identified as "Potentially Contaminated – Further Investigation Required". In 2011 WA Premix sought further advice from the (then) Department of Environment and Conservation on the suitability of the site for a concrete batching plant, who advised that the site was suitable for the proposed use. Refer to Appendix 9.

3.9 Surrounding Land Use and Sensitive Receptors

The subject site is within an existing and established industrial area. To the south are three prescribed premises recycling operations, processing building materials and organic matter. To the west is the City of Bayswater Waste Transfer station (also prescribed premises) and to the east are general industrial uses. To the north of the site is Joan Rycroft Reserve and further north a residential area. It should be noted that the industrial area predates the construction of the residential area.

The residential area to the north has been identified as potential sensitive receptors, with the closest residence being approximately 250 metres from the closest point of the plant and trafficable areas within the premises.

EPA Guidance Statement No.3 Separation Distances between Industrial and Sensitive Land Uses (2005) provides advice on the level of assessment required for a proposal based on the separation distance to sensitive receptors, with the closer the separation distance the greater level of assessment and investigations expected. The guideline does not specify mandatory minimum separation distances and allows for reduced separation distances provided that the proponent can adequately demonstrate that any potential environmental impacts can be appropriately managed.

EPA Guidance Statement No.3 identifies a distance of 300-500 metres for concrete batching plants, with the variation in distance to allow for variation in the size and production throughput of the plant being assessed. For proposals with a lesser separation distance, the guidance recommends site specific scientific investigations for noise and dust to be conducted by the proponent.

WA Premix is proposing a plant with a theoretical production capacity of 150m^3 of concrete per hour, which is considered a medium to large plant in comparison to other plants currently operating in the Perth Metropolitan Area. However due to the best practice plant design features and stringent emissions control measures, the "emissions footprint" will be a fraction of currently operating plants with comparable capacity within the Perth Metropolitan Area.

As the proposed plant is within the separation distances defined WA Premix has undertaken the requisite scientific investigations which found the plant will comply with all relevant legislation and guidelines relating to noise and dust.

Within Western Australia there are approximately 90 operating concrete batching plants, with in more than 45 in the Perth Metropolitan Area. Of these more than 30 plants currently operate with separation distances of less than 300 metres, with at least 7 being less than 100 metres to sensitive receptors including schools, childcare centres, residential areas and other sensitive environmental areas. The continued operation of these plants demonstrates the highly conservative nature of EPA Guidance Statement No.3 and the ability of modern properly managed concrete batching plants such as that proposed by WA Premix to operate with minimal impact to the environment or amenity of the area.

This improvement in plant technology and emissions reductions is recognised in other Australian jurisdictions with the EPA of South Australia *Industry Guideline: Concrete Batching* 2009, and EPA of Victoria *Environmental Guidelines for the Concrete Batching Industry* 1998 both listing the recommended separation distance for concrete batching plants as 100 metres, with provisions for lesser separation distances provided the proponent can demonstrate compliance.

State	Distance
South Australia[1]	100m
Victoria[2]	100m
New South Wales[3]	250m
Western Australia[4]	300-500m
Queensland	Not Specified
Tasmania	Not Specified
Northern Territory	Not Specified
Canberra	Not Specified

Table 4: Separation Distance Guidelines

[1] *Industry Guideline – Concrete Batching, EPA South Australia (2009)*
[2] *Environmental Guidelines for the Concrete Batching Industry, EPA Victoria (1998)*
[3] *NSW Environmental Planning and Assessment Regulation (2000)*
[4] *Guidance for the Assessment of Environmental Factors No. 3 Separation distances between industrial and sensitive land uses, EPA Western Australia (2005)*

4.0 STAKEHOLDER AND COMMUNITY CONSULTATION

Extensive consultation of the proposal occurred during the planning approval process.

Notification of the project was sign-posted at the subject site, advertised in the local paper and West Australian as well as written notification sent to surrounding residents. A summary of the submissions received and WA Premix's response is provided at Table 4.

From the submissions received the majority of the issues appeared to be related to a perception by a section of the local community that existing industrial uses in the area are negatively contributing to the amenity of the area and that the operators of these uses do not comply with their approvals. These submitters expressed their concern that WA Premix's plant may cause an increase to the amenity issues perceived to be caused by the existing uses and impacting nearby residents.

During the planning approvals process it was identified that several nearby prescribed premises undertake dust monitoring on an infrequent basis as part of their planning approval conditions. WA Premix requested this information from the City to examine the existing dust levels and the validity of the submission's claims however this information was not made available to WA Premix.

Therefore to quantify and address these concerns WA Premix undertook an AS/NZS 3580 compliant 12 month baseline air quality monitoring program to determine ambient air quality in the area. Comprehensive independent modelling of noise and dust emissions from the plant was also undertaken, which concluded that the plant will not cause any significant adverse impacts to the residential area to the north. To the knowledge of WA Premix this is the first instance in Western Australia where such a rigorous assessment has been undertaken for a concrete batching plant.

Issue / Concern Raised	WA Premix Response
Impact of noise from operating the plant and trucks entering/exiting the site.	• Noise emissions were assessed by Herring Storer Acoustics who found the plant will comply with the Noise Regulations for both the day and night periods. • Collier Road is a major arterial road servicing the existing industrial area, and the site is adjacent to Tonkin Highway. Traffic from the plant will cause a negligible increase in traffic volumes and noise levels over existing background levels.
Noise impacts from the plant operating during early morning hours before 7:00am.	• Noise emissions were assessed by Herring Storer Acoustics who found the plant will comply with the Noise Regulations for both the day and night periods. • During the planning approval process, concern was raised about the operation of the FEL in the early morning. Despite the noise assessment finding the operation of the FEL would comply, WA Premix agreed to not operate the FEL prior to 7:00am. • Further design changes to the plant have virtually eliminated the operation of the FEL, with all plant processes being in enclosed structures with noise insulation where necessary.
Dust/air pollution impact on resident's health.	• Submissions claimed that nearby existing industrial uses had a history of poor environmental management and a lack of action by regulators in enforcing compliance was responsible for elevated dust levels in the area. The respondents were concerned about WA Premix's plant operating similarly. • The City of Bayswater confirmed a history of complaints against several nearby premises and that some of these were subject to dust monitoring conditions. WA Premix requested details of the dust monitoring undertaken from the City to evaluate ambient emission levels however this information was not provided. During the SAT appeal the City also suggested the area was subject to elevated dust levels, however again did not provide any evidence to support this claim. • To resolve the uncertainty around existing background dust levels, WA Premix undertook a full 12 month baseline air quality assessment of the area and

	comprehensive modelling of the plant's emissions. The findings of the assessment were that the plant will not cause any significant dust impacts to the residential area to the north. • To ensure the amenity of the residential area WA Premix will install permanent real time dust monitoring equipment, compliant with Australian and international standards and guidelines. • The baseline air quality assessment, plant design and proposed monitoring regime greatly exceeds that undertaken by any other concrete batching plant in Western Australia and represents world best practice.
Heavy traffic entering and exiting the site causing traffic conflicts and congestion on Collier Road.	• The proposal was assessed by Main Roads and the City of Bayswater. Both found the plant will not cause any significant traffic issues. • The upgrade of the Collier Road and Tonkin Highway intersection to a grade separated intersection is to occur as part of the Main Roads "Northlink" project, which is currently in the detailed design stage, with construction scheduled to commence in 2016. Preliminary designs show that access to the premises will be via a slip road to the intersection of Collier Road and Jackson Street via a traffic light controlled intersection. • In terms of traffic volumes, compared to the sites former use as a bulk fuel station WA Premix's plant will contribute substantially less heavy vehicle traffic onto Collier Road. • WA Premix has designed the plant to maximise storage of concrete constituent materials to reduce reliance and have greater control over the timing of material deliveries. • In consultation with the City of Bayswater, WA Premix has agreed to reduce the crossovers for the site from two to one.
For vehicles exiting the site, turning right onto Collier Road would be difficult and would cause trucks to use Grey Street and other local roads to the north.	• Traffic for the plant will primarily use Tonkin Highway and Collier Road. The only instance were trucks may need to travel along Grey Street is to deliver concrete to those adjacent properties. • The City of Bayswater has installed a number of traffic restriction devices along Grey Street. Notably several submissions commented that they believed these restriction devices were responsible for trucks avoiding Grey Street and using other local roads to the north. • The upgrade of the Collier Road and Tonkin Highway intersection to a grade separated intersection is to occur as part of the Main Roads "Northlink" project, which is currently in the detailed design stage, with construction scheduled to commence in 2016. Preliminary designs show that access to the premises will be via a slip road to the intersection of Collier Road and Jackson Street via a traffic light controlled intersection.
Visual impact of the silo's	• The proposed plant will not be visible from any residence, and only a partial view from within Joan Rycroft Reserve. The proposed landscaping for the plant, once established is anticipated to almost completely obscure any view of the plant from any publically accessible vantage point the north. • Concrete batching plants are found in virtually all industrial areas within Western Australia, with 2 existing plants in the Bayswater industrial area. They therefore are an expected feature within the visual landscape of such areas. • In addition to the substantial landscaping proposed, to eliminate any potential perceived visual impacts WA Premix has agreed to reduce the height of the silos (excluding filters) to 12 metres. The standard silo height is 18 metres and to reduce the silo height so significantly will add to the cost of the plant. This demonstrates the significant lengths and expense that WA Premix has gone to, to address the concerns of residents and to satisfy the City of Bayswater.
Dust impact on residents using Joan Rycroft Reserve.	• The dust modelling undertaken has demonstrated that emissions from the plant will be very low and will not cause any significant impact to persons within Joan Rycroft Reserve. • The site specific 12 month baseline monitoring program undertaken by WA Premix additionally found that the incremental increase to cumulative dust emission levels in the area will remain compliant with the NEPM air quality criteria and City of Bayswater planning approval conditions.

Affect on property values	• Property values are not able to be considered as part of either planning approval or Works Approval applications. Works Approval applications can only be considered on relevant environmental matters only. • The subject site is within an existing established industrial area, which predates the residential area. There is no evidence to suggest that the construction of a concrete batching plant in an existing industrial area will cause any negative affect to property prices. • WA Premix suggests that the introduction of a new best-practice operation with substantial landscaping into an industrial area currently characterised by old and dilapidated premises with apparent poor environmental management will assist in improving the character of the industrial area and may in fact have a positive effect on property prices.

Table 5: Community Consultation Summary

5.0 ENVIRONMENTAL IMPACTS AND MANAGEMENT

5.1 Air Emissions

No significant air emissions will be produced by the proposed concrete batching plant.

5.2 Dust Emissions

Concrete batching if properly managed is not an inherently dusty operation. Plant design and emissions controls have improved substantially from the early plants and less stringent environmental and occupational health regulation of the 1950's and 60's.

WA Premix has used best practice design and emissions controls to virtually eliminate dust emissions by the proposed plant. Furthermore WA Premix has undertaken a full 12 month baseline dust emission assessment to quantify existing background dust levels, as well as comprehensive modelling of the plants emissions to examine both the plants emissions and any potential cumulative impact to the local airshed. These reports are provided at Appendix 4 and Appendix 5. A summary of these reports is provided below.

5.2.1 Source and discharge points

Potential dust emissions are principally from the handling of sand and aggregate materials and vehicle movements within the site. The potential dust emission sources for the plant are shown at Table 6.

Emission Source	Discharge Point(s)	Emission Type
Trucks unloading aggregates	• Trucks unloading aggregates into drive-over bins • Trucks unloading aggregates into temporary overflow storage bins	Material handling
Transfer of aggregates	• Drive over bins to overhead storage bins, via bucket elevator • Overhead storage bins to main conveyor • Main conveyor to aggregate hopper / mixer • Loading hopper to overhead storage bins	Material handling
Vehicle travel on paved roads	• Aggregate delivery trucks • Front End Loader (FEL) • Cement delivery trucks • Agitator trucks	Wheel generated
Front end Loader on aggregates	• Transfer aggregates from temporary storage bins to loading hopper • Transfer aggregates from reclaimed aggregates from EcoFrog to loading hopper	Material handling
Cement Transfer	• Transfer of cement from cement trucks to cement silo	Material handling
Mixer Loading	• Mixer Loading	Material handling
Wind Erosion	• Temporary storage bins	Wind erosion

Table 6: Potential Dust Emission Sources

5.2.2 Composition and quantity

SLR Consulting undertook a comprehensive assessment of the proposed plant to estimate the composition and quantity of dust emissions for both normal operating and worst case conditions. The results are provided at Appendix 5.

5.2.3 Variability of the emission

Some variability of emissions is anticipated based on the quantities of concrete produced per day and meteorological conditions.

Modelling by SLR Consulting was undertaken based on two operating scenarios under a wide range of meteorological conditions:

- Scenario 1 - Typical Operating Day (135m^3 concrete produced/day)
- Scenario 2 - High Production Day (500m^3 concrete produced/day)

The modelling found that even for worst-case scenario (high production every day over the year under extreme adverse weather conditions), the plant would comply with the relevant emissions criteria.

5.2.4 Treatment methods and management

Provided that proper management is implemented, concrete batching plants do not cause significant dust emissions.

WA Premix proposes to implement comprehensive dust management equipment and procedures. These measures have been developed and refined by WA Premix's existing plants and are proven to be effective. Plant operations are regularly reviewed as part of WA Premix's ISO 9001 certified continuous improvement program.

Emission Source	Risk	Proposed Management
Trucks unloading aggregates	• **If the delivery truck's trailers are not covered and/or the sand or aggregate material is dry then dust may be emitted when the material is transported from the quarry to the plant.** *For the majority of materials used, if a trailer is not covered then a finite amount of wind erodible (fine particles) material may be emitted whilst the truck is in transit. Once the erodible layer is exhausted the larger material on the surface prevents any further dust emissions.*	• The majority of sand and aggregate materials are sourced from quarries operated by the WA Limestone group of companies (which includes WA Premix) thereby providing complete ISO 9001:2008 certified delivery management of chain of custody. • All sand and aggregate deliveries are required to arrive in a dampened state. • All trailers to be covered prior to leaving the quarry.
	• **If sand and aggregate material is dry on arrival at the plant then dust may occur when material is tipped from the trailer into the bins.** *The amount of dust potentially emitted by this activity is dependent on the type of material being delivered.* *The majority of sand and aggregate materials used contains little or no fine particulate matter and therefore cannot generate significant dust regardless of moisture content.*	• Drive-over bins will be enclosed within a shed. The shed will be open at the ends however the positioning of the truck will block the northern end whilst unloading. A water spray will also be fitted at the trailer discharge point within the shed to minimise occupational dust risks. • Temporary storage bins will be enclosed on three sides and fitted with water sprays. *The temporary storage bins are only to be used in the event of a malfunction or breakdown of the overhead storage bin system, or if a delivery truck arrives and there is insufficient storage capacity in the overhead bins.* • Prior to tipping, all loads are to be inspected for moisture content with additional water applied by the operator if necessary. • The quantity of fine particulate matter within the sand and aggregate is closely monitored by the plant through regular material testing. Strict quality acceptance criteria apply for all materials.

Transfer of sand & aggregates	• **If uncovered and/or the sand and aggregate material is dry, then dust may occur when the material being conveyed passes through the transfer point(s).** *The majority of sand and aggregate materials used contains little or no fine particulate matter and therefore cannot generate significant dust regardless of moisture content.*	• All conveyors to be enclosed. • All transfer points to be enclosed and/or fitted with water sprays. • Regular maintenance and cleaning of conveyors and transfer points.
Vehicle travel on paved roads	• **If potentially airborne material is allowed to collect on the yard surface then the action of a vehicle travelling over the paved surface may cause dust to be generated.** *The type and speed of the vehicle are significant to the risk and quantity of dust emitted.*	• The plant has been designed to minimise vehicle movements within the site. • All trafficable areas to be sealed with concrete or asphalt. • Spillages to be cleaned up as soon as practicable. • Yard surface to be regularly washed / swept to maintain clean from material. • Speed limit of 20km/h to be enforced within the yard.
FEL handling sand & aggregates	• **If the sand and aggregate materials in the material storage bins are dry, the action of the FEL transferring material from the material storage bins to the feed bins may generate dust.** *The amount of dust potentially emitted by this activity is dependent on the type of material being handled and moisture content.*	• The plant has been designed to minimise the use of the FEL. • Material storage bins and loading hopper to be enclosed on three sides and fitted with water sprays. • If dust emissions occur during material handling then the water sprays will be used to provide additional water during handling.
Transfer of cement from delivery truck to silos	• **Dust generated from the filling of the cement storage silos.** *Cement is transported in sealed tankers and pneumatically pumped to the storage silos. The displaced air within the silo during filling (containing any dust) passes through the silo filters.* *Any emissions are usually the result of a malfunction of a valve or poor maintenance of the silo filter units.*	• The transfer of cement from the tanker to the storage silo is via sealed pipes and hoses. • Each silo will be fitted with approved overfill protection equipment. A weatherproof box, mounted on the silo legs at the fill access point, will be supplied containing control circuitry with an audible alarm and/or light attached and a test circuit facility. A monitor high-level switch will be mounted in the lid of each silo to signal the control box. When the silo high level is reached the signal initiates the alarm or light and timer. It the filling process is not stopped within a prescribed time, a valve in the fill pipe (operated by the control circuitry) will automatically close and prevent further filling of the silo. • Each cement silo is equipped with a reverse jet pulse filter with ducting to within one metre of ground level, near to the filling point. This provides the operator with instant visual identification of any dust emissions. • The filter capacity is sufficient to handle the maximum discharge rates of cement tankers and have a particulate capture efficiency of >99%. • Overfill protection equipment tested by operator prior to every cement delivery. • Regular inspection and maintenance of silos and overfill protection equipment in accordance with manufacturers specifications. • Dust can only be emitted during this process in the event of multiple control systems failing simultaneously.

Mixer loading	• **If un-managed, the transfer of sand and aggregates from the holding hopper above the mixer, and cement from the cement weigh hoppers may generate dust** *No dust emissions occur from the transfer of mixed (wet) concrete from the mixer into the agitator truck.*	• The aggregate holding hopper and cement weigh hoppers and mixer are enclosed within the plant structure and each ducted to dust extraction filters with the same specification as the cement silo filters. • The transfer of cement into the mixer is via sealed screw auger. • The main conveyor transfer point transferring sand and aggregates into the aggregate holding hopper is enclosed.
Wind Erosion	• **If un-managed (exposed and dry), wind blowing over sand and aggregate stored within the site may generate dust.**	• The plant has been designed to virtually eliminate the storage of materials where they could potentially be impacted by wind erosion. • The temporary material storage bins to be enclosed on three sides, roofed and fitted with water sprays. *In the unlikely event material is stored in the temporary storage bins, if not be disturbed the water applied to the aggregates from the sprays will wash the majority of any wind erodible material from the surface of the material deeper into the pile and below the erodible layer thereby preventing continued dust emissions from wind erosion.* • A solid (colorbond) perimeter fence to be constructed around the site at the maximum allowable height. The proposed fencing in conjunction with surrounding buildings will provide substantial windbreaks.

Table 7: Dust Management Actions

5.2.5 Monitoring

A continuous real-time dust monitoring program will be implemented for the plant monitoring for PM_{10} levels.

Two dust monitors located at the northern and southern boundaries of the site will be used to monitor dust levels entering and leaving the site, thereby enabling the dust emissions produced by the plant to be measured.

A weather station will also be used to identify wind direction, speed and temperature.

Monitoring Equipment	Comments
Tapered element oscillating microbalance (TEOM) with PM_{10} sampling head	• Operated in accordance with AS/NZS 3580.9.8:2008 • Located at northern end of site in accordance with AS NZS 3580.1.1:2007 (as far as practicable).
Beta Gauge with PM_{10} sampling head	• Operated in accordance with AS/NZS 3580.9.11:2008 • Located at the southern end of the site in accordance with AS/NZS 3580.1.1:2007 (as far as practicable).
Meteorological Weather Station	• Located at the southern end of the site, adjacent to the TEOM in accordance with AS/NZS 3580.14:2011 (as far as practicable).

Table 8: Proposed Dust Monitoring Equipment

The monitoring equipment will be linked to a real-time alert system to notify plant personnel and company management of any exceedances or conditions likely to exceed.

Dust monitoring requirements will be regularly reviewed throughout the life of the plant. It is anticipated that over time plant operations will improve and become more efficient and the potential for dust emissions will reduce. Also the redevelopment and improvement of the surrounding area over time will likely result in a reduction in ambient dust levels.

5.2.6 Contingency measures

WA Premix has invested heavily in plant design to eliminate dust emissions from occurring as far as practicable. To complement that real-time continuous dust monitoring equipment will be installed to identify any adverse dust emissions should they occur.

Detailed dust management procedures and contingency measures will be developed within the plants ISO 14001 certified Environmental Management Plan (to be completed). As this will be a new plant construction the effectiveness of management and contingency measures proposed can only be estimated at this stage. To address this, during the commissioning and the initial operating period of the plant the management procedures and contingency measures will be constantly assessed and refined to ensure their effectiveness.

Key contingency measures to be implemented are:

- Real-time monitoring of dust emissions with automatic alerts to plant personnel and company management.
- Manual overrides of automatic dust control equipment to provide additional dust suppression if required.
- Multiple layers of dust control (sprinklers, hoses, street sweeper, shrouding, etc).
- Multiple redundant water sources (groundwater, scheme water, rainwater collection) to ensure adequate water supply in all situations.
- Finally should all the above measures fail and dust emissions cannot be effectively controlled then WA Premix will immediately shut down the activity or portion of the plant causing the excessive dust. The plant will then not be restarted until dust emissions can be managed effectively.

5.2.7 Environmental Pathways

Inhalable small particulate matter (PM_{10}) in high concentrations is known to potentially impact sensitive persons (persons with existing respiratory problems, elderly persons, etc).

Larger particulate matter in high concentrations can potentially cause nuisance through dust deposition on surfaces. In extreme cases deposited dust can cause a smothering affect on vegetation, restricting the plant's ability to photosynthesise.

The 12 month dust monitoring program undertaken by WA Premix found ambient dust levels to be within the NEPM criteria. The monitoring results correlated strongly with the Department of Environmental Regulation (DER) air quality monitoring results for the period. Rates of dust deposition were also found to be within acceptable limits.

Modelling has shown that dust emissions from the plant will be low and will not cause any additional exceedances of the NEPM criteria by way of the plant's cumulative increase to ambient dust emission levels.

5.2.8 Cumulative impacts

During the planning approval process it was suggested by the City of Bayswater and some of the public submissions that the area may experience elevated ambient dust levels. No previous monitoring or measurements had been undertaken to substantiate these claims which were solely based on anecdotal evidence from historical complaints by residents to the north of the industrial area.

To properly quantify the background emission levels for the site and surrounding area WA Premix undertook a 12 month baseline monitoring program to assess background concentrations of PM_{10}, TSP, and dust deposition in the area. This involved the installation of an Air Quality Monitoring Station (AQMS) at the subject site, which monitored ambient dust emissions from 6 April 2012 to 6 April 2013.

The 12 month dust monitoring program found ambient dust levels within the area to be within NEPM recommended limits. The monitoring results correlated strongly with the Department of Environmental Regulation (DER) air quality monitoring at nearby locations for the period. Rates of TSP and deposited dust were also found to be within acceptable limits.

Predictive modelling of the plant's operation was then undertaken utilising the measured ambient dust concentrations to determine the cumulative impacts of the plant. The modelling found that the plant would not cause any additional exceedances of the NEPM standards for PM_{10} or exceedances of guidelines for TSP and deposited dust.

To confirm the results of the modelling data from the plant's dust monitoring equipment to be implemented will be used to measure both ambient dust levels and emissions from the plant thereby quantifying any cumulative impact caused by the plant.

5.2.9 Emission limits

Regulation 3 of the *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998* stipulates that:

"An operator must not carry on concrete batching or cement product manufacturing unless it is carried on in such a manner that no visible dust escapes from the premises".

The "visibility" of dust in the atmosphere is subjective. For the purposes of modelling and monitoring it is assumed that the threshold for atmospheric dust to become visible is 500µg/m^3.

The only legislated criterion for particulate matter in Western Australia is for the area contained within the *Kwinana Environmental Protection Policy (Kwinana EPP) (WA EPA, 1999)* however the proposed plant is not located within the Kwinana EPP region. With the exception of the Kwinana EPP, the DER has generally adopted the goals set out by the National Environment Protection Measures for Ambient Air Quality (NEPM) for ambient air quality. The NEPM standard identifies a goal of maximum ambient PM_{10} concentration of 50µg/m^3 for a 24 hour period, with an allowance of up to 5 exceedances per year. This is consistent with World Health Organization (WHO) guidelines.

Neither the NEPM standard or WHO guidelines specify recommended levels for total suspended particulates or dust deposition. The DER additionally do not specify any recommended levels for total suspended particulates or dust deposition.

In October 1981, the National Health and Medical Research Council (NHRMC) recommended an annual goal for Total Suspended Particulate Matter (TSP) of 90µg/m^3 averaged over a 24 hour period.

NSW EPA and VIC EPA define goals for nuisance dust, with an allowable increase in dust deposition levels of 2g/m^2/month by a contributor, with a maximum ambient (background) level of 4g/m^2/month.

Pollutant	Averaging Period	Criteria	Source
Dust deposition[4]	Annual	2g/m^2/month[2] 4g/m^2/month[3]	NSW & VIC EPA
Total suspended particulates (TSP)	24 hour	150µg/m^3	Kwinana EPP Area C
	Annual	90µg/m^3	NHMRC
Particulate matter (as PM_{10})	24 hour	50µg/m^3	NEPM[1]
Visible dust (>500 µg/m^3)	N/A	Not to leave the premises	EP Act[5]

Table 9: Adopted dust emission criteria

Note [1] NEPM – maximum of 5 exceedances per year is permitted
[2] 2 g/m^2/month is the maximum permissible incremental contribution to dust deposition (i.e. due to the proposed development).
[3] Cumulative dust deposition levels are not to exceed 4 g/m^2/month
[4] Dust is assessed as insoluble solids as defined by AS/NZS 3580.10.1:2003
[5] Criteria from *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998 (WA)*.

5.2.10 Derivation of targets

The Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998 requires that no visible dust caused by the plant is to escape the premises boundary.

Visual monitoring of dust emissions by plant personnel is the industry standard method for dust monitoring and will be employed by WA Premix at the premises.

There is no published standard atmospheric dust concentration for "visible dust" however based on advice from SLR Consulting and Environmental Alliances, for the purposes of electronic monitoring visible dust is assumed to be concentrations exceeding 500µg/m^3 averaged over a 15 minute period.

Targets are also required regarding compliance with the NEPM PM_{10} criteria of 50µg/m^3 averaged over a 24 hour period (with allowance for up to 5 exceedances per year) at the location of the sensitive receptors.

WA Premix has the ability to monitor and control emissions produced by the plant, however has no control over ambient dust levels or emissions caused by others. Therefore in developing targets relating to the NEPM PM_{10} criteria, targets can only reasonably be based on the plant's contribution to cumulative dust levels in the local airshed rather than total airshed emission levels.

The location(s) of dust monitoring equipment is constrained to within WA Premix's premises, which is several hundred metres from the nearest sensitive receptors. Due to the dispersion effect of dust over the distance between the plant and sensitive receptors, any dust emissions produced by the plant and measured at the monitoring equipment location(s) would be substantially higher than that if measured at the sensitive receptors directly.

It was jointly agreed by the dust experts that an appropriate target relevant to the NEPM PM_{10} criteria would be for emissions from the plant to not cause any additional exceedances of the NEPM criteria over and above any exceedances from ambient emission levels or the emissions of others.

The 12 month baseline air quality assessment and dispersion modelling undertaken by SLR Consulting were used to quantify this target. It was jointly agreed by SLR Consulting and Environmental Alliances that the target should be a maximum PM_{10} emission contribution by the plant of 12.4µg/m^3 as a 24 hour average, measured at the agreed location of the TEOM monitoring unit (as shown on the site plan), on days where the ambient PM_{10} concentration (inclusive of the plant's emissions) exceeds 50µg/m^3 as a 24 hour average.

Target	Period
12.4µg/m^3	• 24 hour average • Measured at the proposed location of the TEOM, as shown on the site plan. • Applicable on any day where the ambient dust concentrations (inclusive of any emissions from the plant exceeds 50 µg/m^3 as a 24-hour average.
500µg/m^3	15 minute average

Table 10: Dust Emissions Targets

5.2.11 Environmental risk of discharge

The plant has been designed to world's best practice standards with dust minimisation being a primary design criterion. The risk of dust emissions will be further mitigated by real-time Australian Standards compliant dust monitoring and comprehensive dust control mechanisms and procedures.

The level of engineering controls and mitigation measures proposed significantly exceeds that of all other concrete batching plants within Western Australia, including plants with substantially lesser separation distances to sensitive receptors.

The environmental risk of discharge from the plant is very low. Modelling of the plant's dust emissions by SLR Consulting for a typical operating day estimates the plant will cause a maximum incremental increase in PM_{10} emissions of 0.2µg/m^3 (as a 24 hour average) at the nearest sensitive receptor, 0.004% of the current NEPM PM_{10} criteria.

Furthermore stringent monitoring and contingency measures (including the temporary shutdown of the plant) are to be implemented by WA Premix to ensure that the plant's emissions (albeit small) to the cumulative emissions in the local airshed to not cause any additional exceedances of the NEPM criteria.

5.3 Odour Emissions

The concrete batching process does not produce any significant or discernible odour.

5.4 Noise Emissions

Based on the original plant design proposed in 2011, a noise assessment was conducted by Herring Storer Acoustics who found the proposed concrete batching plant would comply with the *Environmental Protection (Noise) Regulations 1997*. This assessment was independently peer reviewed by Lloyd George Acoustics as part of the planning approval assessment and approval by the State Administrative Tribunal.

It was jointly agreed by the noise experts that the dominant noise source from the plant will be the operation of the front end loader however both agreed that the plant, including the loader operating would comply with the noise regulations for both the day and night time periods.

During the later re-design of the plant by WA Premix in 2014, careful consideration was given to potential noise and whether the emissions could be reduced further. The revised design was assessed by Herring Storer Acoustics in October 2014 confirming the plant will still comply with the noise regulations for both the day and night periods. The full noise assessment of the proposed plant is provided at Appendix 6.

In order to ensure compliance, once the plant is commissioned a full noise survey will be undertaken. Noise contours will be plotted at distance to various noise sources and their impact on adjoining premises. Any exceedance of prescribed limits identified will be addressed to ensure ongoing compliance. Ongoing noise management will be addressed as part of the plant's ISO 14001:2004 certified Environmental Management Plan (to be developed).

1.1.1 Offsite noise

To the south, east and west of the subject site is an existing industrial area. To the north is a drainage reserve, then Joan Rycroft Reserve and further north a residential area. The nearest noise sensitive receptor is located approximately 260 metres from the plant (to the north).

Offsite noise, being noise received from an emitter at surrounding premises is governed by the *Environmental Protection (Noise) Regulations 1997*. As the premises are classified as a "Prescribed Premises" under Part V of the *Environmental Protection Act 1986*, the principal compliance authority will be the Department of Environmental Regulation.

Regulation 8 defines a series of permitted noise levels (L_{A10}) depending the sensitivity of the receptor and time of day. The regulations also make allowances for higher noise emissions occurring less than 10% of the time (L_{A1} assigned level), and for less than 1% of the time ($L_{A\,max}$ assigned level).

As the plant will operate before 7:00am, noise emissions are required to comply with the assigned "night period" levels at the receptors.

The proximity of Tonkin Highway in relation to the plant and residential area is likely to provide a significant masking of plant noise.

The assessment by Herring Storer found the plant would comply with the noise regulations at the location of all nearby receptors for both the day and night periods and that no additional controls or measures were required to achieve compliance.

Offsite noise complaints relating to concrete batching plants typically relate to reversing alarms fitted to front-end loaders. WA Premix has designed the proposed plant to virtually eliminate the use of a loader. In addition this noise can be controlled by maintaining any alarm systems to a level that is audible but only slightly above background levels that prevail at any time.

1.1.2 Occupational Noise

Occupational noise, being noise experienced by personnel within the site is governed by the Occupational Safety and Health Act 1984 and regulated by Worksafe, under the Department of Commerce.

Principally occupational noise is managed through the careful plant design to eliminate or minimise potentially high noise levels around the plant. Where this is not practicable occupational noise is managed through educational programs and site inductions, appropriate signage, and the provision of all necessary hearing protection equipment to site personnel. Inductions and regular training are also provided to site personnel.

Noise insulating panels will be installed around the mixer area to reduce occupational noise levels and assist in communication between staff and the dispatcher.

1.1.3 Noise Sources

The processes involved in the manufacture of concrete are not inherently "noisy" and no heavy/mass equipment is used. Being a batch process, there is no "continuous" source of noise and the plant and site layout have been designed to minimise noise emissions.

The operation of the front end loader is typically the "noisiest" activity within a concrete batching plant. The majority of concrete batching plants in Western Australia utilise "sandwich dosing" which requires the loader to tip each sand and aggregate material into a loading hopper individually for each batch. This process is eliminated with WA Premix's design. The loader is only required to operate to transfer reclaimed aggregates from the EcoFrog (typically once per day) and in the unlikely event that the temporary storage bins are required to be used. Neither activity will occur during the more sensitive "night period".

Dropping aggregate material into an empty metal bin or hopper can cause brief (1-2 second) and infrequent noise if not properly managed. As opposed to the majority of existing plants which utilise "sandwich dosing" which requires the feed hopper to be emptied each time before the next batch is loaded, WA Premix's plant will utilise a series of overhead storage bins, fed by a drive-over bin delivery system enclosed within a shed. As the plant will draw materials directly from the overhead bins, which will be constantly replenished by deliveries the likelihood of these bins being emptied is low.

The loading, mixing and slumping (adding final water to the mix) of the agitator trucks is sometimes considered noisy by the plant operators when the despatch office is located too close to the truck load-out area. This noise can also be a problem to adjoining neighbours, if located in close proximity to the mixing area. By utilising the "wet-mix" process this noise source is substantially reduced as the agitator trucks are not required to rev their engines and spin their bowls at high-rpm for several minutes after being loaded before departing the site.

The proposed plant has been specifically chosen and located in such a way to maximise the distance of the mixing noise source from adjoining office and workshop areas and additional noise insulation will be installed around the mixer. Again, the post-commissioning noise study will confirm that noise levels are maintained within prescribed levels.

1.1.4 Noise Management

The plant has been designed to eliminate and/or reduce significant noise sources and emissions as far as practicable.

The following plant design features will be implemented to manage and mitigate noise emissions.

- The "wet-mix" process is inherently quieter than the traditional "dry-mix process".
    - Transferring wet concrete as opposed to dry aggregate materials into the agitator truck.
    - Mixing the concrete within the enclosed and shielded plant as opposed to the agitator truck.
    - In a dry mix plant the agitator truck must spin the bowl at high RPM whilst being loaded, water added and then for several minutes afterwards whilst the concrete mixes; all before departing the site. During a busy period multiple trucks could be mixing on-site before leaving to deliver their load. In a wet mix plant as proposed the agitator truck bowl spins at low RPM whilst being loaded and is able to immediately depart the site when loaded.

- The delivery of sand and aggregate materials will occur within an enclosed shed utilising a drive-over bin system. Unlike other drive-over bin systems WA Premix's bins will be completely underground providing additional noise screening. The drive-over bin system additionally allows road trains to tip both trailers without having to unhitch, substantially reducing heavy vehicle movements and unloading time within the site.
- The virtual elimination of the front end loader provides the greatest reduction in noise emissions compared to a typical concrete batching plant.
- The overhead storage bin system and their capacity means that the plant can operate for extended periods before replenishment deliveries are required giving greater flexibility to minimise deliveries during noise sensitive periods.
- A post-commissioning noise assessment will be undertaken to verify actual noise emissions. Should any noise issues be identified WA Premix will undertake necessary actions in consultation with qualified noise consultants to ensure ongoing compliance.

Best practice operational procedures	Commitments on activities conducted on site
• Comply with the *Environmental Protection (Noise) Regulations 1997*.	• WA Premix will maintain compliance.
• Design site operations to maximise the separation and protection from sensitive premises.	• The proposed plant has been designed to be as compact as possible and located to the south of the premises site as much as practicable.
• Maintain all plant in good condition with efficient mufflers and noise shielding.	• WA Premix has new modern equipment that is maintained in good condition by in-house service crews and workshops.
• Maintain trafficable surfaces in good condition (free of potholes, rills and spillages).	• All trafficable areas will be sealed with concrete or asphalt and maintained in good condition. • Any spillages will be removed as soon as practicable.
• Implement a site code outlining requirements for operators and drivers	• WA Premix maintains site induction and training for all personnel as part of the companies ISO 14001 Environmental Management System and site specific Environmental Management Plan.
• Shut down equipment when not in use.	• WA Premix uses this policy to save fuel and maintenance costs in addition to noise minimisation.
• Schedule activities to minimise the likelihood of noise nuisance.	• During normal operating conditions the front end loader will not typically operate prior to 7:00am. • The timing of material deliveries will avoid noise sensitive periods as far as practicable.
• Fit warning lights or low frequency beepers on plant and mobile equipment wherever possible.	• Low frequency "croaker" reversing alarms will be fitted to the front end loader, agitator trucks and delivery trucks. • Plant alarms will utilise warning lights rather than audible sirens where practicable and safety allows.
• Avoid the use of engine braking	• Signage and training will be used to discourage drivers from using engine brakes within the site and surrounding roads.
• Provide a complaints recording, investigation, action and reporting system.	• A comprehensive complaints management system will be implemented for the premises.
• Conduct training programs on noise minimisation practices.	• WA Premix maintains site induction and regular training for all personnel.
• Provide all workers with efficient noise protection equipment.	• All personal noise protection equipment is provided to staff where required.

Table 11: Noise Management Actions

5.5 Light Emissions

The project will not cause any excessive light emissions or impact surrounding receptors.

The operating hours for the plant will be 06:00am to 06:00pm Monday to Saturday. Night time operations are not proposed.

Security lighting will be located to minimise light visibility from roads and neighbours. This will be consistent with the surrounding industrial premises and subject to approval by the City of Bayswater in the issuing of a Building Licence for the project.

Existing street lighting along Collier Road, Grey Street and Shalford Street, between the project site and any potential receptors will further mitigate any potential light emissions impacts from the premises.

1.2 Visual Amenity

Visual impacts can occur in a number of circumstances, by the development being too high in the landscape, by being too close to neighbours and/or by insufficient visual protection. Perception of a visual feature and its impact to the observer is highly individualistic and difficult to quantify. A feature may appear visually appealing to one person and offensive to another. However there are a number of generally accepted management actions that can be taken to minimise visual impact and these will be used where possible.

Concrete batching plants are found in virtually all industrial estates within Western Australia. As such their presence and visual characteristics are to be expected and “in keeping” within the visual landscape of industrial areas.

Concrete batching plants are typically tall structures with silos up to 18-20 metres high, however are relatively small in bulk and scale compared with other industrial uses.

The principal management undertaken by WA Premix to minimise the visibility and therefore any potential impact has been to reduce the height of the plants silos and all other structures to less than 12.5 metres. In addition the site will also be substantially landscaped with the bulk of the landscaping being along the northern end of the site facing Joan Rycroft Reserve and residential area to the north, and the frontage onto Collier Road.

Given the size and bulk of the plant and considered in the context of the surrounding uses and landscape, the proposed plant will not impact the visual amenity of the area.

5.6 Discharges to Water

The proposed plant will not discharge any emissions to water.

Water usage will be minimised through recycling of surplus and waste water back into the plant process and by the collection of rainwater.

5.6.1 Surface Water

There is no defined surface water flow within the premises and all water from the plant and stormwater will be retained within the premises. With the exception of landscaped areas the entire site will be sealed with concrete in high traffic areas and bitumen in the remaining areas.

The agitator wash-out areas and re-fuelling station are designed as a closed system with all water collected in these areas recycled for reuse within the plant. The remaining areas of the site will be shaped to contain all stormwater runoff within the premises and collected in a detention basin(s).

All stormwater runoff will be retained within the premises. This will be achieved by:

- Sealing of the site with concrete on high trafficked areas and bitumen for the remaining areas. Landscaped areas will be kerbed and site gradients designed to prevent surface water flow into these areas.
- Forming the ground to smooth flat surfaces with a gentle gradient (typically 1:100) to prevent surface water from pooling and direct water to drainage channels and into the detention basin(s), with sufficient capacity to handle a 1:100 year ARI.

Concrete is rarely poured when it is raining or likely to rain therefore demand for concrete on these days is low. Consequently concrete batching plants typically operate at lower capacity if at all on these days thereby reducing the risk of discharges to water.

5.6.2 Groundwater

The entire plant site will be sealed with either concrete or bitumen creating an impermeable water barrier to the water table. Groundwater sampling by URS in 2009 as part of the sites remediation recorded depths to groundwater of between 7.38 to 10.44m (16.06 to 19.2m AHD) (URS, 2009).

The plant will utilise groundwater for the majority of the plants water requirements. WA Premix has a groundwater Licence (GWL 172394) for the abstraction of 25,000kL per year from the Perth – Superficial Swan aquifer.

Wastewater from the plant and truck washdown may contain elevated suspended solids and slightly elevated pH, however is not considered to be a significant environmental risk. All water from these sources will be separately drained and collected for recycling by the plant in a closed loop system. No water from these areas or processes will flow into the stormwater drainage system and therefore is no potential for plant water to infiltrate the water table. With the exception of landscaped areas and the stormwater detention basin the entire site will be sealed with either concrete or bitumen.

The yard surface will be regularly swept and maintained in a clean condition. Additionally the stormwater detention basin will be periodically cleaned to remove any suspended material collected from the yard surface and maintain the basin's holding capacity.

5.6.3 Wastewater

Water from the agitator truck wash areas, slump stand and from the mixer washing system will be collected and processed through the "EcoFrog" recycling unit. This water has an elevated pH and suspended solids levels however will be completely contained within the site. No wastewater will be discharged into the environment with 100% being recycled for reuse by the plant.

Part of the six monthly maintenance regime for agitator mixer trucks involves the scrubbing down of the outside of the bowl's surface with a diluted acid solution (1 part in 10 of water). The acid is of a hydrochloric base designed to break up any cement matrix sticking to the agitator paintwork. The wash-out area is a separate area where run-off is collected by the EcoFrog unit where the acidic (low pH) water mixes with the alkali (high pH) water from the concrete washings, neutralising any remaining acid.

The EcoFrog unit separates the solids (material >0.25mm) and the liquids from the collected water and returned concrete. The reclaimed water is held in storage tanks fitted with stirrers to maintain any particulate matter in suspension. This water is then used by the plant in subsequent batches of concrete or reused for the washing of concrete agitator trucks. The pH and density of this water is continuously monitored and maintained within required limits through the addition of additional water if necessary.

Stormwater within the site will be managed by shaping the ground surface to direct the water to open drains flowing to detention basin(s) at the northern end of the site. The capacity of the basin will be sufficient to contain a 1:100 year ARI and designed by a certified practicing engineer.

5.7 Discharges to Land

No discharges to land will occur from the proposed concrete batching plant.

5.8 Solid Liquid Waste

No solid or liquid waste will be discharged from the plant. All plant water and returned concrete is collected and recycled for reuse by the plant.

5.8.1 Excess concrete

An EcoFrog RE_X_24 concrete reclaimer unit will be used to process returned concrete and the washing out of agitator trucks. These and similar units are widely used in Europe and are considered the current best practice for concrete waste recycling and water management. The EcoFrog unit is capable of processing up to 24m^3 of returned concrete per hour and allows two agitator trucks to clean out the inside of their bowls at the same time. The capacity of the EcoFrog allows the entire plant agitator truck fleet to wash out in short succession (i.e. at the end of the day) without overloading the system. The EcoFrog unit also has a waste collection point at ground level which will collect any material spilt on the ground surface within the wash bay area.

All solid and liquid waste and truck washings will be recycled by the EcoFrog unit and reused by the plant. The unit separates the sand and aggregate materials (>0.25mm) from the liquids (and fine particulate matter). The reclaimed sand and aggregates are then reused in subsequent batches of concrete. The reclaimed water is either used in subsequent batches of concrete or reused for the washing of agitator trucks in a closed loop system. Given the efficiency of the EcoFrog unit minimal

additional water is required to be added to the washout system other than to replace the water taken for concrete production.

The site will operate toilet facilities and provide for the necessary vanity and crib needs of the workforce. Provision will be made for disabled access where this is required by Council in accordance with local by-laws. Appropriate sewerage disposal mechanisms will be installed by a qualified plumber to Council requirements.

5.9 Hydrocarbon Storage

Hydrocarbons for the quarry are stored and managed in accordance with the *Dangerous Goods Safety Act 2004* and associated regulations, and the *DMP Code of Practice for the Storage and Handling of Dangerous Goods (2nd edition)*.

A 2,000 litre diesel fuel tank is proposed for the refuelling of the front end loader. The tank will be of self-bunded wrap tank construction, compliant with *AS 1940:2004 - The storage and handling of flammable and combustible liquids*. The yard surface will be sealed and fuel spill kits provided for refuelling operations.

Servicing and light maintenance of the front end loader may occur within the premises however all major servicing and/or repairs will be undertaken at WA Premix's workshop facility in Bibra Lake.

The refuelling of light vehicles or concrete agitator trucks is not proposed to occur within the premises.

5.10 Dangerous Goods and Hazardous Substances

Except for the following, no dangerous goods or hazardous substances are proposed to be used or stored at the premises.

All concrete additives and admixtures used by the plant are non-hazardous with the majority being naturally derived substances such as ochres or cellulose-based. These materials will be stored in bunded tanks to prevent spillage.

5.10.1 Acid Wash

Inhibited Hydrochloric Acid, a Class 8 Corrosive Substance is used for the periodic (6 monthly) cleaning of agitator trucks. The acid used is diluted by 50% to a concentration of 115g/L by WA Premix prior to delivery to the plant. Up to 240 litres in 20 litre containers may be stored at the premises.

The acid will be stored in a compliant chemical storage area with appropriate PPE and first aid facilities provided. A copy of the MSDS will be available on-site and appropriate training provided to plant personnel handling this substance.

5.11 Native Vegetation

Not applicable. No clearing is required as the proposed site for the concrete batching plant is already cleared of native vegetation. More than 10% of the premises will be landscaped as part of the project.

5.12 Complaints Management

WA Premix maintains an ISO 9001:2008 compliant complaints register for all sites and operations. Contact details will be sign posted at the entrance to the site.

All complaints are to be investigated immediately upon receipt of a complaint. If the complaint is substantiated, WA Premix will undertake measures as necessary to ensure compliance. Details of complaints received and actions taken will be provided to relevant authorities upon request.

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Figure 4: Site Location Plan

Appendix 1
Compliance Register

Item	Text	WA Premix Compliance

Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998

3(1)	An operator must not carry on concrete batching or cement product manufacturing unless it is carried on in such a manner that no visible dust escapes from the premises (or if there are no defined boundaries to the premises, no such dust escapes onto any place to which the public has access).	• Commitment. • An ISO 14001:2004 compliant Environmental Management System (EMS) and site specific Environmental Management Plan (EMP) are to be implemented. • Real-time continuous dust monitoring will be undertaken to AS/NZS 3580 and provide real-time alerts to plant personnel and company management of dust levels.
3(2)	An operator must immediately clean up any material spilt during concrete batching or cement product manufacturing	• Commitment. • The plant's operations are almost entirely enclosed and automated. There potential for material to be spilt is low.
An operator must ensure that all parts of the premises to which vehicles have access:		
4(1)(a)(i)	Paved or sealed; or	• With the exception of landscaped areas, the entire plant area will be sealed with concrete in high trafficked areas and bitumen for the remaining areas.
4(1)(a)(ii) 4(1)(b)	Treated with water or surfactants as often as is necessary	• Not applicable. All areas of the plant to which vehicles have access will be sealed. • All paved and sealed surfaces will be regularly cleaned.
4(2)	An operator must not allow any vehicles carrying concrete, or any of the ingredients of concrete, to leave the premises until it has been washed free of cement slurry and dust.	• Commitment. • The plant's operations will be undertaken in accordance with the Companies ISO 14001 certified Environmental Management System (EMS) and site-specific Environmental Management Plan (EMP).
5(1)	An operator must store all aggregate and sand kept on the premises in storage bins or bays which are designed to minimise airborne dust, or where the use of such bins or bays in not practicable, in stockpiles on the ground.	• Sand and aggregate will be stored in fully enclosed bins. • No aggregate or sand material will be stored in stockpiles on the ground.
5(2)	An operator must not allow the height of aggregate or sand in a storage bin or bay to exceed the height of the bin or bay (including any windshields fitted to it).	• Sand and aggregate will be stored in computer-controlled fully enclosed bins that cannot be over-filled.
5(3)	Where aggregate or sand is stored in a stockpile on the ground the operator must keep it covered or damp, or otherwise treat it, so as to minimize airborne dust.	• Not applicable. No aggregate or sand material will be stored in stockpiles on the ground.
5(4)	If during the unloading of aggregate or sand, any visible dust escapes from the premises the operator must ensure that unloading stops immediately and does not resume until appropriate measures have been taken to prevent the escape of dust from the premises.	• Commitment. • The unloading of sand and aggregate will occur within an enclosed shed, with the tipping point equipped with water sprays.
6(1)	An operator must store all cement kept on the premises – (a) in bags; or (b) in a cement storage silo – (i) which complies with subregulation (2); or (ii) which is one of a series of interconnected silos at least one of which complies with subregulation (2).	• All cement will be stored in cement storage silos. • Each cement storage silo will be equipped with a reverse jet pulse filter air cleaning system, fitted with ducting to within one metre of ground level compliant with sub-regulation 2.

Item	Text	WA Premix Compliance
6(2)(a)	To comply with this subregulation a cement storage silo must be fitted with – (a) an air cleaning system, which complies with regulation 7, through which all air extracted from the silo while it is being filled must pass before it is discharged into the environment; and	• Each cement storage silo will be equipped with a reverse jet pulse filter air cleaning system, fitted with ducting to within one metre of ground level compliant with Regulation 7.
6(2)(b)	either- (i) a level indicator which complies with regulation 8(1); or (ii) a relief valve, which complies with regulation 8(3).	• Each silo will be fitted with approved overfill protection equipment. A weatherproof box, mounted on the silo legs at the fill access point, will be supplied containing control circuitry with an audible alarm and/or light attached and a test circuit facility. A monitor high-level switch will be mounted in the lid of each silo to signal the control box. When the silo high level is reached the signal initiates the alarm or light and timer. It the filling process is not stopped within a prescribed time, a valve in the fill pipe (operated by the control circuitry) will close and prevent any further filling of the silo. This system complies with both Regulation 8(1) & 8(3)
6(3)	An operator must seal all inspection ports, hatches and other openings to a cement storage silo while cement is being unloaded into the silo.	• Commitment. • All inspection ports, hatches and other openings to the cement silos to be closed whilst cement is being unloaded into the silo.
6(4)	If, during the filling of a cement storage silo, any visible cement dust escapes from the silo the operator must ensure that no further loads of cement are unloaded into the silo until appropriate measures have been taken to prevent the escape of dust from the silo.	• Commitment. • If during the filling of a cement silo visible dust is observed, unloading is to stop until appropriate measures have been taken to prevent the escape of dust from the silo.
The air cleaning system for a cement storage silo must -		
7(1)(a)	Be either (i) a mechanical rapping air cleaning system with a minimum filter area of 23 square metres; or (ii) a reverse pulse air cleaning system which reduces dust emissions to less than 50 milligrams or particulate matter per cubic metre;	• Each cement storage silos will be equipped with a reverse jet pulse filter equipped with cartridge type dust filters with a combined filter area of at least 23 square metres
7(1)(b)	Discharge air from the system into a weigh hopper or to an outlet which is within one metre of the ground	• All cement storage silo filters will be ducted to an outlet within one metre of the ground.
7(2)	An operator must inspect the filters, or if the system is fitted with pressure gauges for the detection of blockages or leaks, check those gauges, at least weekly and immediately clean repair or replace any filter which is blocked or damaged or has an excessive build-up of dust	• Inspections of all dust control components will be performed at least weekly. • Any blockages or leaks or excessive build up of dust identified is to be rectified immediately in accordance with manufacturer's specifications. • Cement silo loading is not to occur unless the air cleaning system is working efficiently.
7(3)	An operator must test the air cleaning system for a cement storage silo at least weekly and if it is not working efficiently, must not unload any cement into the silo until the system is repaired.	• Inspections of all dust control components will be performed at least weekly. • Any blockages or leaks or excessive build up of dust identified is to be rectified immediately in accordance with manufacturer's specifications. • Cement silo loading is not to occur unless the air cleaning system is working efficiently.

Item	Text	WA Premix Compliance
7(4)	An operator must keep on the premises, or in a readily accessible place, sufficient spare filters to replace all such bags or cartridges used in the air cleaning systems of all cement storage silos on the premises	• Filter maintenance will be undertaken by qualified contractors, who service the majority of the concrete batching plants within the Perth Metropolitan Area. • Sufficient spare filters will be stored on the premises. In addition the contractor maintains a local inventory of replacement filter components.
8(1)	A level indicator for a cement storage silo must include – (a) an audible alarm which sounds if cement stored in the silo reaches - (i) 0.6m below the inlet to the silo's air cleaning system; or (ii) 2 tonnes less than the silo's maximum capacity; and (b) a test circuit which indicates whether the level indicator and alarm are working correctly.	• Each silo will be fitted with approved overfill protection equipment. A weatherproof box, mounted on the silo legs at the fill access point, will be supplied containing control circuitry with an audible alarm and/or light attached and a test circuit facility. A monitor high-level switch will be mounted in the lid of each silo to signal the control box. When the silo high level is reached the signal initiates the alarm or light and timer. It the filling process is not stopped within a prescribed time, a valve in the fill pipe (operated by the control circuitry) will close and prevent any further filling of the silo.
8(2)	Where a level indicator is used to comply with regulation 6(2)(b) the operator must ensure that the test circuit is activated before a load of cement is unloaded into the silo and that no cement is unloaded into the silo and that no cement is unloaded into the silo if the level indicator or alarm are not working correctly.	• Commitment • Prior to each delivery of cement the operator is to ensure that the test circuit is activated. • Cement shall not be unloaded unless the level indicator and alarm are working correctly.
8(3)	A relief valve for a cement storage silo must be designed – (a) to automatically prevent the level of cement in the silo rising above the level referred to in subregulation (1)(a)(i) or (ii); and (b) so that any excess cement is piped into a weigh hopper or to an outlet which is within one metre of the ground.	• Each silo will be fitted with approved overfill protection equipment. A weatherproof box, mounted on the silo legs at the fill access point, will be supplied containing control circuitry with an audible alarm and/or light attached and a test circuit facility. A monitor high-level switch will be mounted in the lid of each silo to signal the control box. When the silo high level is reached the signal initiates the alarm or light and timer. It the filling process is not stopped within a prescribed time, a valve in the fill pipe (operated by the control circuitry) will close and prevent any further filling of the silo. • A reverse jet pulse filter will be installed on each silo and fitted with ducting to within one metre of ground level.
9(1)	An operator must not use – (a) an hopper, conveyor chute, bucket elevator or transfer point to move material on the premises; or (b) any area of the premises to load agitators, unless it is – (c) enclosed; (d) fitted with wind shields, water sprays or a dust extraction system; or (e) otherwise designed and operated so as to prevent the escape of any visible dust	• All hoppers, conveyors chutes and transfer points will be fully enclosed. • Water sprays will be fitted to conveyor transfer points, and a dust extraction system fitted to the plant mixer, and cement hoppers.
9(2)	An operator must maintain in good working order all wind shields, water sprays, dust extraction systems and other devices used to comply with subregulation (1).	• Inspections of all dust control components will be performed at least weekly. • All dust control equipment is to be maintained in good working condition.
10	Cement product manufacturing premises to be cleaned	• Not applicable. Cement product manufacturing will not occur within the premises.

Item	Text	WA Premix Compliance
11(1)	An operator must ensure that – (a) all water draining off any area where agitators, mixers or moulds are loaded or where concrete is batched drains into a slurry pit; (b) all water used to wash out agitators, mixers or moulds or to clean up spilt material drains into a slurry pit; (c) all other water draining off sealed or paved areas of the premises and which is likely to contain waste material drains into a slurry pit or settling pond; and (d) any water removed from, or which might overflow from, a slurry pit drains into a settling pond.	• Water from the mixer and agitator loading area, and truck washing area will be plumbed / drained to the EcoFrog aggregate reclaimer where any solids are removed and the water collected for reuse within the plant. • The washing out of agitator trucks will be undertaken with the EcoFrog, which collects and recycles 100% of the water and waste/excess concrete.
11(2)	An operator must ensure that no water used in concrete batching or cement product manufacturing is discharged from the premises until – (a) it has been – (i) though a silt trap; or (ii) contained in a settling pond for long enough to allow all particulate matter to settle out; and (b) if the water is likely to contain hydrocarbons, it has been through an oil interceptor.	• All excess water used in concrete batching will be collected and processed through the EcoFrog unit and recycled for reuse by the plant. • Reclaimed water will be stored in tanks equipped with stirrers to maintain any fine material in suspension. The reclaimed water tanks will be equipped with pH and density meters to monitor and control the consistency of the reclaimed water for reuse within the plant. • No water used in concrete batching will be discharged from the premises.
12(1)	An operator must not allow settled material in a slurry pit to – (a) dry out (except when the pit is dried out to allow the settled material to be removed); or (b) be higher than 30cm below the top of the slurry pit walls.	• All solids within plant water and excess/waste concrete will be recycled through the EcoFrog unit. The reclaimed sand and aggregates will be reused in subsequent batches of concrete. • Reclaimed water will be stored in tanks equipped with stirrers to maintain any fine material in suspension. The reclaimed water tanks will be equipped with pH and density meters to monitor and control the consistency of the reclaimed water for reuse within the plant.
12(2)	An operator must ensure that a settling pond is large enough to contain all water which might drain into it for long enough to allow all particulate matter to settle out.	• A settling pond is not proposed. The EcoFrog unit is equipped with water tanks fitted with stirrers to maintain the reclaimed water (containing fine particulate matter) in suspension. The reclaimed water (including fine particulate matter) is then reused by the plant in subsequent batches of concrete or for the washing of agitator trucks in a closed loop system. • The EcoFrog unit is capable of processing up to 24m^3 of returned concrete per hour. Reclaimed water from the EcoFrog unit is used to wash down the agitator trucks in a closed loop system. Water is only added where necessary to maintain water levels, thereby maintaining the capacity of the system. •
12(3)	An operator must ensure that slurry pits, settling ponds, silt traps and oil interceptors are maintained, and emptied or cleaned as often as necessary, to ensure their efficient operation.	• All water collection and treatment equipment will be regularly inspected, cleaned and maintained in accordance with the manufacturer's recommendations to ensure their efficient operation.

Item	Text	WA Premix Compliance
13	An operator must ensure that all waste material created during concrete batching or cement product manufacturing (including material removed from slurry pits, settling ponds, silt traps and oil interceptors) is – (a) recycled; or (b) disposed of at an appropriate landfill site or waste treatment facility the occupier of which holds a licence under Part V of the Act in respect of that site or facility.	• Any waste / excess concrete produced, including material from the washing of agitator trucks will be collected and processed through the EcoFrog unit. All solid material (sand and aggregates) are separated and reused by the plant in subsequent batches of concrete. • Fine particulate matter will be maintained in suspension in the reclaimed water for use in subsequent batches of concrete or for the washing down of agitator trucks in a closed loop system.

Item	Text	WA Premix Compliance

EPA Code of Practice – Concrete Batching Plants 1991

2.1	Site Selection The siting of industry in an area zoned appropriately is part of a general rule for planning, but the selection of a specific block or sub-division for a particular industry within that zoned area requires careful consideration. The selection of a site for a concrete batching plant should be based on the potential air and noise emissions from the plant and easy vehicle access. It is unwise to site such a plant such a plant to factories carrying out any of the following: • automotive spray painting; • electronics manufacture or repairs; • precision tooling or machine repairs; • retail or wholesale showrooms or any other factory carrying out any work which can be adversely affected by dust. It is equally unsustainable to locate such a plant towards the edge of an industrial area on which a residential area or other sensitive land use abuts.	• The site is within an established industrial area and planning approval for the plant has been granted. • The plant has been rigorously assessed by independent experts and found will not cause any significant adverse impact to surrounding industrial uses or the nearby residential area. • The plant has been assessed to comply with: o State Planning Policy 4.1 State Industrial Buffer o EPA (WA) Guidance No.3 Separation distances between Industrial and Sensitive Land Uses. • The plant has been additionally assessed and found to comply with: o Industry Guideline – Concrete Batching, EPA South Australia (2009) o Environmental Guidelines for the Concrete Batching Industry, EPA Victoria (1998) o NSW Environmental Planning and Assessment Regulation (2000)
2.2	Visual Impact of the plant The bins, silos and conveyor structures of a concrete batching plant invariably rise above the surrounding industrial and warehouse buildings usually encountered in light and general industry areas. An attractively designed construction with an aesthetically pleasing choice of materials and finishing paint or surface coating can greatly enhance the appearance of prominent buildings and structures. Features such as trees and shrubs, rock walls and grassed banks can be incorporated into the landscaping to screen the lower level structures and provide an effective wind break to help in dust control.	• The plant will be within an existing established industrial area and will not be visible from any nearby residence. • The plant will be of new construction and will utilise aesthetically pleasing materials and finishes. • To further minimise any potential impact the height of the cement storage silos will be limited to 12.5 metres (excluding filters). • More than 10 percent of the site will be landscaped with the majority being at the southern end of the site which abuts publically accessible areas. • WA Premix will additionally contribute funds to the City of Bayswater for public art projects to further improve the visual amenity of the area.

Item	Text	WA Premix Compliance
2.3	Impact on traffic The entrance and exit from the premises, whether combined or separate, should be planned to avoid creating congestion or the need for trucks to accelerate excessively or other vehicles to brake suddenly, the consequences of both being unnecessary noise. A drain should be provided at the cross-over to prevent water runoff to the street.	• Consultation was undertaken with both the City of Bayswater and Main Roads. Both found that the plant will not cause any adverse traffic impacts. • A single crossover will be constructed in accordance with the advice from the City of Bayswater. • The ground level of Collier Road is higher than the plant site levels thereby preventing water runoff onto Collier Road.
2.4	Occupational health and safety Attention should be given to the Occupational Health, Safety and Welfare legislation particularly Section 19 of the Occupational Health, Safety and Welfare Act, 1984. This states that an employer shall, as far as practicable, provide and maintain a working environment in which employees are not exposed to hazards. This includes maintenance of workspaces, plant and work systems; provision of information, instruction and training enabling employees to work without hazards; consulting with employee-elected health and safety representatives and/or other employees about occupational health, safety and welfare; providing adequate personal protective clothing and equipment; and ensuring all work procedures are carried out without exposing workers to hazards.	• The health and wellbeing of employees is paramount to WA Premix. Ransberg complies with all Occupational Health, Safety and Welfare legislation and industry codes of practice. • WA Premix will implement an AS/NZS 4801:2001 compliant safety management system for all activities within the premises.
2.5	Environmental commitment All personnel, both management and operators should be encouraged to develop a commitment to being good neighbours and preventing pollution. All plant supervisors and operators should be aware of any emission of dust, discharge of dirty water or vehicle or plant causing noise, and take immediate action to prevent the dust, water pollution or excessive noise continuing.	• An ISO 14001:2004 compliant Environmental Management System (EMS) and Environmental Management Plan (EMP) is to be implemented for the plants operation. This shall include: o Dust monitoring equipment with real-time alerts to plant personnel. o Once commissioned, noise monitoring will be undertaken to ensure the plants compliance with the noise regulations. o A complaints management system will be implemented. o Plant personnel will be appropriately trained and/or instructed in environmental management for the plant.
3.1(a)	Access ways, road ways and plant area All access ways, road ways and any area intended to carry a vehicle of any type should be paved or sealed and swept or hosed clean daily.	• The entire area of the plant will be sealed with concrete in high trafficked areas and bitumen in the remaining areas. • Trafficable areas will be regularly cleaned by washing and/or a street sweeper to ensure that trafficked areas are maintained in a clean state.
3.1(b)	Drainage of floodwaters from all paved and sealed areas should be discharged into channels or drains going to an adequately sized settling pond.	• The site levels have been designed to direct all stormwater to detention basins at the northern end of the site. • Drainage calculations and detention basin size requirements have been designed by a certified practicing engineer. • The detention basin will be regularly inspected and cleaned as required to ensure that the design capacity is maintained.

Item	Text	WA Premix Compliance
3.1(c)	All agitator washing and spillages or discharges of cement slurry should be washed into a slurry pit and the residues in that pit kept wet at all times.	• Water from the mixer and agitator loading area, and truck washing area will be plumbed / drained to the EcoFrog aggregate reclaimer where any solids are removed and the water collected for reuse within the plant. • The washing out of agitator trucks will be undertaken with the EcoFrog, which collects and recycles 100% of the water and waste/excess concrete. • All reclaimed water and fine particulate “slurry” will be maintained in suspension through the use of stirrers fitted to the reclaimed water tanks.
3.2(a)	All aggregate, “metal dust” and sand delivered to the premises should be damp when received and remain so during tipping into the bins or hopper.	• Commitment. • All aggregate and sand delivered to the premises will be received in a dampened state. All sand and aggregates will be delivered by company trucks, from company controlled quarries.
3.2(b)	During tipping there should not be any visible emission of dust when viewed from the property boundary.	• Commitment. • The tipping of sand and aggregate materials will be undertaken within an enclosed structure, with the tipping point fitted with water sprays. • Real-time electronic and visual dust monitoring will be utilised to ensure no visible dust shall cross the premises boundary.
3.2(c)	Wind shields of not less than six metres high should be erected around the bins or hopper.	• All sand and aggregate storage bins are fully enclosed. • All hoppers are either fully enclosed or equipped with wind shield of at least 6 metres high.
3.2(d)	The storage bins or receival hopper should have misting water sprays installed directing the water spray across the entire surface area of the stored materials to ensure the materials are maintained in a damp state before loading out by conveyor or front end loader or the receival hopper situated within a building with dust control.	• The sand and aggregate storage bins are fully enclosed and fed by fully enclosed, computer-controlled conveyors. • Conveyor transfer points will be equipped with water sprays.
3.2(e)	The operation of the misting water sprays should be observed daily to ensure they are operating efficiently and any blocked or otherwise damaged sprays should be immediately replaced.	• Commitment. The misting sprays will be visually inspected daily. • Any blockage or damage will be immediately corrected.
	NOTE: In the case of planted with drive over receival bins it is not considered practical to use water sprays and it is therefore essential that all loads are received in a damp state. Prior to weekends or holiday periods the receival bins should be emptied to prevent dust from any dry materials remaining in the bins.	• Drive over recieval bins will be utilised by the plant. The bins will be enclosed within a shed structure. • A water spray will be fitted to the tipping point to further minimise dust emissions during tipping. • All sand and aggregate materials will be delivered in a dampened state.
3.3(a)	All conveyors should be enclosed to prevent windblown dust	• All conveyors will be enclosed.

Item	Text	WA Premix Compliance
3.3(b)	All transfer points should have either: • misting water sprays to effectively suppress any dust; or • an insertable fabric filter or cartridge type dust collector install at or as near as possible to each transfer point; or • the dust ducted to a free standing fabric filter dust collector.	• All transfer points will be enclosed and water sprays or compliant dust extraction system installed.
3.3(c)	The operation of the misting water sprays should be checked daily to ensure they are operating efficiently and any blocked or otherwise damaged sprays should be immediately replaced, or the fabric bags or cartridge element should be checked at least weekly to ensure the filter is not blocked or partially blocked or worn, frayed or leaking, and if any of the above is evident, the fabric bags or cartridge elements should be immediately replaced.	• The operation of the misting sprays shall be inspected daily. • The operation of the filters is inspected weekly by plant staff. • The maintenance of filters is undertaken by external contractors in accordance with the manufacturer's recommendations.
3.3(d)	Any spillage under or in the vicinity of any conveyor or transfer point should be removed as soon as possible and kept damp with sprinklers until such time as it is removed.	• All conveyors and transfer points are fully enclosed. • Any spillages are to be removed as soon as possible.
3.4	Overhead storage bins a. All overhead storage bins should be totally enclosed. b. All inspection covers and plates should be securely fixed and the bins inspected daily to ensure all covers and plates are secure and not leaking dust. Leaks should be remedied immediately.	• All overhead storage bins will be fully enclosed. • Inspection covers and plates will be securely fixed and inspected daily. • Any leaks shall be remedied immediately.
3.5(a)(i)	All cement storage silos should have installed: A fabric filter or cartridge type dust collector of minimum cloth area of 23 square metres, or equivalent, with automatic rapping or reverse pulse filter.	• All cement storage silos are proposed to be fitted with a cartridge type dust collector with an area of 23 square metres and a reverse pulse air cleaning system.
3.5(a)(ii)	The air outlet from the dust collector should be piped to within one metre of the ground and the pipe should be not less than 150 millimetres in diameter.	• The dust collector air outlet will be 1 metre from the ground with an internal diameter not less than 150mm.
3.5(a)(iii)	A relief valve set at 9KPa discharging through a pipe, of not less than 150 millimetres internal diameter, to within one metre of the ground.	• The relief valve to be set at 9KPa, discharging through a pipe 1 metre from the ground with an internal diameter of not less than 150mm.

Item	Text	WA Premix Compliance
3.5(a)(iv)	A level indicator to warn when the cement comes within 600 millimetres below the silo vent or dust collector inlet (or allowing not less than two additional tonnes capacity), and connected to an audible and visual alarm. The level indicator and alarm should incorporate a test circuit to ensure that the audible alarm is working prior to each delivery of cement. Testing should only be carried out between the hours of 0700 and 1700.	• Each silo will be fitted with approved overfill protection equipment. A weatherproof box, mounted on the silo legs at the fill access point, will be supplied containing control circuitry with an audible alarm and/or light attached and a test circuit facility. A monitor high-level switch will be mounted in the lid of each silo to signal the control box. When the silo high level is reached the signal initiates the alarm or light and timer. It the filling process is not stopped within a prescribed time, a valve in the fill pipe (operated by the control circuitry) will close and prevent any further filling of the silo. • Testing of the level indicator will be restricted to between the hours of 0700 and 1700.
3.5(a)(v)	A cut-off valve in the filling line interlocked with the high-level indicator. (Provision should be made for the high-level indicator to similarly de-activate the tanker compressor).	• Each silo will be fitted with approved overfill protection equipment. A weatherproof box, mounted on the silo legs at the fill access point, will be supplied containing control circuitry with an audible alarm and/or light attached and a test circuit facility. A monitor high-level switch will be mounted in the lid of each silo to signal the control box. When the silo high level is reached the signal initiates the alarm or light and timer. It the filling process is not stopped within a prescribed time, a valve in the fill pipe (operated by the control circuitry) will close and prevent any further filling of the silo.
3.5(a)(vi)	Inspection covers and plates that can be sealed and made airtight.	• All inspection covers and plates will be able to be sealed airtight.
3.5(a)(vii)	A silo pressure reading device to measure the internal pressure in the silo during each filling.	• A pressure reading device will be fitted to the silos to measure the internal pressure during filling.
3.5(b)	The “high-level-alarm” and interlocked cut-off valve in the filling pipe should be tested for audible tested for audible and visible operation before each delivery.	• The high-level-alarm and cut-off valve to be tested prior to each delivery of cement.
3.5(c)	The air emission from the dust collector should be observed during each fill for evidence of any cement dust emission.	• During the filling of cement silos the dust collector will be observed for any evidence of cement dust emission.
3.5(d)	The fabric filter or cartridge dust collector should be examined weekly for evidence of any leaking bags or cartridge, or unacceptable build-up of a hard cement layer on the surface of the fabric or cartridge and the same replaced if necessary.	• The operation of filters and dust suppression equipment is inspected weekly by plant staff. • Dust collectors and filters are maintained by external contractors in accordance with the manufacturer’s recommendations.
3.5(e)	The fabric filter bags or cartridge element should be removed and physically cleaned at least once per month and any worn, frayed or leaking bag or cartridge element repaired before reuse, any bags or cartridge blocked with a hard cement layer discarded.	• The operation of filters and dust suppression equipment is inspected weekly by plant staff. • Dust collectors and filters are maintained by external contractors in accordance with the manufacturer’s recommendations.
3.5(f)	The rapping mechanism or reverse pulse air operation should be tested at least once per week and if found to not be working efficiently, it should be immediately repaired.	• The operation of filters and dust suppression equipment is inspected weekly by plant staff. • The reverse pulse air operation will be tested in accordance with the manufacturer’s recommendations.
3.5(g)	Spare fabric filter bags or cartridge elements sufficient for a total replacement, should be kept on the premises at all times.	• Dust collectors and filters are maintained by external contractors in accordance with the manufacturer’s recommendations. • Spare filter elements will be kept on the premises. In addition the contractor maintains a local inventory of replacement filter components.

Item	Text	WA Premix Compliance
3.5(h)	All inspection covers and places should be checked daily for evidence of leaks.	• All inspection covers and plates are to be checked daily.
3.5(i)	The silo pressure reading device should be observed during each filling and the pressure recorded.	• The silo pressure reading is to be observed during each filling and the pressure recorded.
3.5(j)	The dust collector should be maintained in such an operating condition that the silo internal pressure does not exceed 250 millimetres water gauge during filling.	• Dust collectors and filters are maintained by external contractors in accordance with the manufacturer's recommendations.
3.6(a)	The cement weigh hopper should be enclosed and the return ducted to the cement silo.	• The cement weigh hoppers are fully enclosed and fitted with independent dust filtration system.
3.6(b)	The flexible canvas or rubber connection between the air slide from the cement silo to the weighing hopper should be inspected weekly for any signs of leaks or wear.	• The plant will be equipped with fully enclosed and sealed "screw augers" will transfer cement from the silo to the weigh hopper. • The connections between the screw augers from the silo to the cement weighing hoppers will be inspected weekly, and in accordance with the manufacturer's recommendations.
3.6(c)	The charging chute should be roofed and enclosed on three sides and ducted to a fabric filter or cartridge dust collector with an equivalent cloth area of not less than 33 square metres and a minimum volume flow of exhaust air of 7500 cubic metres per hour or with water sprays installed around the delivery chute and should be operated while the agitator is being charged and for at least one minute after the agitator has departed.	• Not applicable. This requirement relates to dry-mix plants, not wet-mix plants. • In a "wet-mix" plant (as proposed) wet cement slurry is transferred from the mixer via a charging chute to the agitator truck. At this point the concrete is fully prepared and no dust is emitted from the loading of the agitator truck. • The proposed plant will be enclosed on the northern side. The plant will utilise a "drive through" design whereby agitator trucks enter from the east, drive under the loading point, stop and load up, and exist to the west.
3.6(d)	The fabric filter bags or cartridge elements should be removed and physically cleaned at least once per month and any worn, frayed or leaking bag or cartridge element repaired before reuse or replaced.	• The operation of filters and dust suppression equipment is inspected weekly by plant staff. • Dust collectors and filters are maintained by external contractors in accordance with the manufacturer's recommendations.
3.6(e)	The operation of the water sprays should be observed daily to ensure that the sprays are operating efficiently and any blocked or damaged sprays replaced immediately.	• All staff are instructed to monitor the operation of the misting sprays. Any blockage or damage is immediately corrected.
3.6(f)	The floor of the charge chute bay should be sealed and drained to the slurry pit. Vehicles should be prevented from driving across the drain from the charging bay.	• The floor of the charge chute bay will be sealed and drained to the EcoFrog recycling unit.
3.6(g)	All agitators and trucks should be washed free of any cement slurry or dust before leaving the premises.	• All concrete agitator trucks will be inspected for cement slurry or dust prior to leaving the premises and washed free if necessary.

Item	Text	WA Premix Compliance
3.7	Aggregates, “metal dust” and sand should not be stored in the open in stockpiles. In the event that temporary open stockpiles are unavoidable, approval for the temporary open storage should be sought from the local council environmental officer or from the Environmental Protection Authority and a temporary “stockpile management plan” agreed upon before any material is brought onto sight.	• No aggregates, “metal dust” or sand will be stored in the open in stockpiles. • In the event that the overhead storage bins cannot be utilised and temporary stockpiling of materials is unavoidable, three emergency storage bins will be utilised. In such an event material stored in these bins will be transferred to the overhead storage bins as soon as practicable. • Under no circumstances will sand and aggregates (including “metal dust”) be stored in open stockpiles.
3.8(a)	The access ways, road ways and plant area should all be surrounded by kerbs and all water run-off from these areas directed to a settling pond.	• All access ways, road ways and plant areas will be kerbed and all water runoff contained within the premises, drained into detention basins at the rear of the site.
3.8(b)	The settling pond should be of adequate size to allow all particulate matter to settle out before overflow to discharge into any stormwater drain or water course.	• The stormwater detention basin will be of sufficient size to handle a 1:100 year ARI. • No water from the site will be discharged into any stormwater drain or water course.
3.8(c)	During periods of high rainfall, the quantity of the overflow water discharging from the settling pond should be monitored daily.	• Drainage calculations and detention basin size requirements have been designed by a certified practicing engineer. • The detention basin will be regularly inspected and cleaned as required to ensure that the design capacity is maintained.
3.8(d)	The water from the settling pond should be used for batch mixing whenever possible and the pond cleaned of sediment whenever possible.	• 100% of waste / excess water will be recycled for use in subsequent batches of concrete or for the washing down of agitator trucks.
3.8(e)	The level of the sediment in the final settling pond should not be allowed to rise above one third of the depth of the pond.	• Settling ponds are not proposed. • The EcoFrog unit will process and recycle 100% of all solid materials / sediment within returned/waste concrete and plant water. Excess solids materials will be transferred from the EcoFrog unit to the overhead storage bins by the Front End Loader as required.
3.8(f)	The sediment from the settling pond should only be deposited in the slurry pit or taken to an approved disposal site.	• The EcoFrog unit will process and recycle 100% of all solid materials / sediment within returned/waste concrete and plant water for use in subsequent batches of concrete. Excess solids materials will be transferred from the EcoFrog unit to the overhead storage bins by the Front End Loader as required.
3.8(g)	All agitator washings and spillages should only be washed into the slurry pit.	• All agitator washings and spillages will be washed into the EcoFrog unit.
3.8(h)	The overflow water from the slurry pit should only discharge into the settling pond.	• Water within the reclaimed water tanks will be utilised by the plant, thereby maintaining water levels and preventing overflow. • No plant water will be discharged into the sites stormwater drainage system or detention basin.
4	Basic control requirements for country plants	• Not applicable

Item	Text	WA Premix Compliance
5(a)	The premises should be operated in such a manner that during operation the noise level from the premises, excluding vehicle movements, does not exceed the level of noise deemed appropriate for the premises when having regard for the environment in which it is located. The noise from machinery, plant and equipment should not exhibit any pronounced tonal components, frequency modulations or impulses which will increase the annoying effect of any noise generated. It is recommended that noise specifications be included in tenders for the purchase of new plant and equipment to keep noise levels down. The use of extension telephone bells and public address systems should be avoided.	• A noise assessment has been undertaken demonstrating that the plant will comply with the *Environmental Protection (Noise) Regulations 1997*. • As part of the plant's commissioning, an independent noise measurement assessment will be undertaken to confirm compliance with the noise regulations.
6	Lights used to illuminate any areas of the site for security or any other reason should be angled in such a manner so that the light does not directly illuminate any nearby residential areas.	• Security lighting will be installed such that the light does not directly illuminate any nearby residential area.

Item	Text	WA Premix Compliance

State Administrative Tribunal Matter: DR 242 of 2011; Orders Issued 15 July 2014

1	The development/use subject of this approval must be SUBSTANTIALLY COMMENCED within a period of two (2) years of the date of this approval notice. If the development is not substantially commenced within this period, this approval shall lapse and be of no further effect. Where an approval has lapsed, no development/use shall be carried out without the further approval of the City having first been sought and obtained.	• Noted
2	The development shall be carried out only in accordance with the terms of the application as approved herein, and any approved plan, including any plan approved as a component of the Environmental Management Plan required by Condition (7).	• Commitment
3	On completion of construction, all excess articles, equipment, rubbish and materials being removed from the site and the site left in an orderly and tidy condition.	• Commitment
4	All stormwater and drainage runoff produced onsite is to be disposed of onsite via the use of soakwells, approved by the Director of Technical Services. The soakwells must deal with the entire land area and be designed to contain a 24hr storm duration and 100-year ARI.	• The stormwater system has been designed by a certified practicing engineer to deal with the entire land area and be capable of containing an 24 hour storm duration and 100 year ARI.
5	Unless otherwise approved by the City of Bayswater, the vegetated area at the rear of the lot, depicted as “Landscaping and Grassed” area on the revised concept plan is not to be used for the storage of materials or vehicles.	• No storage of materials or vehicles will occur within the “Landscaping and Grassed area”. This being the land 54 metres from the northern boundary to the northern boundary and marked on the site plan.
6	Activities associated with the use of Lot 2 (Nos. 277-279) Collier Road, Bayswater (**Land**) shall not cause the concentration of particulate matter as PM10 at the location referred to in Condition (7)(i), first dot point, to exceed: (a) 12.4µg/m^3 as a 24-hour average on any day where the ambient concentration (inclusive of the contribution from emissions from the **Land**) exceeds 50µg/m^3 of particulate matter as PM10 as a 24-hour average; or (b) 500µg/m^3 as a 15-minute average.	• A comprehensive dust monitoring program will be implemented to measure dust emissions from the plant in real time. • Modelling of the plant’s emissions found the plant will comply with the specified emissions targets. • A comprehensive management plan will be developed including appropriate contingency measures to manage any actual or potential exceedances, should they occur.

Item	Text	WA Premix Compliance
7	Documentation for a proposed Environmental Management System (EMS) compliant with AS/NZS ISO 14001:1996 shall be submitted to the City for approval prior to the issue of a building permit. The EMS shall incorporate an Environmental Management Plan (EMP). The EMP shall address the following issues to the satisfaction of the City: (i) Dust and Particulate Management, including: • The use of a TEOM (PM10) monitor to be located at the previous monitoring close to the boundary, as the primary monitoring method; • The use of a Beta Gauge (PM10) monitor at a second location sited in accordance with AS/NZS 3580.1.1 (as far as practicable), to allow the incremental PM10 concentrations to be determined; • The TEOM monitor to be operated in accordance with AS/NZS 3580.9.8; • The Beta Gauge to be operated in accordance with AS/NZS 3580.9.11; • The applicant is to formalise the approach and procedures for: (a) Determining any dust emissions from the site; (b) For deriving modelled incremental PM10 concentrations at the nearest sensitive premises; and (c) Associated thresholds which could trigger site management alerts and responses. • The TEOM and Beta gauge monitors are to be maintained by an organisation accredited by the National Association of Testing Authorities (NATA) in respect to the operation of those monitors; • The use of an anemometer with a 10 metre pole, unless a lower pole is approved by the City; • PM10 concentrations from the TEOM and Beta Gauge, and wind speed and wind direction from the anemometer, shall be averaged over a period of not more than 15 minutes and electronically recorded; • Summaries of the results of monitoring including each 24-hour average PM10 concentration are to be provided quarterly to the City by no more than 30 days after each quarter. The quarterly summary must identify and highlight the date and time on which the monitoring showed the PM10 concentrations exceeded: (a) 50µg/m^3 as a 24-hour average; and (b) 500µg/m^3 as a 15-minute average; and	• WA Premix will provide the City of Bayswater with copies of the companies ISO 14001:2004 complaint Environmental Management System prior to the application for a building licence. • WA Premix shall prepare and provide to the City of Bayswater an Environmental Management Plan, which addresses the issues detailed by this condition.

Item	Text	WA Premix Compliance
7 (cont.)	• An annual report prepared by the body carrying out the dust monitoring, which reviews whether the dust received at the nearest sensitive premises has been compliant with the NEPM PM10 standard, the extent to which the development contributed to any exceedances of 24-hour average PM10 concentrations greater than 50µg/m^3 and whether the development has complied with the requirements of Condition 6. The annual report referred to as above, shall be submitted by no more than 30 days after each calendar year to which the data relates. Dust monitoring shall be continued indefinitely, or until the City is satisfied that the operating experience of cumulative air quality has shown that the risk of exceeding the NEPM standard for annual particulates has abated. The requirement for continued dust monitoring may be reviewed by the City at the request of the applicant following the provision of an EMS audit required by Condition (9). (ii) Noise Management, including the use of appropriate acoustic barriers and low noise front end loaders; (iii) Surface water management; (iv) Landscaping; (v) Visual amenity; (vi) Waste management; (vii) Light overspill; (viii) Traffic management; (ix) Storage of hazardous and/or dangerous goods; (x) Complaints management; (xi) Contingency measures to be adopted in the event of potential or actual unacceptable emissions from the site; and (xii) Checklists and personnel responsibilities for actions assigned by the EMP.	• An annual report will be prepared and provided to the City by January 30 of each year from the commencement of operations.
8	The Environmental Management System (EMS) and Environmental Management Plan (EMP) approved by the City of Bayswater shall be implemented, and the development must at all times comply with the approved EMS and EMP.	• The Environmental Management System will be implemented in accordance with WA Premix's ISO 14001:2004 certification (to be completed). • The plant's operation will be undertaken in accordance with the Environmental Management Plan.
9	The Environmental Management System must be audited by an independent appropriate body at least every three (3) years from the anniversary of this approval, and the results of the audit must be provided to the City of Bayswater.	• WA Premix's Environmental Management System will be independently audited by WA Premix's ISO 14001:2004 certifying body, at least every (3) years. • Results of the audit relevant to the development will be provided to the City of Bayswater as part of the following annual report.

Item	Text	WA Premix Compliance
10	The plant is to be equipped with audible and/or visual alarms together with supporting microprocessor hardware and software capable of determining and logging incremental concentrations and background concentrations, utilising the monitoring data collected from the monitoring equipment required by Condition (7)(i), such equipment to automatically alert site management in real-time should the PM10 limits in Condition (6) be, or likely to be exceeded. The logged data shall be made available to the City as soon as practicable upon request.	• The dust monitoring equipment will be utilised to provide real time alerts to plant personnel of any actual or potential exceedance of dust emissions, should such an event occur. • Dust monitoring records will be retained by WA Premix and made available to the City of Bayswater upon request.
11	Any portion of the site to be used for movement or parking of vehicles and/or onsite storage of empty bins, must be sealed and drained to the satisfaction of the City of Bayswater.	• With the exception of landscaped areas the entire site will be sealed with concrete in heavily trafficked areas, and bitumen in less trafficked areas. • Site drainage will be in accordance with the drainage system, designed by a certified practicing engineer.
12	Uncovered parking bays shall be a minimum of 5.5m x 2.5m.	• Uncovered light vehicle parking bays will be a minimum of 5.5m x 2.5m. • The site plan identifies the size and location of the light vehicle parking bays.
13	Truck parking bays are to conform to the relevant Australian Standards.	• Truck parking bays will be constructed to the relevant Australian Standards.
14	A bin area is to be provided for of not less than 10m2 and with a permanent water supply and drainage facility for washdown. The bin area is to be screened by a gate and brick walls or other suitable material to a height of not less than 1.8m.	• A compliant bin area will be constructed in the southwest corner of the site as shown on the site plan. • It should be noted that the only rubbish produced by the plant will be from the site office and crib room.
15	Bins are to be washed only in the wash-down facility within the bin area, drained to a silt trap and disposal via the Water Corporation sewer system or if this is not available to a leach drain soakwell system which is separate to the stormwater disposal system, or approved system, to the satisfaction of the City of Bayswater.	• The washing of bins will be recorded in the site Environmental Management Plan. • The bin area will be drained to a silt trap and disposed via the Water Corporation reticulated sewer network, installed by a qualified plumber.
16	One (1) driveway shall be permitted onto Collier Road. The driveway shall be constructed to the City of Bayswater standards for commercial driveways.	• One driveway onto Collier Road is proposed as shown on the site plans.
17	Redundant driveways shall be removed and the verge and its vegetation made good at the applicants cost, prior to the commencement of concrete batching operations.	• The redundant driveway will be removed as shown on the site plans. • The existing second driveway will be removed prior to the commencement of concrete batching operations. • The area of the redundant driveway and verge will be made good in accordance with the site plans and landscaping plan.
18	No earthworks shall encroach onto the Collier Road road reserve.	• No earthworks are proposed within the Collier Road road reseve.
19	No stormwater drainage shall be discharged off-site.	• No stormwater will be discharged off-site.
20	The applicant shall make good any damage to the verge vegetation within the Collier Road reservation, prior to the commencement of concrete batching operations.	• No verge vegetation exists in front of the premises location. • WA Premix will make good any damage to the verge prior to the commencement of concrete batching operations. • The verge will be treated in accordance with the landscaping plan.

Item	Text	WA Premix Compliance
21	No storage of materials outside the approved buildings is permitted.	• No storage of concrete constituent materials will occur outside of the approved buildings.
22	A copy of an approval issued by the Department of Environment and Conservation – Licensing Section for the operation of the facility shall be submitted to the City prior to operations commencing.	• WA Premix will provide to the City of Bayswater a copy of the Category 77 Works Approval and Registration issued by the Department of Environmental Regulation for the premises, prior to the commencement of concrete batching operations.
23	A truck wash-down area is to be provided in accordance with the requirements of the *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998* and in a location approved by the City of Bayswater. Trucks may only be washed down in the approved wash down area.	• The plant will be equipped with a truck wash-down area, compliant with the *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998*. • The location of the wash-down area is shown on the site plan (Appendix 2).
24	Operating hours are to be restricted to 6:00am to 6:00pm Monday to Saturday (public holidays excluded), however no front end loader may operate prior to 7:00am.	• Commitment
25	The cement storage silos are to be reduced to a maximum of 12.5m in height. Amended plans showing the reduced height of the silos must be submitted with the application for a building permit.	• The cement storage silos have been reduced in height to 12.5 metres, excluding the filter and handrail in accordance with the condition.
26	The owner, or the applicant on behalf of the owner, shall comply with the City of Bayswater policy relating to Percent for Public Art, and provide an Art Project for a minimum value of one per cent ($15,000) of the estimated total cost of the development ($1,500,000). Prior to the lodgement of a building permit application, the owner/applicant shall submit details to the City, including plans of the artwork, its cost and construction, and other matters relating to the artwork's on-going maintenance and acknowledgements in accordance with the City's Percent for Public Art Policy. Upon the City receiving this information, the Art Project shall be presented to Council for its consideration and determination. The approved public art shall be installed prior to the submission of an Occupancy Permit for the subject development, and thereafter maintained at the cost of the owner/applicant.	• Commitment

Item	Text	WA Premix Compliance

State Administrative Tribunal Matter: DR 242 of 2011; Orders Issued 15 July 2014

1	The development/use subject of this approval must be SUBSTANTIALLY COMMENCED within a period of two (2) years of the date of this approval notice. If the development is not substantially commenced within this period, this approval shall lapse and be of no further effect. Where an approval has lapsed, no development/use shall be carried out without the further approval of the City having first been sought and obtained.	• Noted
2	Retaining walls exceeding 500mm in height (above natural ground level) are to be designed by a certified practicing engineer, to the satisfaction of the City of Bayswater.	• The retaining wall has been designed by a certified practicing engineer.
3	Revised plans depicting a stepped retaining wall on the rear (northern) boundary of Lot 2 and associated landscaping shall be submitted to and approved by the City of Bayswater prior to the issue of a building permit. The plan for the proposed landscaping shall identify the proposed species, planting rate and location of vegetation, with a view to achieving dense screening vegetation to a minimum height of 3m, but including 5m specimens.	• A “stepped” retaining wall design has been submitted to the City of Bayswater for approval. • A landscaping plan for the retaining wall has been submitted to the City of Bayswater for approval.
4	On completion of construction, all excess articles, equipment, rubbish and materials being removed from the site and the site left in an orderly and tidy condition.	• Commitment

Appendix 2
Plant Plans

Appendix 3
EcoFrog Specifications

Appendix 4
Baseline Air Quality Assessment – SLR Consulting

Appendix 5
Air Quality Impact Assessment – SLR Consulting

Appendix 6
Noise Assessment – Herring Storer Acoustics

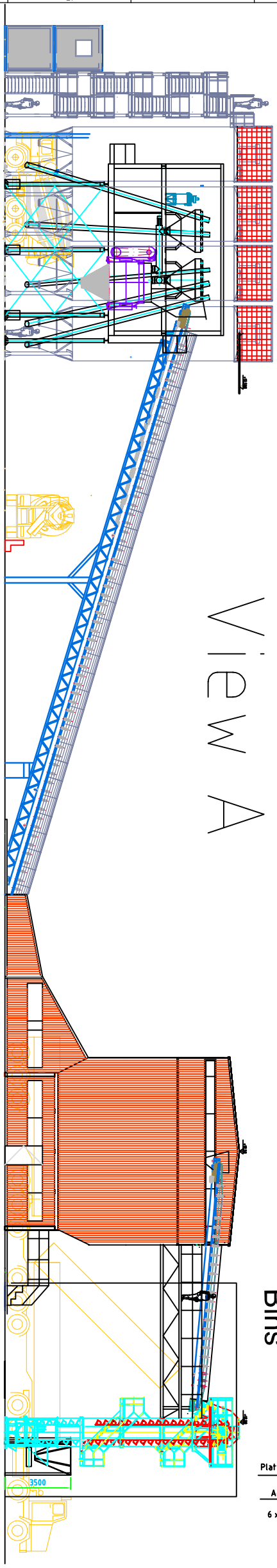
Appendix 7
State Administrative Tribunal Orders

Appendix 8

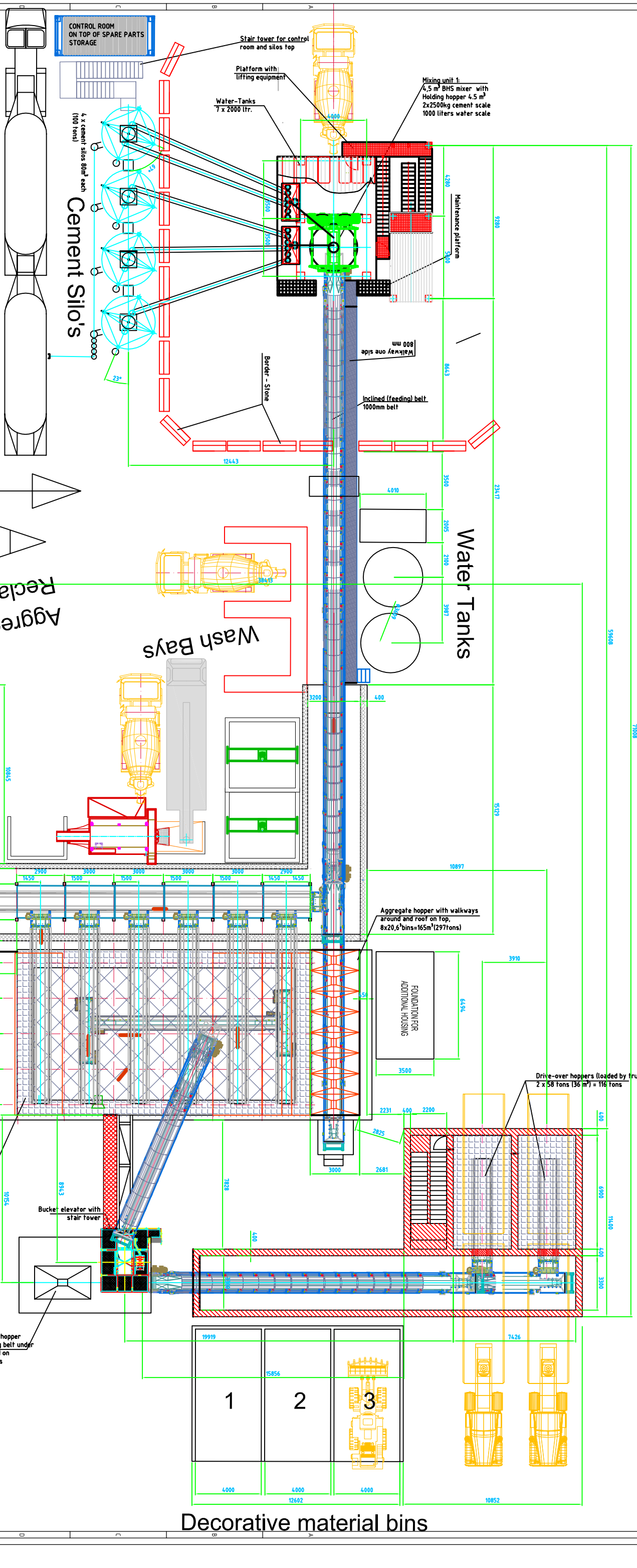
Groundwater Licence GWL172394(1) - Department of Water

Appendix 9

Contaminated Site Advice - Department of Environment and Conservation



View A



LAYOUT OF PROPOSED BATCHING PLANT: **MODEL (1 x 4.5m³ twin shaft batch mixer + 1 optional mixing unit) VERSION 3**

PRELIMINARY / CONTRACT DRAWINGS FOR REVIEW AND COMMENTS. NOT TO BE USED FOR CONSTRUCTION!

CONTRACT:	
CLIENT:	Building:
	Location: PERTH - AUSTRALIA
Project no. XCM50-2000	
Phase: 0 - PROPOSAL	Coating: GALVANISED/ PAINTED
TB:	Name: Date:
Contractor: -	SCALE 1:75
Designer: MK	
Detailer: KB	Part Number PLAN VIEW
Check:	26/07/14.
Model File:	Drawing Number: GA100
Material: S275	Revision REV14.3

Plot Date:

Professional Solutions
Tel.: +41 71 757 7200
Fax.: +41 71 757 7209
CH-9490 Altstaetten
Trogenerstrasse 4
www.xtecag.com

LAYOUT OF PROPOSED BATCHING PLANT: **MODEL (1 x 4.5m³ twin shaft batch mixer + 1 optional mixing unit) VERSION 3**

PRELIMINARY / CONTRACT DRAWINGS FOR REVIEW AND COMMENTS. NOT TO BE USED FOR CONSTRUCTION!

CONTRACT:	Building :
CLIENT:	Location : PERTH - AUSTRALIA
Project No. XCM150-2000	
Phase: 0 - PROPOSAL	Coating: GALVANISED/ PAINTED
TB:	Name: Date: SCALE 1/75
Contractor:	
Designer: MK.	
Detailer: KB 26/07/14	Part Number PLAN VIEW
Check:	
Model File:	Drawing Number : GA100
Material: S275	Revision REV1.3
Plot Date:	

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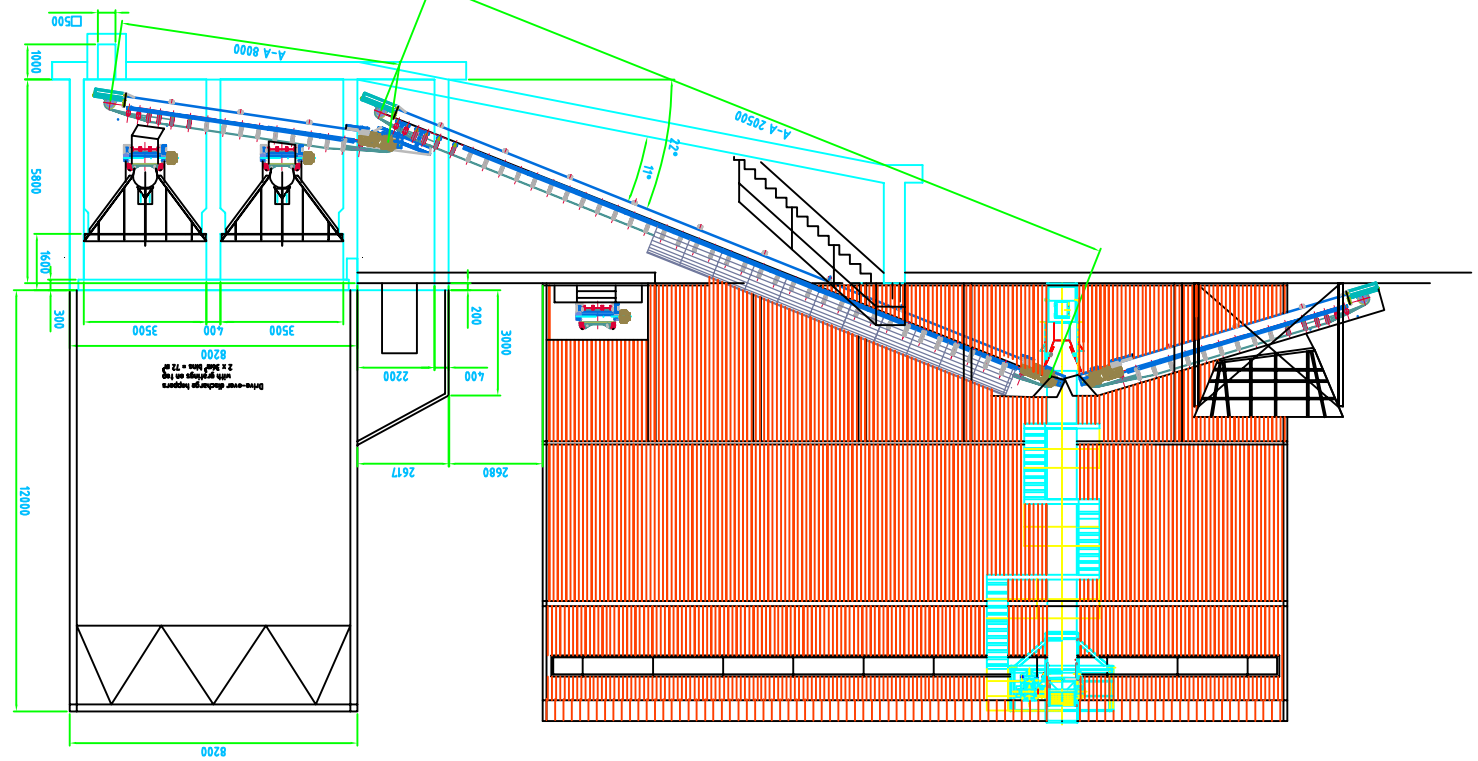

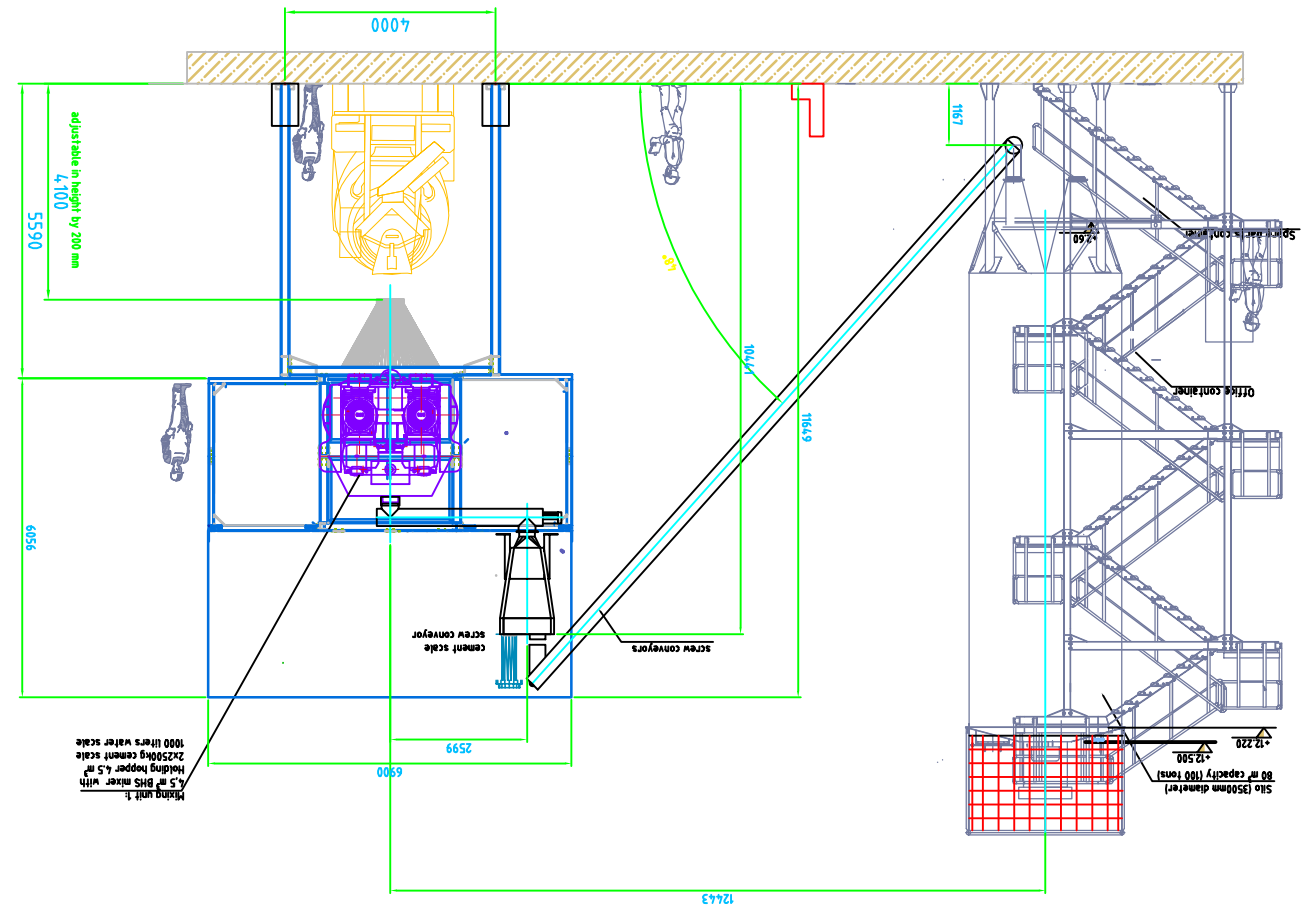

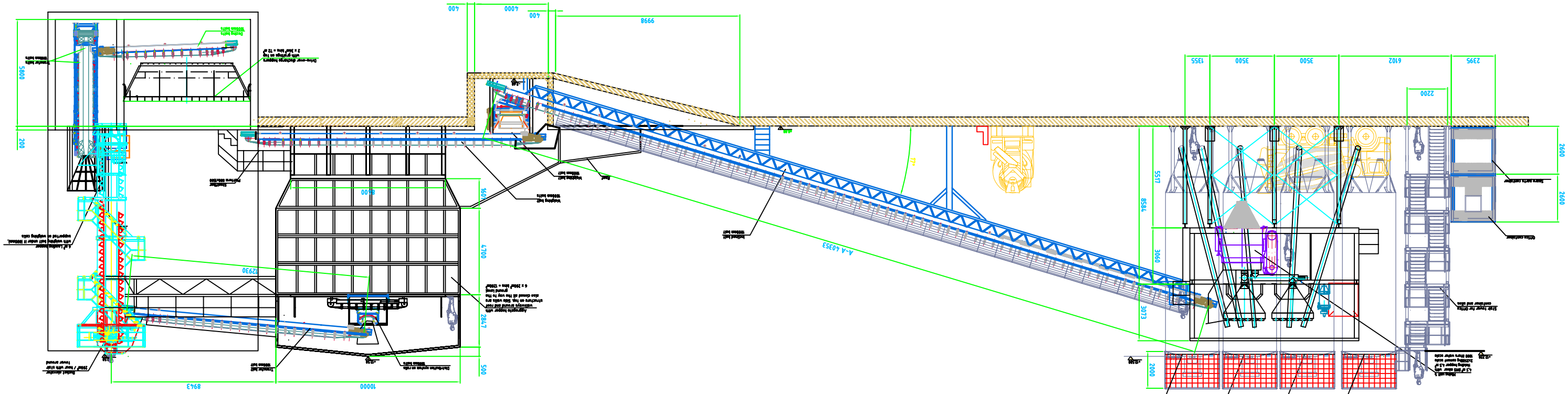

N268830 N268871 N268712 N268752 N268793 N268834 N268874

E60188 E60269 E60228 E60310 E60350 E60391 E60432

N268590

COLLIER ROAD

CHEMICALS WAREHOUSE

1

PROPOSED LRW SETBACK FROM BOUNDARY THE WIDTH 'W' OFTHE LRW BASE

PROPOSED LIMESTONE BLOCKS WITH NEW COLORBOND FENCE CORED INTO WALL

existing bitumen hardstand

existing concrete hardstand

244.92

lanscaped verge

painted median strip

pole

transformers

tow 29.2

tow 28.3

bins

90°

landscaped

kerbing

office / crib

transformer

50.32 - adv

shared area

bollard

5.4

2.4

approx sewer location

slump stand

wm

overhead powerlines

open drainage gully for surface water

surface drainage channel

surface drainage sump

9m

3.0

6.0

16.080

89°59'50"

landscaped

TOTAL LANDSCAPE 1232m²

49.51

50.31

90°00'10"

3003

water tanks

mixer

+26.50

drainage ridge

cement silo's

wash bays

ecofrog

aggregate reclaimer

+26.70

+24.40

overhead storage bins

+26.60

drive-over hoppers

+20.90

+22.54

decorative material bins

2

1.2322 ha

concrete hardstand

proposed truck parking bays

edge of concrete

loading hopper

986

SANDVIK MINING & CONSTRUCTION

TITLE: GENERAL LAYOUT / SITE PLAN CONCRETE BATCHING PLANT 277 - 279 COLLIER ROAD, BAYSWATER	DISCLAIMER: This Drawing has been prepared for the purpose of designing new constructions on the land and should not be used for any other purpose. Boundaries on this plan were not re-established as part of this survey. This plan does therefore not guarantee their accuracy. For any proposed works on or near existing boundaries, cadastral boundaries should be re-established. Certificate of Title should be referred to re: encumbarances prior to design. Only visible services have been located. Prior to any demolition, construction, or excavation a Dial before you Dig must be completed. The position of the sewer lines is indicative ONLY. Users of this plan should verify plan accuracy PRIOR to use. This plan should not be used for any financial dealings related to this land. This note forms an integral part of this plan.	REVISION: 19/08/2015 - landscaping / bin store / parking bays at rear added to this plan / total site landscaping is 10% of the Lot area as required.	SCALE @ A1: 1:400 (0 4 8 12 16 20 40)		DATE: 19/08/2015
CLIENT: WA PREMIX		C:\JOBS\206 -Collier Rd Bayswater\Working Job SE.mjo - Site Plan 1982015	LOT NUMBER: 2	C/T: VOL / FOL 1513 / 683	DATUM H: Perth Coastal Grid (PCG94)
			PLAN / DIAGRAM: D 55129	LOCATION:	DATUM V: AHD (SSM BAYS67A)

WA PREMIX

green
professional
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www.ecofrog.eu

Grey water and waste green concrete recycling

In order to avoid waste, ready mix and precast concrete plants in nearly all European countries recycle grey water and waste green concrete. In the present state of the art recycling processes, uncured waste green concrete or mortar are washed out and aggregates and grey water – a mixture of water and fines ≦ 0,250 mm – are recovered. As a result of the washing process the aggregates have a grain diameter larger than 0,250 mm. In concrete production recycled aggregate mixtures may be returned to production up to 5 % of the total amount of aggregates added. In the UK this limit only applies to aggregates formed by crushing cured concrete. Higher amounts can be added if the recycled aggregates are of the same type as the main aggregate and separated into a coarse and fine fraction. They also must follow the regulations of DIN 4226-1, or similar in the UK. The grey water is predominantly is a mixture of water, cement and fine aggregates and also includes the water used for cleaning the truck mixers, concrete pumps etc. and rain water recovered from the production areas. The reuse of grey water and recovered aggregates in concrete production is described in the »Richtlinie für die Herstellung von Beton unter Verwendung von Restwasser, Restbeton und Restmörtel« (Regulations for the making of concrete and mortar with the use grey water) released by the German association for steel reinforced concrete (Deutscher Ausschusses für Stahlbeton DAfStb). According to these regulations up to 18 kg/m³ and under exceptional circumstances 35 kg/m³ solids may be added by the grey water to the fresh concrete. In both cases the regulations require separate initial tests if concrete types according to DIN EN 206-1/DIN 1045-2 shall be produced. The solids must be distributed homogenous in the grey water by using agitators. The amount of fines in the concrete mix has to be adjusted according to the amount of fines in the grey water. To prevent ex deleterious contamination of the grey water with additives etc which could cause steel corrosion in the reinforced concrete the regulation stipulates that all additives pass the electro chemical tests according to the regulations for the acceptation of additives for concrete making (Richtlinie für Zuteilung von Zulassungen für Betonzusatzmittel). Water contaminated with oils or fat have to be processed separately. Results of research show that additives such as fluxing agents are fully and irreversibly bound to the cement particles during hydration of cement. Therefore under normal production conditions an increase of concentration of additives in the grey water basin is not possible. Further tests showed that grey water up to a density of 1,07 kg/dm³ does not affect the consistence of green concrete. On the other hand, a quick reuse of grey water direct from the recycling process with a density near 1,15 kg/dm³ lead to a better workability in standard concrete. Grey water with a high solids content, density 1,15 kg/dm³ stored over a period of 72 hours gives the concrete a stiffer consistency and slightly stronger pre stiffness than grey water with shorter storage time. This results from the hydration products that developed during the storing time requiring more water for the increased amount of particles. Therefore when using grey water with a high solids content this solids amount has to be included in the mix design, as required according to the DAfStb-guidelines. Particles dissolved in the grey water had very little influence on the consistency and stiffness of the green concrete. Tests with grey water with high solids contents (density 1,15 kg/dm³) standard concrete types showed that the compressive strength, the static elastic modulus, the shrink- and creep properties, the frost- and frost salt resistance, the carbonization resistance, and the elution properties were not affected compared to the use of deionized water. The stability of high strength concrete types made with grey water with high solids content was only slightly lower compared to high strength concrete made with mains water. Concrete made with grey water in accordance to the DAfStb guidelines is durable and has the same properties of use as concrete made with mains water.

(Quelle: Zement-Taschenbuch des VDZ)

Why Recycling?

All over Europe from the annual concrete production approximately 3% in ready mix plants and 1% in precast plants are not used. This amount of concrete waste results from different sources such as, concrete rejected by customers, left over concrete sticking to the inside walls of in the truck mixer drum, mixer wash down, and cleaning of transport or production machines. The disposal costs for waste concrete are high. Looking at the limited capacities of landfill areas the disposal costs and transport costs to the landfills are constantly increasing. Natural resources are declining or their exploitation is becoming economically inefficient. At the same time landfill capacities are reduced. This makes recycling in all production processes ecologically and economically necessary. Legal requirements force producers to recycle waste produced during production. For the concrete industry this means to replace step by step the traditional disposal solution by an integrated closed material flow concept. The required technologies for such concepts are supplied by ecofrog®.

Our plants yield several benefits for our customers:

Return on Investment

Short times of amortization, in average 3 years, with a product life cycle of, at least, 10 years. This makes ecology economical.

Sustainable Developments

All concrete producers commit themselves to a responsible treatment of natural resources. All plants strive to fulfill the lowest possible emissions. The required tools are closed loop processes for materials and water.

Fulfillment of legal requirements

The harmonization of environmental laws all over Europe is the catalyst for the installation of recycling systems in modern concrete plants.

Today many concrete plants already fulfill different requirements of the ISO 14001 (Environmental management systems). The ISO Norm 14001 is the base to build up and implement an environmental management system. In the norm special focus is laid on continuous improvement of processes as a tool to achieve the environmental goals of the company. Like in quality management systems the individual responsibilities of the staff are the key to master the processes, the identification and elimination sources of irritation. Systematic environmental management aims at continuous environmental improvement of the total company.

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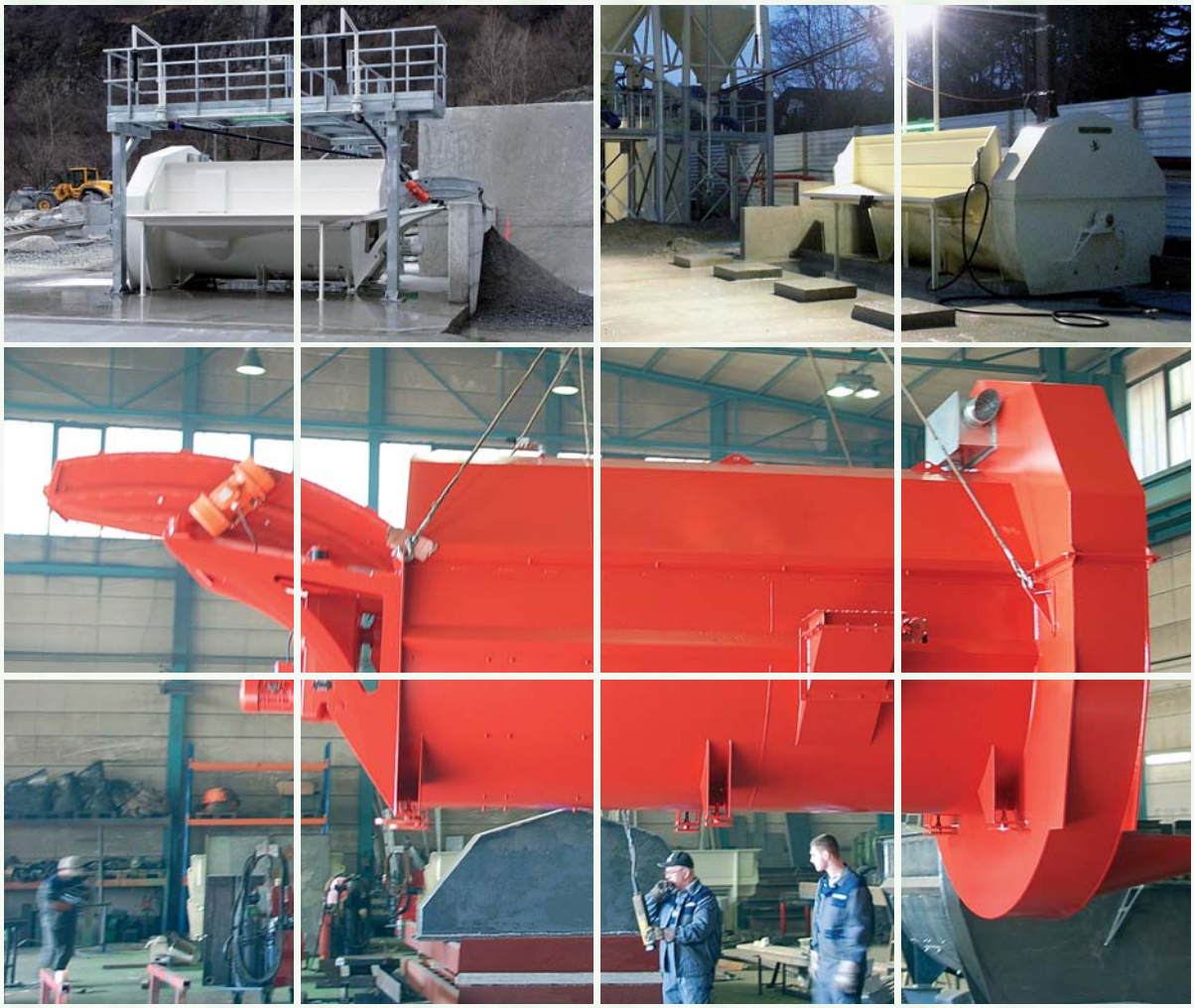
READY MIXED CONCRETE

For the cleaning of: ▪ Truck mixers ▪ Concrete pumps ▪ Mixers ▪ Production yard with the following advantages:

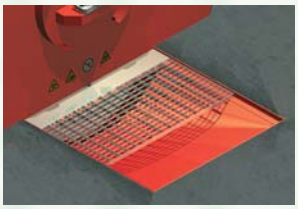


Manifold designs

Fast feeding including machine protection by overload gate

Bearings of main shaft outside the recycling drum

Gentle conveying paired with optimal dewatering of aggregates



Wear reduced uptake of waste concrete and wash down from ground level

All machines excel in:

- ➔ Non compressive material separation
- ➔ Overload warning
- ➔ fast material intake
- ➔ high performance
- ➔ four washing places available at a time
- ➔ low operating cost

RE_X waste concrete reclaimers

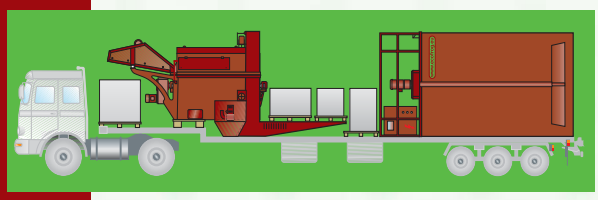
The waste green concrete reclaimer RE_X separates based on the principle of flotation with a separating cut at approximately 0,25 mm waste green concrete into its constiuents washed out aggregates and grey water (Cement and fines suspended in water). The water overflows over a free overflow into a suitable stirring tank, from where it can be returned into concrete production. The sand and gravel mixture is discharged via an ascending vibration chute, simultaneously dewatering the mixture. The water is returned into the drum of the reclaimer and a perfectly washed out ready for reuse sand-gravel mixture is produced.

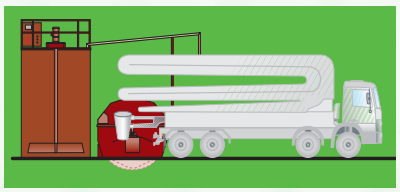
The reclaimer RE_X is delivered as a completely preassembled unit, so that on site only a solid and level foundation is required to install the machine.

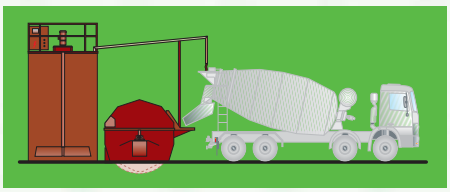
The machine can be supplied with the following throughput variations RE_X 04, RE_X 16 and RE_X 26, so that for each application the correct machine size is available.

As an additional feature all variations can be delivered in execution »Z«, which comprises of an additionally mounted feeding scoop wheel. With the feeding scoop wheel, solids and water can be scooped from under floor level into the washing drum of the reclaimer. This facilitates the confortable cleaning of concrete pumps, or the cleaning of wheel barrows or other machines at washing stations in the factory, as well as the yard around the batching plant area.

MobiRE_X is an additional alternative, especially designed for operation on large construction sites. The main features are: Feeding of concrete at ground level (This enables cleaning of truck mixers and concrete pumps); Transport dimensions (incl. 40 m³ Grey water stirring tank) 13,6 x 3,0 x 3,0 m; Start up time approximately 4 hours.







Data/Variation:	RE_X 13	RE_X 13 Z	RE_X 16	RE_X 16 Z	RE_X 23	RE_X 23 Z	RE_X 26	RE_X 26 Z
Throughput waste concrete [m³/h]	13	13	16	16	23	23	26	26
Throughput water [m³/h]	30	30	30	30	40	40	40	40
Power consumption [kW]	5,8	5,8	5,8	5,8	5,8	5,8	5,8	5,8
Scooping capacity solids [m³/h]	—	5	—	6	—	5	—	6
Scooping capacity water [m³/h]	—	7	—	10	—	7	—	10

green professional reliable

PRECAST PLANT

For the cleaning of:

- Bullet skips
- Concrete distributors
- Mixers
- Extruders

with the following advantages:

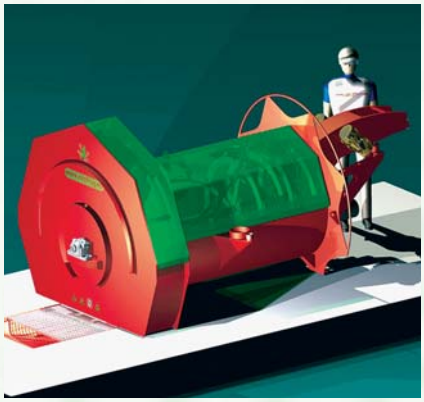
All machines excel in:

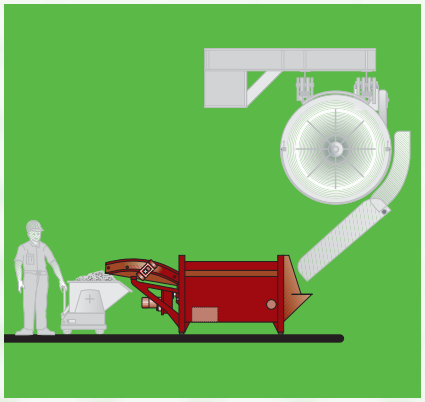
- ➔ Compact design
- ➔ Seamless integration
- ➔ Fully automatic operation
- ➔ Storable washed out aggregates
- ➔ Washing place on ground level
- ➔ Material feeding via pump sumps

RE_X waste concrete reclaimers

The waste green concrete reclaimer RE_X separates based on the principle of flotation with a separating cut at approximately 0,25 mm waste green concrete into the constituents washed out aggregates and grey water (Cement and fines suspended in water). The water overflows over a free overflow into a suitable stirring tank, from where it can be returned into concrete production. The sand and gravel mixture is discharged via an ascending vibration chute, simultaneously dewatering the mixture. The water is returned into the drum of the reclaimer and a perfectly washed out ready for reuse sand-gravel mixture is produced.
The reclaimer RE_X is delivered as a completely preassembled unit, so that on site only a solid and level foundation is required to install the machine.
The machine can be supplied with the following throughput variations RE_X 04, RE_X 16 and RE_X 26, so that for each application the correct machine size is available.

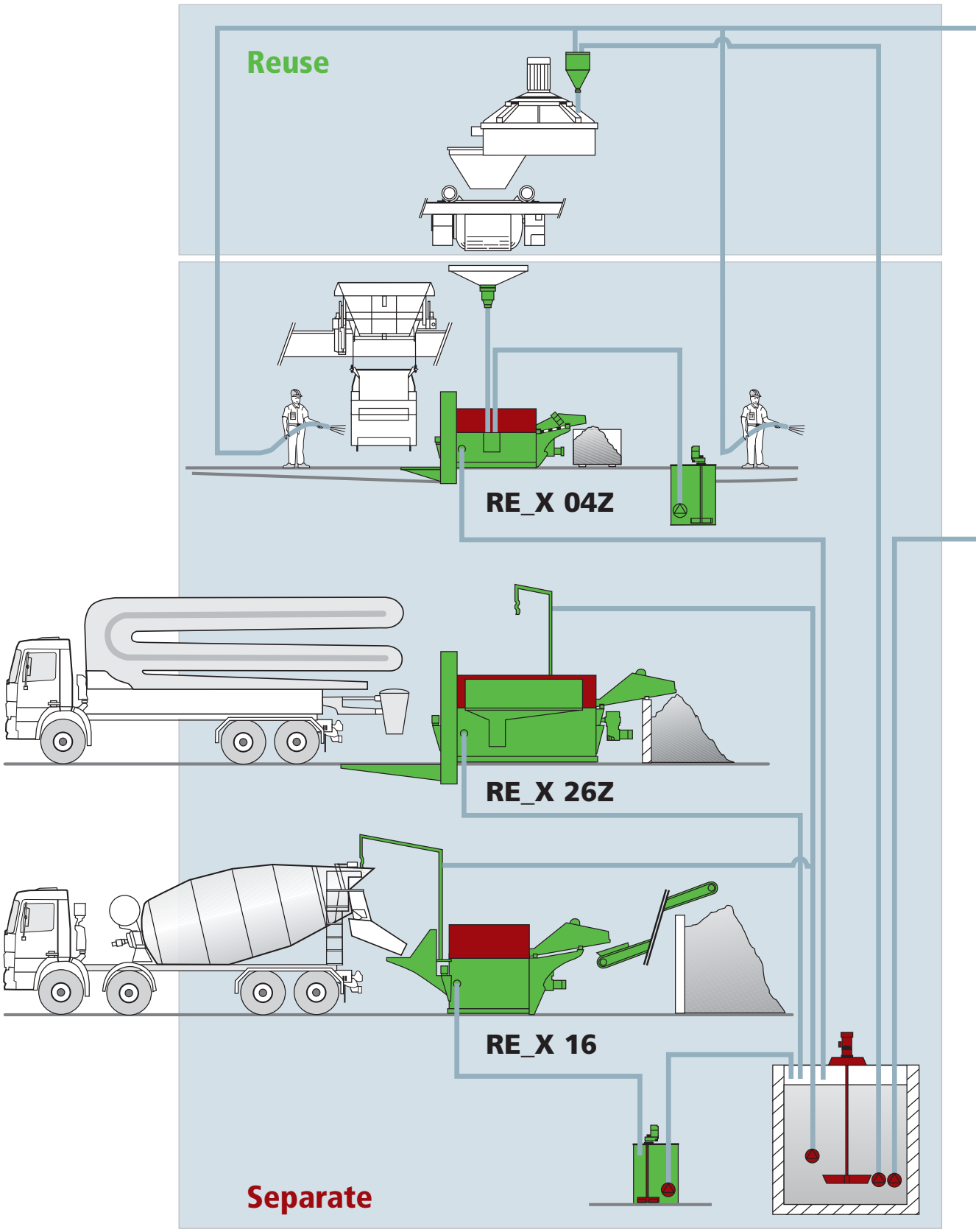
As an additional feature all variations can be delivered in execution »Z« which comprises of an additionally mounted feeding scoop wheel. With the feeding scoop wheel, solids and water can be scooped from under floor level into the washing drum of the reclaimer. This facilitates the confortable cleaning of concrete spreaders, slipformer, extruder and other manufacturing machines, as well as the floor around the batching plant.

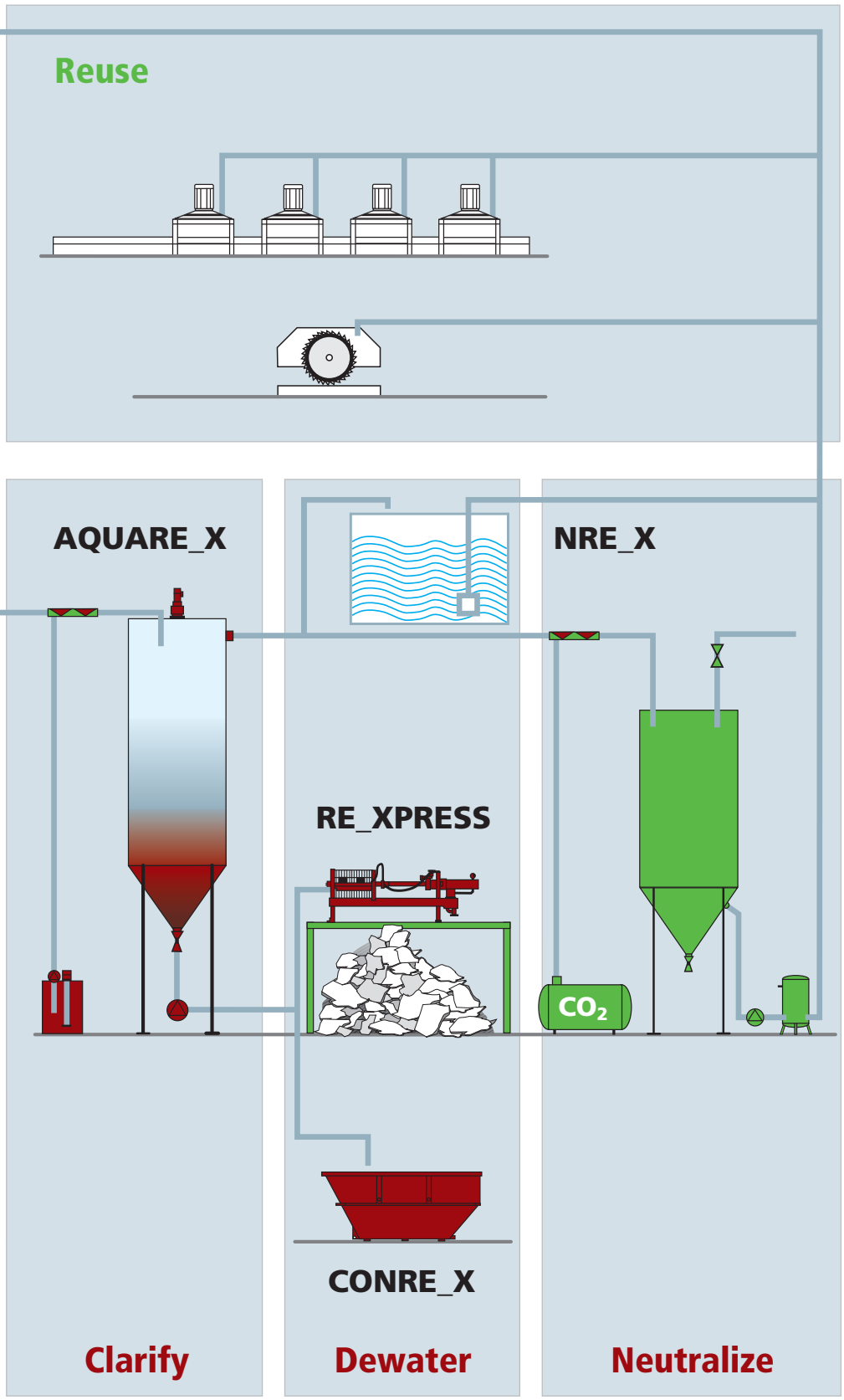




Data/Variation:	RE_X 02	RE_X 02 Z	RE_X 04	RE_X 04 Z	RE_X 16	RE_X 16 Z
Throughput waste concrete [m³/h]	2	2	4	4	16	16
Throughput water [m³/h]	10	10	25	25	30	30
Power consumption [kW]	1,4	1,4	2,1	2,1	5,8	5,8
Scooping capacity solids [m³/h]	---	2	---	4	---	6
Scooping capacity [m³/h]	---	2	---	5	---	10

PROCESS DESCRIPTION
RECYCLING PLANT




Reuse
AQUARE_X
NRE_X
RE_XPRESS
CO_2
CONRE_X
Clarify
Dewater
Neutralize

green professional reliable

WATER TREATMENT

To clarify: Excess grey water · Cooling water from polishing heads · Panel wash water · Cooling water from saws

with the following advantages:

Complex turnkey plants

Wear resistant high efficiency discharger with adjustable scrapers

Completely preassembled components in work shop

Increased settling speed due to solid specific polymer selection.

Improved handling due to optimal slurry dewatering

CONRE_X dewatering of slurry

Data/Variation:	CONRE_X 1	CONRE_X 2	CONRE_X 7
Volume geometric [m³]	0,9	1,2	7,0

AQUARE_X darifying tank

In the water treatment tank AQUARE_X excess grey water is clarified. Excess grey water is created when due to the amount of grey water and/or colour pigments a complete reuse of the grey water in the production process is impossible. Grey water is pumped, if required under the addition of polymers, into the central pipe of the water clarifying tank AQUARE_X. The fines settle in the cone of the tank and are extracted via a system of valves. The maxi discharger assists in extracting the slurry. The slurry can either be dosed into the batching plant or dewatered in the filter press RE_XPRESS. Clarified green water overflows under the roof of the tank and can be buffered in an extra tank. This enables a distribution of pressurized green water throughout the factory via a centrifugal pump followed by a pressure vessel.

Data/Variation:	AQUARE_X 20	AQUARE_X 40	AQUARE_X 60	AQUARE_X 100
Volume geometric [m³]	20	40	60	100
Power consumption [kW]	0,37	0,37	0,37	0,37

RE_XPRESS filter press

The filter press RE_XPRESS dewaters cementitious slurry. A filter cake with high solids content is produced, making the handling of slurry easier, and reducing the disposal costs. A high pressure pump squeezes slurry into the filter chambers formed in between the filter plates. Water passes through the filter cloth and is returned into the grey water basin. After pressing is the central filling system is cleaned and the filter cakes are discharged. The filter press is operated hydraulically. Filter presses can also be used to extract fines from grey water. In this way ready mix plants can reduce the density in their grey water basin.

Data/Variation:	RE_XPRESS 10	RE_XPRESS 15	RE_XPRESS 20	RE_XPRESS 408
Volume filter cake [l]	80	120	160	400
Power consumption [kW]	4,20	4,20	4,20	6,50

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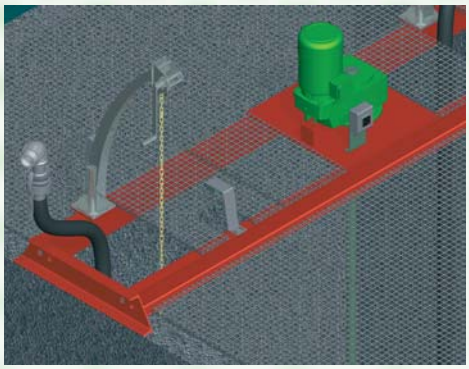
SYSTEM COMPONENTS

Convey, pump, stir, monitor neutralize

Submersible pumps and pitched blade stirrers

Opto-electronic converter of turbidity sensing system



Storing tank with stirrer, pumps and level sensors

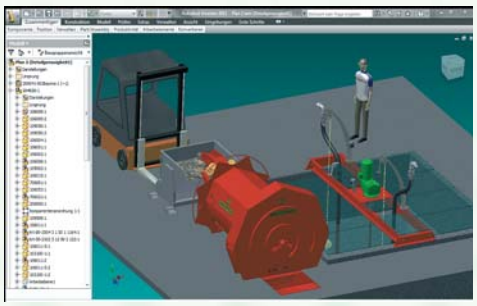
Process controls with touch panel

Operator box with LED-display

Homogenization- and pumping unit for slurry

Gas reservoir with heating for pH reduction system

Chain conveyor for transport of solids and water



Project management, engineering-services and 3D-drawings

CO_2-dosing unit for pH-reduction

Throughput monitoring for aggregates

Gauge head for density measuring in suspensions

SYSTEM COMPONENTS
Batching plant- and bulk technics

In cooperation with the German subsidiary of the market leader for solid bulk technology we offer service and parts for:

- **➔ Cement screw feeders, trough screw conveyors or spiral screw conveyors.**
- **➔ Shut off devices for bulk materials such as butterfly valves, or slide gate valves with the corresponding drives.**
- **➔ Filter devices for bulk materials for example silo venting filters.**
- **➔ Loading bellows, general equipment for bulk/cement silos such as (level indicators, continu-ous level sensors).**

• Screw feeders / conveyors

The offered screw feeders have proved their reliability many thousand times all over the world, preferably in concrete batching plants. Nearly all common variations in design can be supplied, and are determined during lay out together with the customer. Therefore the screw feeders can easily replace already existing systems.

• Butterfly valves

Butterfly valves are used in all types of bulk solids processing plants where interception of gravity-fed or pneumatically conveyed dry powders is required. Butterfly valves consist of two high-pressure die-cast semi-bodies manufactured of aluminum alloy, a swivel disc in SINT® polymer composite or cast iron, and a pre-stressed elastomeric seal. The valves can be fitted with a manual lever or a pneumatic or gear motor actuator. All the actuator systems are interchangeable.

• Slide gate valves

Slide valves are used where the flow of a bulk solid caused by gravity or transport has to be intercepted. Valves may be fitted to hopper or silo outlets to the in/outlets of mechanical con-veyors and to the inlet of telescopic loading spouts. The slide valves con-sist of a two piece carbon/stainless steel frame which is partly coated with a unique polymer composite and a sliding blade manufactured either in the same material or stainless steel.

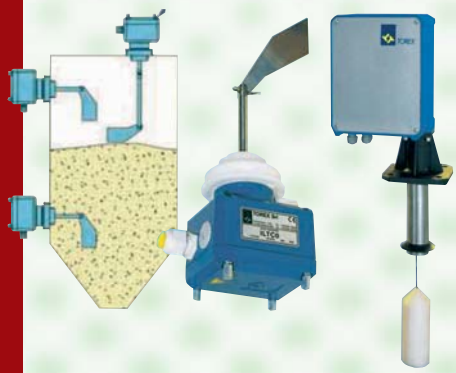
• Silo venting filters

The filter is composed of a cylindrically shaped dust collector for venting of pneumatically filled silos. Dust is separated from the air flow by polypropylene filter elements and re-introduced into the silo by an integrated automatic compressed air cleaning system. Designed specifically for cement, the filter can be used for all dry non sticky dusts.

Special features of the system are:
Sealed frame with integrated anti-intrusion grill extruded 304 stainless steel blow pipes, »Full immersion« solenoid valves incorporated in air tank to minimize flow resistance, Filter element fixing clamps to reduce maintenance time.

• Loading bellows

This is an example of a possible execution of a loading bellow. Other types with different bellow materials (Neoprene, Kevlar) or with automatic drives can be supplied. The type shown on the picture is best suited for the loading of non dusting bulk materials. As additional equipment dust suction equipment or level controls for inside the tanker can be provided. The compact dimensions of the system enable its installation in limited spaces.



• Level indicators, Continuous level sensors

Rotation sensors – Normally a minimum- and a maximum-level indicator are used, which are bolted to the silo wall. The sensors are available in the following variations: 24/48 V, 110/230 V, 50/60 Hz und 24 V.

Continuous level sensors –
Application: Continuous level sensors are preferably used in silos or bins for stokking bulking materials. They can also be used for liquids.

Operation: The microprocessor controlled sensor weight is levelled into the silo/bin. When reaching the surface of the filling materials it is pulled back into its starting position. The distance travelled is determined.

Biggest isn't always best when it comes to finding a supplier!



Our conviction:

High flexibility || Components supplied optimally suited for the concrete industry
Intensive consultancy || Development of custom made solutions
Short reaction times || Modular, expandable product range
Pre- and after-sales-service || Supply of vital parts within 24h
Many years of branch experience || Supplier of turnkey solutions

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Our staff specializes in the design and installation of custom made solutions for the processing of waste green concrete and wash down water in precast and ready mix plants. Our knowhow is based on the successful worldwide implementation of several hundred waste concrete recycling plants. Due to our workshop, we are able to supply products with quality standards »Made in Germany«. All components used in our plants have been tested over several years in the severe conditions of concrete plants, so that a high grade of reliability is achieved.

The ecofrog® GmbH young and experienced.

green professional reliable

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