Western Lehigh County Sewer System Capacity

Review by Lehigh County Authority Board of Directors

August 26, 2019

Overview

- Sewer capacity – a multi-faceted challenge
- Brief history (2009-2019)
- Impacts of 2018-2019 weather patterns
- Where does that leave us now?
- Next steps

Sewer Capacity: a multi-faceted challenge

- Kline's Island Wastewater Treatment Plant
- Regional conveyance system
- Individual municipal collector systems
- LCA Industrial Pretreatment Plant
- Dry day vs. wet-weather conditions
- Weather & Climate Change
- Regulatory landscape
- Complex intermunicipal agreements
- Growth – timing, location, cost

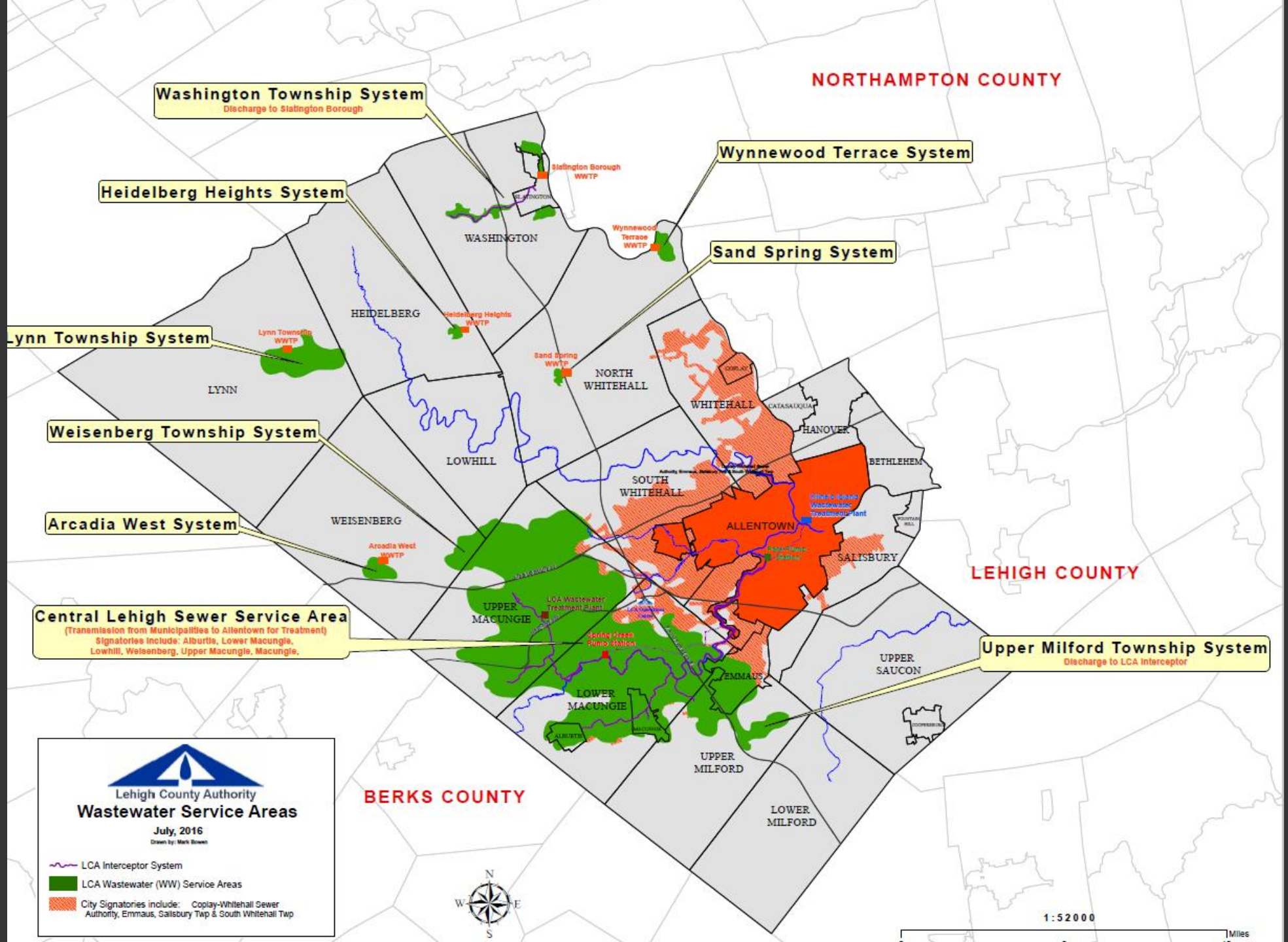
Municipalities in the Kline's Island Sewer System (KISS)

LCA / Western Lehigh Service Area

- Upper Macungie
- Lower Macungie
- Upper Milford
- Macungie
- Alburtis
- Weisenberg
- Lowhill

Allentown / City Signatories

- South Whitehall
- Salisbury
- Coplay-Whitehall Sewer Authority
- Emmaus
- Hanover
- City of Allentown


Washington Township System
Discharge to Slatington Borough
Heidelberg Heights System
Lynn Township System
Weisenberg Township System
Arcadia West System
Central Lehigh Sewer Service Area
(Transmission from Municipalities to Allentown for Treatment)
Signatories include: Alburtis, Lower Macungie,
Lowhill, Weisenberg, Upper Macungie, Macungie,
Wynnewood Terrace System
Sand Spring System
Upper Milford Township System
Discharge to LCA Interceptor
NORTHAMPTON COUNTY
LEHIGH COUNTY
BERKS COUNTY
WASHINGTON
HEIDELBERG
LYNN
LOWHILL
WEISENBERG
NORTH WHITEHALL
WHITEHALL
SOUTH WHITEHALL
HANOVER
BETHLEHEM
ALLENTOWN
SALISBURY
UPPER MACUNGIE
LOWER MACUNGIE
EMMAUS
UPPER SAUCON
UPPER MILFORD
LOWER MILFORD
Slatington Borough WWTP
Wynnewood Terrace WWTP
Heidelberg Heights WWTP
Lynn Township WWTP
Sand Spring WWTP
Arcadia West WWTP
LCA Wastewater Treatment Plant
Spring Creek Pump Station
Lehigh County Authority
Wastewater Service Areas
July, 2016
Drawn by: Mark Bowen
LCA Interceptor System
LCA Wastewater (WW) Service Areas
City Signatories include: Coplay-Whitehall Sewer Authority, Emmaus, Salisbury Twp & South Whitehall Twp
N
W
E
S
1:52000
Miles

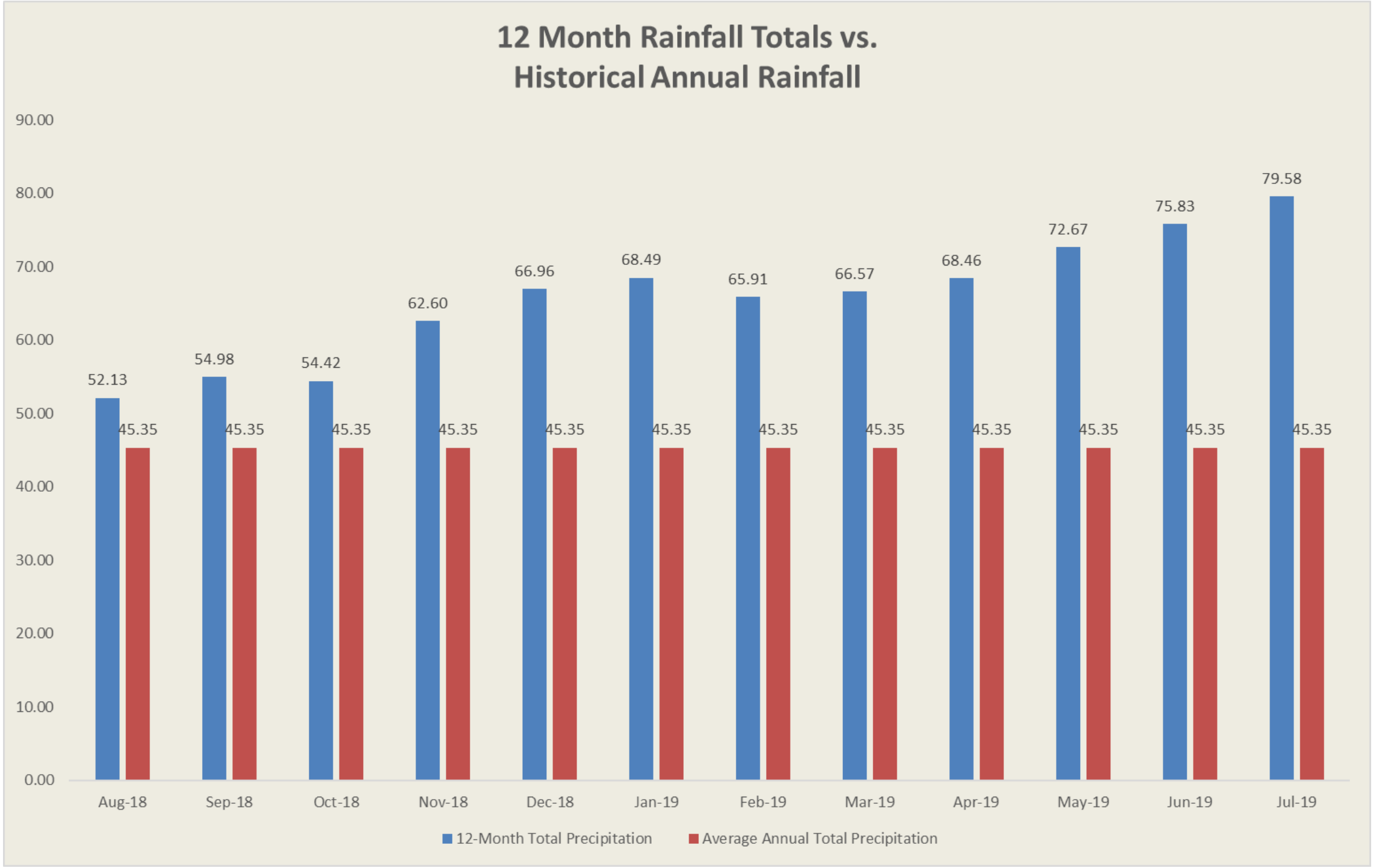
Brief History (2009-2019)

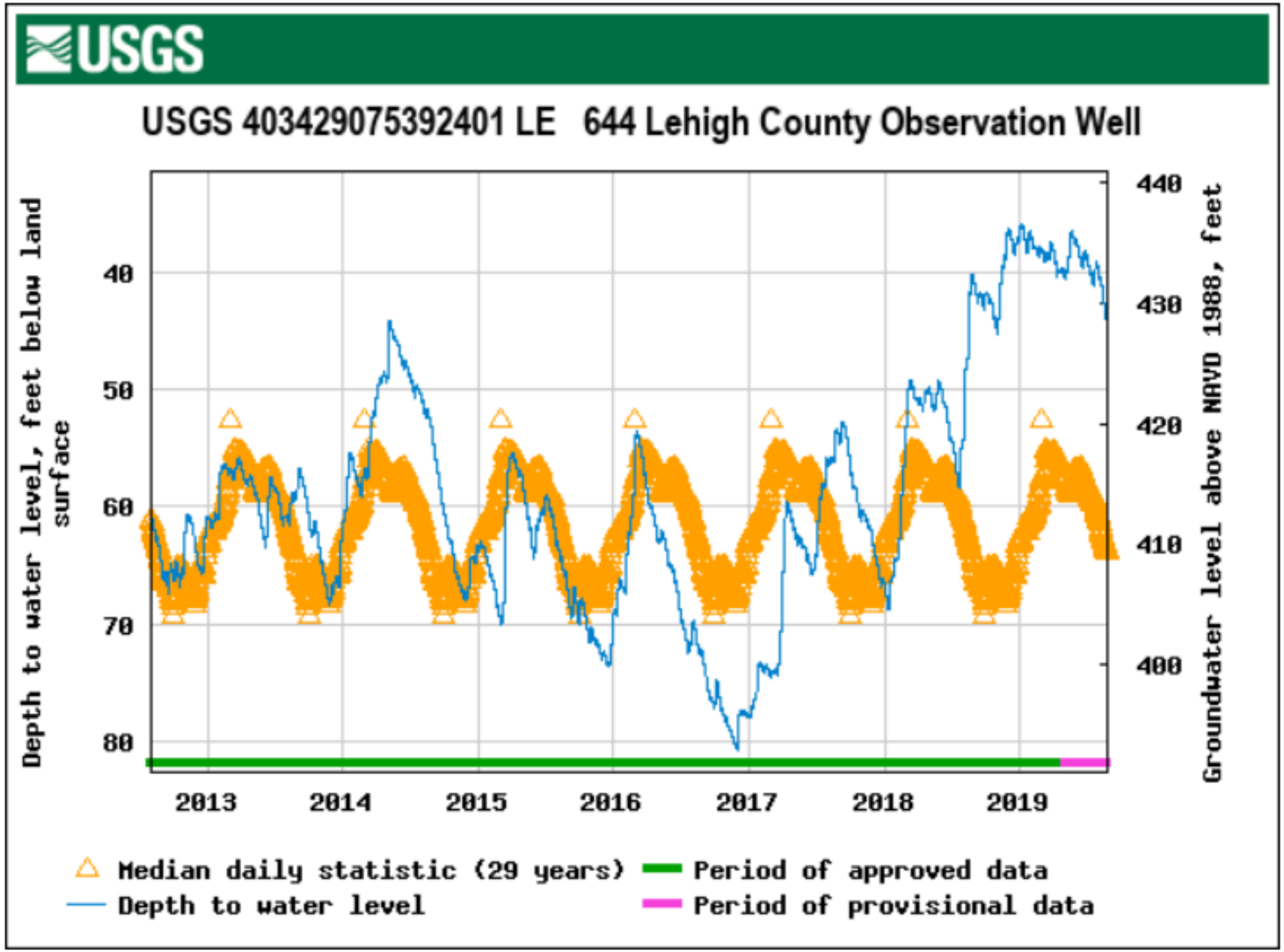
- 2009 – EPA issues Administrative Order (AO) to all 14 municipalities with 12/31/2014 deadline to eliminate sanitary sewer overflows (SSOs)
- 2009 – Western Lehigh Sewerage Partnership (WLSP) and Sewer Capacity Assurance & Rehabilitation Program (SCARP) were formed to address conveyance capacity challenges in LCA service area
- 2010 – 3 million gallon flow equalization basin (FEB) constructed
- 2011-2014 – Hydraulic modeling, planning and engineering on WLSP options for conveyance capacity and treatment capacity → Act 537 plan update? (completed in collaboration with City of Allentown)
- 2015 – EPA extends AO deadline to 12/31/2017
- Ongoing – WLSP municipalities completing significant system rehab to remove inflow & infiltration

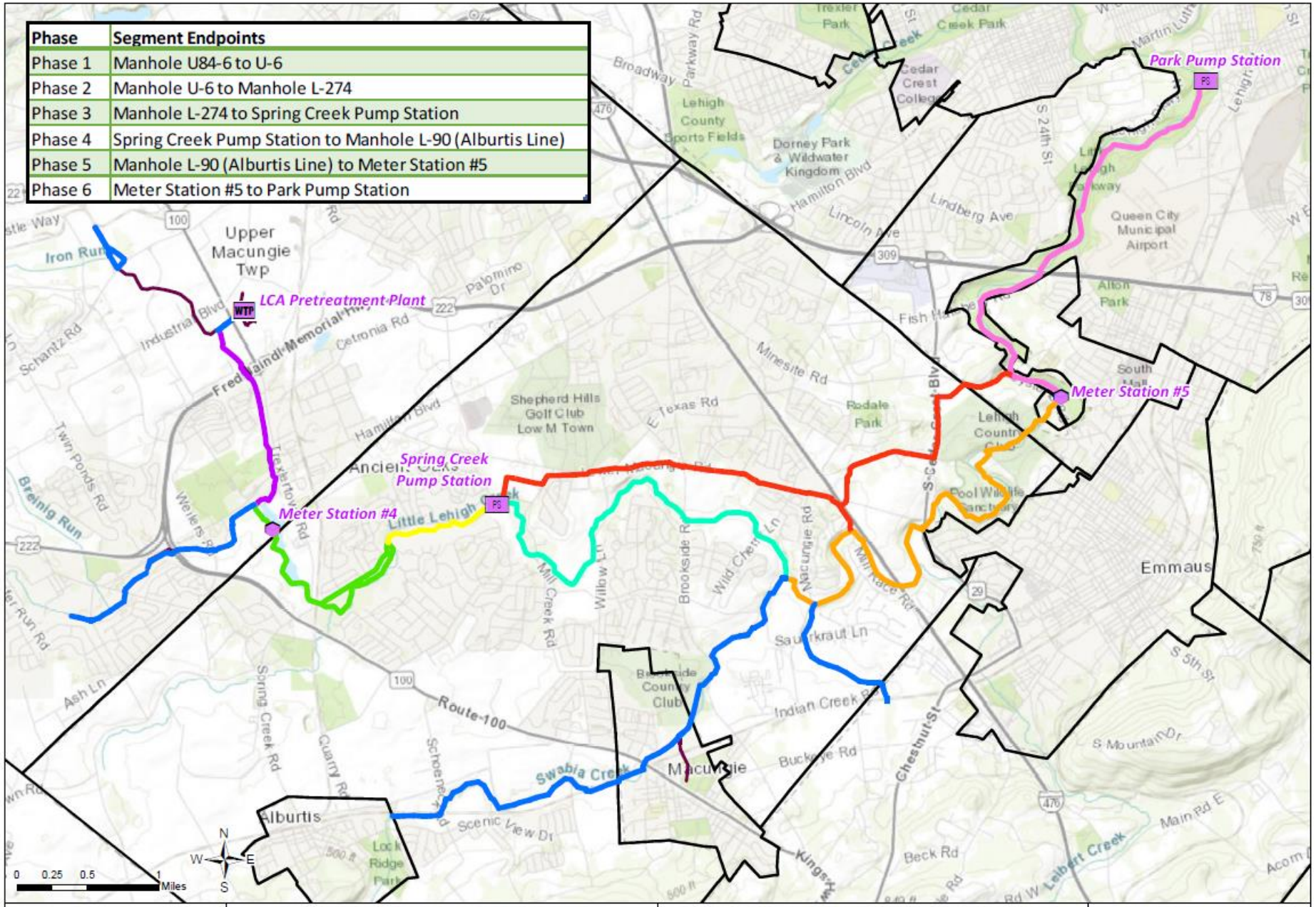
Brief History (2009-2019) - continued

- 2015 – DEP advises region to hold off on Act 537 work – focus on regional wet-weather plans
- 2016-2017 – LCA / City of Allentown collaborate extensively to develop integrated strategy for addressing the AO with capital intensive upgrades (>$300 million)
- Late 2017 – EPA advises region that capital intensive strategy is no longer preferred – instructs the region to focus on flow monitoring and system rehab
- 2018 – Regional Flow Management Strategy developed and submitted to EPA to address the new approach requested by regulators
- Early 2018 – record-breaking, prolonged rainy period begins
- November 2018 – LCA declares emergency to address high flows in Western Lehigh Interceptor
- March 2019 – EPA withdraws AO, transfers oversight back to PA-DEP

Impact of 2018-2019 Wet Weather


12 Month Rainfall Totals vs.
Historical Annual Rainfall
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
52.13
54.98
54.42
62.60
66.96
68.49
65.91
66.57
68.46
72.67
75.83
79.58
45.35
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
12-Month Total Precipitation
Average Annual Total Precipitation


USGS
USGS 403429075392401 LE 644 Lehigh County Observation Well
Depth to water level, feet below land surface
40
50
60
70
80
440
430
420
410
400
Groundwater level above NAVD 1988, feet
2013
2014
2015
2016
2017
2018
2019
Median daily statistic (29 years)
Depth to water level
Period of approved data
Period of provisional data



Lehigh County Authority

Western Lehigh Interceptor Emergency Project

Phase 1 — Phase 4 — LCA Western Lehigh Interceptor

Phase 2 — Phase 5 — Spring Creek Force Main

Phase 3 — Phase 6 — Test & Seal Completed 2016-2017

LEHIGH COUNTY AUTHORITY

WLI EMERGENCY PROJECT

PHASES 1-6

LEHIGH COUNTY AUTHORITY GIS

SCALE: 1:55,000 *DATE: 8/23/2019*

DRAWN: AKW *CHECKED:*

Impact of 2018-2019 Wet Weather

Good news

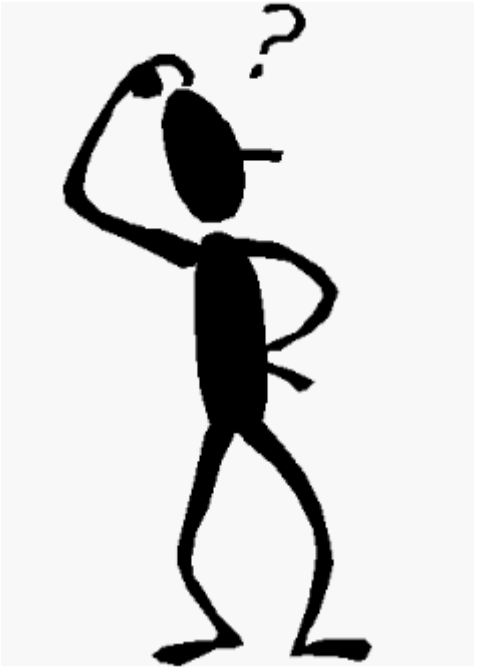
- SSOs and bypasses at the treatment plant have been relatively limited as compared to historical patterns
- Treatment plant is meeting all permit requirements despite very high flows
- Extraordinarily high groundwater table makes system leakage easier to find
- Western Lehigh interceptor emergency work has been efficient and cost-effective
- LCA Pretreatment Plant has performed far above design capacity

Bad news

- October notice of violation for multiple SSOs and bypasses in August 2018
- Western Lehigh exceeded its treatment allocation in 2018 → significant penalty paid to City treatment plant
- All flows in KISS (not just LCA's) are very high – makes the system susceptible to failure if we have heavy storm events
- It is generally accepted that this weather pattern could be repeated as a reality of climate change

Where does that leave us now?

- 10 years of good system rehab work to remove inflow & infiltration in the Western Lehigh area – this work is continuing
- Flow equalization basin is effective in managing peak flows
- Lots of capacity-related engineering work and planning activities
- BUT…



- Regional capacity plan halted due to shifting regulatory guidance
- Pressure for growth / economic development continues
- System is still nearly “full” and needs to be addressed
- WLSP “flow credits” from SCARP are dwindling

Next Steps – there is a lot we can do!

TREATMENT CAPACITY EVALUATIONS

- What is Kline's Island's maximum monthly flow capacity during prolonged wet weather? ***(today's request for approval)***
- How much flexibility and capacity can the LCA Pretreatment Plant offer to manage high flows or new growth? ***(kicking off now under contract terms with Jacobs)***
- Prepare to revisit prior engineering work on capacity upgrades (halted in 2015, so it's not terribly old/outdated) ***(future discussion)***

NOTE: Prior treatment capacity evaluations completed by AECOM focused on two primary options:

- ***Upgrade treatment capacity at Kline's Island***
- ***Upgrade LCA's Pretreatment Plant to full treatment with new discharge (Lehigh River, Jordan Creek or land application sub-options)***

Next Steps – there is a lot we can do!

CONVEYANCE CAPACITY EVALUATIONS

- How have our flows changed in 10 years and what do future flows look like in various storm events, including future growth projections? Has the 10 years of system rehab work been effective and what should the WLSP communities be focusing on next? (WLSP flow metering under way in 2019) ***(September approval for hydraulic modeling phase)***
- Have the WLSP communities received "flow credit" for all the system rehab they have done? How do we measure the positive impacts of the WLI emergency work? ***(WLSP engineers' meeting in September)***
- Will in-line storage or a new storage tank in Trexlertown area relieve current hydraulic restrictions in this area? Will it have a downstream impact that we need to manage? ***(September / October approval for engineering work)***
- Prepare to revisit prior engineering work on conveyance capacity upgrades that work with potential future treatment capacity upgrades (halted in 2017) ***(future discussion)***

Next Steps – there is a lot we can do!

COMMUNITY / STAKEHOLDER CONVERSATIONS

- How can the region balance economic development, environmental, regulatory and community needs? ***(ongoing discussion with PA-DEP)***
- How can the economic development community help? And what is the impact of future increases in tapping fees to pay for this work? ***(Lehigh Valley Economic Development Corp. & local business leaders)***
- How should LCA be planning for future infrastructure with unknown future climate change impacts? ***(assemble expert panel)***
- How do we fund the large system upgrades? ***(financing evaluations kicking off now)***
- How do we share the costs among the impacted municipalities? ***(ongoing collaboration with City, signatories, WLSP communities)***
- What does the community want for our future? Where will growth happen and when? Where should we plan for growth to absolutely not happen? ***(municipal leaders, County officials, Lehigh Valley Planning Commission & others)***

Discussion?