

EPA Administrative Order (AO) Compliance Plan July 11, 2016

The AO is a regional problem. It demands a regional solution. A successful, long-term response to the AO will require collective, collaborative action among the Western Lehigh communities and municipal systems that contribute to wastewater flow processed by the treatment plant in Allentown.

We've undertaken a methodical, scientific, rational approach to dealing with the overflow problem to develop a solution that balances the need to protect our environment with public's ability to pay for the improvements.



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July 11, 2016

SEWER CAPACITY ASSURANCE & REHABILITATION PROGRAM (SCARP)

USEPA Administrative Order and PADEP Chapter 94 Corrective Action Requirements
Plan of Action Briefing



Meeting Objectives



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Describe the proposed overall sewer capacity plan

- Drivers
- Phasing
- Costs
- Next Steps

Agenda

1. I&I Primer
2. Root Causes
3. Regulatory Commitments
4. Regional Collaboration
6. WLSP and COA Alternative Analyses
7. Selected Approach, Sequence, and Costs
8. Path Forward
9. Questions and Discussion



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Sewer Capacity Assurance and Rehabilitation Program Objectives



- Reduce peak wet weather and baseline flows to:
 - Minimize capacity expansion of the interceptors
 - Prevent expansions at Kline Island WWTP
- Eliminate dry and wet weather SSOs in sewer systems
- Provide long term sustainability of the sanitary sewer systems

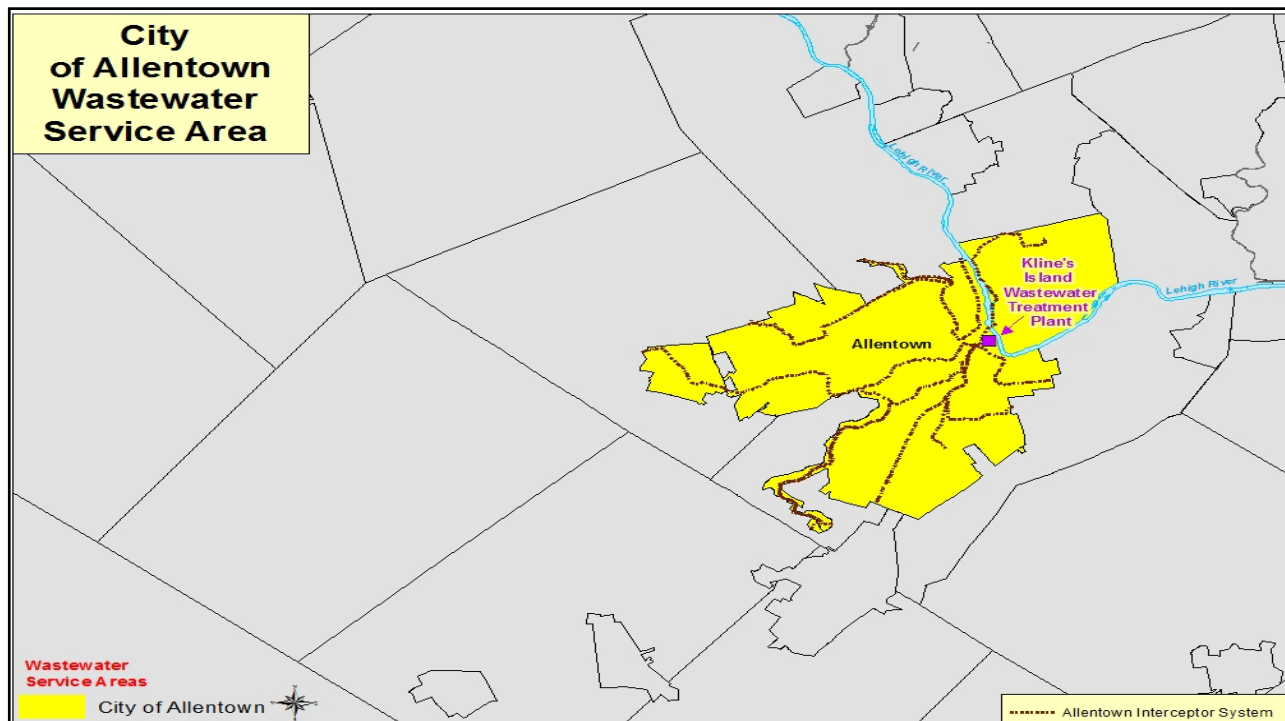
Cut to the chase...

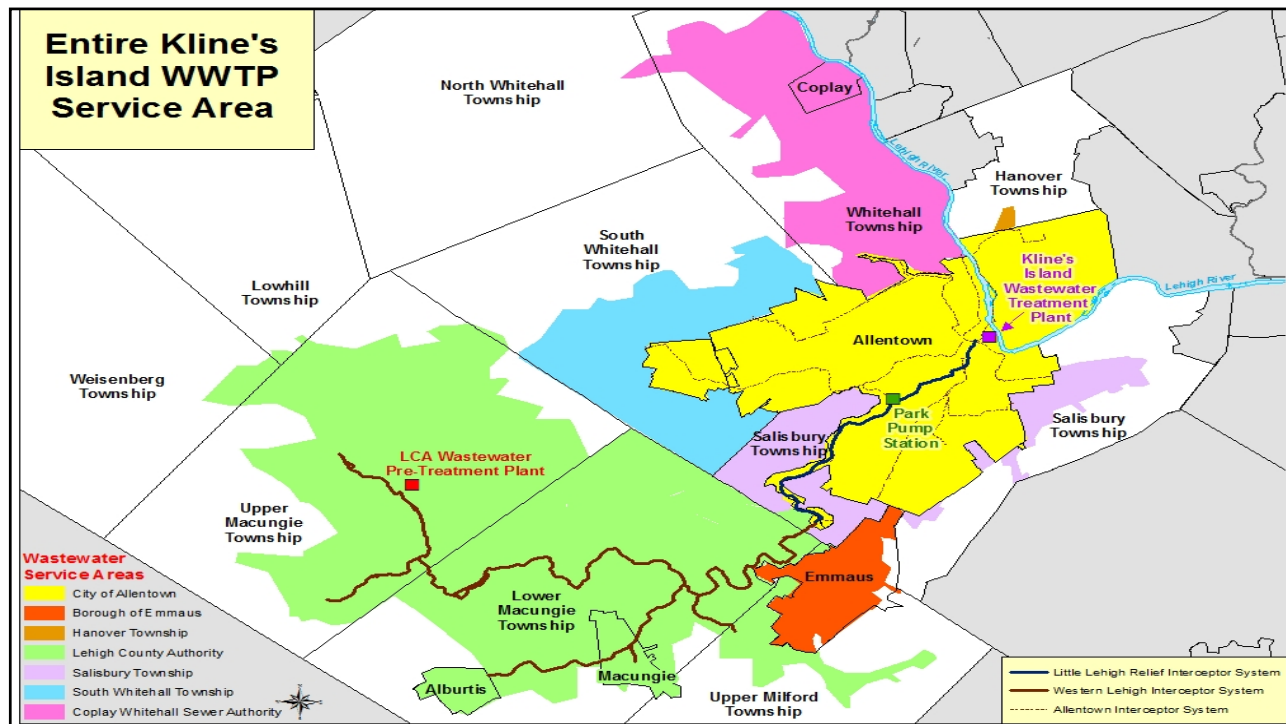
Total Program	\$461M+
Partners	\$212M
Allentown	\$110M
Lehigh County Authority	\$139M
Other Signatories	???



THE BACK STORY

The Players

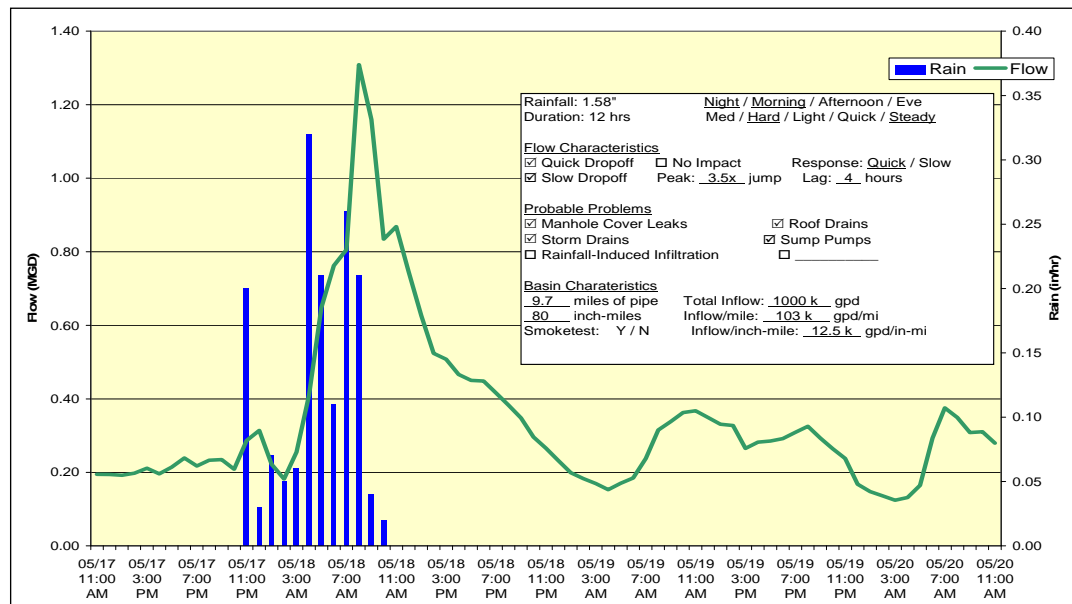




INFLOW AND INFILTRATION IN SEWERS

A Quick Primer in the Basics

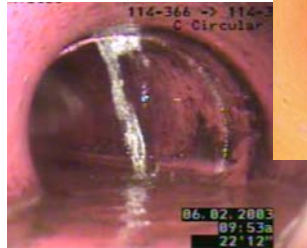
SEWAGE or RAINWATER?



INFILTRATION AND INFLOW (I/I)

1. Infiltration – Groundwater flow into pipes and/or manholes through defects and failed gaskets
2. Inflow – Stormwater flow directly into manholes and cleanouts
3. Clearwater - Roof drains and sump pumps connected to sanitary sewer pipes.

INFILTRATION



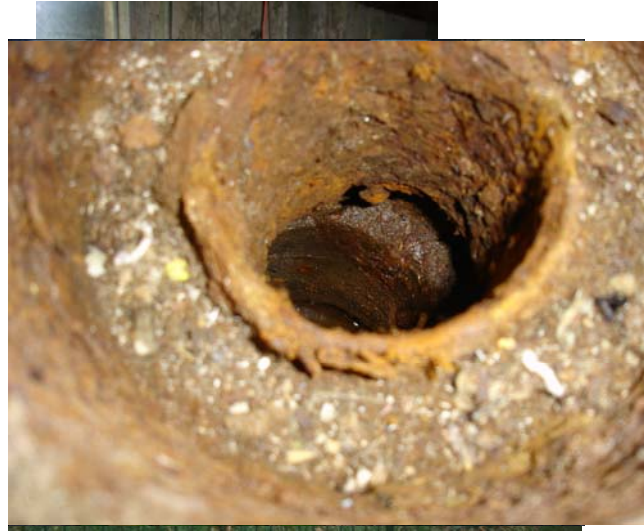
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INFLOW



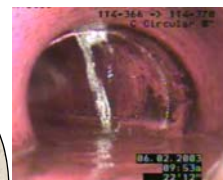
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Clearwater



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Leakage Originates in the Collection System... but Overflows in the Interceptor



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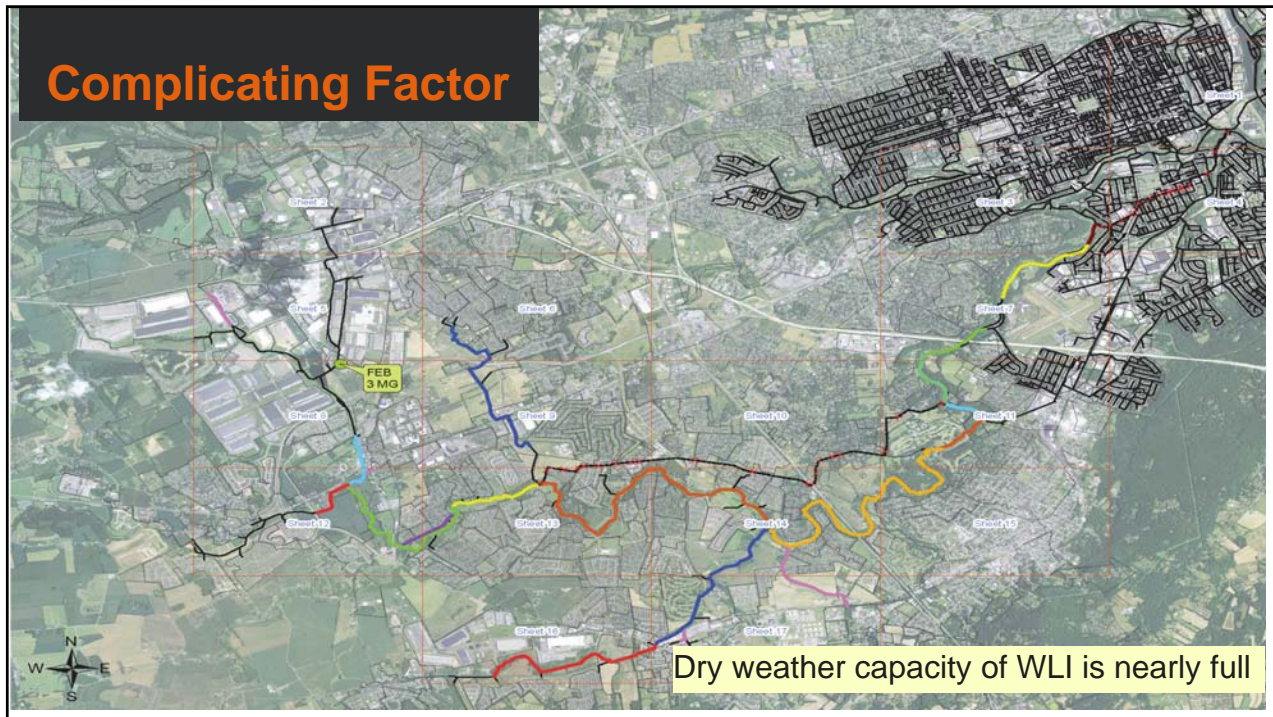
Root Causes

- Peak wet weather flows
 - Exceed capacity of the WLI, LLI, and PPS
 - SSOs were 2x per year before FEB
 - Now every other year
 - Exceed capacity of the KI WWTP headworks, causing bypasses at Outfall 003
 - Bypasses were 2x per year before FEB
 - Now every other year
- Infiltration is chewing up base capacity intended for planned 537 growth
- The oldest sewers are at the end of their life

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Complicating Factor



Main Regulatory Drivers

- PADEP is limiting new connections (94.21 rules) based on wet weather capacity in Western Lehigh Interceptor
- USEPA Administrative Order based on wet weather overflows
- Capital Improvement Plan to USEPA and PADEP in accordance with 2009 SCARP Program Approach Outline by 12/31/17
 - Specific scopes of work
 - Construction schedules



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Regional Collaboration



Regional Collaboration

- Western Lehigh Sewerage Partners (WLSP)
 - Regular Engineers Meetings
 - Monthly Meetings with Partners
 - Finalizing BOR and CIP
 - Memorandum of Cooperation
 - Coordinated Bidding Schedule
 - Standardized Construction Specifications
 - Communications Plan



Regional Collaboration



City of Allentown and WLSP

- Monthly Program Manager's AO Planning meeting
- Sharing of costs, data, CIP
- Coordinated construction schedules
- Use of the same hydraulic model (KISS model)



Regional Collaboration



Other COA Signatories

- Individual Signatory meetings to brainstorm corrections to flow meter data issues
- Signatory Meetings to present the City CIP and allocation of costs methodology
- Engineers Meetings to encourage collaboration



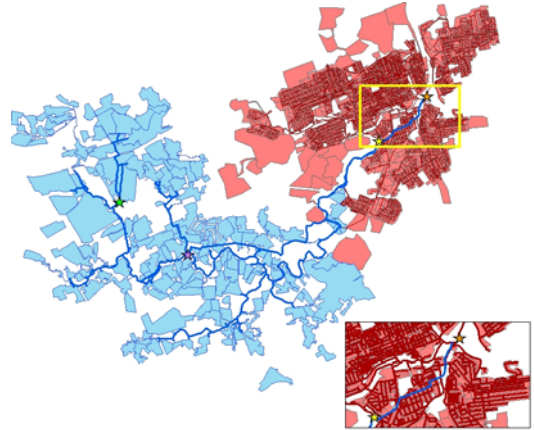
WLSP Alternative Evaluation



Western Lehigh Sewer Partnership

Solution Planning

- Klines Island Sewer System (KISS) model
- Based on Year 2040 flow projections
 - ~4 additional MGD from WLSP
- Approaches considered
 - Source reduction
 - Storage
 - Gravity conveyance
 - Pumping
 - Blending



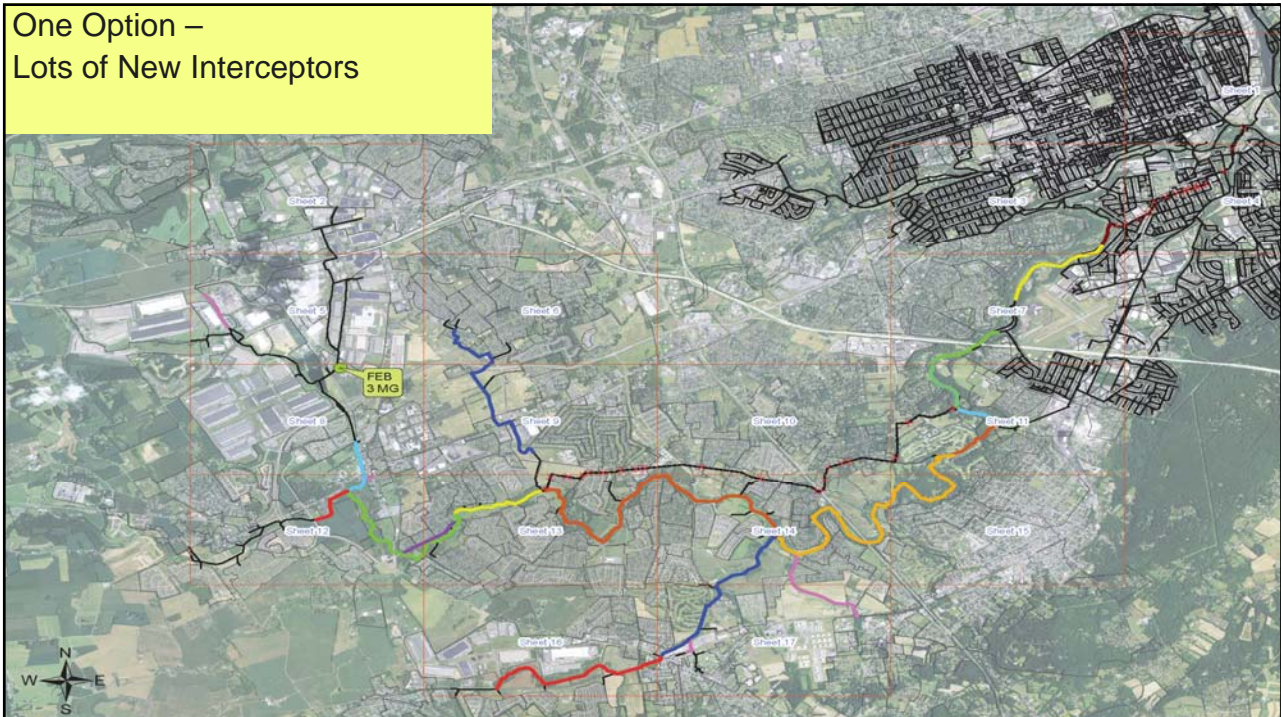
Solution Planning covers both Current and Future flows

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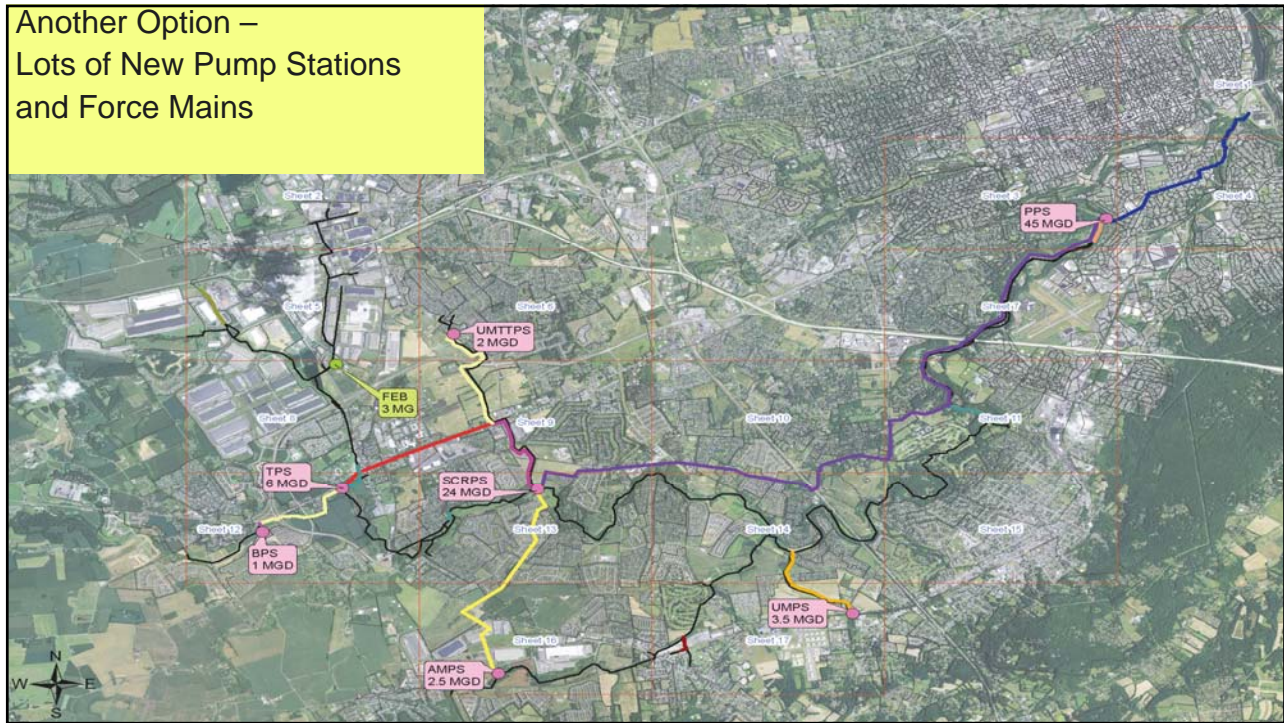
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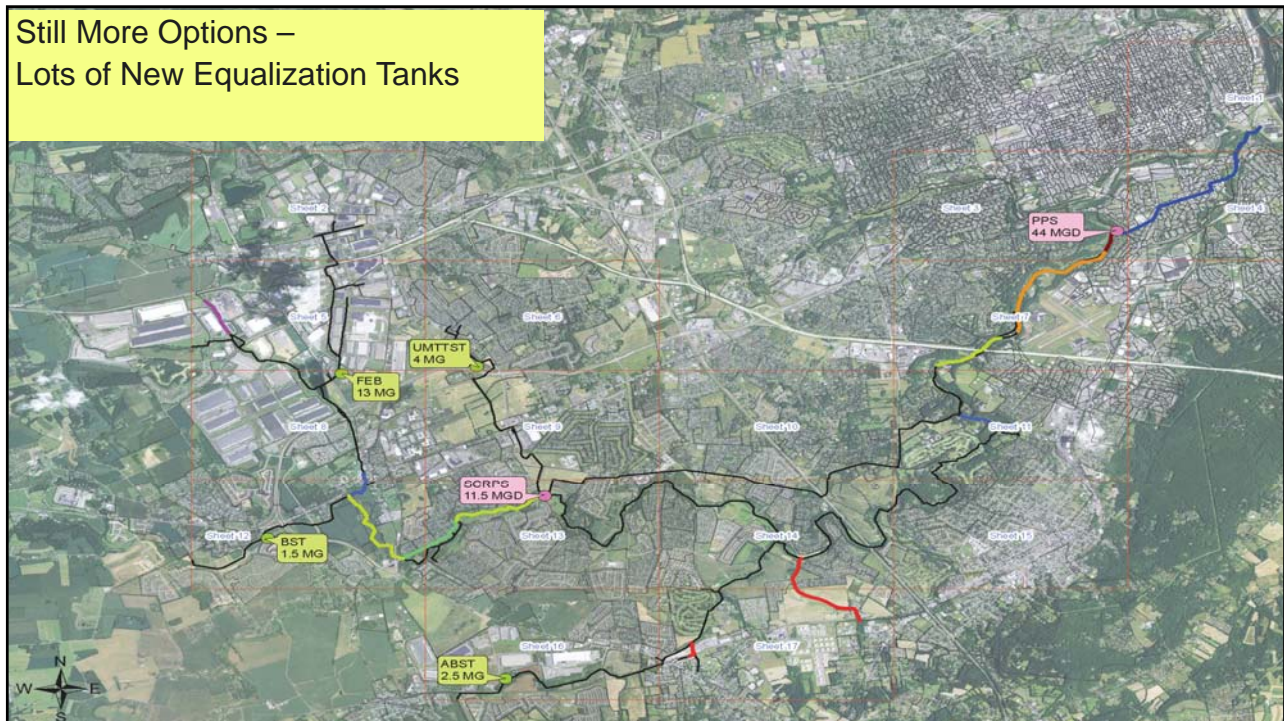
One Option – Lots of New Interceptors

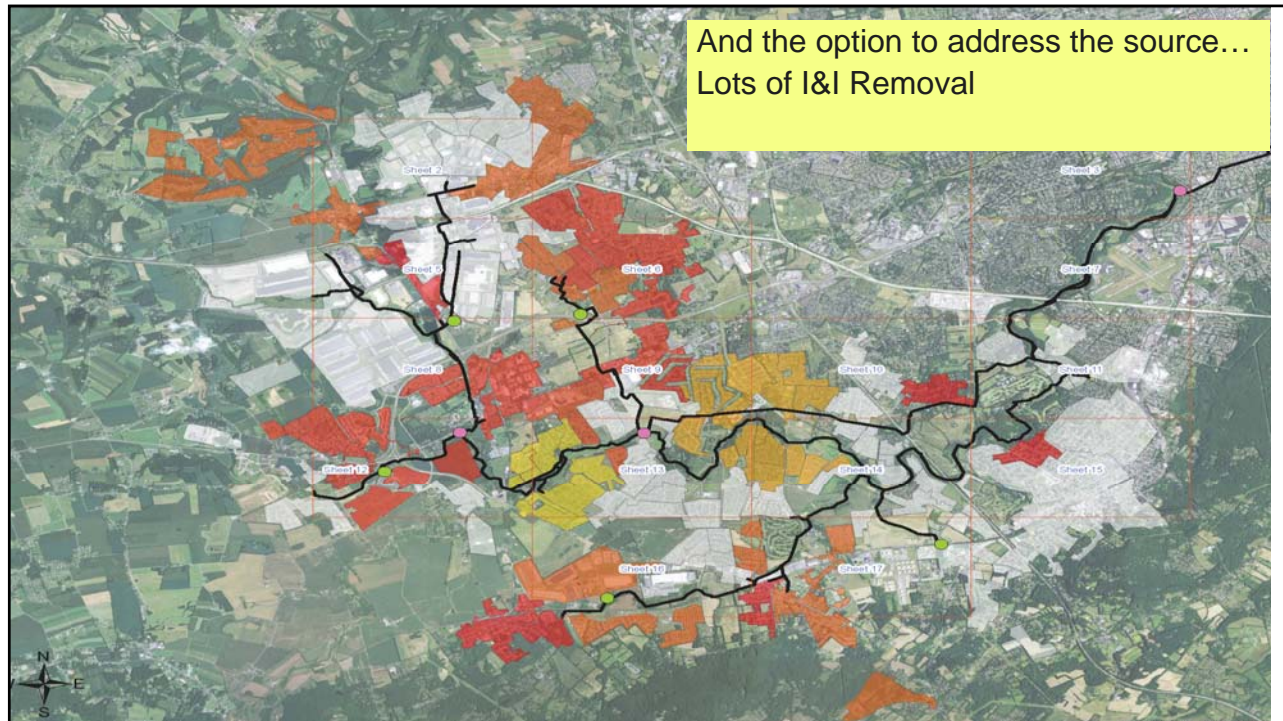


Another Option –
Lots of New Pump Stations
and Force Mains



Still More Options –
Lots of New Equalization Tanks





Western Lehigh Sewer Partnership

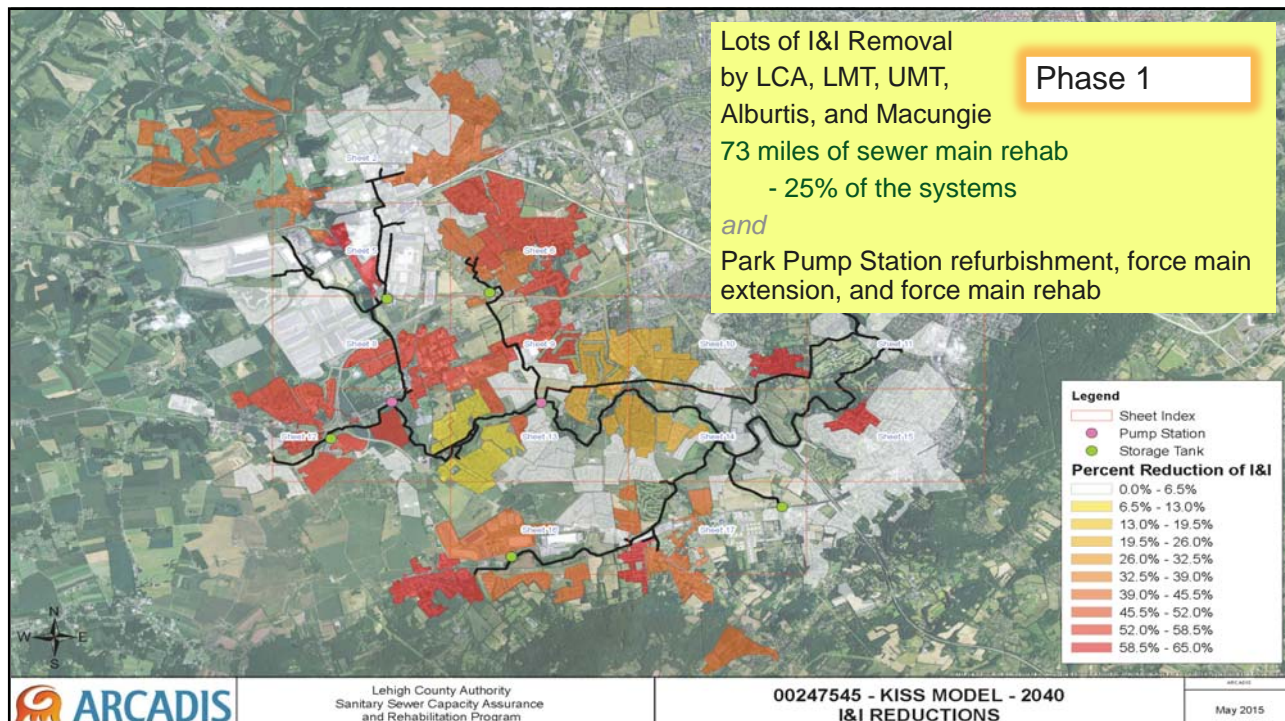
Alternative No.	Description	COA + LCA	Total NPC Rank
1	Pure Gravity	\$ 264	7
2	Pure Gravity except PPS pumps all flow	\$ 298	10
3	Pure Pumping	\$ 329	12
5	Mostly Tanks, some Gravity, with SCRPS and PPS left unchanged	\$ 305	11
6	Mostly Tanks, some Gravity, with SCRPS left unchanged and PPS upsize to pump all flow	\$ 265	8
7	Tanks, Pumps, some gravity, PPS upsized to pump all flow	\$ 224	1
9	Alt 1 plus I&I Removal	\$ 266	9
10	Alt 2 plus I&I Removal	\$ 230	2
11	Alt 3 plus I&I Removal	\$ 239	4
13	Alt 1, plus ABST, plus I&I Removal	\$ 256	6
14	Alt 1, plus ABST, plus I&I Removal	\$ 235	3
15	Tanks, Pumps, some gravity, PPS upsized to pump all flow	\$ 239	4

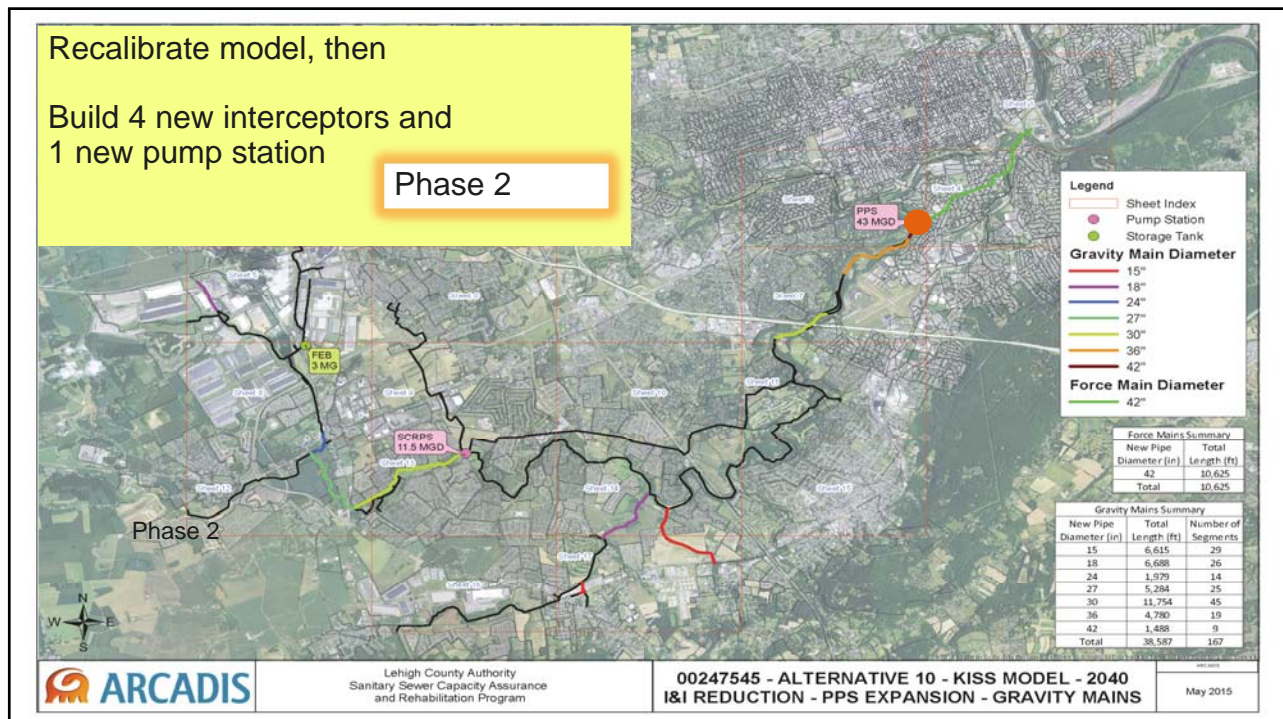
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Selected Approach







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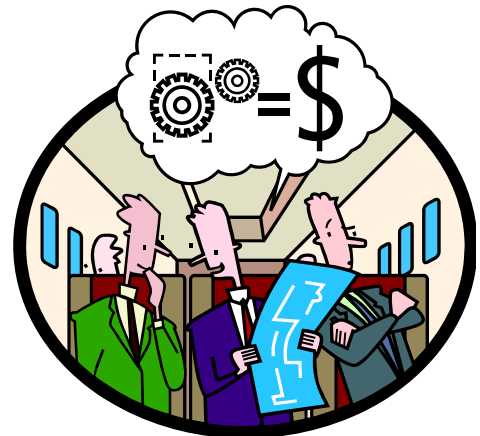
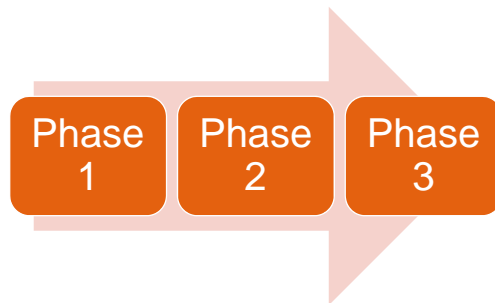
Total 50 year cost

		Total Program	\$461M+
Partners	[Short Term I&I Removal (Source Reduction Program –SRP)	\$32M
		Long Term Sewer Rehab (Ongoing Sewer Rehab Program – OSRP)	\$180M
City	[Klines Island Equalization Tanks	\$100M
		City Interceptors	\$10M
LCA	[LCA Phase 1	\$12M
		O&M Costs	\$41M
		Phase 2/3	\$86M
		Other Signatories	???

Much of the cost is Partner reinvestment over 50 years in *their* sewer infrastructure

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Phasing



Phased approach = Good Phase 2 and Phase 3 decisions

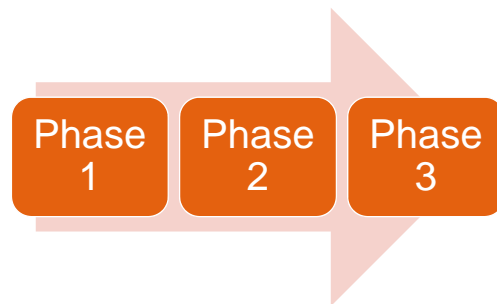
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Proposed Sequence and Schedule

- Phase 1
 - Source Removal Program
 - Sump Pump and Roof Drain Disconnections
 - Sewer Rehabilitation
 - Park Pump Station Refurbishment
 - Park Pump Station Force Main Extension and Rehabilitation
 - Western Lehigh Interceptor Rehabilitation
 - Phase 1 Equalization Tank at Klines Island



**Phase 1 by 2025,
then remeter/model, then Phase 2 from 2027-2038,
then remeter/model, then Phase 3 from 2039-2043**

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Sequence of LCA and COA Projects

	Spend Year	LCA's Portion of Spend Year Capital
WLI Trunkline Rehab	2016	\$ 820,000
Park Pump Station Refurbishment	2018	\$ 2,842,991
WLI Main Rehab 2	2018	\$ 3,446,050
Park Force Main Refurbishment	2019	\$ 3,201,057
Park Force Main Extension	2020	\$ 2,551,597
Phase 1 COA EQ Tanks	2020	\$ 5,657,041
Park Force Main	2027	\$ 23,554,139
Park Pump Station	2028	\$ 18,816,676
Phase 2 COA EQ Tanks	2029	\$ 14,129,738
Kecks Bridge Park Interceptor	2030	\$ 27,779,985
Upper Milford Relief Trunk Line	2032	\$ 7,424,496
AMTL Relief Trunk Line	2034	\$ 8,879,518
Ancient Oaks Interceptor	2036	\$ 37,146,122
Phase 3 COA EQ Tanks	2040	\$ 12,977,609

LCA Big Ticket Items don't
start to hit until 2027

Sized after Partners have
completed their I&I
reduction efforts

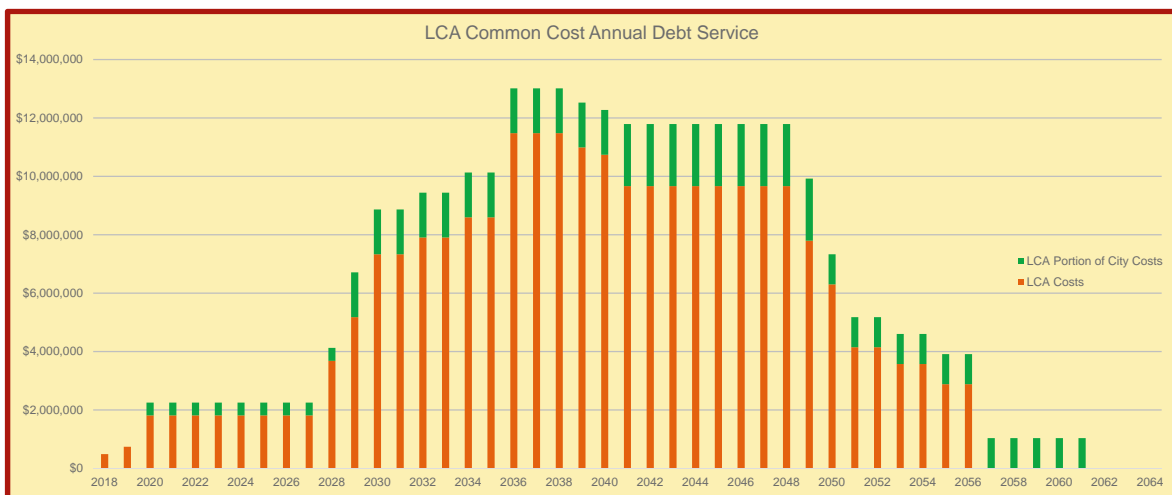
Phased to pace the 4 MGD of new connections expected between now and 2040

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LCA Debt Service Estimate



Path Forward

LCA and COA

WLSP and LCA

WLSP

LCA

COA



Task Name	Duration	Start	Finish
SCARP Preliminary Time Line	99.8 wks	2/3/16	1/1/18
Combined WSLP/COA Selected Approach Confirmation	12 wks	2/3/16	4/26/16
COA Cost Allocation Basis	11.2 wks	2/8/16	4/25/16
COA Signatory Briefings and Negotiations	14 wks	4/26/16	8/1/16
COA Peak Flow Agreement Negotiation	28 wks	7/5/16	1/16/17
WLSP Phase 1 and Phase 2 Cost Allocation	13 wks	2/3/16	5/3/16
Source Removal Program Definition	22 wks	2/3/16	7/5/16
Park PS Phase 1 Need	35 wks	2/3/16	10/4/16
Park PS Force Main Phase 1 Need	35 wks	2/3/16	10/4/16
WLSP Phase 1 Cash Flow Planning	48 wks	5/4/16	4/4/17
Ongoing Sewer Rehabilitation Program Definition	24 wks	2/3/16	7/19/16
Signatory Billing Meters	99.8 wks	2/3/16	1/1/18
SCARP Capital Recover Fee Determination	55 wks	2/3/16	2/21/17
WLSP Phase 2 Cash Flow Planning	24 wks	2/15/17	8/1/17
WLSP Memorandum of Cooperation Negotiation	40 wks	7/27/16	5/2/17
WLSP Long term Asset Management Plan (CMOM Plan)	65 wks	10/3/16	12/29/17
WLSP Capital Improvement Plan	31 wks	4/12/17	11/14/17
COA and COA Signatory Capital Improvement Plans	31 wks	1/17/17	8/21/17

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Path Forward

LCA and COA

WLSP and LCA

WLSP

LCA

COA



Task Name	Duration	Start	Finish
Path Forward Engineering and Construction	1367 wks	2/29/16	5/9/42
SRP Scoping, Standards, Approaches, Sequences, and Schedules	52 wks	2/29/16	2/24/17
SRP 2018 Projects	93 wks	3/20/17	12/31/18
SRP 2019 Projects	107 wks	12/12/17	12/31/19
SRP 2020 Projects	107.2 wks	12/13/18	12/31/20
SRP 2021 Projects	107 wks	12/13/19	12/31/21
SRP 2022 Projects	107 wks	12/11/20	12/30/22
SRP 2023 Projects	107 wks	12/10/21	12/29/23
SRP 2024 Projects	107 wks	12/13/22	12/31/24
SRP 2025 Projects	107 wks	12/13/23	12/31/25
WLI and Manhole Rehab	85 wks	11/11/16	6/29/18
KI Blending/EQ1	195 wks	1/17/17	10/12/20
Park Pump Station Refurbishment	146 wks	10/5/16	7/23/19
Park Force Main Rehab and Extension	230 wks	10/5/16	3/2/21
Trout Creek and Tioga Interceptor Parallels	143 wks	4/3/23	12/26/25
End of Phase 1 Performance Evaluation	77 wks	8/25/25	2/12/27
Little Sister Pump Station Force Main	661 wks	9/5/16	5/4/29
Little Sister Pump Station	668 wks	9/5/16	6/22/29
KI Blending/EQ2	186 wks	6/8/26	12/28/29
Kecks Bridge Park Interceptor	254 wks	2/5/26	12/18/30
UMiT Trunkline Parallel	305 wks	2/15/27	12/17/32
Jordan Creek Interceptor Parallel	357.4 wks	2/15/27	12/20/33
AMB Trunkline Parallel	409.6 wks	2/15/27	12/20/34
Ancient Oaks Interceptor Parallel	514 wks	2/15/27	12/19/36
End of Phase 2 Performance Evaluation	135 wks	8/4/36	3/4/39
KI Blending/EQ3	166 wks	3/7/39	5/9/42

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Path Forward

- Signatory Meetings and Public Communications
- Capital Plan Development Process
 - Memorandum of Cooperation
 - 12/31/17 Plan submission to PADEP and USEPA
 - Project authorizations
- Start funding process
 - Partner funding and rate evaluations
 - LCA bonding and rate analyses
 - City bonding analyses



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The logo for Lehigh County Authority, featuring a stylized blue roofline with a water drop icon inside, and the text "Lehigh County Authority" below it.

The ARCADIS logo, featuring a stylized orange 'A' icon followed by the word "ARCADIS" in bold black capital letters, and the text "Design & Consultancy for natural and built assets" in smaller text to the right.