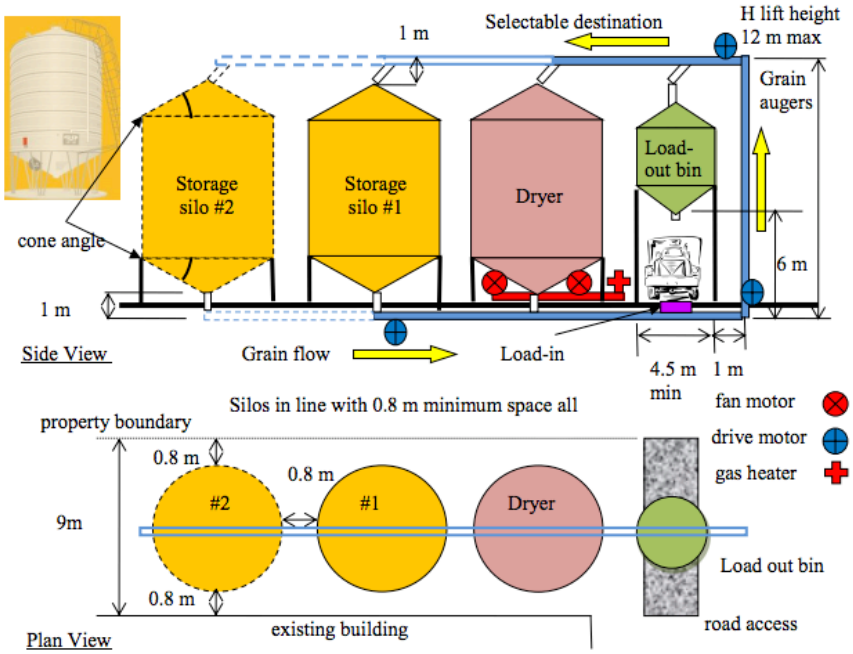

2.1 Requirements

The following requirements must be met:

R1. The facility must be capable of storing at least 600 tonne (metric) of wheat.

R2. The dryer must be capable of drying grain at a rate of at least 25 tonne per day, in batches equal to the storage in a single silo.

R3. The load-in auger must be capable of accepting a mass flow rate of 30 tonne/hr.

R4. ~~The load-out bin must be capable of delivering a mass flow rate of 200 tonne/hr to load a truck.~~ The maximum truck capacity is 25 tonne. The frequency of trucks at peak times is expected to be 3 trucks per hour.

to be loaded

The average frequency of trucks to be loaded is 1 per hour.

Table 1: Technical Information relevant to Silo, dryer and load-out bin design

Quantity	variable	value or equation	unit
Density of grain stored (wheat)	ρ_w (rho w)	800	kg/m^3
Cone angle (slope of cone to horizontal)	Θ (theta)	30	degrees
Cost per square meter of silo (surface area)	C_S	60	\$/m^2
Cost per square meter of load-out bin	C_B	60	\$/m^2
Number of storage silos	**N**	**To be calculated**	
Mass of grain stored in each silo	$\mathbf{m_S}$	**To be calculated**	kg
Radius of the silo	$\mathbf{r_S}$	**To be calculated**	m
Height of silo cylindrical section	$\mathbf{h_S}$	**To be calculated**	m
Depth of silo conical base and top	$\mathbf{d_S}$	**To be calculated**	m
Mass of grain stored in the load-out bin	$\mathbf{m_B}$	**To be calculated**	kg
Radius of the load-out bin	$\mathbf{r_B}$	**To be calculated**	m
Height of load-out bin cylindrical section	$\mathbf{h_B}$	**To be calculated**	m
Depth of load-out bin conical base and top	$\mathbf{d_B}$	**To be calculated**	m
Required lift height	**H**	**To be calculated**	m