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## BENTLEY® SEWERCAD®

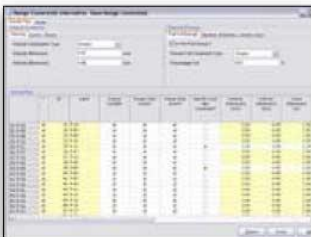
### SANITARY SEWER MODELING AND DESIGN MADE EASIER



*SewerCAD stand-alone, MicroStation, and AutoCAD platforms offer platform freedom and versatility.*



*SewerCAD provides a broad range of tools for estimating and allocating sewer loadings.*



*Automatically determine diameters and invert elevations with the SewerCAD constraint-based design.*



*Use a single model to evaluate an unlimited number of design, operational, and sanitary loading scenarios.*

Thousands of municipalities, utilities and engineering firms around the world trust SewerCAD to design and analyze wastewater collection systems. Engineers can model both pressurized force mains and gravity hydraulics with ease, using steady-state analysis with various standard peaking factors, and extended-period simulations.

#### Model in Stand-Alone, or within Your Favorite CAD Platform

Out of the box, SewerCAD users can work within stand-alone and MicroStation® platforms, while optional AutoCAD integration means users can model within their favorite CAD environment. Regardless of the platform used, SewerCAD maintains a single set of modeling files for true interoperability across platforms.

The stand-alone interface offers easy-to-use model layout tools, multiple background support, conversion utilities from CAD, GIS, and databases, and unlimited undo and redo layout. SewerCAD can import SewerGEMS® models including those created with ArcGIS platform.

The MicroStation interface, included at no additional cost with all SewerCAD versions, provides a geospatial and engineering design environment with unrivaled visualization and publishing tools. AutoCAD users can also add AutoCAD integration features to build, lay out and, plot models with engineering precision within an environment they are already comfortable with.

#### Gravity and Pressure Hydraulics

Engineers can analyze pressure or free surface flow conditions using robust gradually varied, standard-step algorithm in SewerCAD for solving for subcritical, critical, supercritical conditions, and complex composite profiles.

The steady-state simulation analyzes the system under extreme flow conditions. Automated design features are available with a steady-state analysis type to find cost-effective sewer designs. The Extended Period Simulations (EPS) allow modelers to visualize how the system behaves over time. Results can be animated through time to locate hydraulic jumps and surcharging sections.

#### Wastewater Loading Allocation and Estimation, and Infiltration and Inflow

The included LoadBuilder™ module helps engineers allocate sewer loads based on a variety of GIS-based sources such

as customer water use billing data, area-wide flow measurement or polygons with known population or land use.

Sewer loading in SewerCAD can also be applied as user-defined hydrographs, pattern-based loads, and unit loads. Modelers can use totally customizable unit load libraries to estimate sanitary flows based on contributing population, service area, total dry weather discharge, or their own customized loading types.

SewerCAD also includes numerous pre-defined extreme flow factor formulas and tables, or lets user enter their own formulas and tables. SewerCAD determines infiltration in gravity pipes, based on pipe length, diameter, surface area, length-diameter, or user-defined data. SewerCAD can also use multiple flow patterns or flow hydrographs for Extended Period Simulations. Sanitary load control center and Inflow control center make it easy to globally edit or edit a filtered set of elements.

#### Automatic New Systems Design and Existing Sanitary Sewers Rehabilitation

The constraint-based design features in SewerCAD allow modelers to automatically design gravity piping and structures. The design is flexible enough to allow users to specify the elements to be designed, from a single pipe size to the entire system, or anything in between, by simply entering their design restrictions: minimum/maximum velocities, covers and slopes; pipe and manhole matching offsets; allow (or not) drop structures.

SewerCAD will automatically determine cost-effective pipe sizes and invert elevations avoiding unnecessary pipe trench excavation.

#### Comprehensive Scenario Management

With the SewerCAD scenario management center, engineers can visualize and compare an unlimited number of what-if scenarios (e.g. analyzing rehabilitation alternatives for multiple planning horizons, evaluating pump operation strategies, etc.) within a single file.

## SYSTEM REQUIREMENTS

### Processor

Pentium III at 750 MHz

### Operating System

Windows Vista, Windows XP, Windows 2000 (with latest service packs)

### Memory

128 MB or more

### Hard Disk

25 MB of free storage space, with additional room for data files

### Display

800 x 600 resolution, 256 colors

SewerCAD runs without platform restrictions using the stand-alone interface. If integration with CAD platforms is desired, these are the requirements: MicroStation V8i, AutoCAD 2009

Support for older platform software versions is available if required. Contact your Bentley representative for details

## ABOUT BENTLEY

Bentley Systems, Incorporated is the global leader dedicated to providing comprehensive software solutions for sustaining infrastructure. Architects, engineers, constructors, and owner-operators are indispensable in improving our world and our quality of life; the company's mission is to improve the performance of their projects and of the assets they design, build, and operate. Bentley sustains the infrastructure professions by helping to leverage information technology, learning, best practices, and global collaboration — and by promoting careers devoted to this crucial work.

## About Harken-Reidar

Harken-Reidar, Inc. is a Bentley Channel Partner for the Mid-Atlantic VA, MD, DC & PA. Our sales and training staff are Registered Professional engineers who understand Civil design and plans preparation. We have 20 years of experience using GeoPak, InRoads, MicroStation and Haestad Methods software for over 20 years.

Contact Harken-Reidar, your local Bentley dealer, integration and training center.

Corporate office: 1105 N. Royal Avenue  
Front Royal, VA 22630

Offices: Pittsburgh, 130 Venango Ct.  
New Kensington, PA 15068  
Houston, 2201 Fountain View #F38  
Houston, TX 77057  
T: 540-635-6742 F: 540-635-6752  
info@harken-reidar.com

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## BENTLEY SEWERCAD AT-A-GLANCE

### Interface and Graphical Editing

- Stand-alone Windows interface
- AutoCAD-based interface
- MicroStation-based interface
- Unlimited undo and redo
- Element morphing, splitting, and reconnection
- Automatic element labeling
- Scaled, schematic, and hybrid environments
- Element prototypes
- Aerial view and dynamic zooming
- Named view library
- Multiple background-layer support
- Image, CAD, and GIS background support
- Inferencing tool (to interpolate missing elevation data)
- Automatic calculation of elevations on pipe split operation

### Interoperability and Data Connections

- Single set of model files for three compatible interfaces
- Bidirectional synchronized database connections
- Bidirectional synchronized Shapefile connections
- Polyline-to-pipe conversion from DXF and DWG files
- Spreadsheet, database, Shapefile, and OLE DB connections
- SewerGEMS model import

### Hydraulics and Operations

- Steady-state simulations
- Extended-period simulations
- Flow profile methods: capacity and backwater analysis
- Automatic constraint-based design
- Diversion simulation
- Rule-based or logical controls
- Tractive stress calculations
- Accurate variable-speed pumping
- Pump batteries element

- System head curves
- Totalizing flow meters
- Air valves for high points in force mains
- Complex manifolded pump stations/force mains

### Sanitary Load Allocation and Estimation

- Automatic sanitary load allocation from geospatial data
- Geospatial load allocation from billing meters
- Load allocation using flow monitoring distribution
- Land use-based load distribution
- Sewer load assignment based on phased land use projections and population projections
- Dry-weather load assignment using hydrographs, unit loads, and pattern-based loads
- Customizable area-, count-, discharge-, and population-based unit sanitary loading library
- Pipe length-, diameter-, surface area-, length-diameter-, or user-defined infiltration load type

### Model Building

- SewerGEMS model import
- LandXML data import and export
- Polyline-to-pipe conversion from DXF and DWG files
- Spreadsheet, database, Shapefile, and OLE DB connections
- Elevation extraction from contours, points, and Shapefiles
- Elevation extraction from CAD drawings and surfaces
- Interpolating elevations between elements
- Interpolating elevations at split

### Model Management

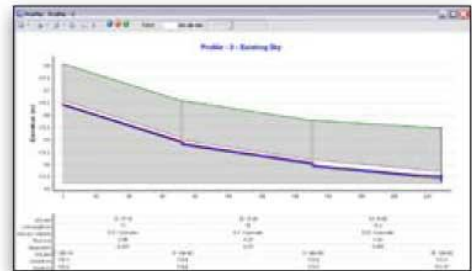
- Unlimited scenarios and alternatives
- Comprehensive scenario management

- Active topology (activate or deactivate network elements)
- Diversions displayed as links
- Tabular reports with global editing
- Sorting and persistent filtering on tabular reports
- Customizable engineering libraries for extreme flow factors, section size, material properties, minor losses, and unit-sanitary (dry-weather) loads
- Dynamic (query-based) and static selection sets
- Element selection by polygon
- Element selection inversion
- Table opening on selection
- Statistical analysis from tabular reports
- Global engineering-units management
- Drawing review tools for connectivity consistency
- Automatic topology review
- Network navigator with dozens of useful predefined queries
- Orphaned node and dead-end pipe queries
- Hyperlink for network elements
- User data extension
- Support of ProjectWise XM / Geospatial Management

### Results Presentation

- Thematic mapping
- Dynamic, multi-parameter, and multi-scenario graphing
- Advanced dynamic profiling
- Advanced tabular reporting with FlexTables®
- Property-based color coding and symbology
- Property-based annotation
- Project inventory report
- Scenario summary report
- Element report and graphs
- Hydrograph graphs
- Contouring with export to Shapefile, DXF, and native CAD format

Use FlexTables to sort, filter, manage units and globally edit your data.



Locate bottlenecks quickly using thematic mapping, FlexTables, and dynamic profiles.