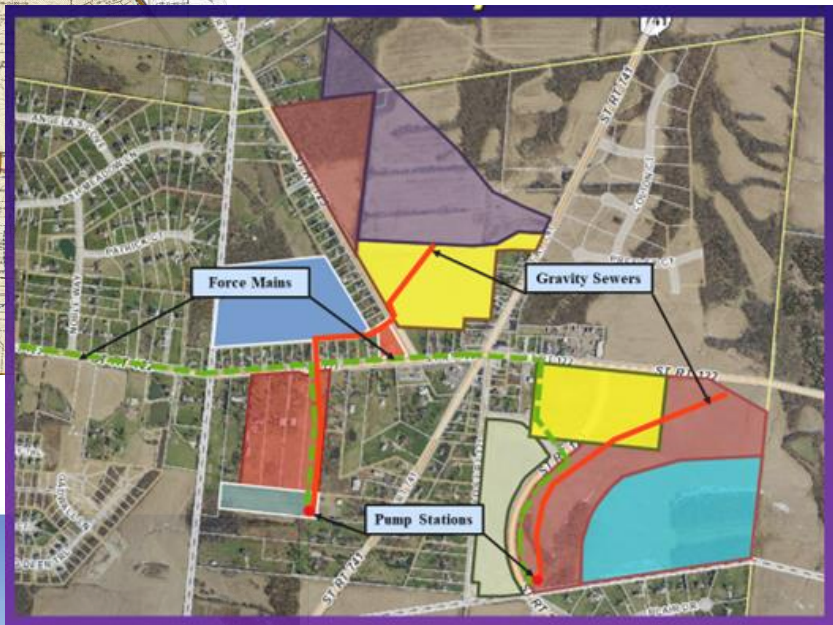
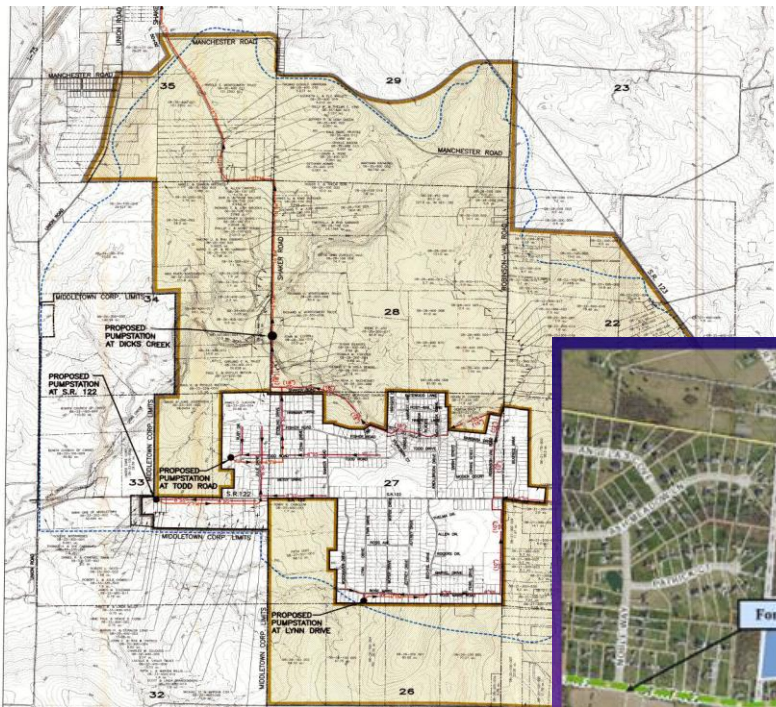


FINAL REPORT

Red Lion Area Sanitary Sewer Service Study




HUNTER
RED LION
AREA PLAN





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Red Lion Area Sanitary Sewer Service Study

SECTION 1: INTRODUCTION

1.1 Background

The means and methods to bring centralized sanitary sewers to the Red Lion Area have been discussed since the inception of the Dick's Creek Sanitary Sewer District in the late 1990's. A strong push to achieve well planned sewers and likewise desirable development of the Red Lion and Hunter areas was undertaken by a large committee of individuals including community groups and the WC Regional Planning Commission. Their extended efforts culminated in 2017 with the publishing of the Hunter/Red Lion Area Plan. The plan laid out conceptual development ideas for the properties in and around Red Lion and included several scenarios which might be utilized to sewer those areas. The Plan was endorsed by the Clearcreek Township Trustees, the WC Regional Planning Commission and the Warren County Board of County Commissioners, but actual implementation of the plan would require desire and commitment from a majority of the Red Lion area property owners and stakeholders.

In an attempt to further stimulate interest in development in the Red Lion area, the Clearcreek Board of Township Trustees requested the Warren County Department of Water and Sewer to look for a simplified alternative plan to provide sewer to as many Red Lion properties as practical, but with limited infrastructure. The WCWSD presented their simplified plan to the Clearcreek Trustee representatives in the March 20, 2018 regular BOCC meeting. Discussions of the proposed plan at that meeting included the desire of the Township to bring economic development to the Red Lion area through both commercial and mixed uses. It was noted that the existing Hunter/Red Lion sanitary sewer area boundary would ultimately require modification to include Red Lion areas to be served. The BOCC stated the need for balanced growth in the area and suggested that an engineering study be undertaken and paid for by the Township. The Township agreed in concept to fund an engineering study and requested the guidance of the WCWSD to navigate the necessary process.

After several meetings and discussions with the WCWSD, the Clearcreek Board of Township Trustees were prepared to advertise a Request for Qualifications for the Red Lion Area Sanitary Sewer Service Study (Appendix A). The deadline for submittals was set for April 30, 2019. Several submittals were received by the Trustees, each reviewed, rated and ranked, with interviews being held with the top firms. Environmental Engineering Service was the selected firm to perform the work, and after negotiation of responsibilities and compensation, an agreement was signed between the Consultant and the Township in June of 2019. The desired outcome of the Agreement is summarized in Section 2.2.





Red Lion Area Sanitary Sewer Service Study

1.2 Desired Outcome

The primary tasks of this project were to:

- Gather historical and technical data from involved agencies
- Develop a list of stakeholders and contact them for input
- Develop a conceptual sewer plan to serve interested properties
- Hold public meetings for discussions and input from stakeholders
- Refine the conceptual plan based on stakeholder's desires
- Calculate estimated project costs and expected capital assessments
- Present the modified sewer plan and assessments to stakeholders for ultimate buy-in
- Present a Final Report to the Board of Trustees detailing the project feasibility

The Board of Trustee's desired outcome of this project was to gauge the feasibility of a cost-effective sanitary sewer project for the Red Lion area that would support both commercial and mixed commercial/residential developments in a well-planned, beneficial manner.



Red Lion Area Sanitary Sewer Service Study

SECTION 2: DATA COLLECTION & ANALYSIS

2.1 Review of Previous Studies

The two main studies investigating alternatives for sanitary sewer in the Red Lion area are as stated in the previous section: the Warren County Regional Planning Commission's Hunter/Red Lion Area Plan (Appendix B), and the 2018 Red Lion Area document (Appendix C) and presentation to the BOCC by the WCWSD on March 20, 2018.

The Hunter/Red Lion Area Plan Chapter 6 provided key information regarding the proposed pathway which could be utilized to sewer the Red Lion area: collect sewage flows from the Red Lion area and transmit them to the Hunter Area Sanitary sewer system either through gravity sewers or pressure sewer forcemains, or a combination of both. The combined flows of the Hunter sewers and Red Lion sewers would be collected and pumped from the existing WCWSD Dick's Creek SLS, through its 16" ductile iron forcemain, into the Franklin City sanitary sewer system, as it does from the Hunter system today.

The gravity approach shown in the Hunter/Red Lion Area Plan (Option 1) proposed to sewer a large portion of the area with a gravity trunk sewer. This alternative would require relocating or raising by 30 feet a significant portion of State Route 122 directly west of the intersection with State Route 123. The cost per mile to raise/reconstruct the State Highway here would be in the range of \$3-4 million dollars, before adding the cost of the sewer construction. Additionally, most of the property developers would face significant sewer construction connection costs both north and south of State Route 122 for most of the Red Lion area. Another major drawback to this option would be the creation of deep sanitary sewers that would be difficult to access and maintain in the future.

The Hunter/Red Lion Area Plan (Option 2) that included one master sewage lift station (SLS) for the entire Red Lion area, located in the northeastern most corner of the proposed planning area, was both costly and did not extend facilities near to the expected developable properties. This plan may have also created some deep public sewers in order to serve some of the outlying properties. The most significant issues with this alternative are downstream improvements for conveyance to the Dick's Creek SLS, improvements to the SLS and further downstream, significant upgrades to the WWTP, estimated at \$10 million dollars.

The Hunter/Red Lion Area Plan option (Option 3) that proposed a limited service area just near the heart of Red Lion, but would still cost over \$1 to 1.3 million dollars to construct, contained a smaller, centrally located SLS. This alternative would limit future potential growth of the greater Red Lion area and promote multiple additional private SLS's in order to sewer these developable properties.



Red Lion Area Sanitary Sewer Service Study

Comparing each of these three scenarios, the common unit typically used is the cost to sewer a property per basic unit of sewage flow. The base unit of flow for most sanitary sewer studies is 400 gallons of sewage discharge per day per residential household, which can be termed an Equivalent Residential Unit (ERU). Residential zoning in the Red Lion area currently allows for development of two residential units per acre with available sanitary sewers. Two residential units per acre is equivalent to 800 gallons per day per developable acre. Other than residential development, land uses such as commercial, industrial, and mixed-use typically produce sewage flows of 1,200 gallons per day per acre. These sewage flow estimates are supported by the work done by the WCWSD and presented in their 2017 Red Lion Area Sewer Study (Appendix D).

Cost Analysis: Using the assumed land use designations and anticipated project costs reported in the Hunter/Red Lion Area Plan, with adjustments for differences in residential development density (from 2.4 down to 2 ERU per acre) and the cost of additional downstream improvements, the relative cost per ERU for the basic backbone sanitary sewer system would be approximately \$5,850 for Option 1, \$5,750 for Option 2, and between \$3,300 and \$4,200 for Option 3. These cost figures do not include on-site improvements necessary to serve sanitary sewer service to most of the developable acres involved.

Upon request of Clearcreek Township, the WCWSD again looked at the Red Lion area in 2018. The requested review involved adjustments to the single SLS Option 3 scenario to maximize the developable acreage in the core Red Lion area, including properties as far east along State Route 122 as practically possible. The March 2018 proposed layout shown in Figure 2.1 was presented to Clearcreek Township in the March 20, 2018 BOCC public meeting. The results of this

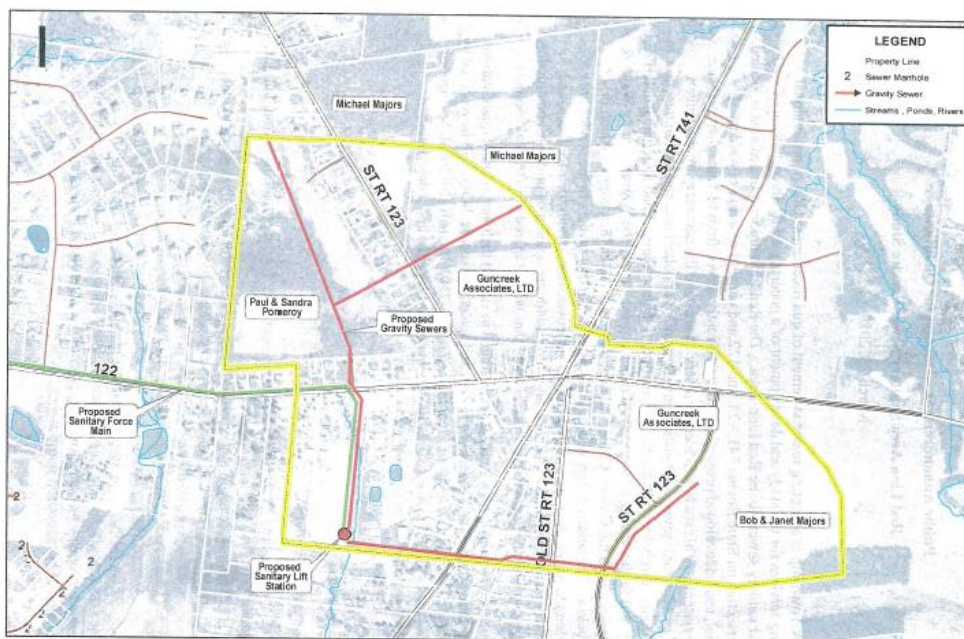


Figure 2.1 WCWSD Proposed Sewer Layout 2018



Red Lion Area Sanitary Sewer Service Study

meeting were three-fold: Clearcreek Township will commission a study to develop a plan to sewer optimal acreage and determine the financial feasibility of said plan; the Hunter Sewer boundary area would need to be modified to include any proposed development of public sewers in the Red Lion area; the BOCC would need to formally accept a new SLS as part of the public sewers, but were non-comital stating they would make that determination at a later date.

Analysis: The area proposed to be served in the 2018 Red Lion Area layout appears to include most of the properties that could be serviced by a “one-station” sewer design. This layout could be modified slightly to include more sewerable acreage by adjusting the proposed SLS to the south, further downgradient, to collect flows by gravity from an expanded service area, slightly larger than that shown in Fig 2.1. The most significant factor of a “one-station” design will be the BOCC’s willingness to accept or not accept future ownership of that SLS.

2.2 Hydraulic Data Collection and Capacity Review

Any proposed Red Lion sewer system will be tributary to the Hunter Sanitary Sewer System and further downstream, the Franklin City sanitary sewer system. The proposed sewage flows will ultimately pass from the Franklin sewers into the Clear Creek SLS and be pumped to the Franklin Regional WWTP. Flow capacity of these systems needed to be identified.



Figure 2.2 Red Lion-Hunter Collection Route





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Plan and profile drawings of the downstream conveyance system were obtained from the three sources listed above. These maps were analyzed to acquire the existing sewer slopes and pipe diameters. This data was then used to calculate the theoretical maximum full-pipe capacity of each segment of the gravity and pressure lines. The full set of calculations are contained in Appendix E.

2.2 Analysis and Findings: The critical components of the sewage flow hydraulic data are:

Existing Hunter Area Sewage Flows: 0.375 MGD Average Daily, 1.1 MGD Peak Daily Flow

Minimum Existing Full-Pipe Hunter Gravity Sewer Capacity: 3.62 MGD

Existing Dick's Creek Maximum Pumping Capacity: 2.8 MGD

Future Peak Capacity of Dick's Creek 16" Discharge FM: 5.4 MGD at velocity 6 FPS

Minimum Existing Full-Pipe Hunter/Franklin Gravity Sewer Capacity: 6.3 MGD

Minimum Existing Full-Pipe Franklin City Gravity Sewer Capacity: 5.7 MGD

Peak Capacity of Clear Creek SLS and Discharge FM: 8 MGD

Current Treatment Capacity of the FRWRF: 4.5 MGD Average Daily Flow

The calculated ratio of Dick's Creek peak wet weather flow of 1.1 MGD to the 375,000 gpd average daily influent flow yields a peak wet weather flow factor of 2.9. This peak flow factor is in line with standard peaking factor calculations for small to medium sized residential areas.

The limiting factors for conveyance of the combined Hunter/Red Lion sewage flows are twofold: the existing minimum full-pipe capacity of the gravity sewers and the maximum pumping capacity of the Dick's Creek SLS. Based on the data presented above:

Current Hunter excess gravity sewer capacity: $3.62 \text{ MGD} - 1.1 \text{ MGD} = 2.5 \text{ MGD}$.

Dick's Creek SLS existing excess pumping capacity: $2.8 \text{ MGD} - 1.1 \text{ MGD} = 1.7 \text{ MGD}$

Future Hunter Area peak flows are projected to be 2.9 MGD. Based on the minimum full-pipe capacity of 3.62 MGD, a maximum additional flow of 0.720 MGD could potentially be accepted from the Red Lion system, without upgrading the gravity sewers in Hunter.

Dick's Creek SLS pumps would need upsized to meet those future flow conditions, but the 16" FM would still have an excess capacity of $5.4 \text{ MGD} - 3.6 \text{ MGD} = 1.8 \text{ MGD}$.

Downstream of the Dick's Creek discharge point, there appears to be ample capacity in the gravity and pressure lines all the way to the FRWRF. Capacity issues at the WWTP final clarifiers could be problematic, depending upon the pace of Hunter and Red Lion potential future connections (reference letter from FRWRF, Appendix F).

SECTION 3: PRELIMINARY SEWER LAYOUT

3.1 Sanitary Sewer Trunk Layout to Reach Stakeholder Properties

As stated in the previous section, after thorough analysis of the previously proposed sanitary sewer layouts and further review of the Red Lion area topography, it was determined that the WCWSD proposed 2018 WCWSD Red Lion Area graphic (Figure 2.1) was logical starting point for the layout proposed here.

The southern draining topography of the areas south of State Route 122 and west of St Rt 741 includes most of the properties which can be serviced by one common SLS. Figure 3.1 shows the areas to be served and the trunk sewers needed to reach those properties. The SLS was positioned at the lowest practical existing elevation to be able to accept sewage flows from the designated properties through gravity sewer mains. The sewage collected at the SLS could then be pumped through the forcemain and discharged into the Hunter sanitary sewer system.



Figure 3.1 Preliminary Sanitary Sewer Plan

3.2 Estimation of Sewage Flows

To properly size the sewer mains and SLS pumps and forcemain, anticipated sewage flows from these properties was established. Based on the residential/commercial/mixed use flow rates established previously in Section 2.1, and the total acreage of each parcel, the total anticipated flow was calculated. The individual property contributions are shown in Figure 3.2.

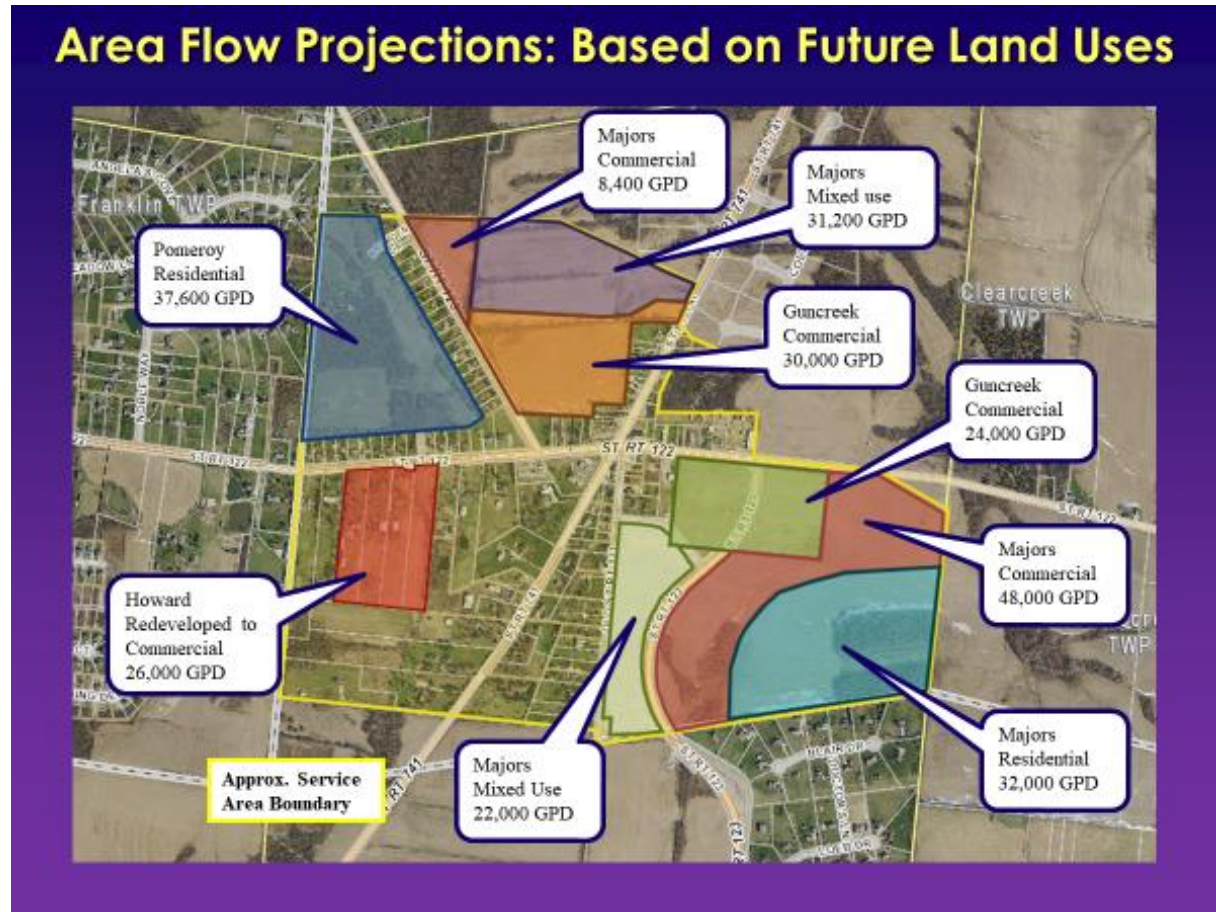


Figure 3.2 Flow Projections Based on Land Use

The sum of the projected sewage flows from this area is nearly 260,000 GPD (estimated peak daily flow of 610,000 GPD). As discussed in Section 3.2, the minimum excess carrying capacity in the Hunter sanitary sewers was estimated to be 720,000 GPD. This confirms that the Hunter gravity sewers could accept and transmit without issue, these initial estimated future flow contributions from the Red Lion area shown here.



Red Lion Area Sanitary Sewer Service Study

SECTION 4: PUBLIC MEETINGS WITH STAKEHOLDERS

4.1 Public Meeting No.1: Introduction of Preliminary Sewer Plan

The first public meeting with stakeholders (final stakeholder list, Appendix G) to introduce and discuss the proposed Red Lion sanitary sewer plan was held November 6, 2019 (PPT document, Appendix H). The Plan was presented and discussed as to how projected sewage flows were calculated and the pathway the gravity and pressure sewer lines would take. Questions regarding the proposed service area boundary were asked and answered. The biggest issues were: What will the project cost, and Who will get assessed for the sewer construction? Regarding project cost, that issue was still nebulous due to this being the initial public meeting to discuss the plan, but preliminary construction assessment costs per \$1M of project cost were presented, \$1,547 per ERU per \$1M Construction cost (see Appendix H). Residents' fears of forced connection to the sewer system were calmed by statements that only those residents desiring a sewer tap and development property owners desirous of sewer capacity would be charged fees for the sewer project. No existing resident would be forced to connect to the new sanitary system.

Attendees were requested to update their intended developments with the Township and/or with the Project Engineer and make any formal written or verbal comments to be incorporated into the next public meeting. Items to be addressed at Public Meeting No.2 included: updated sewer capacity requests (ERU) and updated project costs.

4.2 Public Meeting No.2: Refinement of Projected Flows and Project Cost

Prior to the second public meeting, many of the stakeholders had either refined their projected ERU numbers or asked to be included into the ERU count. The updated numbers were presented December 11, 2019 in the Public Meeting No.2 presentation (PPT document, Appendix I). The slide from that presentation is presented below as Figure 5.1 Updated Area Flow Projections. The current desired ERU count as of this meeting was 628.5 ERU (400 GPD per ERU calculates to an average daily flow of 251,400 GPD, estimated peak flow of 458,100 GPD).

The probable opinion of capital construction costs was presented at the meeting (Appendix J): \$3.5M. This cost did not include potential rock excavation if encountered during construction, costs associated with any necessary upgrades to the WC Dick's Creek SLS, or costs associated with treatment or capacity upgrades at the FRWRF. These costs could be significant increases to the project budget. Per the ERU count listed above, the project cost assessment would be approximately \$1,591 per ERU per \$1M of project cost, or \$5,568.50 per ERU. On an annual basis for 20 years at 1.78% APR, the cost per year per ERU per year would be about \$332.



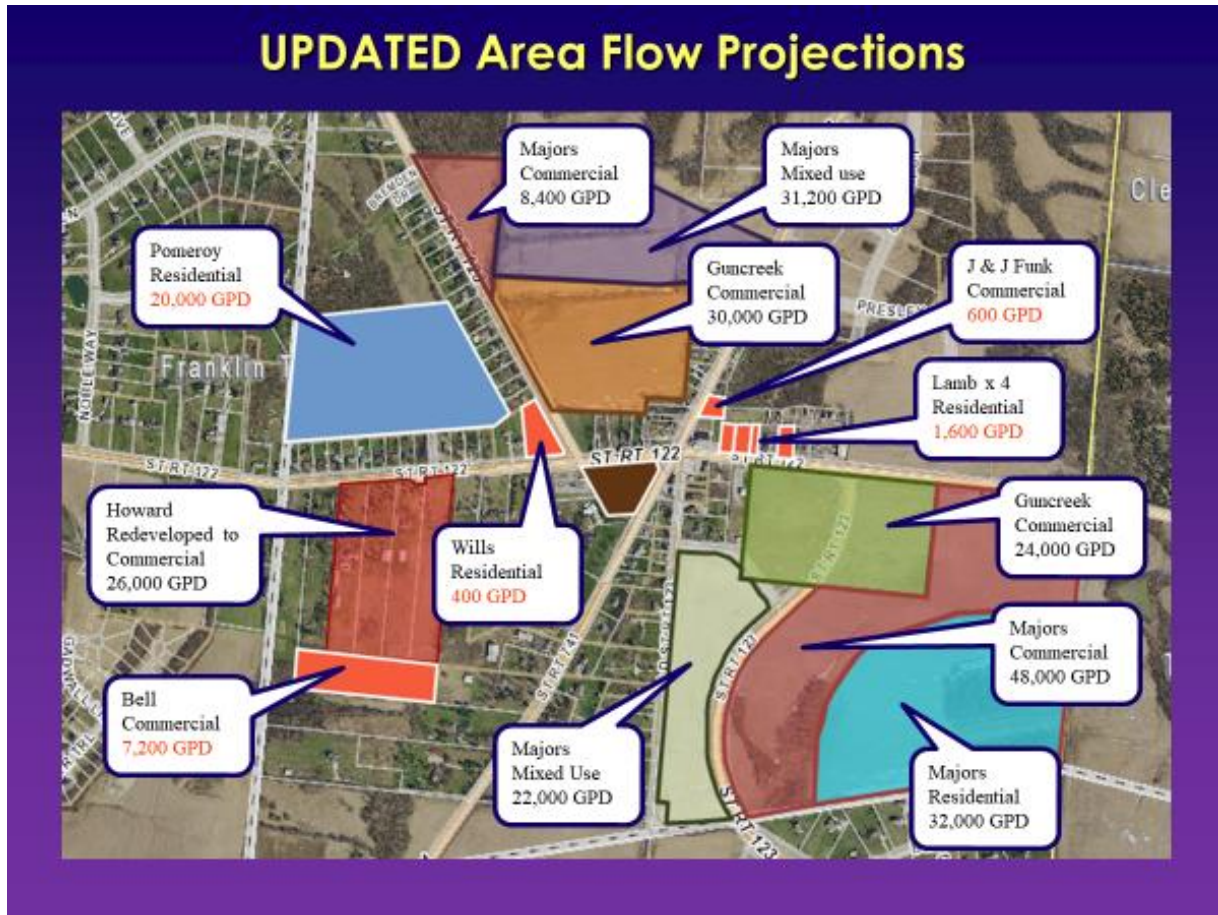


Figure 4.1 Updated Flow Projections

The steps listed moving forward from Meeting No.2: property owners must refine and commit to their request for ERU’s; gain approval of the entire project from the Board of County Commissioners; gain approval of both hydraulic capacity and treatment capacity from the Franklin Regional Waste Water Treatment Corporation.

In order to move the project forward in the time constraints set out by the Township, firm ERU commitments, either verbally or in writing, were requested to be lodged by residents no later than January 3, 2020.



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4.3 Public Meeting No.3: Updated Projected Flows and Project Cost

Prior to the January 22, 2020 Public Meeting No.3, residents were sending in their updated ERU requests or making verbal requests over the telephone. Several residents requesting inclusion in the ERU count could not be serviced sewer due to the layout of the trunk system design. Those properties would have the potential to connect to the sewer system in the future if a sewer main were constructed near their residence. Provisions were made for these future connection request scenarios from existing residents by Clearcreek Township and the WCWSD agreeing in concept to add 50 ERU as future connection placeholders. The final ERU count is shown in Figure 5.2.

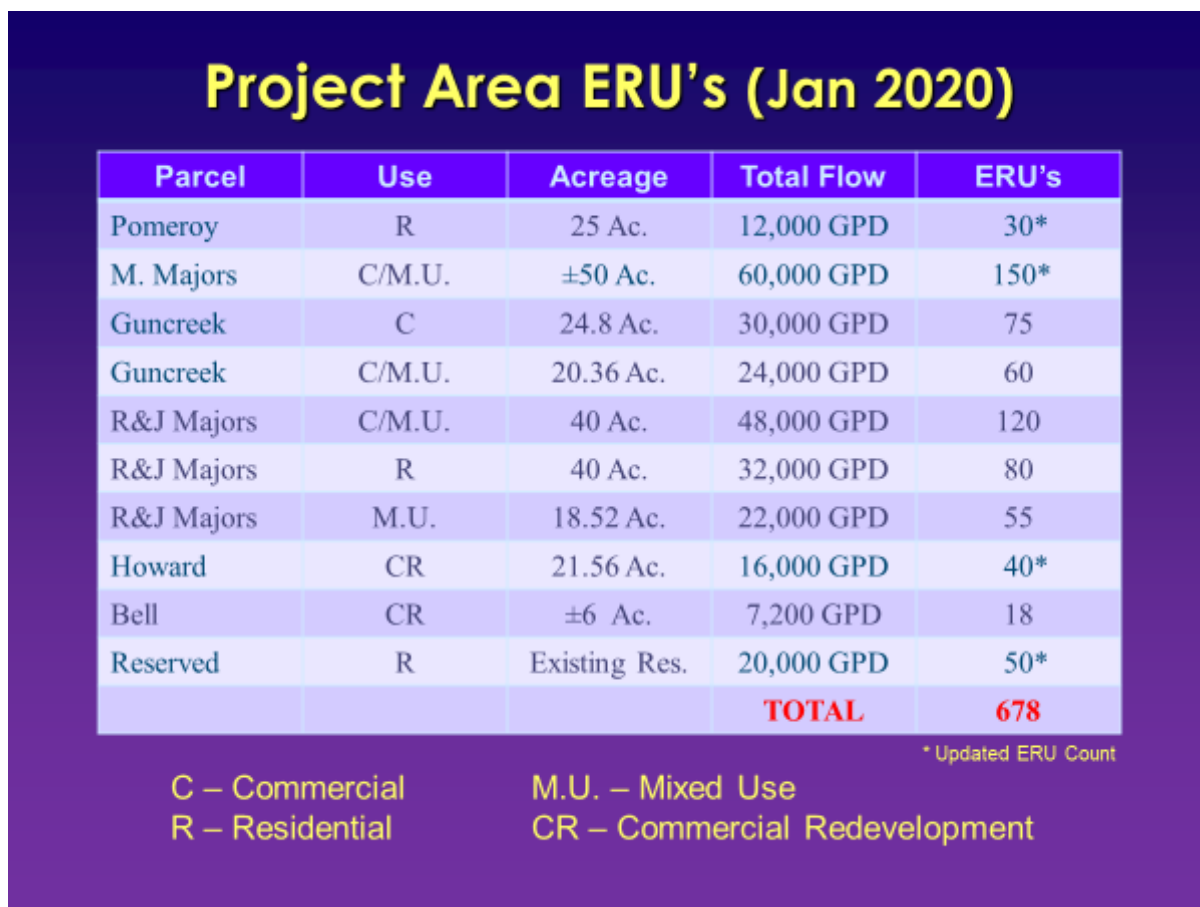


Figure 4.2 Final ERU Requests

The updated sewage flow totals for the requested 678 ERU's calculate to be 271,400 GPD average daily flow and 518,100 GPD estimated peak flow. The excess capacity of the downstream gravity sewers as stated previously, should accommodate these flows.



Red Lion Area Sanitary Sewer Service Study

As stakeholders were finalizing their ERU requests, one stakeholder, John Forman, who had been adamant from the beginning of this project that sewers would not cross his property, circulated a petition to residents to oppose the sanitary sewers. He received several signatures affirming their opposition to the project. This petition by itself would not necessarily stop the project, but it did firm up the minds of four property owners from which key easements would have been necessary to build the project as previously proposed.

The resultant modified sewer layout is shown in Fig 5.3. The changes to the original plan include a second SLS, additional forcemain, adjustments to the gravity trunk sewer routing, and a slight increase in sewerable acreage on the north edge of the service area.



Figure 4.3 Alternate Sewer Plan

The plan modifications were significant and impacted the probable cost of construction, increasing it from \$3.5M to \$4.0M. The estimated cost per ERU rose from \$5,568.50 to \$5,900.



Red Lion Area Sanitary Sewer Service Study

SECTION 5: PROJECT SUMMARY

5.1 Project Highlights and Findings

This project began with the gathering of previously proposed sewer plans and development studies. Technical and physical data about the area topography, existing Hunter sanitary sewers, pump station capacities, and Franklin City sanitary sewers were collected and analyzed.

Clearcreek Township was instrumental in developing a stakeholders list and providing contact information such that development desires could be gathered from the property owners in the study area. This list was refined throughout the project and the most recent version is included in the Appendix of this report.

Based on previous sewer plans and considering property owners development desires, a new sewer plan was developed and presented to the public. The plan went through a series of slight modifications throughout the public meeting/stakeholder comment process. A final version of the plan was presented at the third and final public meeting. A capital project cost total and individual capital cost assessments by property were presented and fairly well received.

The answer as to this project's feasibility question appears to be "yes."

Reviewing the numbers:

Projected sewage flows: 0.272 MGD average daily flow, 0.518 MGD peak daily flow

Future minimum excess capacity of Hunter gravity sewers: $3.6 \text{ MGD} - 2.9 \text{ MGD} = 0.7 \text{ MGD}$

Red Lion peak flow will pass through Hunter gravity sewers without upgrade: $0.7 > 0.518$ YES

Dick's Creek SLS pumps will need to be upsized in the future to pump a peak flow of 3.4 MGD.

The peak flow of 3.4 MGD is less than the maximum carrying capacity of the DCSLS forcemain.

The sanitary sewer system downstream of the discharge point from DCSLS will carry 3.4 MGD.

The destination WWTP owned by the FRWWTC could in concept accept future average daily flows of 0.272 MGD from Red Lion, but depending on the pace of development in Hunter and Red Lion combined, the WWTP may not be capable of handling the combined area peak flow.

Project Capital Cost: \$4M per current layout, Capital Assessment Cost: \$5,900 per ERU.





Red Lion Area Sanitary Sewer Service Study

5.2 Sanitary Sewer Project Status as of Final Report

Moving this project forward includes these necessary steps:

- Formal acceptance of the Project by the Warren County Board of County Commissioners and Clearcreek Township Board of Trustees
- A legal change to the Hunter Service Area boundaries to include the Red Lion service area
- Receipt of ERU requests from property owners as Petition Statement & Waiver forms
- Receipt of formal acceptance letter from FRWWTC accepting plan concept
- Commitment by the Warren County Board of County Commissioners and Clearcreek Township Board of Trustees to participate in future FRWRF peak weather improvements

The unfortunate current circumstance impeding this project from beginning these steps forward is the withdrawal of verbal commitments for request for sanitary sewer service (in a meeting with the largest stakeholders, held days after the 01/22/2020 Public Meeting). As presented in Figure 5.2, the Majors and Gun creek properties total 540 of the 678 ERU's requested. The loss of essentially 80% of the project ERU participants has severely limited further consideration of project feasibility.

5.3 Future Scenario/Coordination with Warren County

Alternative sanitary sewer layouts could be considered in the future that would include additional properties to the current Red Lion plan and increase the ERU count without raising the capital construction cost significantly. Opportunities may exist for negotiations with Warren County for modification of the existing Hunter sanitary sewer service area to allow for additional flows from the Red Lion area beyond basic acceptance of the current Red Lion Area plan. These alternative layouts do not meet the criterion put forth for this Project and thus were not considered here.