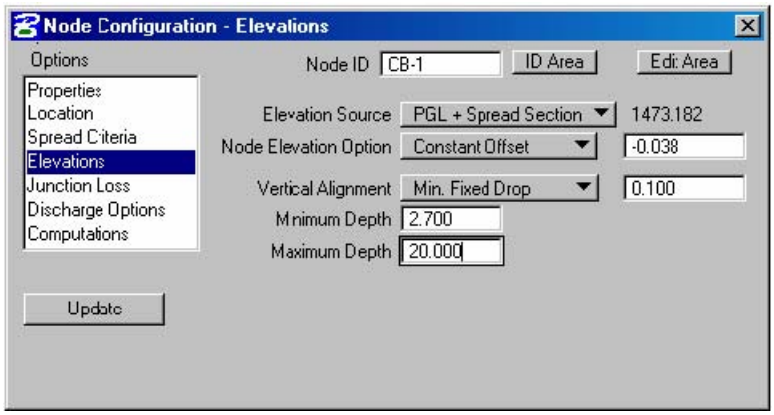
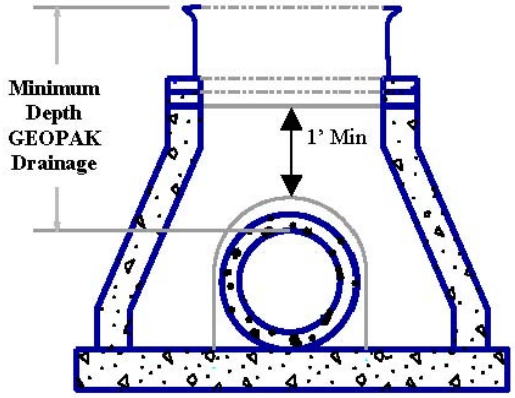
Minimum Depth for Structures in GEOPAK Drainage Lisa Sayler, July, 2003

The Minimum Depth elevation is set in the node elevation dialog within GEOPAK Drainage and is a significant factor for designing storm drain pipes. Generally, it will be cost efficient to design a system as shallow as possible – lower cost for structures, less trenching (possibly less disruption during construction), and a little more slope available for some pipes. Drainage uses the Minimum Depth to determine the upper limit of the design "envelope" that is available to select pipe size and slope. For a typical storm drain project, the critical point for minimum cover will be the drainage structures. The actual minimum depth will depend both on pipe size and structure depth. For most precast structures, it is recommended to allow for at least 1' from the top of the pipe hole in the structure to the top of the structure, a pipe thickness for the gap outside the pipe, and at least 2 adjusting rings.





In GEOPAK Drainage, the Minimum Depth

variable (on the Node Configuration – Elevation dialog) is the distance from the Node Elevation (Top of Casting for Structures) to the pipe soffit (inside top of pipe). The recommended default value for Minimum Depth is 2.7 ft.

The table at right shows the recommended Minimum Depths based on pipe size and structure type. Using a Minimum Depth of 2.7' for an initial design using GEOPAK Drainage will allow adequate clearance for Design A, C, F, or G structures for most allowable pipe sizes. For terminal structures (Design H or N), the Minimum Depth should be set smaller. Once the system is designed and structure and pipe sizes selected, the Minimum Depth may need to be increased for 4020 structures. An option to changing the Minimum Depth is to lock the pipe invert to the appropriate value.

Recommended Minimum Depth (GEOPAK Drainage) - ft						
Pipe Diameter (in)	**F or G**	**H**	**N**	**SD**	**48-4020**	**54-4020 to 102-4020**
12	2.6	2.2	2.4	1.8	3.1	3.2
15	2.6	1.9	2.1	1.9	3.1	3.3
18	2.7		1.8	1.9	3.2	3.3
21	2.7			1.9	3.2	3.4
24	2.7			1.9	3.2	3.4
27	2.8				3.3	3.4
30						3.5
36						3.6

For low-point structures or other structures where there is not much allowable cover, an SD structure should be considered. However, SD structures are generally more expensive than a similar sized G structure, so they should not be used if not needed. Also, when using the shallow SD structures, the top of the pipe should be below the grading grade.