

The General Manager's Guide to GIS

A Practical Introduction to What a Modern GIS Should Do — and How to Measure Its Success

Introduction: GIS Is Not a Map

If you are a General Manager of a water district, sewer district, stormwater agency, municipality, or other special district, you probably did not take the job because you wanted to become a GIS expert.

You have enough to manage.

Budgets. Employees. Boards. Regulatory requirements. Infrastructure. Customers. Emergency response. Aging equipment. Increasing costs.

Yet someone eventually tells you:

“We need a GIS.”

The next conversation can become confusing very quickly.

You hear terms such as *geodatabase*, *feature classes*, *data models*, *web services*, *layers*, *portals*, *editing*, *integrations*, *dashboards*, and *enterprise GIS*.

You may receive a proposal that costs tens or hundreds of thousands of dollars.

Then comes the question:

What are you actually buying?

More importantly:

How will you know if it works?

This guide is intended to answer those questions.

A modern GIS should not be viewed primarily as mapping software. It should be viewed as an **operational information system that helps your organization understand, manage, and use information about physical assets and their locations.**

The map is the interface.

The information is the value.

1. What Should a GIS Do for Your District?

At its simplest, GIS connects **what you know** about an asset with **where that asset is located**.

For example:

- A water valve has a location, size, type, installation date, and operating status.
- A sewer manhole has a location, depth, condition, inspection history, and video records.
- A storm drain has a location, diameter, material, maintenance history, and photographs.
- A water meter has a location, account number, meter size, installation date, and customer information.

Without GIS, this information can exist in separate systems.

A spreadsheet may contain the asset number.

A work-order system may contain maintenance records.

A billing system may contain customer information.

A paper map may show the location.

A technician may know where the asset is because they have worked there for 20 years.

The GIS should connect these pieces.

The real objective

A successful GIS should make it easier for your staff to answer questions.

For example:

“Where is this valve?”

“Which customers will be affected if we shut this valve?”

“When was this hydrant last inspected?”

“What work has been performed on this sewer manhole?”

“Which storm drains have not been cleaned?”

“Show me all water mains installed before 1970.”

“What assets are inside this proposed project area?”

“Which work orders are overdue?”

“Show me the entire gravity sewer path downstream from this manhole.”

If your GIS cannot help your employees answer questions such as these, having a beautiful map is not enough.

2. The Five Things a General Manager Should Expect

A modern GIS should provide five basic capabilities.

1. See

Your staff should be able to see infrastructure clearly.

- Water mains
- Valves
- Hydrants
- Meters
- Sewer lines
- Manholes
- Storm drains
- Outfalls
- Roads
- Parcels
- Facilities
- Projects
- Other information important to your organization

The information should be easy to turn on, turn off, search, and view.

2. Find

Your employees should be able to locate information without being GIS specialists.

For example:

“Find valve 1047.”

“Find the sewer manhole at 123 Main Street.”

“Show all hydrants within 500 feet of this location.”

“Find all water mains larger than 12 inches.”

Finding information should take seconds, not a trip to the GIS department.

3. Understand

A GIS should provide more than a picture.

Users should be able to select an asset and understand it.

For example:

Hydrant 217

- Location
- Hydrant type
- Diameter
- Installation date
- Inspection date
- Maintenance history
- Work orders
- Photographs
- Related documents

The GIS becomes much more useful when the map becomes a gateway to information.

4. Act

A modern GIS should help employees perform work.

- Create work orders
- Record inspections
- Update asset information
- Record maintenance
- Locate infrastructure
- Perform measurements
- Produce reports
- Support emergency response
- Trace utility systems
- Plan projects

This is where GIS changes from a **mapping tool** into an **operational tool**.

5. Connect

Your GIS should not become another isolated database.

It should work with the systems your district already uses.

Depending on your organization, that may include:

- CMMS
- Work-order systems
- Billing
- Permitting
- Document management
- Customer information
- CCTV
- ERP systems
- Asset management
- Regulatory records

The goal is simple:

Your employees should not have to enter the same information into five different systems.

3. The Most Important Question: Who Will Use It?

One of the most common GIS mistakes is to design the system around GIS professionals instead of the people who actually operate the district.

Your GIS users may include:

General Manager

Needs:

- High-level information
- Reports
- Dashboards
- Capital planning information
- Asset condition information
- Project status

- Emergency information

Operations Manager

Needs:

- Asset locations
- Maintenance history
- Work orders
- Inspection records
- Operational information
- Crew information

Field Employees

Need:

- Simple access
- Mobile capability
- Asset locations
- Directions
- Inspection forms
- Work history
- Easy data entry

Engineering Staff

Need:

- Accurate infrastructure data
- Measurements
- Project information
- Data export when authorized
- Design information
- As-built information

Board Members

May need:

- Maps

- Project information
- Asset replacement needs
- Capital improvement information
- Clear reports

A GIS that works beautifully for a GIS professional but frustrates field employees is not a successful GIS.

4. The GIS Should Fit the District — Not the Other Way Around

You may hear that there is a “standard” way to build a GIS.

Be careful.

There are standards for data.

There are standards for interoperability.

There are standards for geographic information.

But there should not be a requirement that a small district operate a complex GIS environment designed for a large metropolitan utility.

Your GIS should reflect:

- Your organization
- Your infrastructure
- Your staff
- Your workflows
- Your budget
- Your technology
- Your regulatory requirements
- Your future needs

Complexity is not the same as capability.

A system can contain thousands of features and still be difficult to use.

A system can have sophisticated technology and still provide little operational value.

The best GIS is usually the one your employees actually use.

5. What Should You Expect to Pay For?

This is an important question because the purchase price of GIS software is only one part of the cost.

Ask about the **total cost of ownership**.

Consider:

- Software licenses
- User licenses
- Server hardware
- Cloud hosting
- Database administration
- Implementation
- Data conversion
- Data creation
- Data cleanup
- Training
- Support
- Maintenance
- Upgrades
- Custom programming
- Integration
- Internal staff time
- Future software costs

A low software price can become expensive if the system requires significant staff effort.

Likewise, a higher initial price may be reasonable if the system eliminates significant ongoing costs.

Ask this question:

“What will this GIS cost us over five years?”

Then ask:

“How many hours of district staff time will it require?”

Both answers matter.

6. The Hidden Cost: Your Employees' Time

This is often overlooked.

Suppose an employee spends 15 minutes looking for information.

That may not sound significant.

Now multiply it by:

- 5 employees
- 10 searches per week
- 52 weeks per year

That is more than **650 employee-hours per year**.

Small inefficiencies become expensive when repeated thousands of times.

A good GIS reduces this friction.

The goal is not simply to create better maps.

The goal is to make work easier.

7. GIS Data Is an Asset

Your infrastructure represents a significant investment.

Your GIS should represent that investment.

If your district owns:

- 100 miles of water line
- 80 miles of sewer
- 2,000 valves
- 1,500 meters
- 600 hydrants
- 1,000 manholes

then the GIS contains information about millions of dollars of physical infrastructure.

That information has value.

But GIS data also has a problem:

It becomes obsolete.

New valves are installed.

Old mains are abandoned.

Manholes are rehabilitated.

Meters are replaced.

Pipelines are extended.

Facilities change.

If nobody maintains the GIS, its value decreases.

8. Ask Who Will Maintain the GIS

This may be the most important question in your GIS project.

Ask:

“Who is responsible for keeping the GIS current?”

Do not accept:

“Your staff can update it.”

That may be true.

But ask what that actually means.

Who will:

- Process new construction?
- Update locations?
- Correct errors?
- Add new assets?
- Retire old assets?
- Review field changes?
- Maintain database relationships?
- Update integrations?
- Answer GIS questions?
- Train new employees?

If your district does not have a GIS professional, someone still has to perform this work.

A GIS without a maintenance plan becomes an expensive historical record.

9. A Modern GIS Should Integrate With Your Work

Your employees should not have to think:

“Now I need to leave the GIS and open the work-order system.”

The systems should work together.

Consider a hydrant.

A field employee selects the hydrant on the map.

The GIS shows its information.

The employee can see previous work.

The employee records today's inspection.

The work is associated with the correct asset.

The information becomes available to management.

That is much more valuable than simply displaying a hydrant symbol on a map.

10. Measure GIS Success by Business Results

This is where General Managers should take control.

Do not measure GIS success by:

- Number of map layers
- Number of database tables
- Number of GIS licenses
- Number of features
- Number of training classes
- Complexity of the database

Those are system measurements.

They are not business results.

Instead, measure things such as:

Time

- How long does it take employees to find an asset?
- How long does it take to create a map?
- How long does it take to answer a Board question?

- How long does it take to prepare information for a project?

Accuracy

- How many asset records contain errors?
- How many assets cannot be located?
- How often does field information disagree with GIS information?

Usage

- How many employees use the GIS?
- How often?
- Which functions do they use?
- Are field employees using it?

Maintenance

- How quickly are new assets added?
- How quickly are field changes incorporated?
- How often is data reviewed?

Operational value

- Does it reduce repeat field visits?
- Does it improve work-order management?
- Does it improve emergency response?
- Does it help identify infrastructure problems?

Financial value

Does GIS reduce:

- Staff hours
- Contractor costs
- Engineering costs
- Repeat field visits
- Emergency response time
- Paper records
- Duplicate data entry

A GIS should produce measurable value.

11. Establish a Baseline Before You Buy

You cannot measure improvement unless you know where you started.

Before implementation, record several simple measurements.

For example:

Finding an asset

Current average time: 12 minutes

Target: 1 minute

Creating a utility map

Current average time: 2 hours

Target: 10 minutes

Finding maintenance history

Current average time: 15 minutes

Target: 2 minutes

Updating GIS after construction

Current average delay: 90 days

Target: 30 days

The exact numbers will differ for every district.

The principle is the same:

Measure before. Measure after.

12. The General Manager's GIS Scorecard

Consider reviewing your GIS every six or twelve months.

Rate each area from 1 to 5.

Area	Question
Accessibility	Can employees access GIS when they need it?
Usability	Can normal employees use it without GIS expertise?
Accuracy	Can staff trust the information?
Currency	Is the information kept current?

Area	Question
Integration	Does GIS work with other systems?
Field Use	Can field employees use it effectively?
Operations	Does it improve daily work?
Reporting	Can management obtain useful information?
Emergency Response	Does GIS help employees respond faster?
Cost	Is the system providing reasonable value?

Score interpretation

41–50: Excellent operational GIS

31–40: Good GIS with opportunities for improvement

21–30: Functional, but significant improvements are possible

10–20: The GIS may be functioning primarily as a map repository

The purpose is not the score itself.

The purpose is to identify where the GIS is helping — and where it is not.

13. Five Questions to Ask Every GIS Vendor

Before approving a GIS purchase, ask these questions.

Question 1

“What will my employees be able to do on Monday morning that they cannot do today?”

Look for specific answers.

Not technical terminology.

Question 2

“Who will maintain our GIS after implementation?”

Get a clear answer.

Question 3

“What will this cost us over five years?”

Include:

- Software
 - Services
 - Hosting
 - Maintenance
 - Upgrades
 - Training
 - Staff time
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Question 4

“How does this integrate with the systems we already use?”

Ask for demonstrations using your actual workflows.

Question 5

“How will we measure whether the GIS is successful?”

A good vendor should be able to help you define measurable outcomes.

14. Beware of the “Technology Trap”

GIS vendors can make technology sound impressive.

You may hear about:

- Enterprise architecture
- Advanced geodatabases
- Cloud infrastructure
- Artificial intelligence
- Machine learning
- Digital twins
- Utility network models
- Web services
- APIs

- Automation

These technologies may have legitimate value.

But technology should answer a business need.

Ask:

“What problem does this solve for my district?”

If the answer is unclear, keep asking questions.

15. Your GIS Should Become More Valuable Over Time

A good GIS is not a one-time project.

It should become more useful as your organization uses it.

Start with the information that provides the greatest value.

Then add capabilities.

For example:

Phase 1

- Water assets
- Sewer assets
- Stormwater assets
- Basic searching
- Basic reporting

Phase 2

- Work orders
- Inspections
- Maintenance history
- Documents
- Field access

Phase 3

- Dashboards
- Asset management
- Utility tracing

- Advanced reporting
- Capital planning

The exact sequence should depend on your district.

The important principle is:

Do not build everything simply because you can.

Build what your employees need.

16. What a Successful GIS Looks Like

Imagine this situation.

A water main breaks at 8:00 AM.

An employee receives the call.

They open the GIS.

They locate the break.

They identify nearby valves.

They determine which valves should be closed.

They identify the affected customers.

They view previous work on the main.

They create a work order.

The crew receives the information.

The repair is completed.

The GIS is updated.

Management can see what happened.

The maintenance history remains associated with the asset.

That is GIS doing its job.

The map is important.

But the real value is everything that happens **because the information is connected.**

17. The Ultimate Test

There is a simple way to evaluate your GIS.

Ask your employees:

“What information do you need to do your job that is difficult to find today?”

Write down the answers.

Then ask:

“Can our GIS solve these problems?”

If the answer is yes, you are moving toward an operational GIS.

If the answer is no, you may have a mapping system rather than a business system.

18. The General Manager's GIS Checklist

Before approving a GIS project, you should be able to answer **yes** to most of these questions.

- ☐ Our GIS has a clearly defined business purpose.
- ☐ Our employees can use it without becoming GIS experts.
- ☐ Field employees can access the information they need.
- ☐ We can quickly find our infrastructure.
- ☐ We can view information about each asset.
- ☐ GIS connects to our work-order or CMMS system when appropriate.
- ☐ GIS can work with our existing business systems.
- ☐ We know who will maintain the GIS.
- ☐ We understand the five-year cost.
- ☐ We have identified the staff time required.
- ☐ We have established baseline measurements.
- ☐ We have defined measurable goals.
- ☐ We can measure employee adoption.
- ☐ We can measure time savings.

-  We can measure data accuracy.
 -  We can measure how quickly data is updated.
 -  We have a plan for future improvements.
 -  The system can grow without forcing us to replace it.
 -  Our GIS supports actual district operations.
 -  We can explain the value of the GIS to our Board and customers.
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Conclusion: Don't Buy a Map. Buy Better Information.

For a General Manager, GIS should not be about technology for technology's sake.

It should be about better decisions.

Better information.

Faster answers.

Less wasted staff time.

Better maintenance.

Better emergency response.

Better asset management.

And better stewardship of public infrastructure.

The question is not:

“Does our district have GIS?”

The better question is:

“Does our GIS make our district better at what it does?”

That is the standard a modern GIS should meet.

And that is the standard General Managers should use when selecting, evaluating, and investing in one.

A successful GIS is not measured by how sophisticated it looks.

It is measured by how much easier it makes your organization's work.