Norfolk, VA GIS Wholesale Conversion

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City of Norfolk
Department of Utilities


N
W
E
S
Williamsburg
Newport
ws-Hampton
Norfolk
Virginia
Beach
25 12.5 0 25 50 75
Miles
GREAT
PLAINS
United States of America
Mexico
Cuba

Water Distribution System

- Central water utility system established in 1871
- Department of Utilities officially established in 1969
- Provides water for more than 820,000 people in Hampton Roads
- >800 miles of water distribution mains
- >65,000 Water meters
- Approximately 24,000 Valves
- >42,000 Fittings
- 2 Water Treatment Plants

Sanitary Sewer System

- Central sewer utility system established in 1879
- >800 miles of gravity sewer mains
- >62 miles of sewer force mains
- 126 pump stations
- >20,000 Manholes
- 66 square miles

- Hampton Roads Sanitation District (HRSD) for sewer treatment

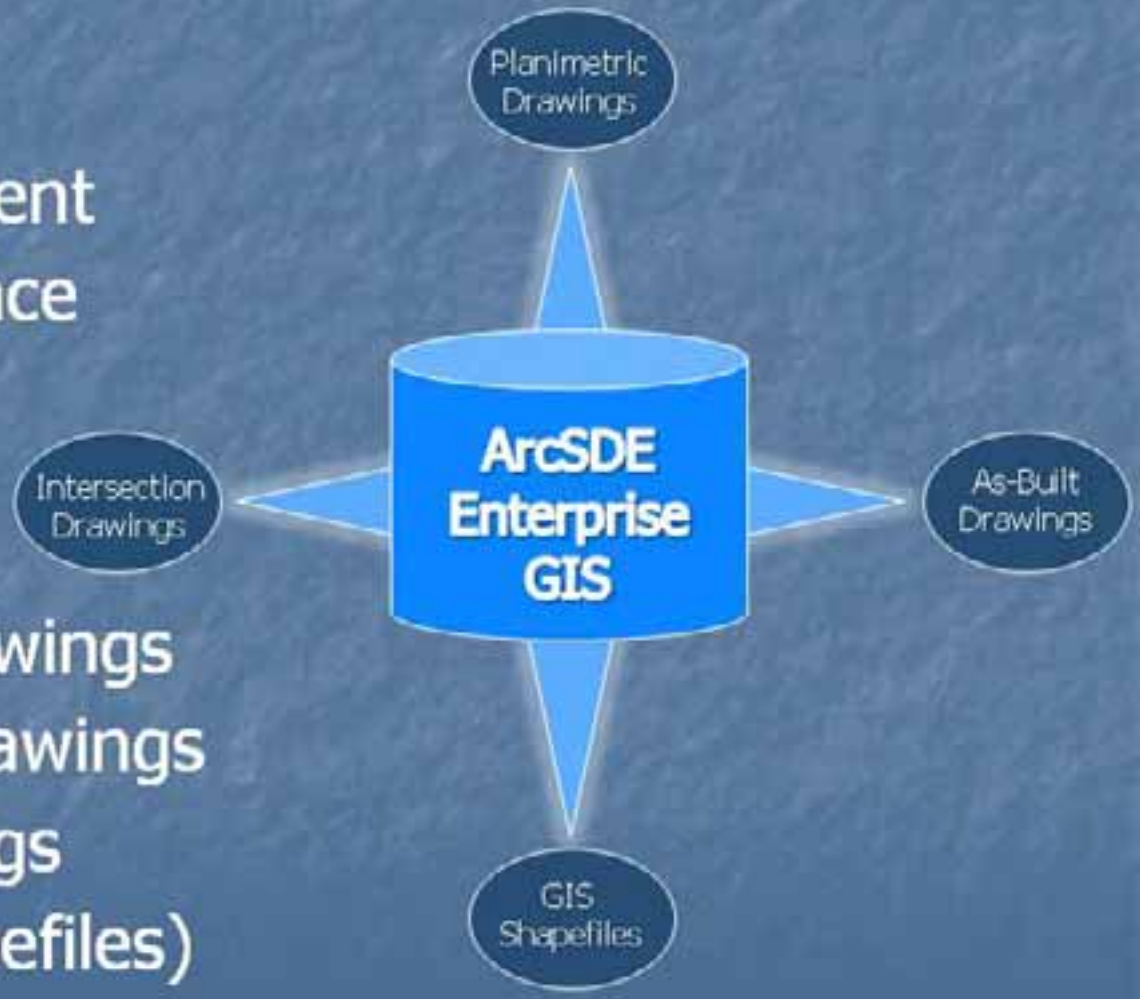
Reasons for a New Record System

- Enterprise GIS
- Consolidation into one system.
- Increasing update speed.
- Integration with HANSEN.
- Increased speed in map distribution of maps and data.

Data Conversion

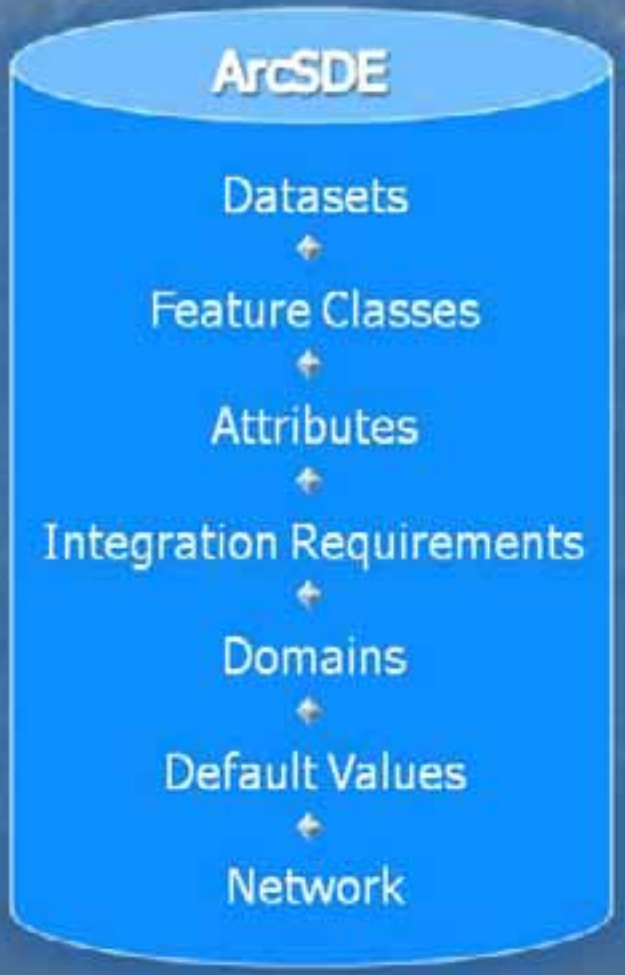
Data Conversion

- History
  - Data Development
  - Data Maintenance
- Data Sources
  - Planimetric Drawings
  - Intersection Drawings
  - As-Built Drawings
  - GIS Data (Shapefiles)



GeoDatabase Design

- Water
  - Standard ESRI
  - Customizations
  - Geometric Network
- Sewer
  - Standard ESRI
  - Customizations
  - Geometric Network



Methodology

- Digitizing
- Versioning
- Disconnected Editing
- Workflow Management

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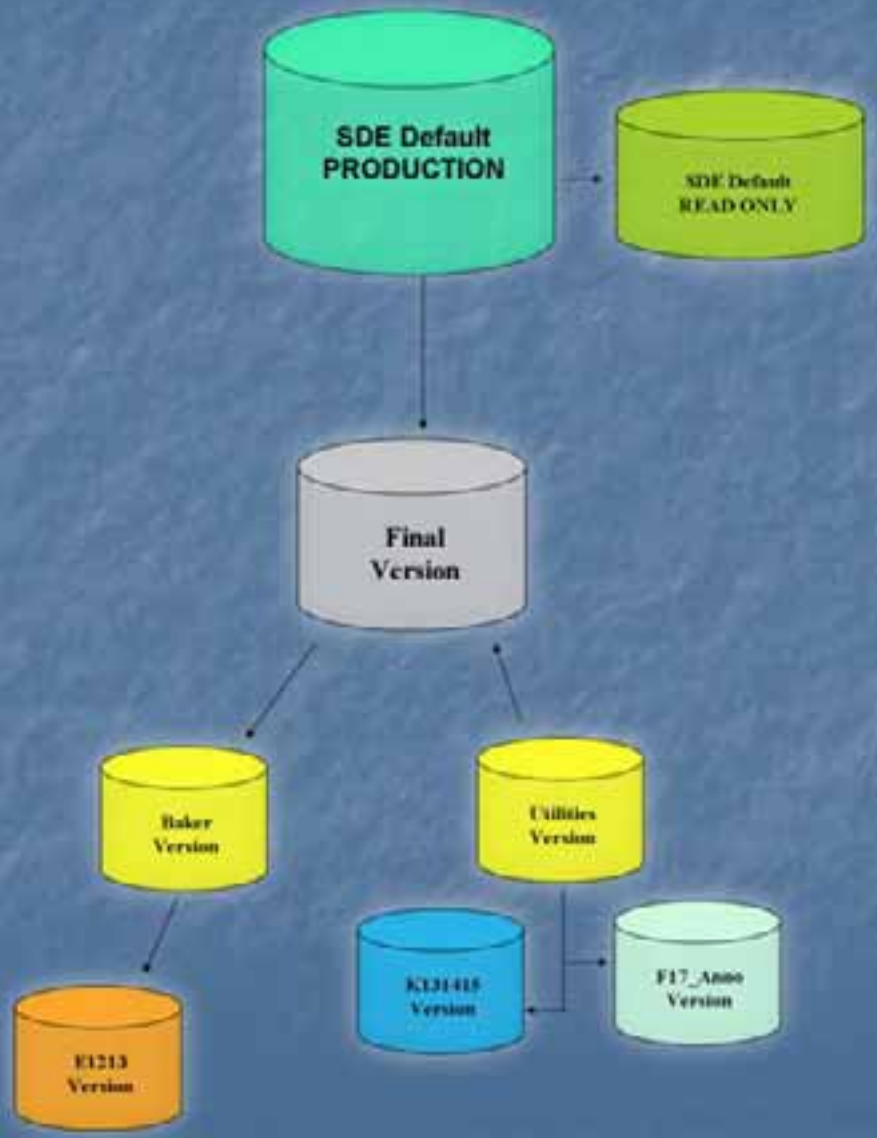

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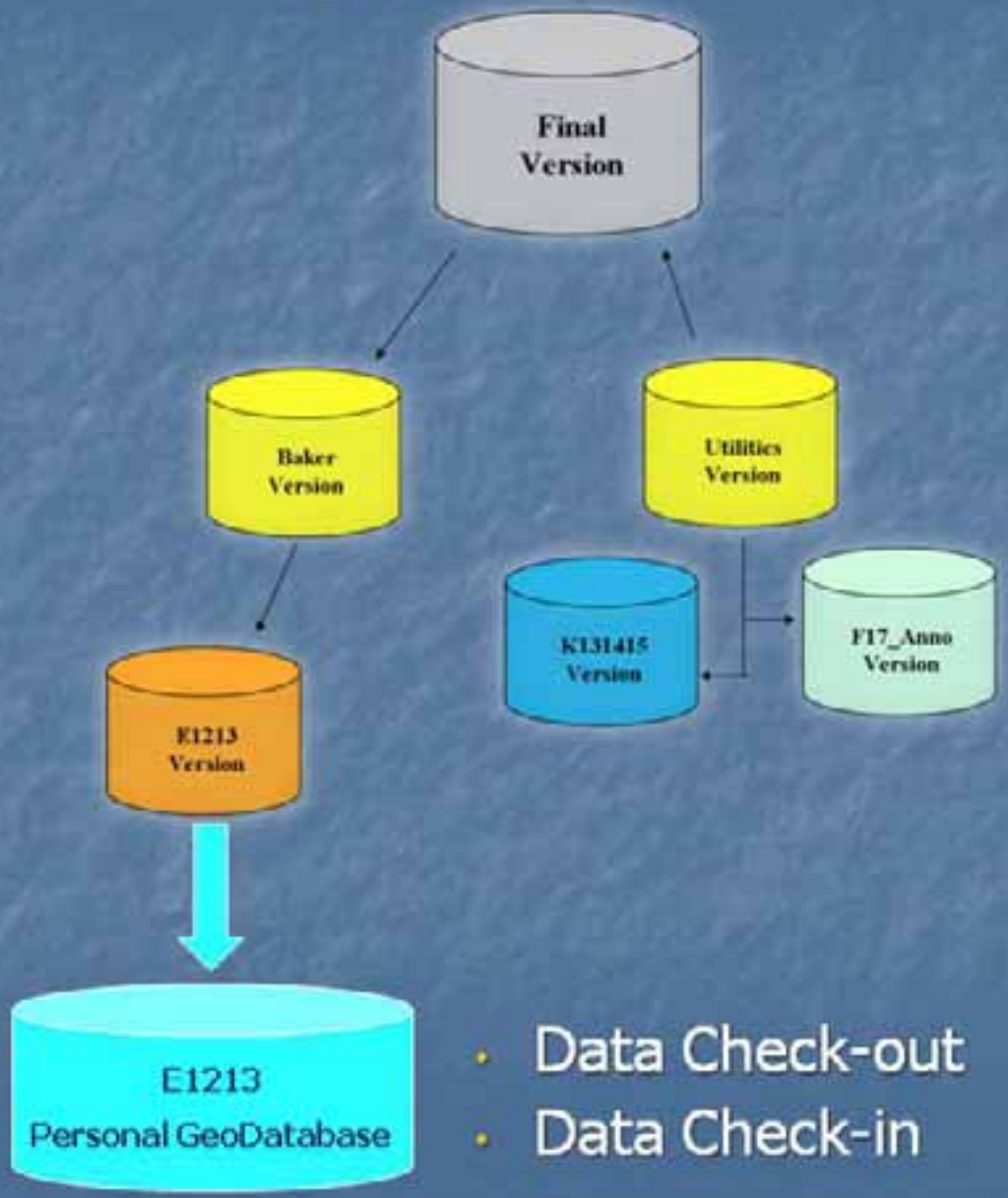

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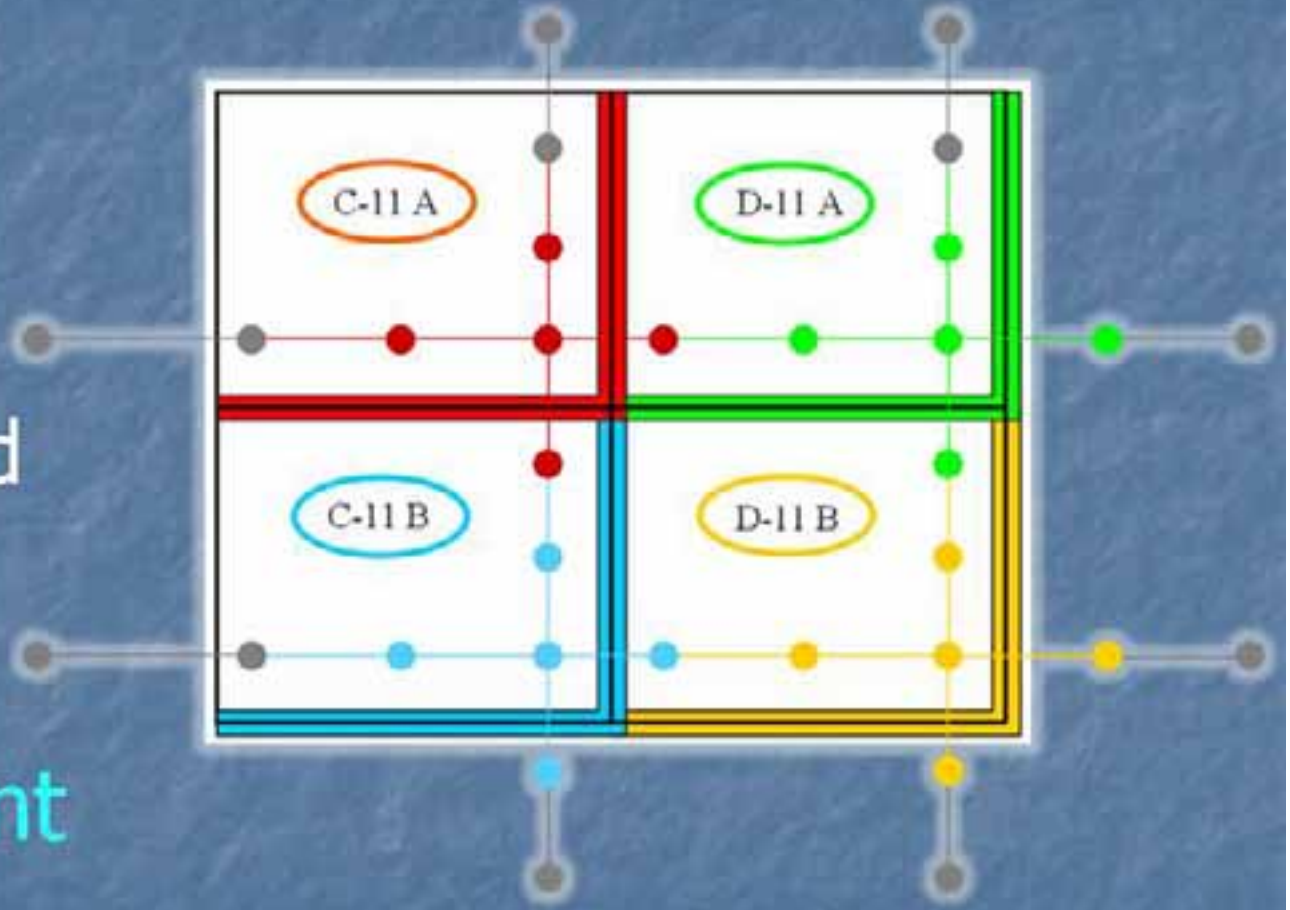


Bottom-Right Rule

Custom Applications

- QC Tools
- Data Maintenance
- Calculated Length
- Lateral Placement Tool

Early Milestones

- Intersection Points
- Staff Training
- Staff Participation
- ArcReader

Integration with Hansen

Hansen Asset Management System

- Service Requests
- Work Orders
- Scheduled Maintenance
- Maintenance Cost
- Asset Valuation
- Condition Assessment

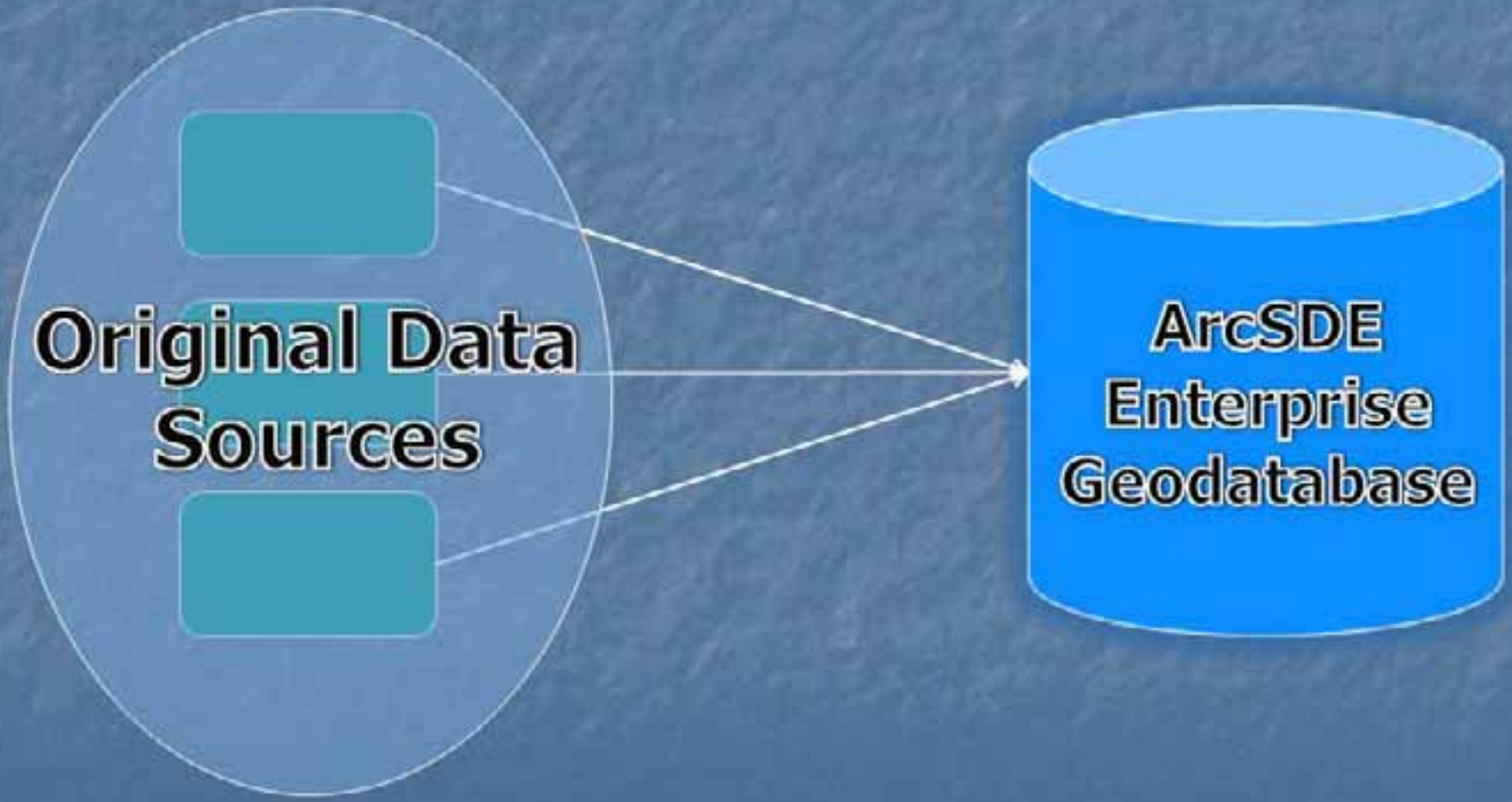
Reasons to Integrate GIS with Hansen

- Requires less labor to maintain
- Systems are more accurate
- Continuity among datasets
- Customers are better served
- More informed decision-making
- Existing investment

Geodatabase Design

- Hansen required fields
  - COMPKEY
  - UNITID
  - COMPTYPE
  - MAINCOMP1, MAINCOMP2
- Field Properties
- Code Tables / Domain Values
- Geometric Network

Populating the Geodatabase

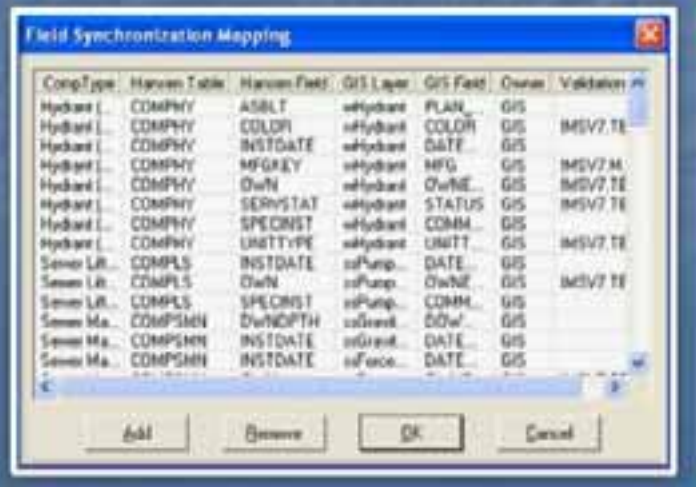


Developing a Workflow

- Determine Ownership
- Map Related Fields
- Identify System Specific Fields
  - Hansen specific fields
  - GIS specific fields

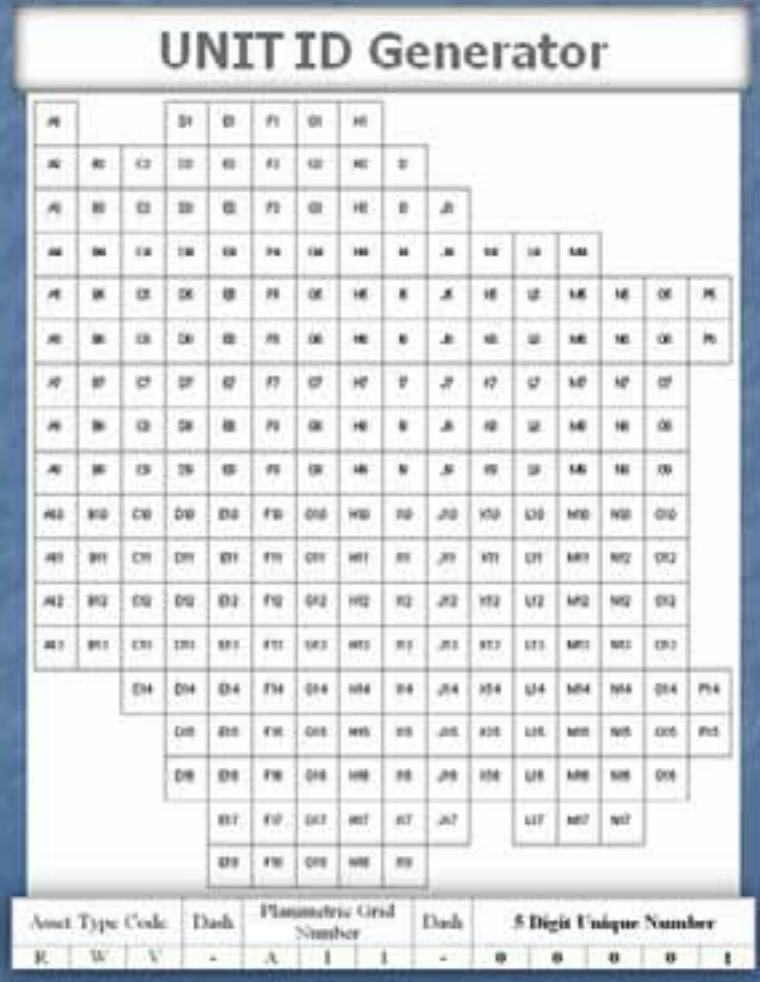
ArcSDE Enterprise Geodatabase

Hansen Asset Management



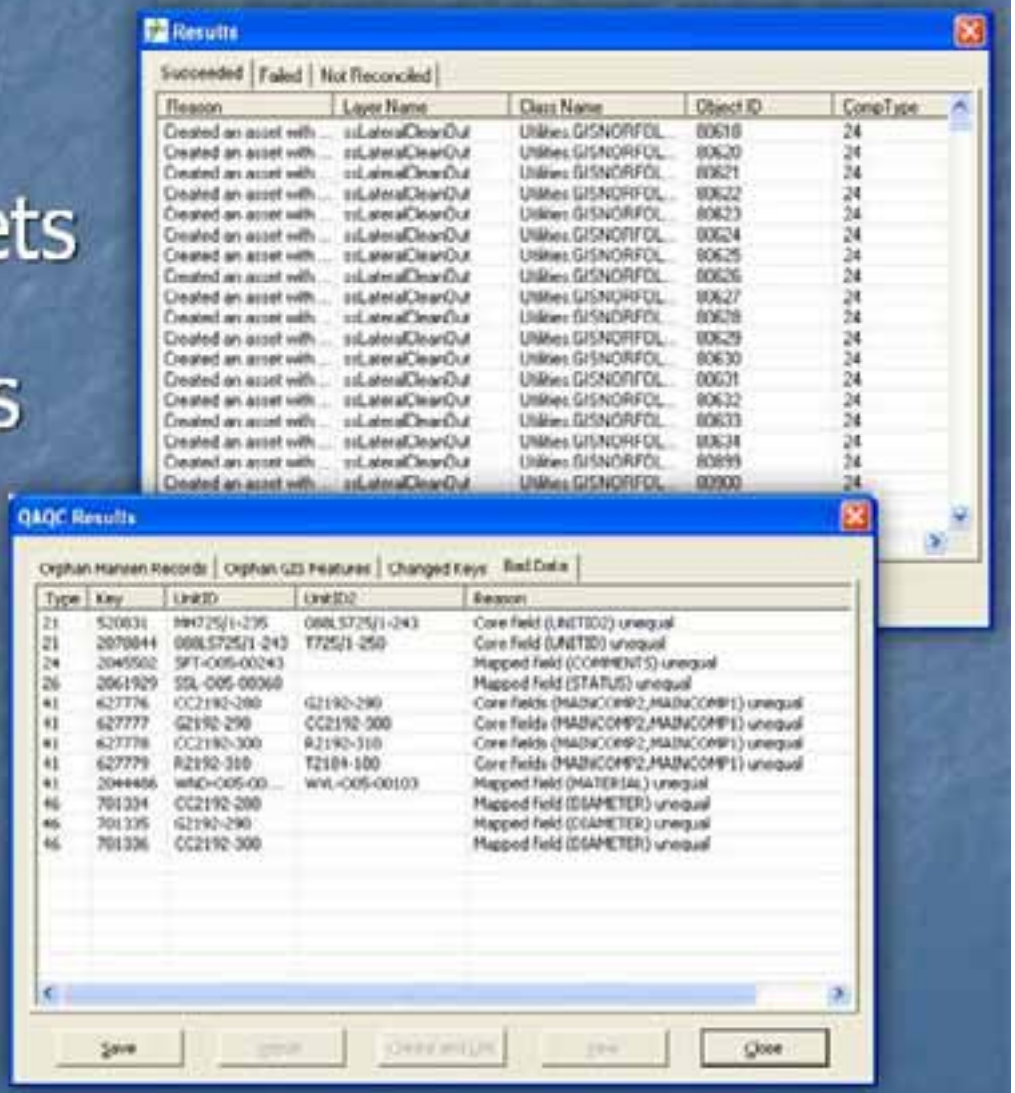
Maintaining the Data

- Automated Tools
  - GeoResults Sync
  - UNITID Generator
- Manual Tools
  - GeoAdministrator
  - GeoAssistant

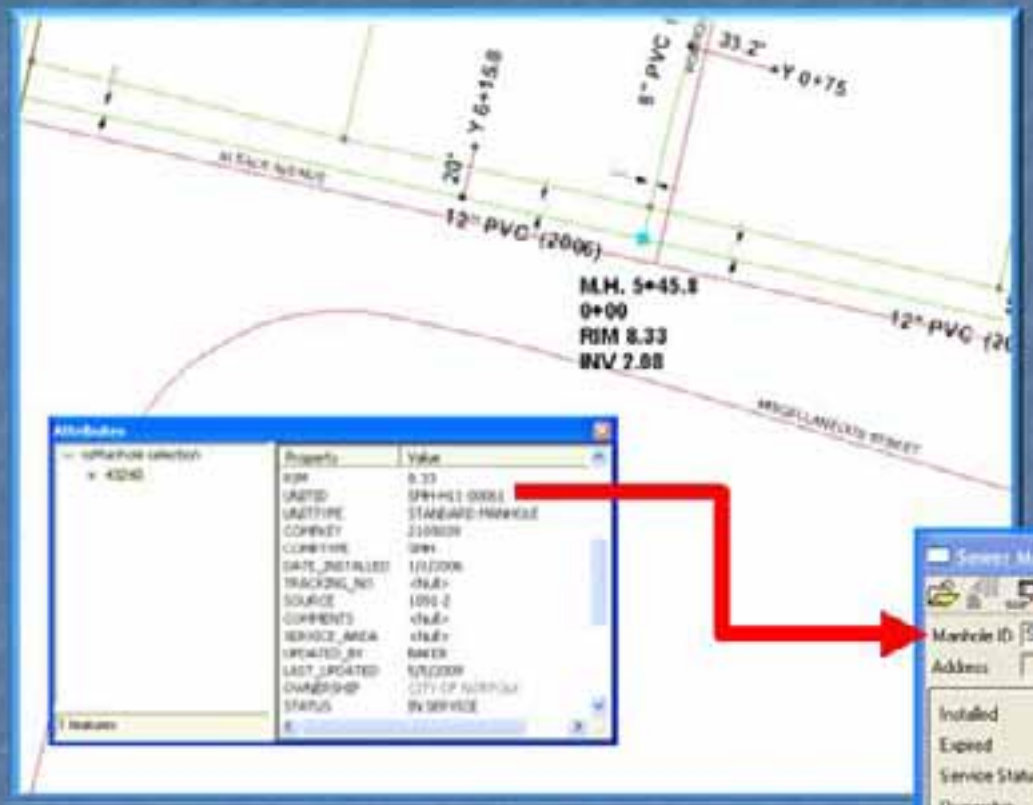


Validating the Data

- Resolving Sync Logs
- Orphan Hansen Assets
- Orphan GIS Features
- Changed Compkeys
- Bad Data

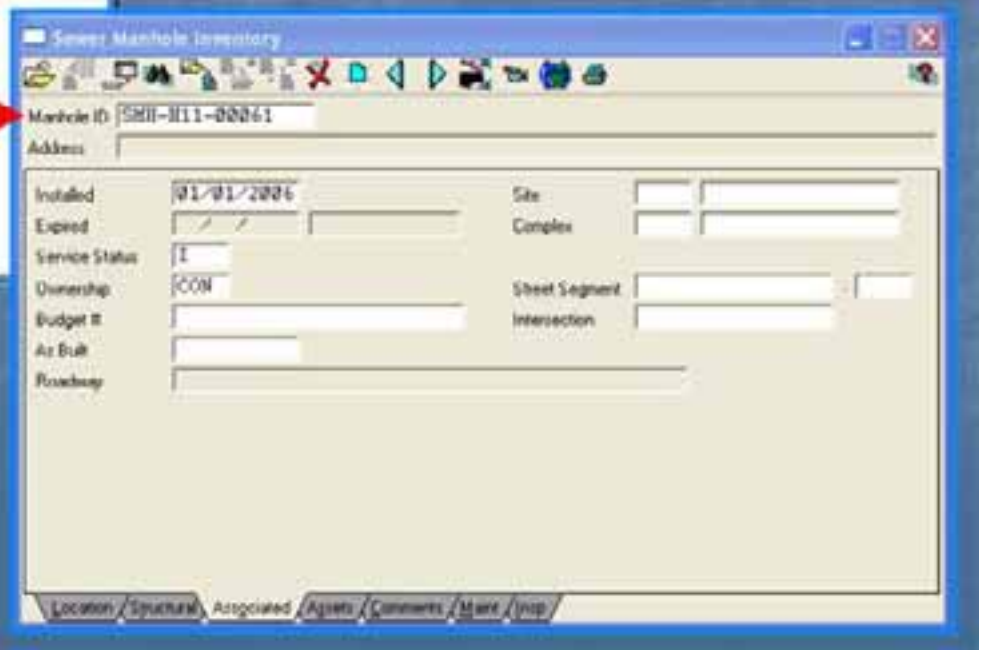


One to One Link



ArcSDE

Hansen



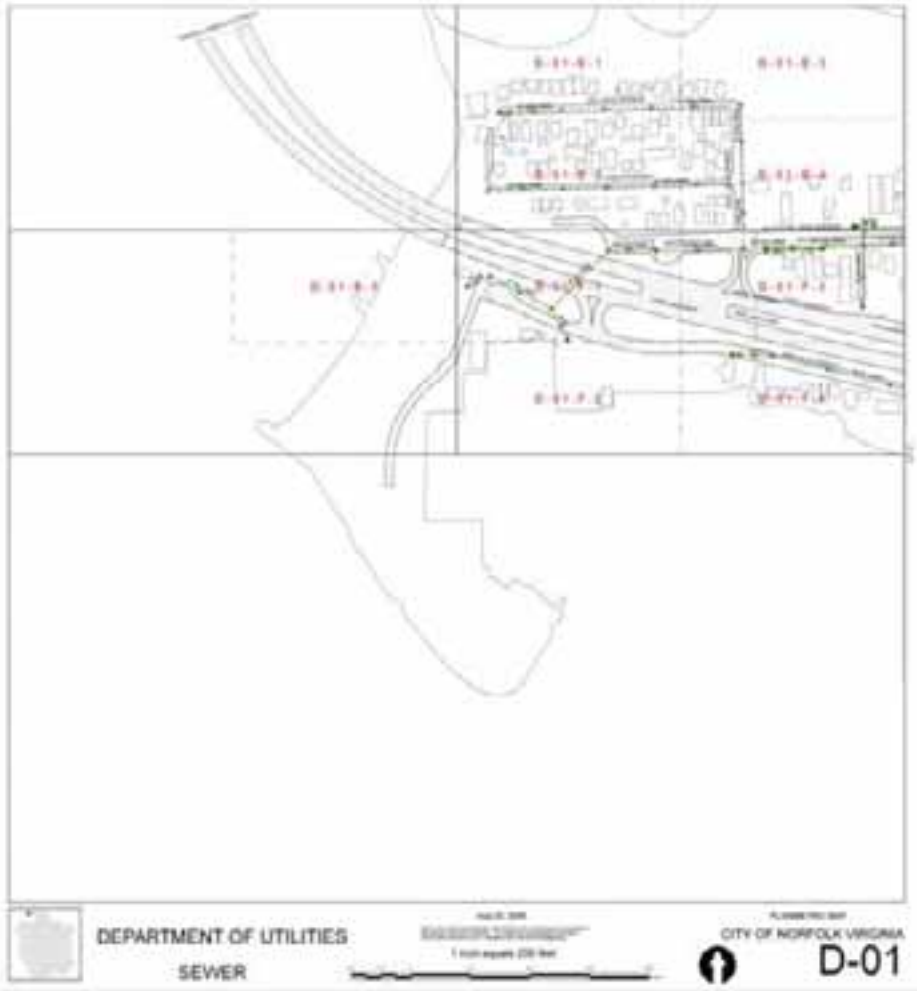
Mapping and Viewing Data

Automated creation of physical records

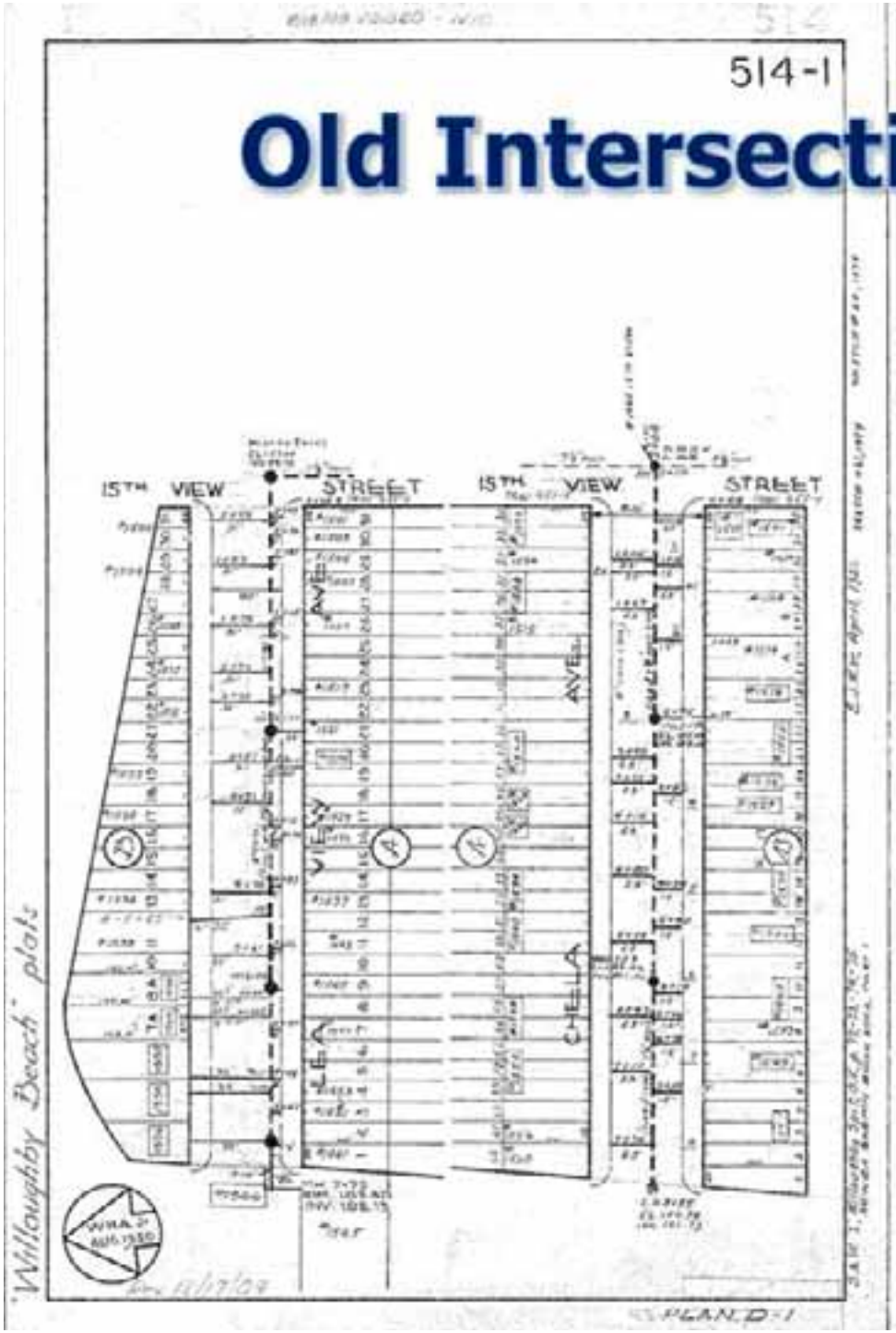
- Map Book Developer's Sample
  - Created a new grid based on previous Planimetric drawings
- Reason for creating physical records
  - Backup for power/network failure
  - Comfort of use for some customers and applications
- Updates to physical records
  - As needed due to changes in system

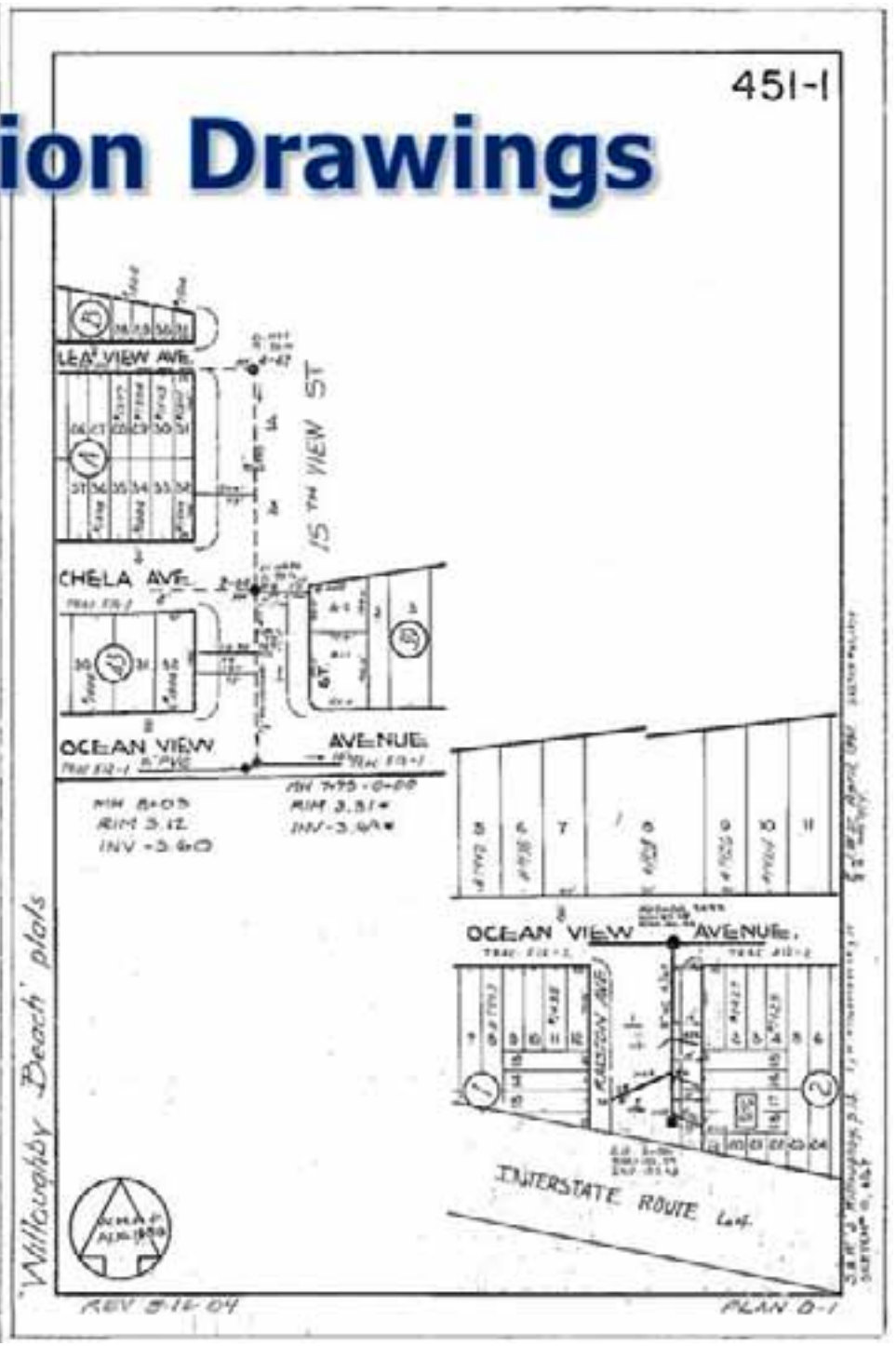
Old Planimetric Sheet

New Planimetric Sheet



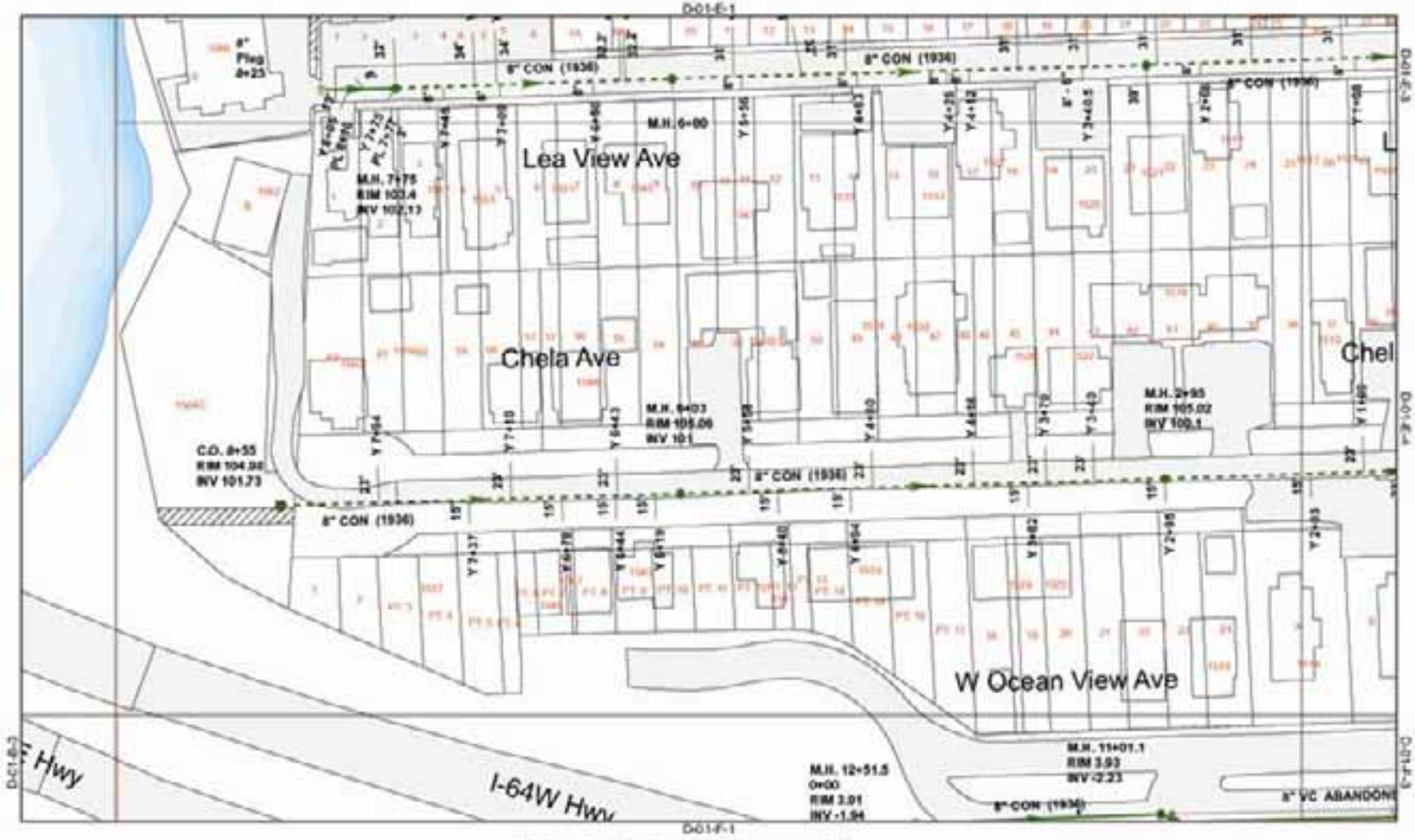
Old Intersection Drawings





New Sheet Drawings

City of Norfolk
Department of Utilities
400 Granby St.
Norfolk, VA 23510



Note: Locations, elevations, and inverts are approximate and should be field verified. City does not guarantee accuracy. Check with private utility owners for further information.

Remember: Before you dig call Miss Utility at 811

Sewer Sheet:

D-01-E-2

Improvements of The New Record System

Color Planimetrics

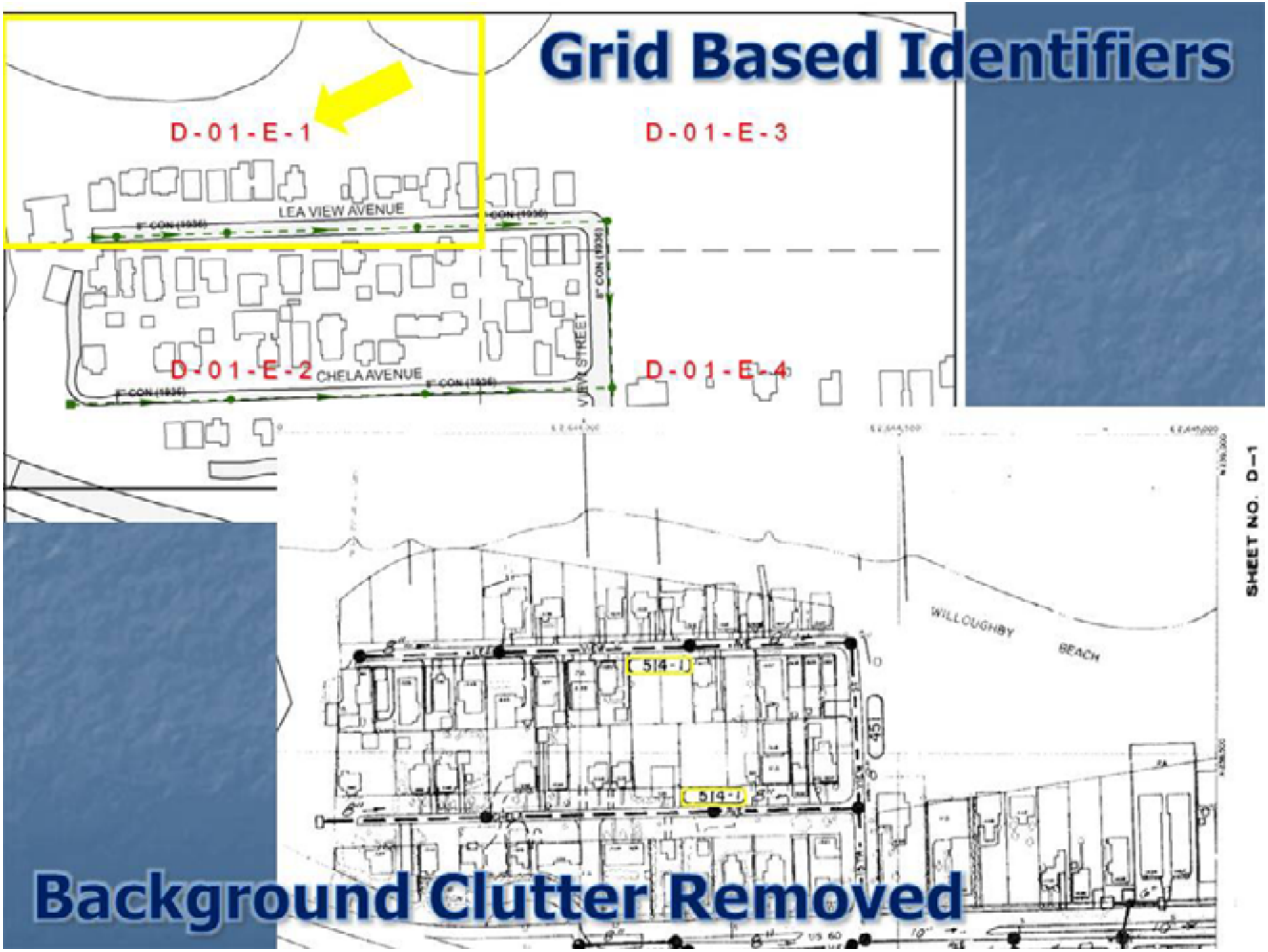
DEPARTMENT OF UTILITIES

SEWER

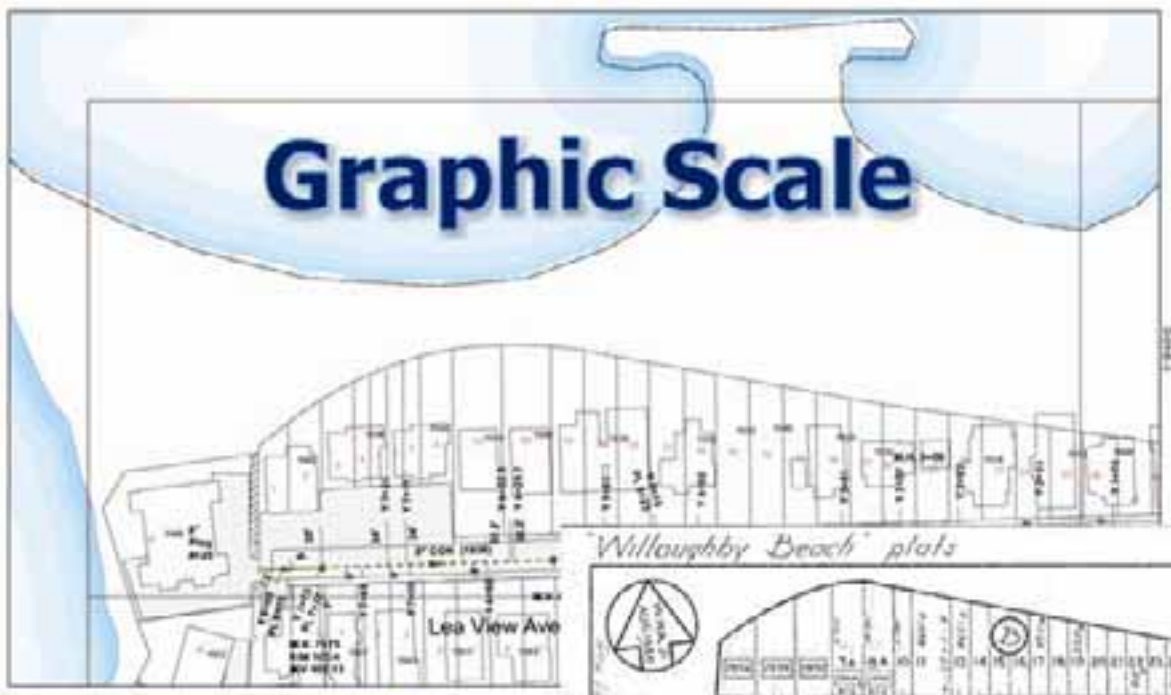
1 inch equals 200 feet

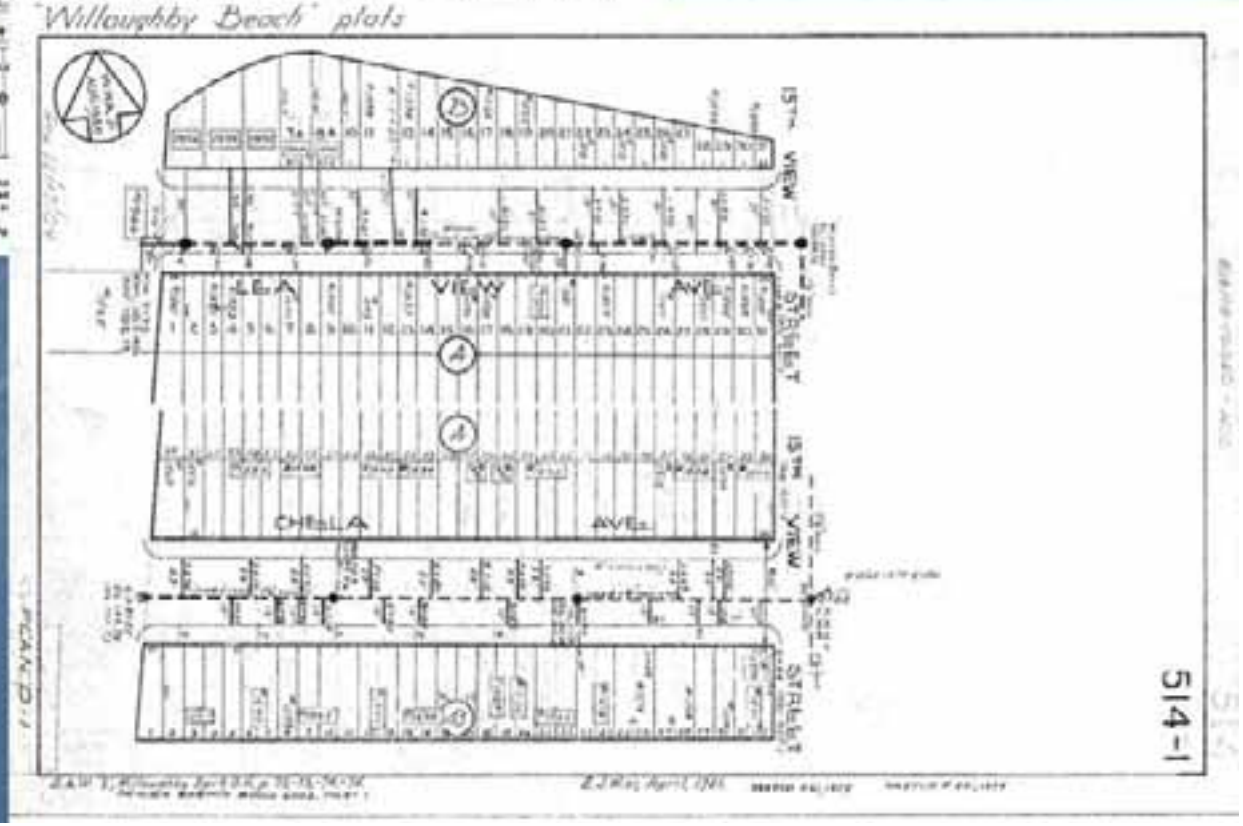
CITY OF NORFOLK VIRGINIA

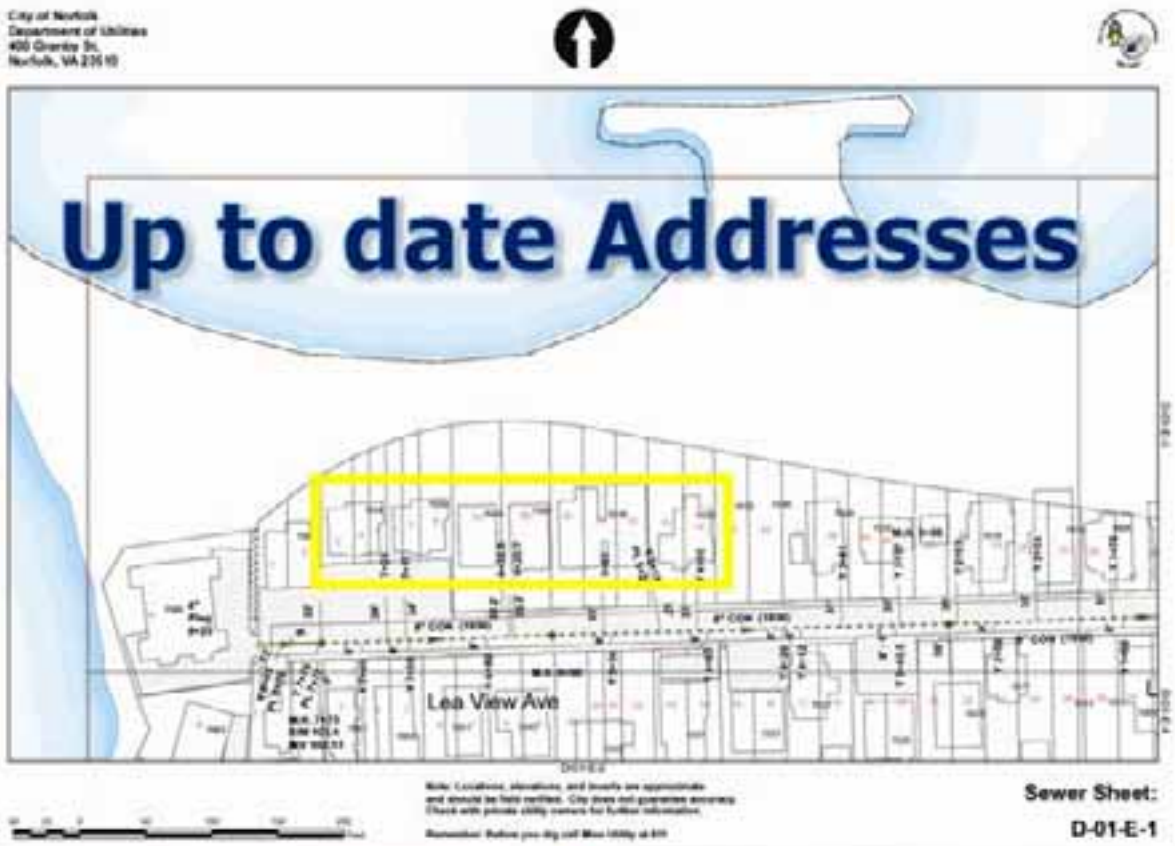
D-01


Grid Based Identifiers
D-01-E-1
D-01-E-3
D-01-E-2
D-01-E-4
LEA VIEW AVENUE
CHELA AVENUE
VIEW STREET
WILLOUGHBY
BEACH
514-1
514-1
451
SHEET NO. D-1
Background Clutter Removed

Graphic Scale

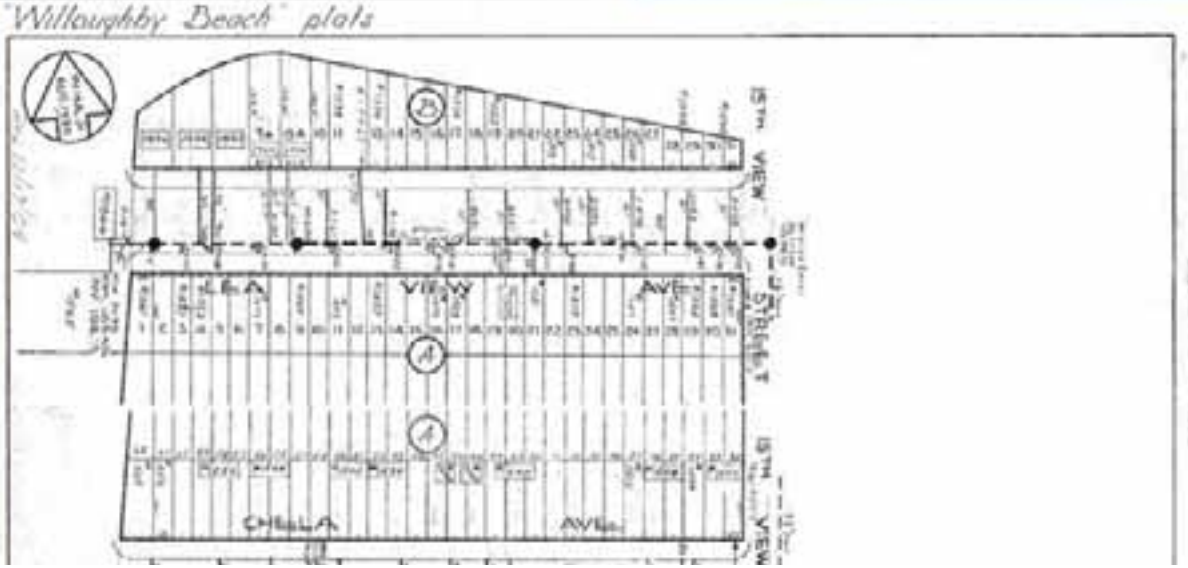


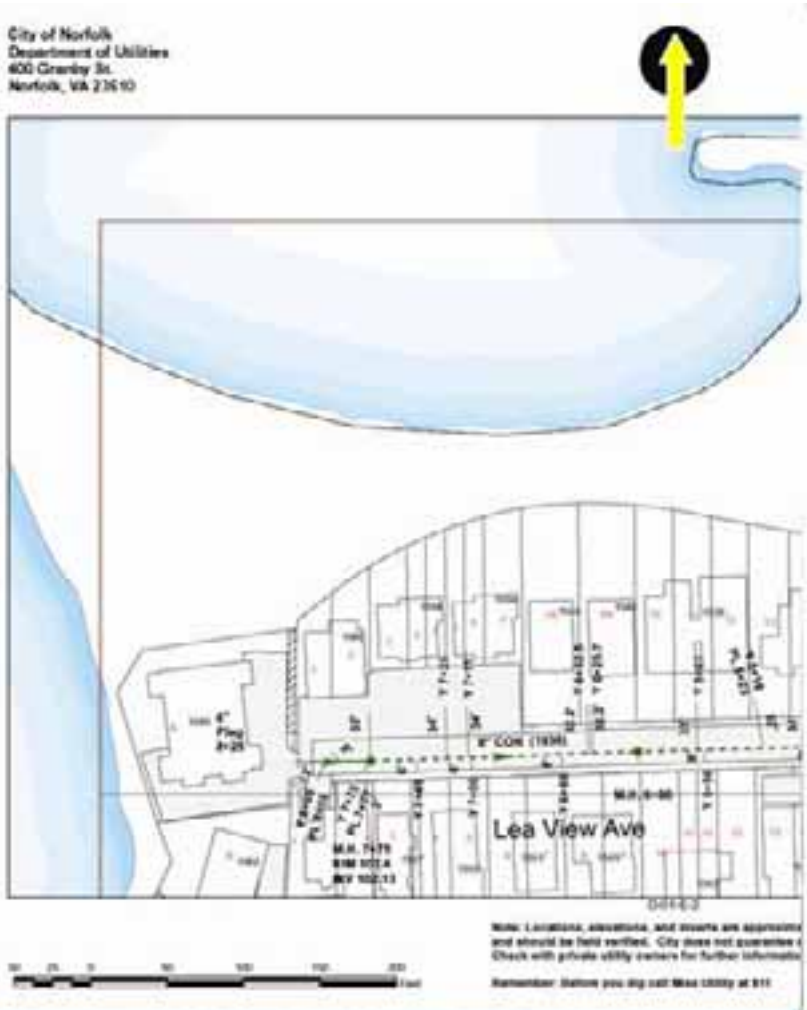


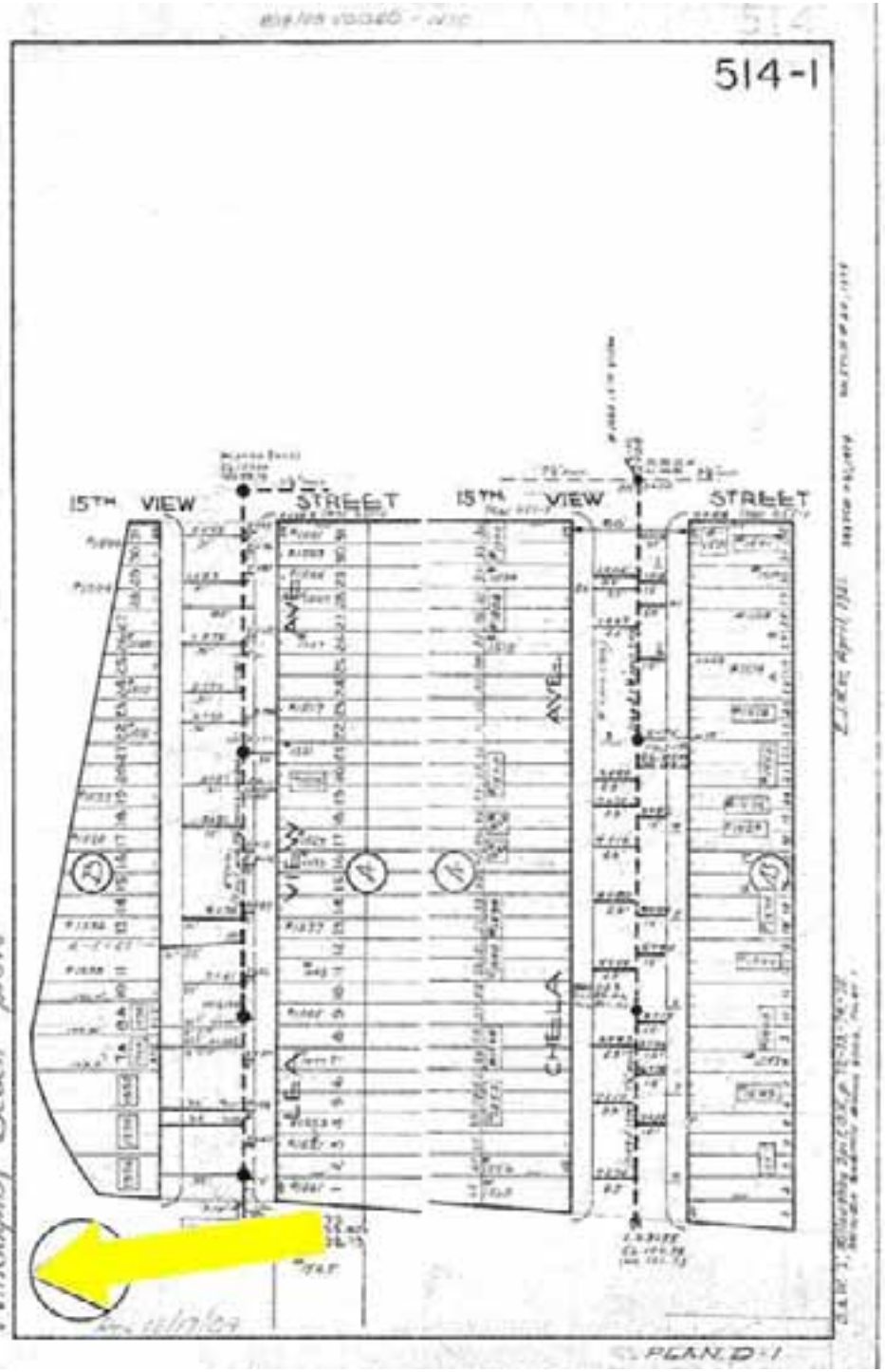


Lot Lines

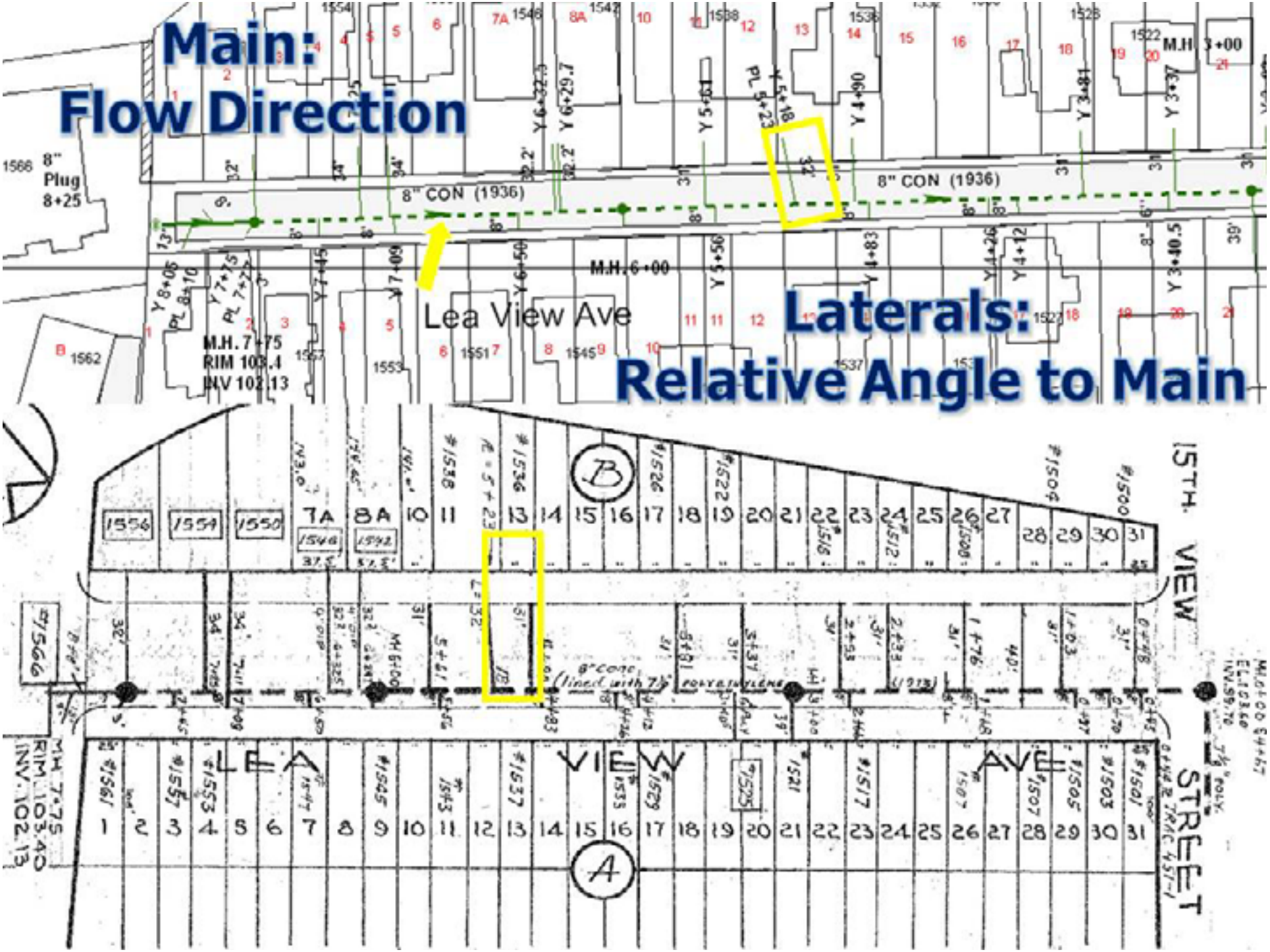
Buildings







North Oriented to Top of Map Sheet


Main:
Flow Direction
Laterals:
Relative Angle to Main
8" CON (1936)
8" CON (1936)
M.H. 6+00
Lea View Ave
M.H. 7+75
RIM 103.4
INV 102.13
15TH. VIEW STREET
LEA VIEW AVE

City of Norfolk
Department of Utilities
400 Granby St.
Norfolk, VA 23510

Uniform Scale Overlapping Sheets

D-01-E-4

Note: Locations, elevations, and inverts are approximate and should be field verified. City does not guarantee accuracy. Check with private utility owners for further information.

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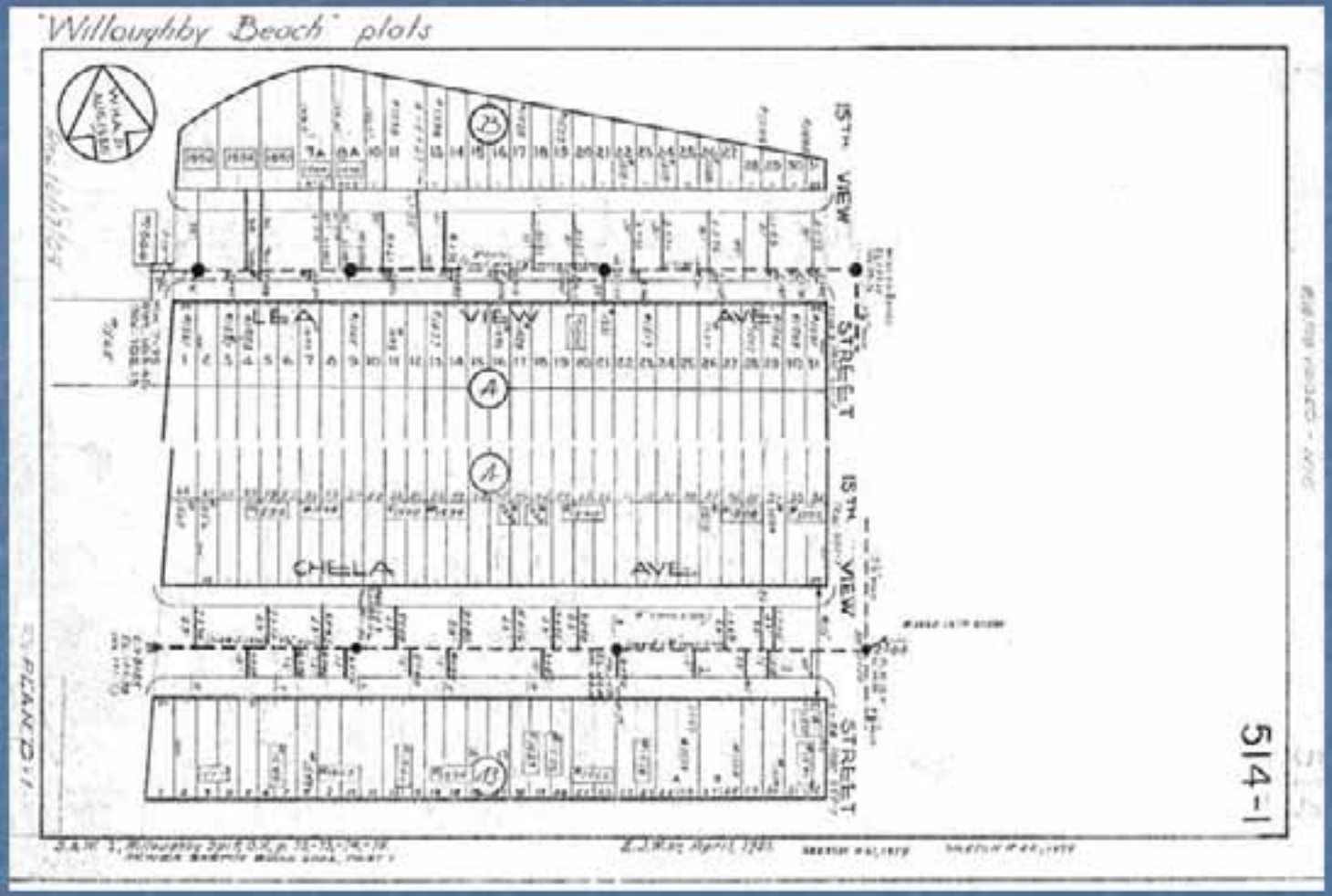
Sewer Sheet:

D-01-E-3

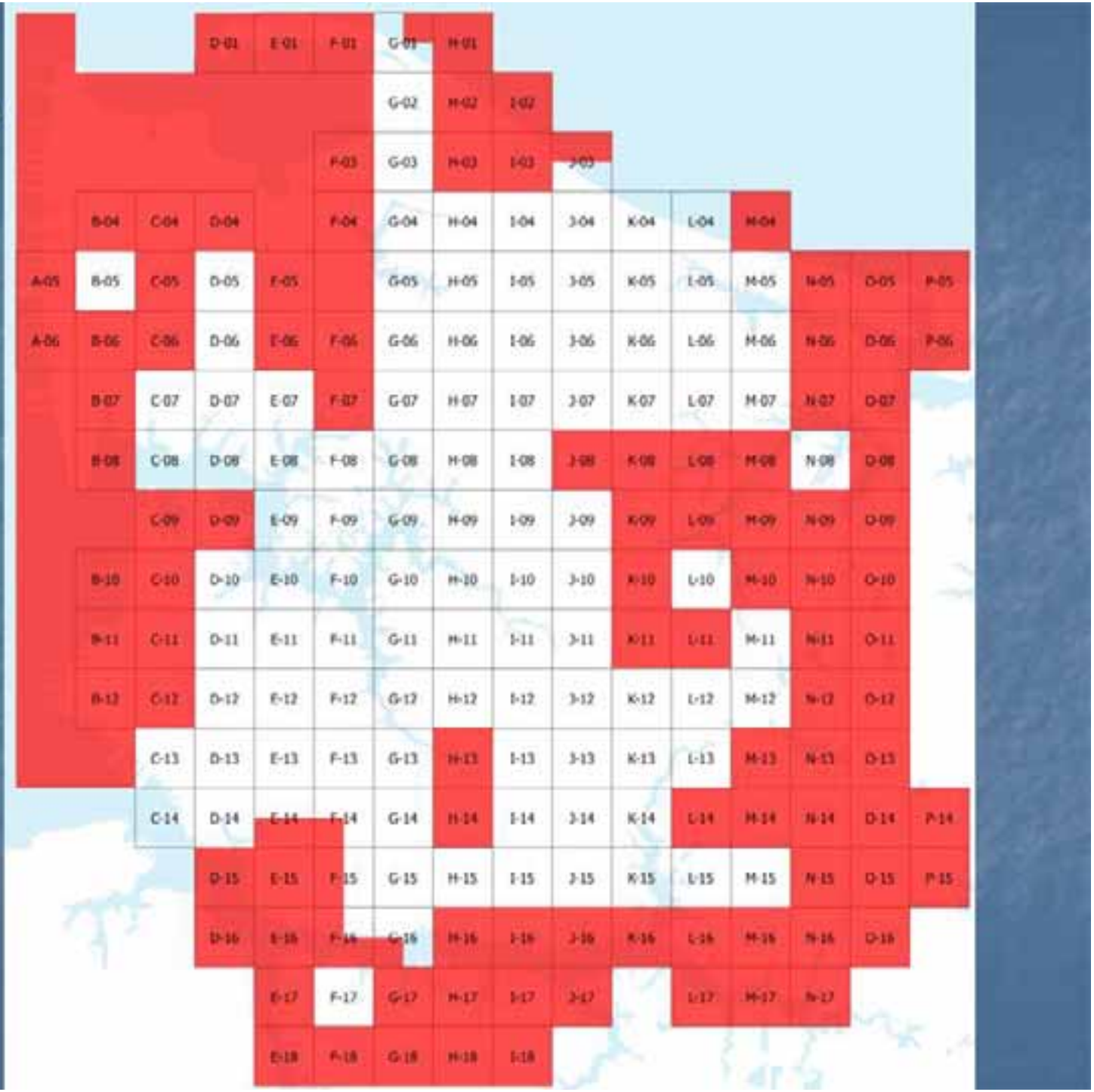
Old Drawings: No Uniform Scale



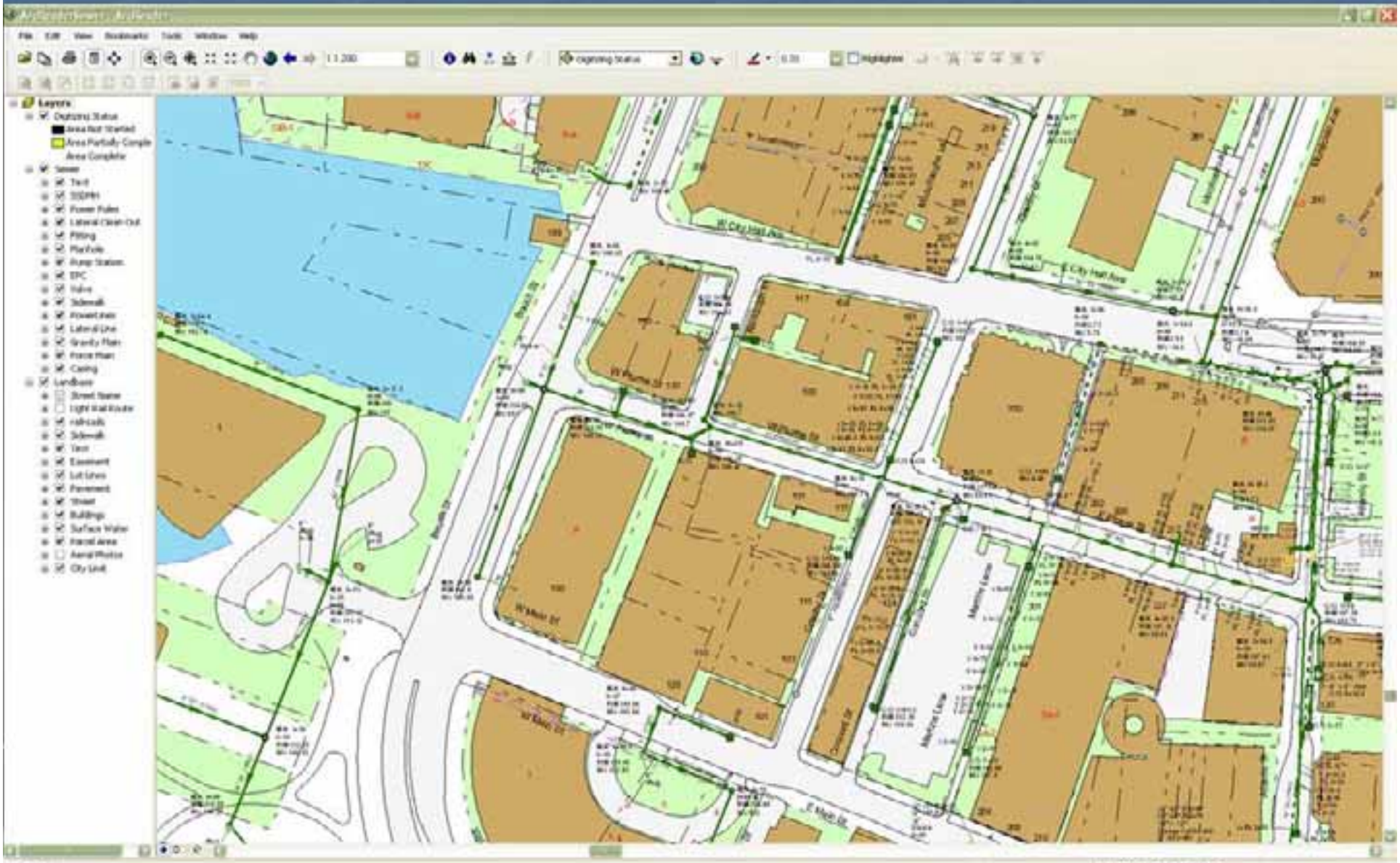
Other Areas

Complete

Not Complete



ArcReader



Reasons for ArcReader

- Ease of viewing records digitally.
- Standalone program.
- Allows easy printing of custom maps.

Implementation of ArcReader

- Packaging information
  - Field Use
- Frequency of Updates
  - Every 2 months or if major changes in shorter time
- Methodology of updating field computers
  - External hard drive
- Future of ArcReader Application
  - Will continue to update and use

Flex Viewer


Sewer Viewer
Powered by ArcGIS Server
M.H. 2+02
INV 100.48
W City Hall Ave
M.H. 1+66
INV 100.63
Boush St
8" TC (1971)
8" Sleeve
8" Plug
8" CI
C.O. 1+35
RIM 106.58
INV 101.05
8" x 6" Tap 1+15
Randolph St
W Plume St
M.H. 2+17.3
0+00
RIM 109
INV 102
M.H. 0+00
1+95
RIM 104.85
INV 99.7
M.H. 0+99
RIM 104.89
INV 100.23
M.H. 10+45
0+00
RIM 105.37
INV 100.7
M.H. 0+12
INV 100.7
M.H. 10+39
0+00
RIM 106.58
INV 100.47
W PLUME STREET
PL 2+56
199
150
117
130
100

Reasons for Flex Viewer Selection: Cost

- ESRI's Sample Flex Viewer is free to download, modify, and use
  - Minor modifications to Sample Flex Viewer requires only a text editor
- $249 Standard edition for Personal/Business

Reasons for Flex Viewer Selection: Ease of Development

- Code well developed
  - Limited changes to code are easy to implement
  - Larger changes… not so much
- Large community of Users
  - More free code to add to the Flex Viewer
  - Free advice
    - From the basic: how do I get this to work on my computer
    - To the complex: how do I modify the code from the viewer to limit the search functionality to only return desired information on specific items

Reasons for Flex Viewer Selection: User Friendly Application

- Sample Flex Viewer appears to require less technical knowledge for the end user than ArcReader
  - Encourages people to use newer record system
  - Enables people to have multiple methods of getting to data

Modifications to Flex Viewer

- Config.xml
  - Text editor or Adobe Flex Builder 3
- Search Widget
  - Modified to search and identify based on limited feature classes
- Overview Map
  - Added back and forward buttons

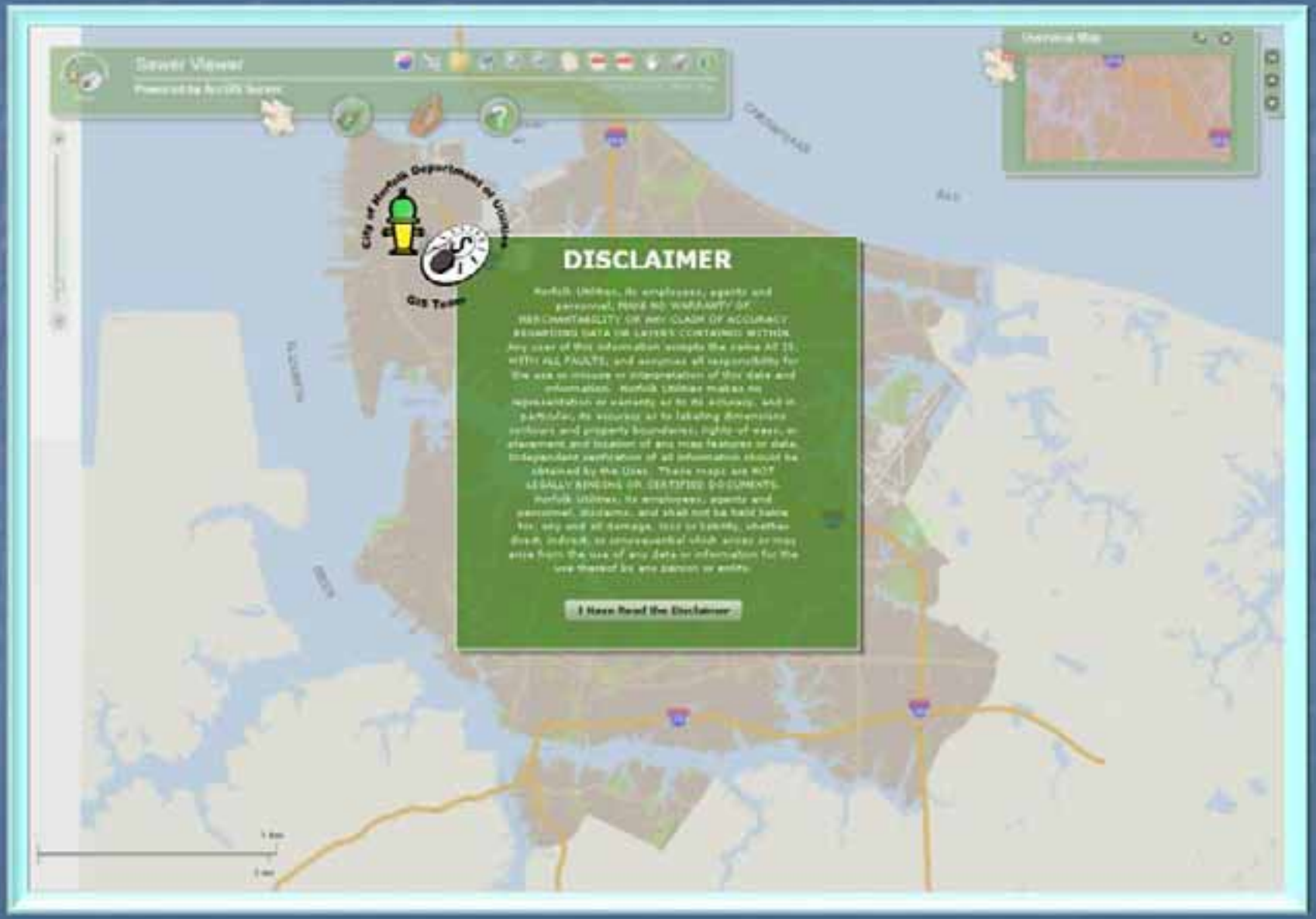
Modifications to Flex Viewer (continued)

- Added shortcut menu bar
  - Found file at the ESRI ArcGIS Server Flex API Resource Center
  - Contains icons that dock on upper right of menu bar
- Developed application specific help files
  - Enables easier learning curve for the new application

Flex Viewer Facts

- Sample flex viewer looks nice
- Minor changes easy to make
- Major changes can be a big hassle to make
- Acceptance has been greater than ArcReader by people who are not as comfortable with computers

Sewer Viewer Demonstration



Contact Information

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