| Model Parameter | Units | Symbol | Source | Value | | KEY | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | User input | Calculated value |
| Design Wastewater Load | L/day | Q | Wastewater generation | 1080 | | | | |
| Total nitrogen in effluent | mg/L | TN | Table 5-2 of the Guideline or site-specifc effluent quality data[1] | 37.5 | Mid-range values from Table 5-2 | | | |
| Total phosphorus in effluent | mg/L | TP | Table 5-2 of the Guideline or site-specific effluent quality data[1] | 12.5 | Mid-range values from Table 5-2 | | | |
| Design life of system | years | L | Reasonable service life of 50 years | 50 | | | | |
| P-sorption soil capacity | mg/kg | $P_{sorp}$ | Site-specific/ soil landscape-specific laboratory data or Table 4-7 of the Guideline | 44 | | | | |
| P-sorption soil capacity field coefficient | % | $P_{sorp}C$ | Capacity of a soil to sorb phosphorus in the field is 25-75% less than in measured lab conditions[2] | 0.5 | | | | |
| Soil depth for P-sorption | m | D | Soil depth from base of EAA to limiting layer and/or depth of excavation based on SSE | 1 | | | | |
| Bulk density of soil | g/cm³ | B | 1.8 (sandy loam), 1.7 (fine sandy loam), 1.6 (loams and clay loams), 1.4 (clays)[3] | 1.8 | A P reduction tertiary process is required to reduce P | | | |
| Nitrogen plant uptake | kg/m²/year | NPU | 90 (good quality woodland), 65 (poor quality woodland), 240 (managed lawn), 120 (unmanaged lawn), 280 (improved pasture), 99 (perennial pasture), 150 (managed shrubs and some trees), 75 (unmanaged shrubs and some trees)[4] | 240 | | | | |
| Phosphorus plant uptake | kg/m²/year | PPU | 25 (good quality woodland), 20 (poor quality woodland), 30 (managed lawn), 12 (unmanaged lawn), 24 (improved pasture), 11 (perennial pasture), 16 (managed shrubs and some trees), 8 (unmanaged shrubs and some trees)[4] | 30 | | | | |
| **Model Inputs** | | | | | | | | |
| Appiled total nitrogen | kg/year | $TN_A$ | *(Q x TN x 365) ÷ 1,000,000* | 14.8 | | | | |
| Applied total phosphorus | kg/year | $TP_A$ | *(Q x TP x 365) ÷ 1,000,000* | 4.9 | **Notes** | | | |
| **Model Outputs** | | | | | | | | |
| Subsoil nitrogen cycle losses[5] | kg/year | NL | *$TN_A$ x 20%* | 3.0 | 1. Data only should be considered where NATA accredited laboratory results can be supplied to support the nutrient (effluent) quality peformance of a specific treatment system. | | | |
| Phosphorus sorption by soil | kg/m² | PS | *[($P_{sorp}$ ÷ 1,000,000) x (B x 1,000)] x D x $P_{sorp}$ C* | 0.0 | | | | |
| Phosphorus plant uptake over design life | kg/m² | $PPU_L$ | *(PPU ÷ 10,000) x L* | 0.2 | 2. Patterson (2001) | | | |
| **Model Results** | | | | | | | | |
| Minimum area required for nitrogen uptake | m² | $NUA_N$ | *[($TN_A$ -NL) ÷ NPU] x 10,000* | 492.8 | 3. Hazelton & Murphy (2016) | | | |
| Minimum area required for phosphorus uptake | m² | $NUA_P$ | *($TP_A$ x L) ÷ (PS+$PPU_L$)* | 1299.4 | 4. WaterNSW (2023a) | | | |
| **Minimum area for nutrient uptake** | m² | NUA | *Maximum value from $NUA_N$ and $NUA_P$* | **1299.4** | 5. Geary and Gardener (1996) | | | |