Table A.4. Excavation for pipe network

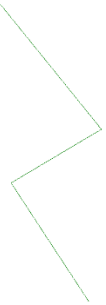
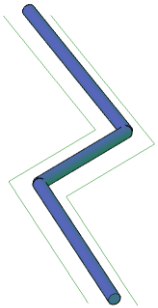
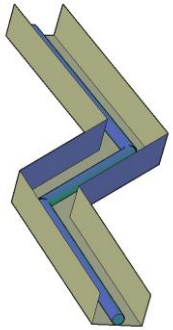
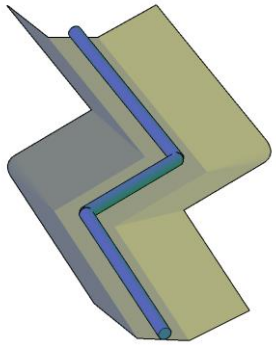
LOD 100	LOD 200	LOD 300	LOD 350
			
Geometry: Rough excavation along a 3D line. The depths are determined by rules, design requirements are ignored. The width of excavation is arbitrary.	Geometry: Rough excavation along a pipe network. The depths are determined by piping profile or by rules. The width of excavation is determined by rules with low accuracy.	Geometry: Excavation along the pipe object, correct width but no slopes. Width and profile correspond with the design values.	Geometry: Detailed 3D surface with consideration for all network features. Using corridors is allowed.
Object type(s): 3D line (3D polyline, feature line)	Object type(s): Pipe network elements	Object type(s): Pipe network elements, 3D surfaces, 3D breaklines	Object type(s): 3D surfaces, 3D breaklines, grading objects and/or corridors
Properties: Layer, elevation, slope, tentative volume	Properties: Layer, elevation, slope, diameter, approximate volume	Properties: Layer, elevation, slope, diameter, volumes	Properties: Layer, elevation, slope, diameter, volumes
Where used: Conceptual design, initial studies.	Where used: Conceptual design, preliminary design, feasibility study	Where used: Preliminary design, basic design, construction management planning, implementation planning	Where used: Basic design, design documentation, construction, construction management planning, implementation planning

Table A.5. Roads and railways

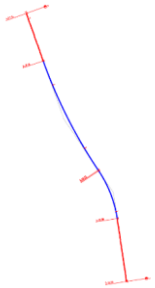
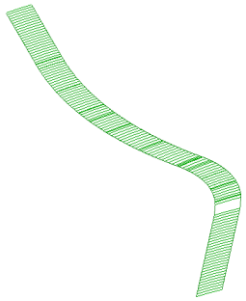
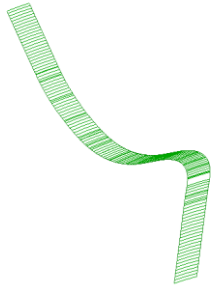
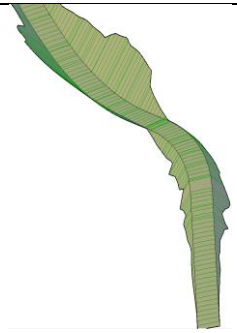
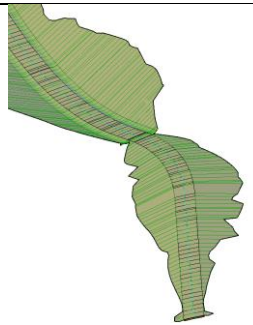
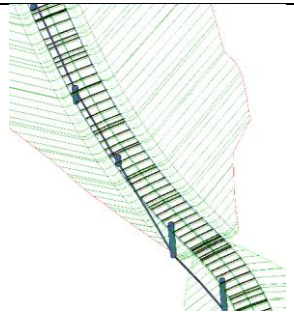
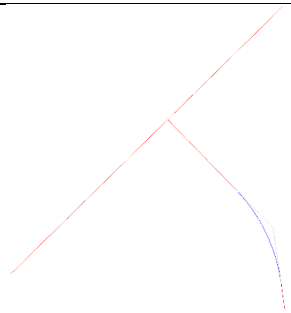
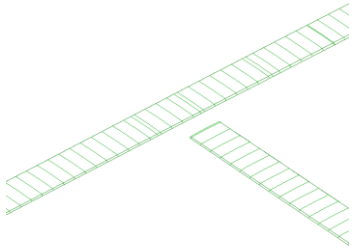
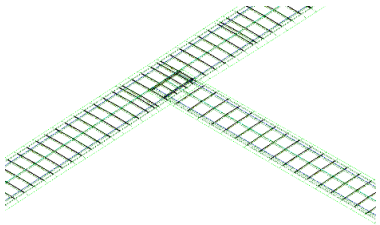
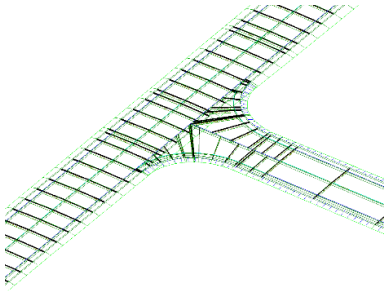
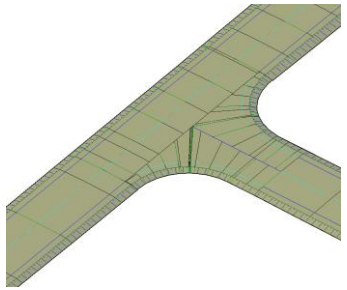
LOD 100	LOD 200	LOD 250	LOD 300	LOD 350	LOD 400
					
Geometry: Centerline of road (2D).	Geometry: Corridor is a plane with an expected width of the track or the ROW. Corridor profile coincides with the existing terrain.	Geometry: The same as the LOD 200, but corridor profile coincides with the approximate grade surface.	Geometry: The corridor has the alignment and the profile. The design represents the plane of the top of the road with cross-slope and outcrops. The top surface of the roadway and slopes.	Geometry: The same as the LOD 300, but elaborated in detail and representing the complete road profile with outcropping, ditches etc. The top and bottom surfaces of the road.	Geometry: The complete road model with full assembly, sawtooth profile elevations, structural elements, fences, screens, pillars, culverts etc.
Object type(s): Alignment (2D)	Object type(s): Alignment, corridor, assembly	Object type(s): Alignment, corridor, assembly, layout profile, surface	Object type(s): Alignment, corridor, assembly, layout profile, surfaces	Object type(s): Alignment, corridor, assembly, layout profile, surfaces	Object type(s): Alignment, corridor, assembly, layout profile, surfaces, AutoCAD solids
Properties: Layer, stations, criteria	Properties: Layer, stations, area	Properties: Layer, stations, area, layout profile	Properties: Layer, stations, area, layout profile, volumes, cross-sections	Properties: Layer, stations, area, layout profile, volumes, cross-sections	Properties: Layer, stations, area, layout profile, volumes, cross-sections
Where used: Planning	Where used: Planning, area calculation	Where used: Conceptual design, preliminary design, feasibility study	Where used: Preliminary design, basic design, construction management planning, implementation planning	Where used: Basic design, design documentation, construction, construction management planning, implementation planning	Where used: Design documentation, construction, construction management planning, implementation planning

Table A.6. Intersections. Single-level intersection modeling with AutoCAD Civil 3D corridors

LOD 100	LOD 200	LOD 300	LOD 350	LOD 400
				
Geometry: Alignment centerline intersection (2D). May be numbered.	Geometry: Corridor intersection is not formed. Corridor boundaries may stay apart. Assembly may either only include the top of the roadway or be complete. Corridors are not vertically matched.	Geometry: Corridors do touch but there are no additional matching areas. Assembly is complete. Corridors are vertically matched.	Geometry: Complete single-level intersection. Corridors have additional matching areas.	Geometry: The complete road intersection model with full assembly, sawtooth profile elevations, structural elements, fences, screens, pillars, culverts etc.
Object type(s): Alignment (2D)	Object type(s): Alignment, corridor, assembly	Object type(s): Alignment, corridor, assembly, layout profile, surfaces	Object type(s): Alignment, corridor, assembly, layout profile, surfaces	Object type(s): Alignment, corridor, assembly, layout profile, surfaces, AutoCAD solids
Properties: Layer, stations, criteria.	Properties: Layer, stations, area.	Properties: Layer, stations, area, layout profile, volumes, cross-sections.	Properties: Layer, stations, area, layout profile, volumes, cross-sections.	Properties: Layer, stations, area, layout profile, volumes, cross-sections.
Where used: Planning	Where used: Planning, area calculation	Where used: Preliminary design, basic design, construction management planning, implementation planning	Where used: Basic design, design documentation, construction, construction management planning, implementation planning	Where used: Design documentation, construction, construction management planning, implementation planning