

# Issues in Mega Infrastructure Analysis, Appraisal and Finance in the USA



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# Summary



- A major problem in the USA and possibly elsewhere in UK and Europe is many cities and counties are essentially “broke”.
- One outcome of this is many cities infrastructure is in poor condition and needs repair and / or upgrade.
- Another situation is that many cities and counties do not have their infrastructure recorded properly in their accounting records and GIS systems.
- We have a fairly simple solution for these issues that is scalable to any size city or county.

# The Solution



- We devised a four point solution
- First, inspect and analyze all infrastructure via robot or human means.
- Second, appraise all the infrastructure we inspected.
- Third, adjust both the accounting records and GIS system to reflect the first two points.
- Fourth, request new municipal bonds be issued to cover the difference in value.

# Inspection



- We inspect all infrastructure via robot or human means.
- We have wheeled robots that crawl through a city's pipes and both measure the length of the pipes and record through GPS the location of all components for input into the GIS system.
- The robot uses a laser to video the pipes and determine the condition of the pipes.
- Other infrastructure items such as water tanks, treatment plants, etc., are inspected by humans.

# Robot



# Robot inside pipe



# Results of pipe inspection



- Each type of pipe is determined: 18 in PVC, 24 in PVC, etc.
- Length of each type of pipe: 4,000,000 linear feet etc.
- Each use of pipe is determined: potable water, waste water, storm water, etc.
- Type of earth pipe is laid in: sand, clay, etc.
- Backflow: yes or no
- Condition of pipe: 75% useful life left, etc.
- All junction boxes etc. identified and located.
- All pipe is mapped and GPS located for GIS.

# Other infrastructure is inspected



- Other infrastructure is inspected and catalogued.
- Items such as water tanks, treatment plants.
- These are very valuable components to the infrastructure.



# Appraisal of the infrastructure



- We have patent pending software used in the appraisal analysis of the infrastructure.
- Each type of pipe has a replacement cost. This is obtained from various sources and used to apply factors to determine overall value: length, condition, earth type, use, backflow, etc.
- Each type of treatment plant or water tank is analyzed for replacement cost as well.
- We sum all of these values to obtain what we call one of several Indications of Value.

# Appraisal - continued



- We also will analyze the city's revenue stream from the services provided to the customers.
- These data will be used to develop a Discounted Cash Flow model.
- This is a second Indication of Value.

# Appraisal – continued



- We also look at the social value of these infrastructure items.
- Obviously, if you don't have something such as a potable water system or sewer system there is a strong possibility of infectious disease, such as plague in the middle ages, or even third world countries today.
- These data form a third Indication of Value.

# Appraisal - conclusion



- We use the Indications of Value to form a Concluded Value.
- This is based upon our long experience in these matters and current appraisal standards.
- A side note on appraisal standards: these obviously vary by country. In the USA currently they also vary by appraisal society, e.g., the NACVA says the appraiser shall determine the method which best represents the value of the subject property in the appraiser's mind. The ASA says the appraiser shall reconcile the Indications of Value by using a weighted average formula, etc.

# Report writing



- We then have to write a Report which completely explains and justifies our Concluded Value.
- This can be very time consuming.

# Adjusting the books etc.



- The city must then adjust its accounting records to reflect the new values.
- Accounting standards to do this also will vary by country.
- In the USA, cities and counties are in this matter governed by GASB 34. This pronouncement states that the original recording of the values will be done at “historical cost”. But it turns out, many cities never recorded the original infrastructure cost. So an adjustment has to be made.

# GIS Adjustments



- The GIS system must be adjusted to identify all infrastructure locations, etc.
- The GIS system itself has a value and we also appraise that for inclusion in the final Concluded Value.

# City Finance



- The city can then take the appraisal, along with its adjusted books and records to a municipal bond underwriter. We have one that is familiar with our process and can do the underwriting swiftly.
- The underwriter will then issue new bonds.
- The funds obtained can then be used to repair the existing infrastructure, purchase new infrastructure, or other purposes the city chooses.



# A simple case study example



- This is very oversimplified and just for explanatory purposes.
- City of Hollyville has 40,000,000 linear feet of 24 in PVC pipe, 30 water tanks of various sizes and 14 water treatment plants and 16 sewer treatment plants.
- The Replacement Cost of the PVC is \$300 per foot installed. The Replacement Cost of the water tanks averages \$10,000,000. The Replacement Cost of the water treatment plants averages \$20,000,000 and the Replacement Cost of the sewer treatment plants averages \$25,000,000.
- The Indication of Value on this basis is \$3,980,000,000.

# Simple case study - continued



- On the basis of fees generated we determine that the Discounted Cash Flow Indication of Value for City of Hollyville is \$3,500,000,000.
- On the basis of social values we determine that the Indication of Value for City of Hollyville is \$4,500,000,000.
- Our Concluded Value is determined to be \$4,000,000,000.
- This is a simple case that could easily be true for a medium size city in the USA. A larger city such as New York or Los Angeles could be many times this.

# A more advanced case study



- We were recently approached by a major political subdivision to discuss their electric power generation and transmission infrastructure. Obviously not water and sewer but very large,
- It turns out that we are not doing this job, but to value all high transmission wire towers, all generating stations, all transformer substations, could amount to hundreds of billions.

# Conclusion



- So how does this help?
- We believe that infrastructure in the USA is in serious need of repair upgrade and expansion.
- This process allows the city, county or agency to re-finance their infrastructure to accomplish just that.
- We are experiencing that these projects can range anywhere from \$500,000,000 to multiple billions of dollars.

# Contact Information



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