A ARCHITECTURAL

E.1: Design Criteria and Parameters
The design criteria applied to the electrical engineering services shall include the following, namely :
- Capital costs
- Operational and maintenance requirements and costs
- Ease of functionality, operation and maintenance

Compliance with general energy efficiency and / or sustainability standards.

E.2: Bulk Electricity Service Connection
The East London Industrial Development Zone is the licensed electricity supply authority within the defined industrial zone, and in terms of its authority granted by National Electricity Regulator (South Africa), has the right to supply electricity to all customers situated within the industrial development zone.
The Dairy facility presently has an 11 000 V, 1,6 MVA bulk electricity service connection. Their present maximum demand is considerably lower than the capacity provided to them. It is anticipated that the electrical requirement of the proposed extensions to their facility, to accommodate the Cheese Factory and additional Cold Storage, will be accommodated within the spare capacity available and that the existing bulk electricity service connection need not be upgraded.
However, it remains the responsibility of the appointed Design Team to consider the electrical loads presented to themselves by the East London Industrial Development Zone and / or User (Tenant) and to confirm the electrical requirements.
Whether the bulk electricity service connection is to be upgraded or not, an application shall still be submitted to the East London Industrial Development Zone for the necessary bulk electricity service connection, for record purposes.
The East London Industrial Development Zone shall not impose any electricity service connection fees and / or electricity account deposits on the project.
If required, the project shall be responsible for the necessary extension of the existing medium voltage reticulation.

E.3: Medium Voltage Switchgear and Equipment
It is anticipated that the existing medium voltage switchgear and equipment shall suffice. However, if the existing medium voltage switchgear and equipment has to be extended and / or upgraded in any way, the extension and / or upgrading thereof shall comply with the standard specifications set by the ELIDZ which shall be made available upon request.
Briefly, the standard medium voltage switchgear and equipment may be summarised as follows:
- a 11 000 V switchboard (with "incomers", "feeders", "transformer feeders" and "voltage transformer" panels as is necessary
- All medium voltage equipment fed, and inter-connected, by a dual, redundant and ring-fed medium voltage cable network
- Over current & earth fault relay (Alstom MiCOM P122 or equal and approved), Trip circuit monitoring, Buchholz & oil temperature auxiliary relays (Alstom MVAA or equal and approved), Intertrip relay, etc.
- Customer energy and demand electricity metering

11 kV / 420 V, Dyn11, transformers, sized as is necessary, with copper windings, suuitable for outdoor application in coastal areas, all compliant with SANS 780

C.1 External Roads, Hardstand and Stormwater
External hardstands will consist of 200mm thick, Unreinforced 30MPa/38mm concrete on two layers of imported G5 type material. Jointing of concrete surfaces will be designed by the Engineer and will consist of sealed saw cut joints and sealed construction joints. Construction joints will be fitted with 115 x 115 x 6mm galvanised steel plates. Saw cut joints to be min 6mm width with an effective cut of 1/3 the depth of the hard stand surface, cut in a two-cut process. Construction joints to be min 6mm effective width fitted with a backing strip and sealant. Joint sealant to be specified and approved by the ELIDZ, joint sealant to be silicone free.
Saw cut panels to have maximum dimensions of 4.5m x 4.5m.
Expansion joints against building edges or structures.
Finishes of hardstand areas will be to a mechanical float "Pan Finish" texture.
Curing of hardstand surface will be via an approved curing compound acceptable to the design Engineer.

Hardstands will be cast to falls away from buildings to drainage collectors such as kerb inlets along roads edge with underground concrete storm water pipes class 100D, sized to take a 1 in 5-year flood event. Heavier rain will result in surface water drainage across the site to site entrances and onto external roads. Were collection of storm water cannot be achieved along the road/hardstand edge, drop inlet structures with heavy duty grill covers are to be positioned at the required design intervals and trapezoidal shaping of hardstands designed to achieve drainage to falls not exceeding 1:20 to the drop inlets must be constructed. Where there is evidence of sub-surface ground water on site, A sub soil drainage system must be designed by the engineer.

Office and visitor parking area – will consist of 200mm thick Unreinforced 30MPa/38mm concrete as per the hardstand specification.

Traffic manoeuvring models are to be verified and reported on to the ELIDZ, and to the requirements of the tenant.

C.2 Kerbing and Access Ramps
Hardstand edges finished with 180mm high precast Fig.3 type barrier kerbs set on 15MPa concrete haunching. Space from building to back of kerb is finished with bond paved sidewalks of varying widths with lawns or planted areas in between. Pavers will consist of 80mm interlocking pavers colour to architect's specification on a 2 x 150mm G5 type base.

Access Ramps with vehicle traffic will consist of 200mm thick, Unreinforced 30MPa/38mm concrete on two layers of imported G5 type material. The access ramps to have a 1:13 slope between hardstand and finished floor level with 10mm weather step.
Access ramps for pedestrian use only will consist of 100mm thick, unreinforced 25MPa/19mm concrete on a 150mm subbase layer of G7 type material with a 150mm base layer of G5 type material. Concrete panels via saw cuts at 2.5m max.

C.3 Access to Sewage and Water Reticulation.
Municipal services are provided along the road reserve. The site is serviced with a sewer and water connection point.

The underground sewers servicing the building must be provided to accommodate all the internal plumbing outlets. The minimum diameter and class are 110mm uPVC Class 34 solid wall pipe.

Water supply mains provide 20 kl per day per hectare of erf area with a max head of 90m and a min of 25m. Separate metered connections to each building must be provided. A separate external fire main must be provided to supply the fire hydrants for the building.

S STRUCTURAL

E.4: Medium Voltage Cables
All single core and three core cables with stranded copper conductors and insulated with cross linked polyethylene, shall comply with SANS 1339.
Conductors shall comprise standard annealed copper, complying with the requirements for class 2 conductors in SANS 1411-1.
All single core cables shall comply with the requirements given in tables 11, 12 and 13 of SANS 1339:1981.
All three core cables shall comply with the requirements given in tables 23, 25 and 26 of SANS 1339:1981 for type A cable and tables 29, 31, 32 and 33 for type B cables.

E.5: Load Shedding / Load Curtailment
The Buffalo City Metropolitan Municipality (BCMM) have recently directed that the East London Industrial Development Zone will no longer be exempt from any electrical load shedding implemented by themselves and / or Eskom.
Furthermore, BCMM have directed the East London Industrial Development Zone begin participating in their (BCMM) electrical load curtailment programme.
Therefore, it is imperative that all electricity users within the East London Industrial Development Zone comply with the requirement in that when directed to do so, they reduce their operating electrical load by 20 % of their base load, for the duration of the load shedding cycle.
The electrical installation of the new Dairy Facility is to be designed such that participation in this electrical load curtail programme is possible.
Furthermore, and is this project is an extension of an existing facility, it is imperative that the design of the electrical load curtailment be such that the value of the reduction in the operating electrical load be calculated on the base load of the existing and proposed facility, for the duration of the load shedding cycle.

E.6: Low Voltage Reticulation
The low voltage reticulation shall comprise the following, namely:
- Extension to / modification of existing Main Low Voltage Panel so as to accommodate the proposed new facility
- Main Low Voltage Panel, termed MLVP B, housed within the new facility
- A series of electrical distribution boards throughout the new facility servicing the

respective load centres i.e. Cheese Factory, Cold Storage, AC Plant, Refrigeration Plant, etc.
(note : all electrical distribution boards and associated low voltage cables necessary for the User (Tenant) internal electrical installation shall be provided under this contract)
- All main low voltage panels and respective electrical distribution bards shall be

inter-connected by a low voltage cable network

Electricity feeder cables shall be Cu PVC PVC SWA ECC PVC cables, with stranded conductors.
All main low voltage panels and electrical distribution boards are to be manufactured by a reputable company, with relevant experience in the manufacturing of low voltage panels, electrical distribution boards, control panels, etc.

C CIVIL

E.7: Builder's and related Works, Trench Excavations, Brick-built Enclosures (Manholes), Ducts
The Contractor shall be responsible for the necessary co-ordination and timing of the builder's and related Works pertaining to this Contract.
All Utility Rooms shall be constructed with the necessary floor trenches for the installation of all associated electrical services.
The Contractor shall undertake all trench excavations, including backfilling and compaction, required for the electrical installation.
The Contractor shall be responsible for the provision of the brick-built enclosures (manholes).
The Contractor shall be responsible for the provision of all ducts necessary for the electrical and, telecommunications and associated installations. In summary, ducts shall be installed beneath (across) all walkways, driveways, and finished surfaces.
The ducts shall be manufactured from a high-density polyethylene with a double wall construction, allowing a corrugated outer wall finish and a smooth inner wall finish, and of the internal diameters as indicated on the attached drawings.
All ducts shall be minimum 160 mm outer diameter, with minimum 137 mm internal diameter.

E.8: Standby Generator Set / Uninterruptible Power Supply Installation
The Contractor shall be not be responsible for the provision of a generator set.
The Contractor shall be not be responsible for the provision of an uninterruptible power supply unit.

E.9: Lighting Installation
A lighting installation, in accordance with the relevant regulations, which will ensure the efficient and proper usage of all spaces throughout the new buildings, shall be provided.
All luminaires specified shall be fitted with light emitting diode-type lamps.
The lighting design calculations shall be based on achieving the minimum lighting levels, in accordance with the relevant South African National Standards documentation, as follows:

• Manufacturing	General Working Areas (*)	350 lux
• Administrative Buildings	Entrance Halls	100 lux
	Reception Areas	100 lux
	Board rooms, offices	300 lux
	Computer rooms	500 lux
• Maintenance Buildings	General	300 lux

The lighting design shall (where applicable) take into account and include the following, namely:
- Specified luminaires shall provide high levels of luminous flux and be fitted with electronic control gear
- Specified lamps shall provide the correct colour rendering for the application and use

energy efficient lamps i.e. light emitting diode (LED) type
- Maximum natural daylight usage and controllable light levels
- Task specific light sources
- Multiple control for light circuits / zones covering areas greater than 100 m²

Emergency exit signage and route lighting shall be provided for any evacuation procedures that could occur.
Allowances shall be made for decorative post-top type luminaires, with light emitting diode type lamps, on fibreglass poles to be installed throughout the complex including along all walkways, roadways and parking areas.
The luminaires shall comply with the specification detailed in the Project Specification.
All low voltage single core conductors shall be of the PVC insulated type with stranded copper conductors, rated at 600 V general service duty and manufactured in accordance with SANS 1507 - 1990..

E ELECTRICAL

E.10: Small and Large Power
Generally, power shall be provided to the various areas by means of switched socket outlets.
The layout and quantity of the switched socket outlets shall be determined by the use of the specific room, the equipment to be installed therein and the services / activities to be rendered from there.
Switched socket outlets shall be provided approximately every 10 m² in all passages and public areas for cleaning and maintenance purposes.
Should the activity or specific equipment require, i.e. within the kitchen areas, the power supply provided shall be in the form of a switched isolator.
As the design responsibility ends at the switched socket outlet or isolator points, we cannot guarantee what the End User is going to connect to the installation. Therefore, it is only possible to encourage (and not guarantee) energy savings at switched socket outlet and isolator points. All low voltage single core conductors shall be of the PVC insulated type with stranded copper conductors, rated at 600 V general service duty and manufactured in accordance with SANS 1507 - 1990

E.11: Power Factor Correction and Harmonic Filtration
The Contractor shall be responsible for the design and supply of necessary power factor correction and harmonic filtration equipment, designed to service the electrical installation.

M MECHANICAL & FIRE

M.1: Air-conditioning
The Auxiliary Office-related Buildings (Production Offices, Server Rooms, Drivers Kitchen, Canteen, etc.) shall be provided with Daikin inverter split type air-conditioning equipment.
The air-conditioning system shall be an air cooled, inverter split type system consisting of one outdoor unit and one indoor unit, each unit having capability to control heating or cooling independently to suit the requirements of the rooms.
The refrigeration compressor in the outdoor unit shall be equipped with inverter controller and capable of changing the rotating speed to follow variations in cooling or heating load.
The system shall be capable of operating continuously at ambient temperatures between -5°C and 40°C. Both indoor and outdoor units shall be assembled, tested, and charged with refrigerant at the factory.

M.2 Fire Protection
The site and facility / building are to be designed and constructed in accordance with the National Building Regulations SANS 10400 "Part T".

M.3: Ventilation
Ventilation in building will be provided in terms of the stipulated minimums in SANS 10400 "Part O" and the OHS Act under the Environmental Regulations for Workplaces.
Air extraction systems will be provided for ablution facilities, canteens and tea kitchens in accordance with SANS 10400 "Part O".
Fresh air will be provided for all air-conditioned spaces in accordance with SANS 10400 "Part O".
Room areas are to be less than 500m2 to elliminate the need for smoke extraction, according to SANS 10400 "Part T".

G GENERAL

G.1 Effluent Disposal
Tenant is responsible for industrial effluent disposal and applications for Trade Effluent Permit.

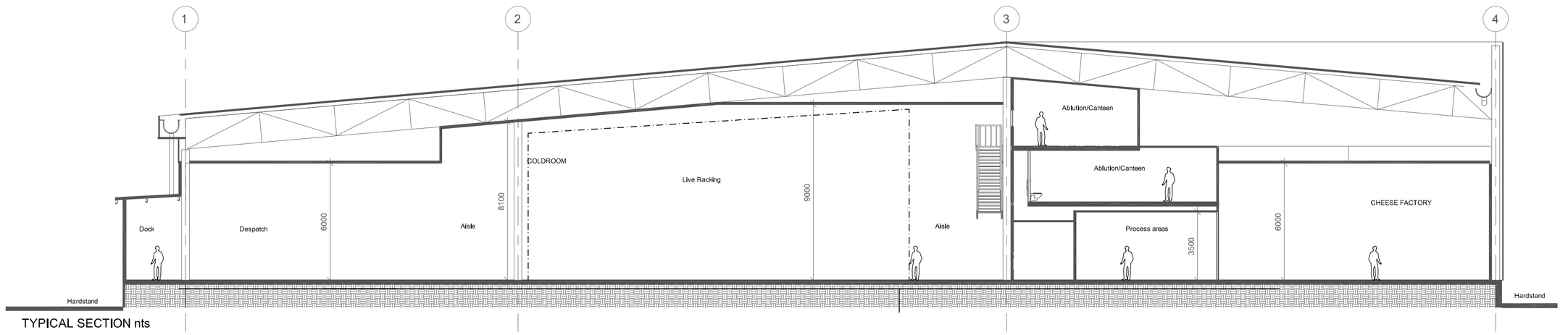
G.2 Access Control
The ELIDZ operates an integrated access control system to monitor and control the entrance and egress of all staff and vehicles to and from each zone of the IDZ. The ELIDZ will provide tenants with the opportunity to subscribe to the central access control system subject to payment of a defined subscriber fee ,

G.3 Logistic Facility
Sundale has access to a logistic facility subject to tenants making their own contractual arrangements with the service provider of the logistic facility.

G.4 Landscaping
ELIDZ will provide site landscaping.

G.5 Exclusions
The following services, unless otherwise stated or agreed, are not provided by the landlord:
- Standby diesel generators.
- UPS and computer equipment.
- Internal computer network cabling.
- Purpose made computer access flooring.
- Internal PABX, data and telephone networks, cabling.
- Power factor correction equipment.
- Electricity reticulation from the internal site electricity network to tenant's plant components.
- Special foundations for tenant's equipment.
- Internal division walls within factory.
- Catering and kitchen equipment.
- Lockers.
- Compressed air supply and equipment.
- Gas suppression.
- Bulk storage tanks.
- Compressor rooms.
- Forklift refuelling enclosures.
- AC and ventilation plant including plant rooms to process areas.
- Water supply, effluent control and other under floor wet services to process areas.
- Specific fire protection other than general industrial fire protection.
- Steam generation.
- Furniture, fixtures and fittings.
- Building, operational and tenant signage.
- Logistics equipment.

Protection of building and equipment from process or logistics equipment. Special security systems and access control.
Specialised lifting equipment and crawler beams.



TYPICAL SECTION nts

A.1 Ceilings
- **Canteen and Ablutions - (Non Process areas)**

'Non-process' rooms on the Ground floor and upper floor ablutions and canteens to be finished with 600 x 600mm suspended vinyl clad gypsum ceiling tiles laid in exposed aluminium T-grid suspended from roof structure/ slab

- **Coldroom and Cheese Factory**

All "process/clean " areas to have suspended insulated ceilling panels, with sealed joints
Portion of the Cheese Factory ceilling to be trafficable on upper surface. Catwalk to be installed by tenant

A.2 Walls
- **Canteen and Ablutions - (Non Process areas)**

Canteen, change room and Ablution spaces are located on the first and second floor; in-between the coldroom and cheese factory double volume spaces :
1. 100mm Insulated wall panels between the Process and Non-Process areas.
2. Non-process Dry areas to be seamless painted 90mm dry wall partition with aluminium top track , with 200 high skirting.Plascon "Wall n All" in light tint colour.
3. Non-Process Wet areas to 90mm Moisture Resistant Silicone impregnated dry wall partitioning be sealed with Tal Superflex flexible waterproof membrane capable of accommodating normal structural movement in the background and suitable for waterproofing internal wet areas. Continuous membrane from underside of floor finish up the wall and flush with the ceiling . Walls to be tiled up to ceiling level and bonded with appropriate adhesive and movement joints.
4. Showers to be lined with 21mm Marine plywood sealed in waterproofing as described above and tiled as ditto

- **Coldroom and Cheese Factory:**

Cold store, Product dry store and all Process areas to be Insulated Wall panels . Thickness of wall between 50mm to 100mm, depending on the internal thermal requirements of the Room.
Insulated panel from floor to ceiling with finishes,flashing and trims to be Chromadeck. No aluminium. Bump rails and Bollards to be provided at Forklift circulation areas and at dock levellers .

A.3 Floors:
- **Canteen and Ablutions - (1st and 2nd floor)**

Structure: 50mm screed on PRESTRESSED HOLLOW CORE SLABS supported on steel structure to Eng Detail.
Finishes : Porcelain tiles and Heavy duty flexible hygienic Vinyl sheet .

- **Cold Room and Cheese Factory**

Polyurethane finish on floor sloped to drains & channels

A.4 Doors
Internal doors to be standard flush panel 2032 x 813mm solid core doors with concealed edges finished with primer and two coats "velvaglo" or similar. Change rooms and toilets to be undercut as required.
External doors to be hardwood 2032 x 813mm FLBB doors with flush panel internally in hardwood frame set in steel sub frame
All doors in process/clean areas to be insulated standard/coldroom doors faced both sides with Chromadek and with perimeter tri, airtight.

A.5 Openings in Envelope - Roller Shutter and Sectional doors
Roller Shutter: galvanised and manually operated by chain slatted doors . Door openings will be formed and framed using steel channel sections.
Sectional doors: with pre-painted skins, hot dipped galvanised steel with rigid polyurethane insulation core

A.6 Openings in Envelope - Windows
Generally , no openings in the steel structure will be made for windows. Windows fixed onto side cladding rails. External Openable Windows to be aluminium Sheerline 36 . External Curtain wall to be Sheerline 90

A.7 Roof Sheeting and Insulation
Huletts Aluminium GRS Zip-Tek, 0.9mm thick with embossed PVDF finish on exterior and standard backing coat to underside fixed to galvanised cold rolled purlins with isolation tape between purlin and roof sheet. Owens Corning SA 50mm Factorylite insulation laid over purlins in single lengths and supported on galvanised straining wires at 300mm centres .

A.8 Gutters and Downpipes
Internal gutter:
GRP half-round gutters with integral fibreglass drop-outs at 12m c/c's with 'Geberit Pluvia' rainwater head at base of each drop-out. Each head to be serviced by 2 no. 'Geberit Pluvia' continuous HDPE welded pipes, suspended to approved Geberit detail from gutter support structure. Gutter support would be as per engineers specification
Rainwater heads and downpipes are located internal to the building on east and west extremities of the gables.

External gutter:
GRP half-round gutters with integral fibreglass drop-outs with standard UPVC downpipes

A.9 Side Cladding
Huletts Aluminium GRS BR7 profile, 0.8mm thick with embossed PVDF finish on exterior and standard backing coat on inside from eaves to finished floor level fixed to galvanised steel girt rails to all external walls.
No side wall insulation is provided.
Translucent sheeting to be Modek opal polycarbonate sheeting with profile to match side cladding

S.1 Roof Structure
The roof structure consists of a welded and bolted girder truss spanning 24000mm with horizontal tie and 5° slope top chord with HDG finish. Trusses are at 6000mm centres. Alternate trusses are supported internally on plate girder running the length of the building supported on stanchions at 12000mm centres. Services load is 40 kg/m2 with 20 kg/m2 reserved for standard mechanical and electrical services and 20 kg/m2 available for tenant services ,

S.2 Structure - Internal Stanchions
Girder columns: 203x203x60kg/m, UC steel sections at 12000mm centres with HDG finish on grid 2. Girder columns: 254x254x7kg/m, UC steel sections at 12000mm centres with HDG finish on grid 3. Note: Vertical bracing from floor to underside of truss will be required in one 12m girder bay on grid line 2&3. Vertical K bracing is used on internal grids under the plate girder.

S.3 Concrete Surface Beds
Seamless floor: Concrete to be 35/19 MPa with washed sand, minimum 200mm thick, reinforced top and bottom and receive Micro Fibre at a rate of 600g - 900g/m ^{3}. Floor to be cast in max 30mx30m panels with armoured "terrajoint" type joints.
Finishes: Floor to be cast to falls. Finish with a Mechanical power pan floated finish followed by a mechanical grind to expose aggregate, in order to apply a seamless polyurethane antimicrobial epoxy self- levelling, HACCP certified Polyurethane 6-9mm screed as per the manufacturer's specification. (to be approved by client) Flat areas to have FM3 flatness and the same polyurethane finish.
Damp proofing membrane 250 micron to be installed under surface beds.
Saw-cut joints were required shall be done as soon as concrete is firm enough not to damage the edges, usually between 6 to 16 hours but not later than 48 hours. Joints to be repeated in finished surfaces spacing at 4m c/c . "
Maximum wall load on slab = 9.0 ton / m run.
Maximum uniformly distributed load = 6.4 ton / m2
Maximum racking post load = 12 ton at 2500mm intervals along aisles and 1000mm to 2500mm in opposite direction.
Maximum axle load = 10 ton assuming a nominal forklift lifting capacity of 4.5 tons.

S.4 Perimeter structure
Exposed steel columns along the sides. Iso panels to be located/fixed onto the inside flange of the steel columns, flush.
Sheeting along the front to extend down to floor level.

S.5 Column Protection
Column protection will be provided to all centre row internal steel stanchions by means of 750 x 750mm steel lined, sand-cement filled barriers 1000mm high painted in diagonal black and yellow.

S.6 Structure - Perimeter Stanchions
457x191x 67mm UB steel sections at 6000mm centres with HDG finish .

S.7 Canopies
Cantilevered structural steel canopies will be provided above the full length of the dock levelers. Canopies will extend nominally 3600mm off grid line 1.

S.8 Structure - Modular Design + Expansion
The structure is designed to fit a 6m perimeter bays and 12m structural internal grid.

S.9 Staircases
All staircases to upper levels are galvanized structural steel.

Rev	Dm	Date	Description

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Project Name: SUNDALE DAIRY EXPANSION
Title: PROPOSED DESIGN LOADS, SERVICES & FINISHES

Discipline: ARCHITECTURE
Drawn Date: 18.03.2020
Drawing Originator: OSMOND LANGE ARCHITECTS AND PLANNERS

Approved By	Checked By	Drawn By	Scale
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Project	Discipline	Type	Drawing No.	Rev.
ELIDZ	ARC	SK	0000	0