



# Strategic Planning for Healthcare Facilities Management

## *An Implementation of GoRPM Software as a Service*

Carilion Clinic maximized its return on investment by implementing GoRPM, R&K's enterprise geospatial real and personal property software, as a comprehensive and strategic facility planning solution. GoRPM enabled the large healthcare provider to more effectively manage its facilities operations, identify cost saving opportunities and inform its decision-making across the organization, providing value to all facilities stakeholders, from the technician in the field to the C-suite.



**R&K Solutions**

Clarifying the Complex

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# Strategic Planning for Healthcare Facilities Management

## Overview

Carilion Clinic is a not-for-profit healthcare organization serving nearly one million residents in western Virginia. Carilion Clinic owns and operates seven hospitals, as well as numerous primary care clinics, laboratories, health clubs and specialty medical practices. Carilion Clinic promotes medical education and research through its higher ed partnerships, the Virginia Tech Carilion School of Medicine and Radford University Carilion.



Since adopting the clinical model in 2006, Carilion Clinic has grown to deliver integrated healthcare at more than 200 practice sites throughout the region. Comprised of over 7 million square feet of floor space, its facilities are valued at approximately \$2 billion.

As with all healthcare providers, Carilion Clinic is faced with rising pressure to reduce costs while improving the quality of patient care. Efficient portfolio management is crucial to patient care and the bottom line. However, Carilion Clinic struggled to effectively use data to manage its facilities operations. Carilion Clinic sought an enterprise-level strategic planning solution to consolidate, visualize and analyze its data. Carilion Clinic chose to implement GoRPM, R&K Solution's enterprise geospatial real and personal property management software, as a comprehensive solution to provide decision makers the key information needed to better manage its facilities, identify opportunities to improve efficiency and optimize investment decisions.

## At the Crossroads

"Water, water, everywhere, nor any drop to drink." Like Mr. Coleridge's ancient mariner, today's facilities managers are surrounded by a sea of data but are challenged to effectively use the data to guide decisions. This disconnect is a natural consequence of the fragmented evolution of facilities management (FM) technologies. Independent and specialized systems were developed over time to manage the various types of facilities data and meet specific business needs. These disparate FM

systems do not typically share information with one another, even though they often serve a common business function. The knowledge to operate and extract useful information is dispersed across departments and work groups. These challenges are magnified when coupled with rapid growth, such as that

experienced by Carilion Clinic. Compartmentalization and lack of interoperability impede managers in their quest to harness the full power of the information they possess. As a result, the best information is not always available to make decisions. Opportunities for gains in efficiency are overlooked and businesses continue to operate facilities below optimum performance.

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***“Today knowledge has power.  
It controls access to  
opportunity...”***

**-Peter Drucker**

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Carilion Clinic held several types of data in a number of stove piped systems that included CAD, its computerized maintenance management system (CMMS), ENERGY STAR® Portfolio Manager, and a variety of spreadsheets and documents. Specialized knowledge is required to operate many of the systems, which reside in different departments. Data was not easily extracted, analyzed and shared across the organization. Carilion Clinic was unable to combine its data in a comprehensive fashion to assess performance. Executive managers did not have ready access to data bound in the CAD to effectively manage space. Carilion Clinic had begun the process of scanning its historic construction and renovation drawings as PDFs but lacked a centralized platform for sharing.

Also, Carilion Clinic did not possess all of the information desired to effectively manage its real and personal property, shape its comprehensive facilities master plan and guide capital investment decisions. Gaps in information and management capabilities included tracking furniture, equipment and artwork, identifying and quantifying finishes and cleanable areas, tracking hazardous materials and storage locations, tracking site features such as roads, parking, utilities and emergency planning information, and accessing and managing maps, imagery and geospatial information including the FEMA Flood Zones. Carilion Clinic lacked condition assessments, estimates of deferred maintenance costs and forecasts of future capital requirements.

Faced with managing an expanding array of data for a growing facilities portfolio, the healthcare provider realized that the status quo was no longer acceptable. Carilion Clinic knew that making effective use of facilities management data was critical to its goal of providing affordable healthcare for the region’s residents. The healthcare provider sought a means of transforming its data to useful information that could be shared with decision makers across the organization. To maximize its return on investment, Carilion Clinic decided to employ GoRPM as a comprehensive strategic planning

solution to provide users throughout the organization ready access to key facilities information and analytics needed to guide decision-making.

Carilion Clinic selected GoRPM because of its ability to consolidate and manage a wide variety of data sets. Leveraging Esri’s ArcGIS Enterprise platform, GoRPM visualizes and relates spatial information in 2D or 3D maps and floor plans. Nearly all facilities data relates to a location, such as a site, building, floor or room. Spatial representation of data is often much more powerful than tabular form. It shows valuable spatial relationships that are otherwise not easily communicated. When presented in GIS, understanding spatial relationships becomes intuitive. GoRPM has the capacity to scale to accommodate additional facilities, data sets and users.

Carilion Clinic chose R&K Solutions because of its depth and breadth of experience in the real property and facilities arena and since it offers a comprehensive package of software and services. R&K supported Carilion Clinic by providing guidance in business process improvement, through delivering related data capture services, such as producing as-built floor and site plans, and performing condition assessments, and by implementing its GoRPM software.

## Implementation

Seeking to create a single repository for key real property, personal property and facilities information, Carilion Clinic opted to place a substantial amount of data in GoRPM. Carilion Clinic incrementally implemented GoRPM across its portfolio, beginning with a proof-of-concept project for two buildings and then progressively adding the remainder of its facilities. Data was integrated for the following functional areas.

- Maps, Imagery, Site and Floor Plans
- Real Property Inventory
- Personal Property Inventory
- Fire and Life Safety
- Hazardous Materials
- Roads, Parking and Utilities
- Energy Tracking
- Operation and Maintenance
- Condition Assessments
- Capital Planning
- Emergency Preparedness
- FEMA Flood Zone Map
- Historic Construction and Renovation Drawings

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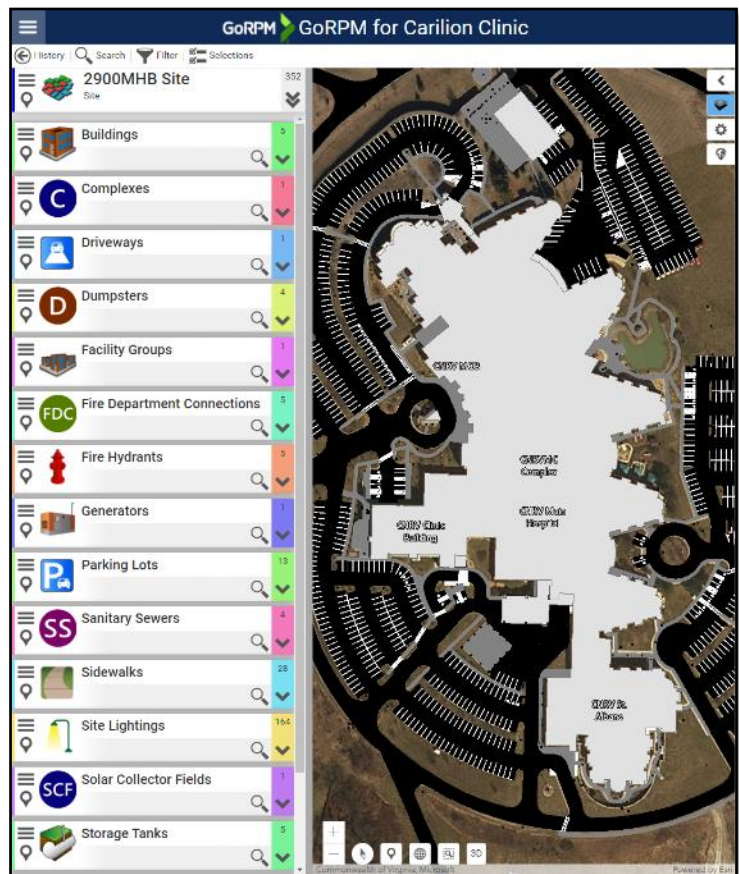
***Carilion Clinic maximized its return on investment by leveraging GoRPM to meet business needs across multiple functions.***

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R&K collaborated with Carilion Clinic to refine, streamline and standardize its business processes to produce consistent, reliable data. As a result, Carilion Clinic adopted the U.S. National CAD Standard to enforce a consistent layering scheme. It converted to object-based CAD to support use of the Building Owners and Managers Association International (BOMA) space measurements to calculate net and gross areas. Carilion Clinic adopted room-level data associations, assigned virtual room numbers and adopted the Open Standards Consortium for Real Estate (OSCRE) space classifications. CAD was configured to automatically apply the BOMA space measurements based on selection of the OSCRE space classification.

Version control was implemented to support CAD processes, and prevent over-writing files while maintaining a history of changes. Unifomat II was adopted to organize data for condition assessments. Domains (presented in pick lists) were established to promote consistency for numerous attributes. Business rules were enforced for quality assurance both in imports and manual data entry. In addition to improving the quality of data and smoothing related processes, adoption of standards provided Carilion Clinic with the ability to manage data at a more discrete level and enhanced its data analytic capabilities.

R&K configured GoRPM to match Carilion Clinic’s organizational hierarchy and support its unique data sets. Roles were configured to provide user groups with views and edit access for selected data sets. Historic and newly collected data such as floor and site plans, produced using mobile CAD, and condition assessments were placed in GoRPM. Historic energy data was imported using back end importers. Other data collected by Carilion Clinic, such as room services, furniture and equipment and artwork data, was imported via a client-facing Web importer. R&K also created a client-facing importer to georeference and import CAD floor plans. Ultimately the software was configured to produce automated reports and interactive dashboards, enabling managers to quickly gauge performance via desired analytics and key performance indicators (KPIs).





## Return on Investment

Carilion Clinic was able to integrate multiple facets of facilities management, throughout its business process areas and data sources, into a single comprehensive solution. With over seven million square feet of its portfolio now placed in GoRPM, key facilities information is readily accessible throughout the organization. Data can be visualized in dashboards, maps and floor plans. Broader access is available for data formerly bound in the specialized systems, spreadsheets and file cabinets. A host of data is now associated with the more discrete room level. This includes room names and numbers, net and gross area, departments and cost centers, OSCRE space classifications, available services and personal property.

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***Data analysis and key performance indicators are readily available to inform business decisions.***

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As shown in the following table, Carilion Clinic’s adoption of the OSCRE space classifications established a coherent structure for its room use data that may be used in searches or report roll ups. OSCRE enhanced Carilion Clinic’s data analysis and reporting capabilities, providing new ways to assess and gain useful insights for managing their space inventory.

Hospital Room Native Names	OSCRE Level I	OSCRE Level II
Clean Utility, Electrical Room, Equipment Room, Mechanical Room, Telephone Room, Utility Room	2100 - Core Building Service	2140 - Utility Equipment Room
Dining Room, Dishwashing Room, Kitchen, Food Prep Room	4200 - Personnel Service	4210 - Food Service
Admission, Check In, Sign In	5300 - Medical Practice	5310 - Admission
Exam Room, Treatment, Treatment Room	5300 - Medical Practice	5360 - Treatment and Examination

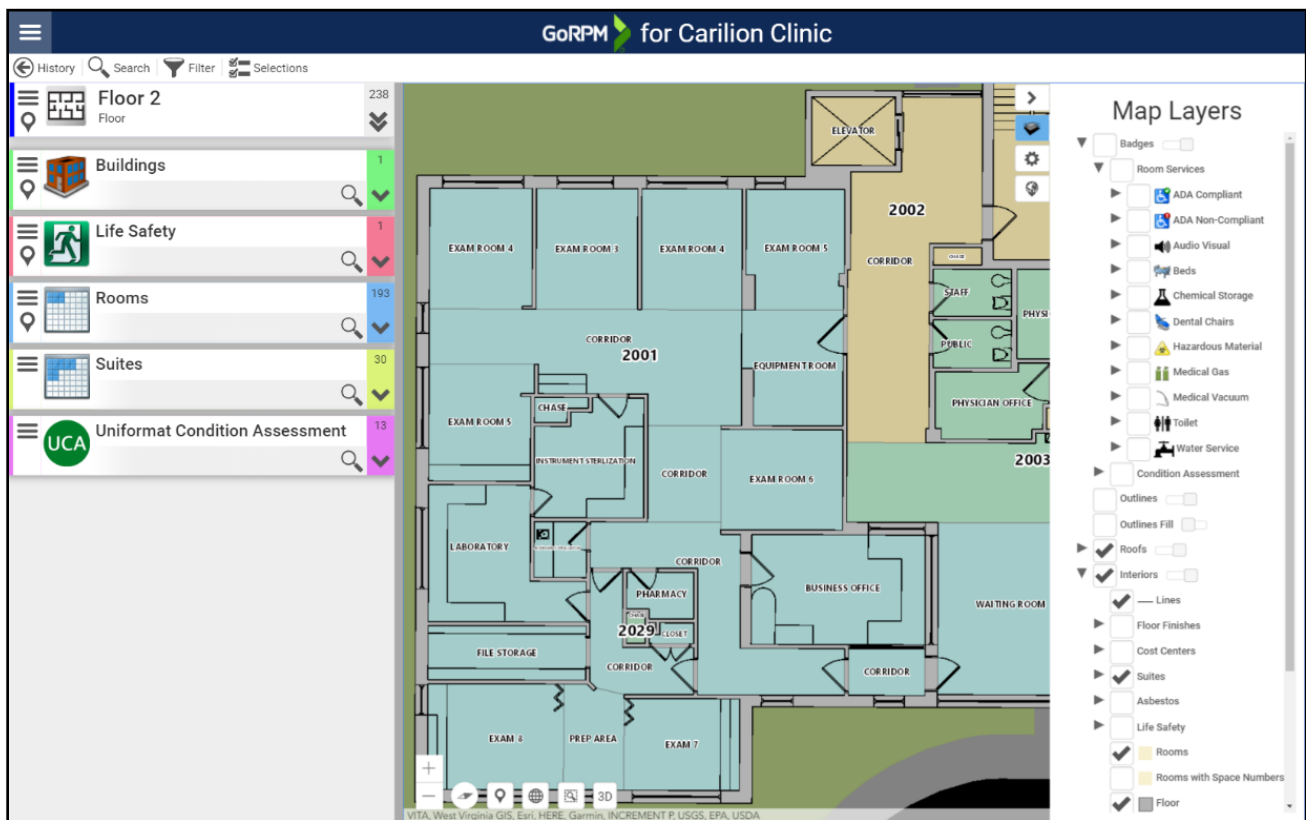
Floor plans are now available in a user-friendly format across the organization. By presenting room data in the floor plans, proximity relationships are easily understood for use in planning department moves and consolidations. Carilion Clinic utilizes mobile data collection tools to inventory and place room data in GoRPM. As a result, the location of telephone, data, water and other services are easily determined to inform planning. Information about the types and quantities of floor finishes and cleanable areas is available for planning and estimating the costs of maintenance and related contract activities. Carilion Clinic also employed GoRPM to inventory its personal property using GoRPM’s integral bar code feature to manage information for furniture, equipment and artwork.

R&K collected and placed Carilion Clinic’s GIS site and exterior emergency planning data in GoRPM. Fire and life safety information and hazardous materials locations are accessible in GoRPM. Information is available for maintenance and construction managers to avoid disturbing asbestos and preserve the

integrity of fire barriers. In the event of fire, hospitals often attempt to shelter in place rather than evacuate. Since GoRPM is accessible via mobile devices, Carilion Clinic now has ready access to quickly identify its fire barriers. Environment of Care/Life Safety standards are the most frequently cited deficiency from The Joint Commission (TJC) inspections. GoRPM provides wide visibility of fire and life safety to promote safety and compliance for regulatory authorities such as TJC and the Fire Marshall.

All data can be rapidly explored using GoRPM's robust search, filter and multi-level refine feature or extracted via ad hoc reporting in Excel or PDF format. Formerly arduous processes have been reduced to automated reports. Vacant space is now quickly and easily identified. Carilion Clinic is able to produce cost center reports for its Medicare reporting through push button reports. In addition to saving time to extract and manipulate data through automation, GoRPM empowers Carilion's informed decision-making through direct access to analytics and KPIs.

With average hospital construction costs now at \$300/SF or more, the annual opportunity cost associated with unused space amounts to \$15/SF when applying a modest five percent rate of return. Non-productive use of space can easily equate to millions of dollars for owners of large portfolios. With the ability to visualize floor plans and quickly determine the location and quantity of vacant space, GoRPM provides Carilion Clinic the means to manage space more effectively and thereby avoid unnecessary investments in leased space or new construction.



Carilion Clinic takes advantage of GoRPM's robust integration framework of REST Service and APIs to exchange and leverage data from other systems, including integration with its CMMS and ENERGY STAR Portfolio Manager®. Carilion Clinic uses GoRPM to collect and track its energy use and costs, which are automatically pushed to Portfolio Manager. GoRPM is then used to pull analytics from Portfolio Manager and offers supplemental capabilities for a more granular level of analysis. GoRPM normalizes energy use and cost data so to provide a comprehensive picture of a facilities' energy consumption. In addition to producing historical reports and graphs of monthly use and costs, GoRPM calculates use and cost intensities. These intensities are KPIs, which may be used to compare one building to another to identify opportunities for energy and cost savings.

GoRPM also combines energy costs with maintenance and repair costs to produce total operating costs for facilities. GoRPM uses this data to calculate operation and maintenance (O&M) cost intensities (\$/SF), KPIs which again may be used to compare buildings and determine opportunities for cost savings.

GoRPM was configured with an updatable condition assessment, which is used to capture, and maintain data. The assessments identify and estimate the cost of deferred maintenance and capital renewal backlogs. Assessment data is also used to calculate associated KPIs, such as condition indices, and produce a ten-year forecast of capital renewal requirements. Condition indices are used to compare facilities and guide capital planning. All condition and cost information, and KPIs are now available in GoRPM to guide multi-million dollar investment decisions.

PDF versions of Carilion Clinic's historic construction and renovation drawings were posted in GoRPM and made accessible to all users based on permissions. R&K collected and placed site and emergency preparedness information in GoRPM. Parking managers have access to lot space counts. Facilities managers can quickly identify locations of utility shut-offs, fire department connections and similar information when emergencies arise.



Carilion Clinic continues to expand GoRPM to manage other aspects of its facilities, such as personal property. Carilion Clinic is currently exploring opening use of GoRPM to emergency response agencies. Responders could use GoRPM to view floor plans and other key information such as fire barriers from mobile devices. This information could be used to contain the fire and coordinate the relocation of patients.



## Summary

Carilion Clinic maximized its return on investment by implementing GoRPM as a comprehensive strategic planning solution to better manage its facilities operations and guide investment decisions across the organization. Carilion Clinic consolidated its facilities data in a single platform, providing valuable visualizations of data in maps and floor plans while streamlining

and speeding access and analysis of data. Data quality and processes were improved by adopting standards. Existing data sources were leveraged through integration. Data is readily available through rapid searches and automated reports. Analytics and KPIs provide insights about Carilion Clinic's facilities operations and aid in identifying opportunities for cost savings. Executive managers may quickly gauge performance by viewing dashboards. Information is now centralized and broadly available, providing value to a wide spectrum of users, from the technician in the field to the C-suite.

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***“GoRPM is an invaluable strategic planning tool providing keen insights to better manage our facilities.”***

**Senior Director of Facilities,  
Carilion Clinic**

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## About the Author

William Wingfield is a former executive manager of facilities and operations in transportation, schools and higher education. He currently serves federal and state government, healthcare and higher education clients as a senior consultant for R&K Solutions. Mr. Wingfield holds a Bachelor of Science degree in Mechanical Engineering from Virginia Tech and an MBA from Averett University. Mr. Wingfield is a member of IFMA, NFMT, OSCRE and SAME. He serves on OSCRE's board, contributes to IFMA's Knowledge Library and frequently speaks at national conferences.

## R&K Solutions

Established in 1984, R&K Solutions delivers professional services and software to support clients in achieving business and mission goals through improved facilities portfolio management.

For more information on GoRPM and R&K's services, please visit <https://rksolutions.com/gorpm> or contact us at:

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