City of Kyle, Texas

Wastewater Collection System Hydraulic Model Final Report - Amendment

Burgess & Niple, Inc.

June 2016

REPORT

WASTEWATER COLLECTION SYSTEM HYDRAULIC MODEL FINAL REPORT - AMENDMENT

CITY OF KYLE, TEXAS

STATE OF TEXAS
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PROFESSIONAL ENGINEER

6/28/16

Prepared By:
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Austin, Texas

TBPE FIRM REGISTRATION NO. F-10834

Burgess & Niple Project No. 53574
June 2016

Executive Summary

Burgess & Niple, Inc. (B&N) was engaged by the City of Kyle to develop a hydraulic model of the existing wastewater collection system. The purpose of this amendment to the final report for the wastewater hydraulic modeling is to provide:

1. 2016 wastewater hydraulic model update reflecting the current modeled wastewater collection system performance based upon updated system map information;
2. Modeled flow projections and wastewater collection system performance results for 2016, 2022, and projected full build-out conditions, for developments listed in Table 7.1.A.
3. Resultant recommendations to convey projected wastewater from known developments in 2022 and projected full build-out conditions, for developments listed in Table 7.1.A.

This amendment is organized as follows:

- **Table 7.1.1A Known Development Properties for City of Kyle Water and Wastewater Systems Flow Projections** provides a listing of known developments as of May 17, 2016 and estimated projected flows for average dry weather (ADF) and wet weather peak flow (WWPF) in years 2022 and projected full build-out for each proposed development, as based upon information provided by the City of Kyle (map updates, new development connections points and new development Living Unit Equivalent (LUE) projections).

- **Year 2016 Wet Weather Current System** map displays the model results of the updated City of Kyle Wastewater System, based upon map data provided by the City of Kyle in May 2016, in wet weather projected conditions.

- **Future Developments and Connecting Lines** map displays the known projected development locations and line extensions to the City of Kyle wastewater system.

- **Year 2022 Wet Weather Proposed Developments Current System with Bolted Manholes** map displays the hydraulic model results based upon the development projections and resultant system flows, provided in Table 7.1.1A. Modeling the wastewater system with the manholes bolted simulates the system response if wastewater cannot leave the system through manholes.

- **Year 2022 Wet Weather Proposed Developments Current System with Non-Bolted Manholes** map displays the hydraulic model results based upon the development projections and resultant system flows, provided in Table 7.1.1A. Modeling the wastewater system with the unbolted manholes simulates the system response, allowing wastewater to leave the system through manholes.

- **Full Build-out Wet Weather Model Results** map displays the hydraulic model results for projected full build-out conditions, based upon the development projections and resultant system flows, provided in Table 7.1.1A

- **Full Build-out Wet Weather Model Results (Except Nance and BRI/McCoy)** map displays the hydraulic model results for projected full build-out conditions, based upon the development projections and resultant system flows, provided in Table 7.1.1A, with the exception of the Nance and BRI/McCoy developments.

- **Figure 8.01.1 Wastewater Improvement Recommendations** map provides an overview of all wastewater projected improvements, applying wet weather calibrated conditions and the development projections and resultant system flows as provided in Table 7.1.1A.

- **Table 11.0.2 Estimated Construction Costs for Recommended Improvement Projects** lists the recommended wastewater system improvements and associated costs, based upon development projections in Table 7.1.1A and wastewater hydraulic model results for new development full build-out.

- **Priority 1: Wastewater Improvement Recommendations** map displays the Priority 1 recommended improvements, applying wet weather calibrated conditions and the development projections and resultant system flows as provided in Table 7.1.1A. Priority 1 projections are anticipated to meet 2022 development projections.

- **Table 11.02A Priority 1: Estimated Construction Costs for Recommended Improvement Projects** lists the Priority 1 recommended wastewater system improvements and associated costs, based upon development projections in Table 7.1.1A and wastewater hydraulic model results for new development and the Development Triggers indicated by Improvement Project.

- **Priority 2: Wastewater Improvement Recommendations** map displays the Priority 2 recommended improvements, applying wet weather calibrated conditions and the development projections and resultant system flows as provided in Table 7.1.1A. Priority 2 projections are anticipated to meet development projections following 2022, and the completion of Priority 1 projects, before 2027.

- **Table 11.02B Priority 2: Estimated Construction Costs for Recommended Improvement Projects** lists the Priority 2 recommended wastewater system improvements and associated costs, based upon development projections in Table 7.1.1A and wastewater hydraulic model results for new development and the Development Triggers indicated by Improvement Project.

- **Priority 3: Wastewater Improvement Recommendations** map displays the Priority 3 recommended improvements, applying wet weather calibrated conditions and the development projections and resultant system flows as provided in Table 7.1.1A. Priority 3 projections are anticipated to meet development projections following 2027 and the completion of Priority 2 projects.

- **Table 11.02C Priority 3: Estimated Construction Costs for Recommended Improvement Projects** lists the Priority 3 recommended wastewater system improvements and associated

costs, based upon development projections in Table 7.1.1A and wastewater hydraulic model results for new development and the Development Triggers indicated by Improvement Project.

- **Table 11.02D Development Abbreviations** lists the abbreviations developed for each known development to date, for brevity in listing Development Triggers in Tables 11.02 through 11.02C.

- **Table 11.02E Estimated Construction Unit Costs for Recommended Improvement Projects** lists the unit costs applied in development the construction estimates in Tables 11.0.2 through 11.0.2C.

A summary of recommendations and costs is provided below:

Table E-1: Estimated Construction Costs for Recommended Improvement Projects

Improvement Project	Pipe Size[2]	Total Footage	Total Estimated Cost[1]	Development Triggers	WWPF[3] at Full Build-Out (MGD)
WWTP Interceptor Improvement Phase 1[5]	54 Inch	6,060	$3,437,200	ANT, AZT, BRR, BRI, BRK, BSP2, BCRP, CS, CSBC, CV, CM, CF, DG, FLA, HCP, HJA, I/D, KEW, LS, LT, NA, OGA, OM, PC, SF, SH, SA, TPCA, VPCA, WP	48.0
WWTP Interceptor Improvement Phase 2[5]	54 Inch	4,080	$2,308,400	ANT, AZT, BRR, BRI, BRK, BSP2, CV, CM, CF, DG, FLA, HCP, HJA, I/D, KEW, LS, LT, NA, OGA, OM, PC, SF, SH, SA, TPCA, VPCA	46.0
Four Seasons Farms Interceptor Improvement	36 Inch	6,320	$3,135,800	AZT, BRR, BRI, CF, I/D, LS, NA, SF	22.4
Center Street Village Wastewater Improvement	18 and 24 Inch	7,240	$1,763,800	Collector Line for Upstream Improvements/Developments	2.6
North Trails Interceptor Improvement	36 Inch	4,340	$2,152,600	ANT, BRK, CV, CM, CF, DG, FLA, HCP, HJA, LT, OGA, OM, PC, SH, SA, TPCA, VPCA	22.5
Steeplechase Interceptor Improvement	30 Inch	7,380	$6,445,700	ANT, BRK, CV, FLA, OM, PC, TPCA, VPCA	11.2
Plum Creek Interceptor Improvement Phase 1	18 Inch	4,310	$960,800	BRR, CV, CF	3.0
Plum Creek Interceptor Improvement Phase 2	24 Inch	3,460	$1,313,200	ANT, CV, DG, FLA, TPCA, VPCA	5.3
Plum Creek Interceptor Improvement Phase 3	21 Inch	8,440	$2,145,100	ANT, FLA, PC, TPCA	4.0
Dacy Lane Wastewater Improvement	18 Inch	2,680	$578,800	CM	3.8
Plum Creek Pipeline Wastewater Improvement	12 Inch	7,780	$3,565,200	CV, DG	1.2
Southlake Lift Station Improvement[4]	_ _ _	_ _ _	$4,234,100	CM, HCP, HJA, SH, SA	9.5
			$32,040,700		

[1]Costs are presented in 2015 dollars and are based upon the unit costs presented in Table 11.0.2E

[2]Pipe size is assumed to convey peak flow (WWPF) at existing pipeline slope. Pipeline design, route and sizing (preliminary engineering) is required.

[3]WWPF: Wet Weather Peak Flow

[4]South Lake Lift Station Improvement is based upon all upstream flow conveyed through the lift station. Should the Bunton Creek interceptor be extended to relieve the South Lake Lift Station, the flow capacity requirement for the lift station should be re-evaluated.

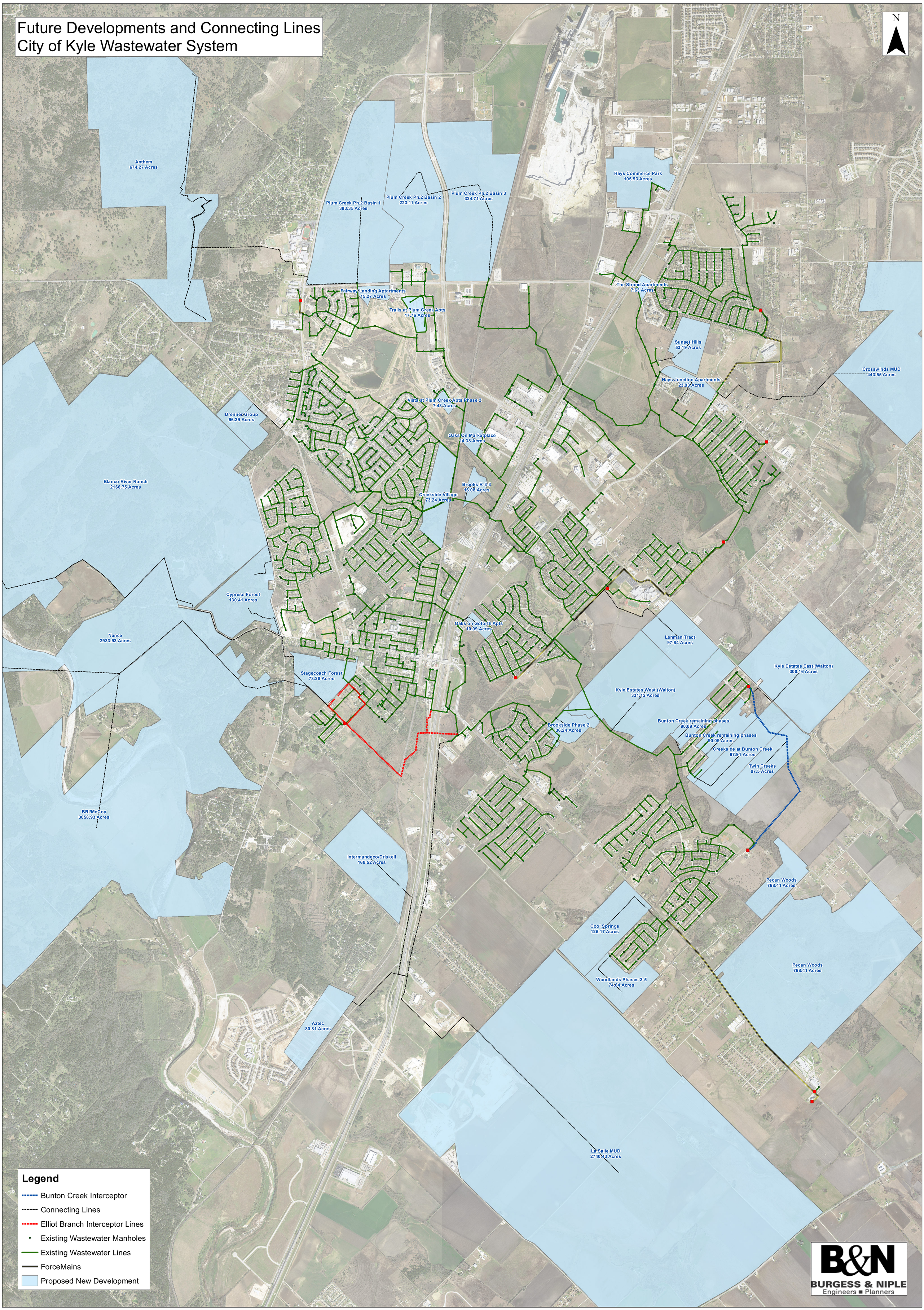
[5]Improvement projects assume flow discharges to the existing WWTP site and all known projected developments occur.

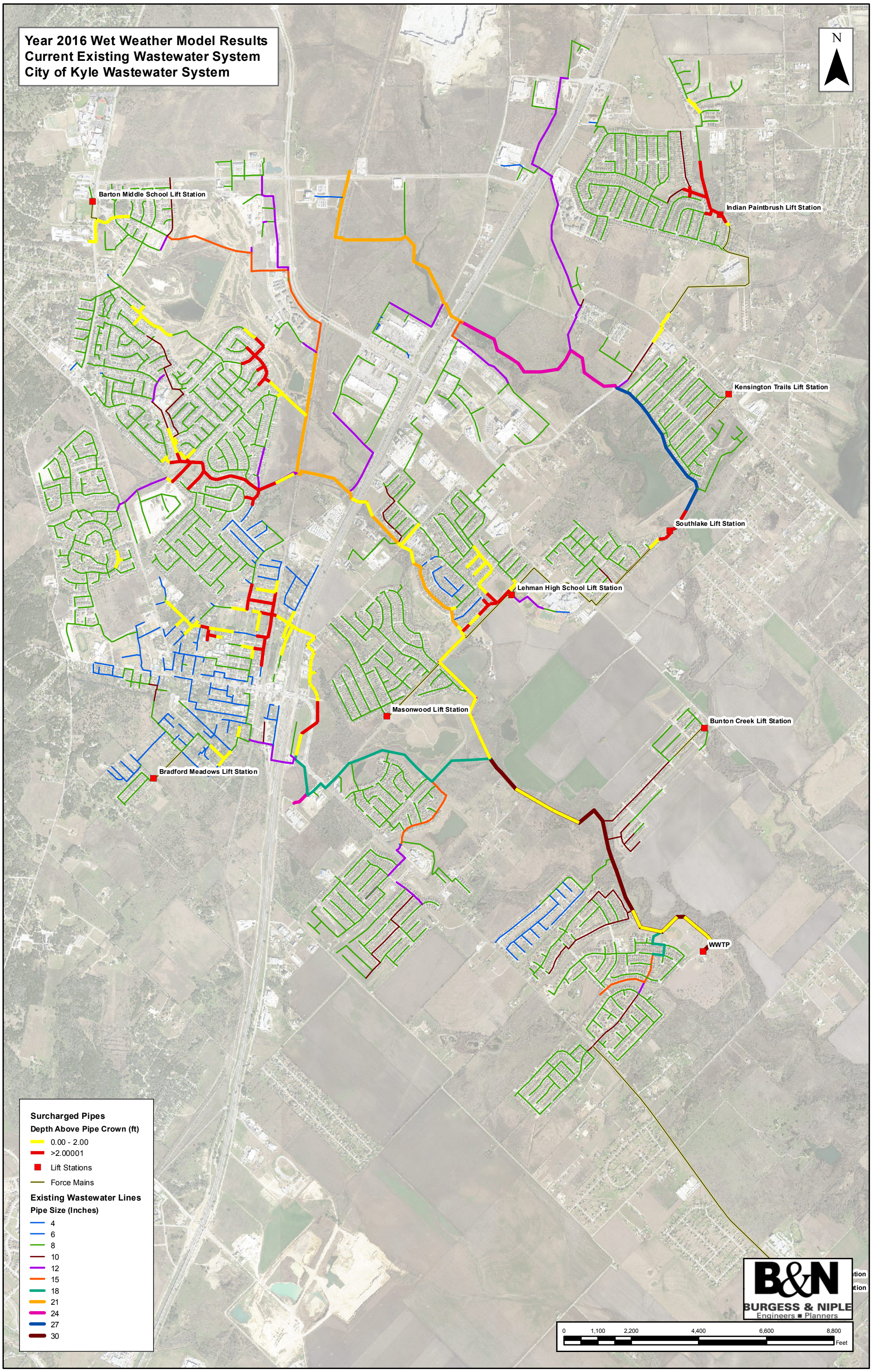
Table 7.1.1A - Known Development Properties for City of Kyle Water and Wastewater Systems Flow Projections

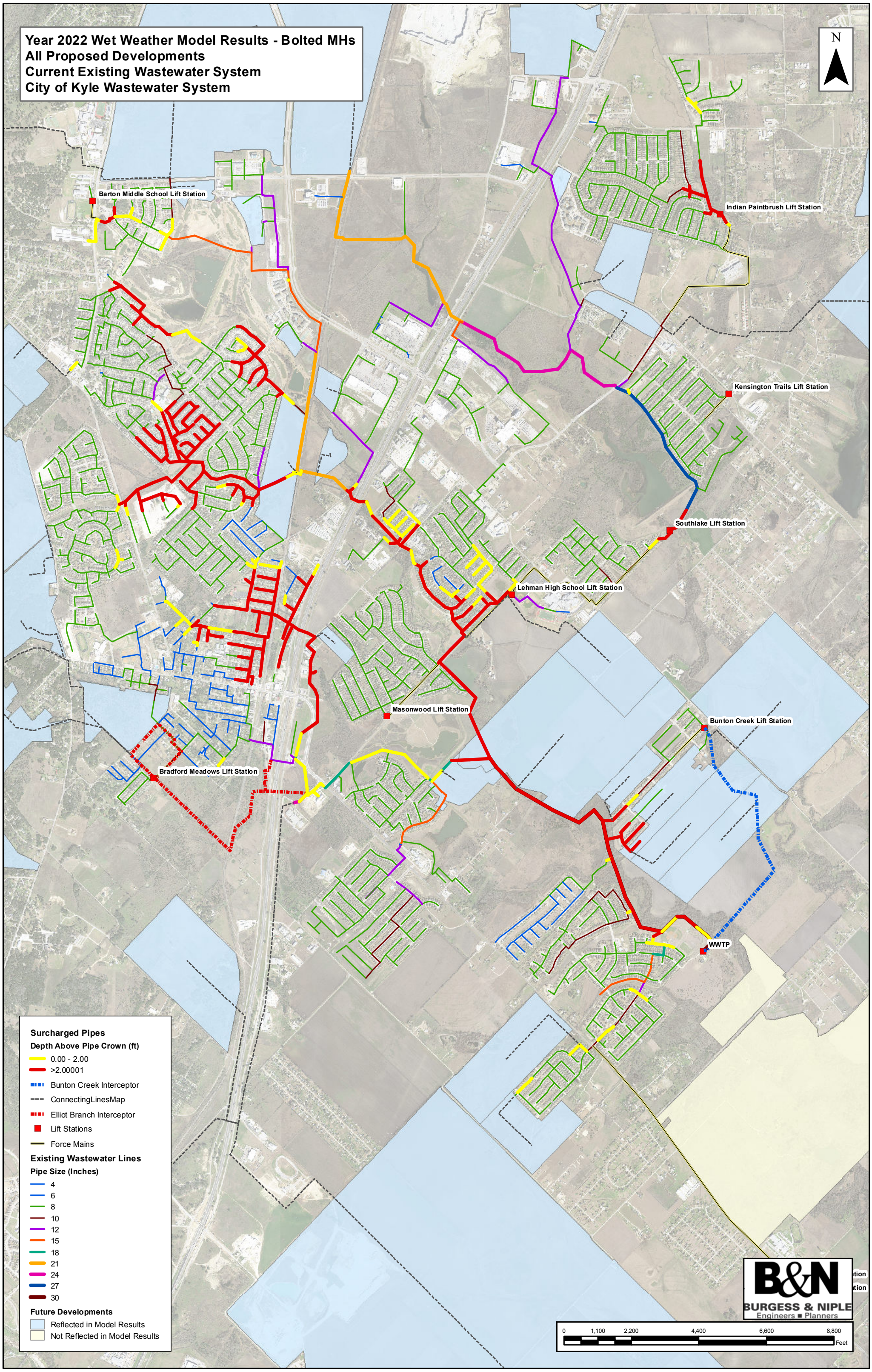
Subdivision	Included in 2015 Model	Units (from GIS)	Start Date	Projected LUEs[1] (By 2022)	ADF[2] 2022 (MGD)	WWPF[3] 2022 (MGD)	Projected LUEs[1] (Full Build-Out)	ADF[2] Full Build-Out (MGD)	WWPF[3] Full Build-Out (MGD)	Kyle Water Service	Kyle Wastewater Service	Comments
Anthem	Y	2200	2017	779	0.21812	0.65	1,960	0.54880	1.65	Y	Y	
Aztec	Y	140	1995	140	0.03920	0.12	150	0.04200	0.13	Y	Y	
Blanco River Ranch	Y	3500	2017	1,460	0.40880	1.23	4,199	1.17572	3.53	Y	Y	
BRI/McCoy	N	8000	2020	200	0.05600	0.17	8,000	2.24000	6.72	Y	Y	
Brooks R-3-3	N	300	2018	300	0.08400	0.25	300	0.08400	0.25	Y	Y	
Brookside Phase 2	Y	73	2016	220	0.06160	0.18	220	0.06160	0.18	Y	Y	
Bunton Creek Remaining Phases	Y	440	2016	440	0.12320	0.37	440	0.12320	0.37	Y	Y	
Cool Springs	Y	372	2016	372	0.10416	0.31	372	0.10416	0.31	N	Y	
Creekside at Bunton Creek	Y	300	2017	300	0.08400	0.25	300	0.08400	0.25	N	Y	
Creekside Village	Y	280	2016	280	0.07840	0.24	280	0.07840	0.24	Y	Y	
Crosswinds MUD	Y	1750	2016	600	0.16800	0.50	1,750	0.49000	1.47	Y	Y	
Cypress Forest	Y	337	2016	247	0.06916	0.21	343	0.09604	0.29	Y	Y	
Drenner Group	N	300	2017	300	0.08400	0.25	300	0.08400	0.25	Y	Y	
Fairway Landing Aptartments	N	216	2016	200	0.05600	0.17	216	0.06048	0.18	Y	Y	
Hays Commerce Park	Y	24	2016	20	0.00560	0.02	24	0.00672	0.02	Y	Y	
Hays Junction Apartments	N	207	2016	207	0.05796	0.17	207	0.05796	0.17	Y	Y	
Intermandeco/Driskell	N	600	2016	400	0.11200	0.34	600	0.16800	0.50	Y	Y	
Kyle Estates East (Walton) (was Kyle Estate I)	Y	2500	2020	150	0.04200	0.13	2,500	0.70000	2.10	N	Y	
Kyle Estates West (Walton) (was Kyle Estate II)	Y	2600	2020	150	0.04200	0.13	2,600	0.72800	2.18	Y	Y	
Kyle Ranch	N	400	2016	400	0.11200	0.34	400	0.11200	0.34	Y	Y	
La Salle MUD	Y	7200	2018	250	0.07000	0.21	7,200	2.01600	6.05	Y	Y	***First 700 LUE's to Southside LS
Lehman Tract	Y	150	2020	150	0.04200	0.13	150	0.04200	0.13	Y	Y	
Nance	N	9000	2022	-	-	-	9,000	2.52000	7.56	Y	Y	
Oak on Goforth Apts	Y	204	2016	204	0.05712	0.17	204	0.05712	0.17	Y	Y	
Oaks On Marketplace	N	254	2016	254	0.07112	0.21	254	0.07112	0.21	Y	Y	
Pecan Woods	N	2600	2018	500	0.14	0.42	2,600	0.728	2.18	N	Y	
Plum Creek Phase 2	Y	1500	2017	3,065	0.85820	2.57	5,777	1.61756	4.85	Y	Y	
Stagecoach Forest (was Perry Blanton Addition)	Y	200	2018	200	0.05600	0.17	200	0.05600	0.17	Y	Y	
Sunset Hills	Y	177	2016	177	0.04956	0.15	177	0.04956	0.15	N	Y	
The Strand Apartments	Y	160	2016	160	0.04480	0.13	160	0.04480	0.13	Y	Y	
Trails at Plum Creek Apts	Y	248	2016	248	0.06944	0.21	248	0.06944	0.21	Y	Y	
Twin Creeks	N	400	2016	250	0.07000	0.21	400	0.11200	0.34	N	Y	
Vistas at Plum Creek Apts Phase 2	Y	180	2015	180	0.05040	0.15	180	0.05040	0.15	Y	Y	
Woodlands Phases 3-5	N	300	2016	300	0.08400	0.25	300	0.08400	0.25	N	Y	
			Totals	**12,623**			**51,531**					

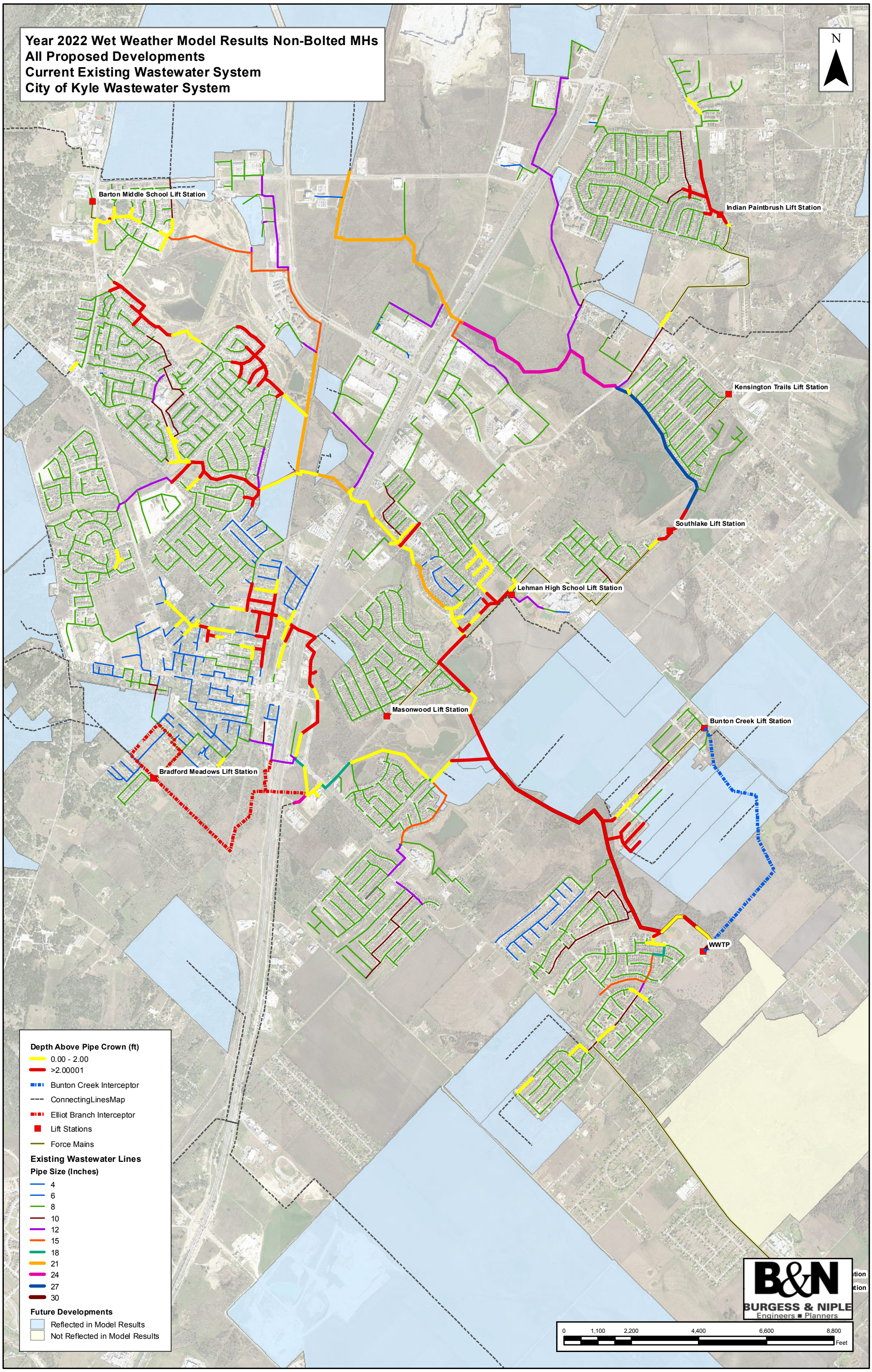
[1] **LUE - Living Utility Equivalent**
[2] **ADF - Average Dry Weather Flow**
[3] **WWPF - Wet Weather Peak Flow**

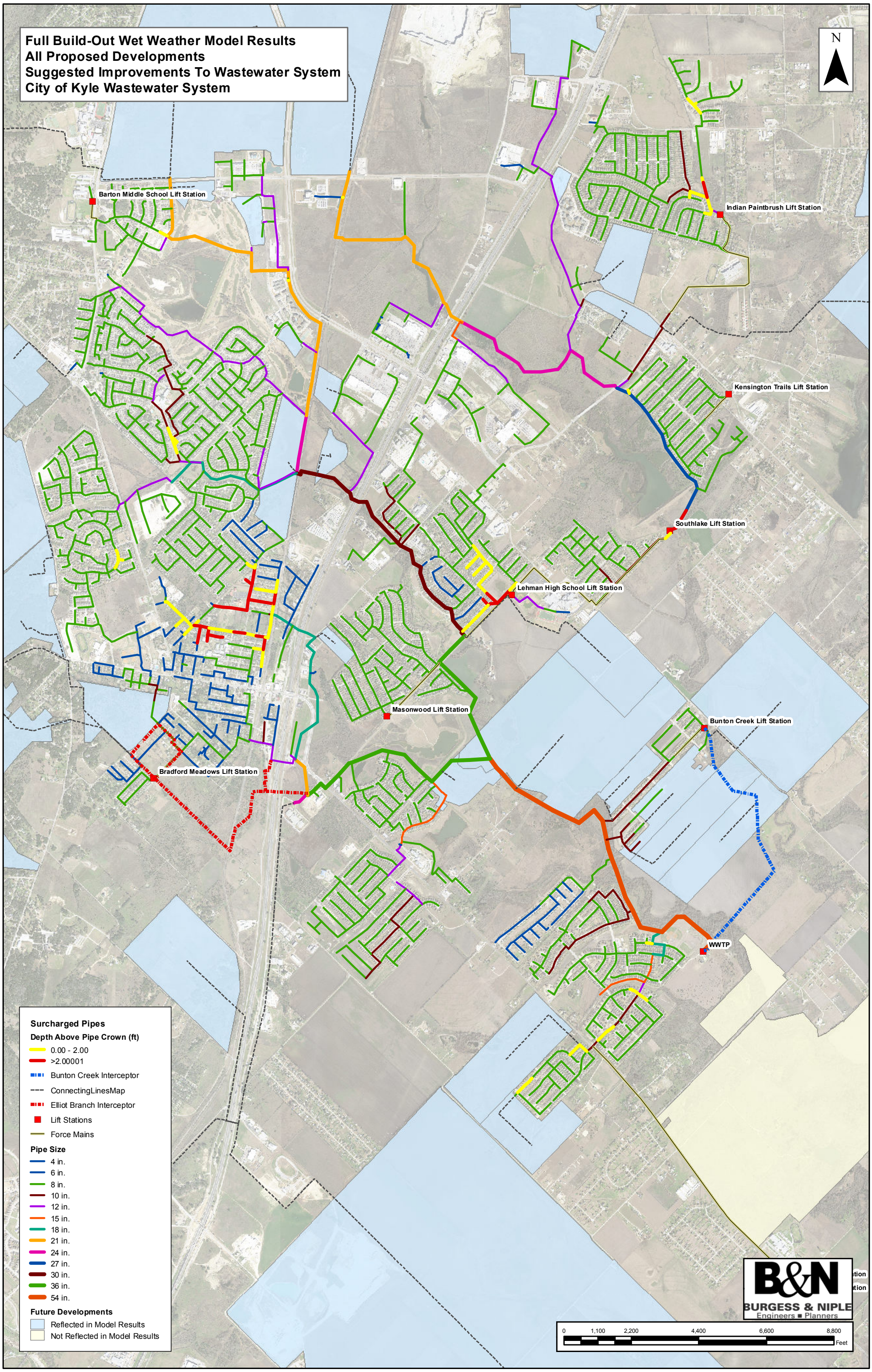
Future Developments and Connecting Lines
City of Kyle Wastewater System




Year 2016 Wet Weather Model Results
Current Existing Wastewater System
City of Kyle Wastewater System
N
Barton Middle School Lift Station
Indian Paintbrush Lift Station
Kensington Trails Lift Station
Southlake Lift Station
Lehman High School Lift Station
Masonwood Lift Station
Bunton Creek Lift Station
Bradford Meadows Lift Station
WWTP
Surcharged Pipes
Depth Above Pipe Crown (ft)
0.00 - 2.00
>2.00001
Lift Stations
Force Mains
Existing Wastewater Lines
Pipe Size (Inches)
4
6
8
10
12
15
18
21
24
27
30
B&N
BURGESS & NIPLE
Engineers ■ Planners
0
1,100
2,200
4,400
6,600
8,800
Feet


Year 2022 Wet Weather Model Results - Bolted MHs
All Proposed Developments
Current Existing Wastewater System
City of Kyle Wastewater System
N
Barton Middle School Lift Station
Indian Paintbrush Lift Station
Kensington Trails Lift Station
Southlake Lift Station
Lehman High School Lift Station
Masonwood Lift Station
Bunton Creek Lift Station
Bradford Meadows Lift Station
WWTP
Surcharged Pipes
Depth Above Pipe Crown (ft)
0.00 - 2.00
>2.00001
Bunton Creek Interceptor
ConnectingLinesMap
Elliot Branch Interceptor
Lift Stations
Force Mains
Existing Wastewater Lines
Pipe Size (Inches)
4
6
8
10
12
15
18
21
24
27
30
Future Developments
Reflected in Model Results
Not Reflected in Model Results
B&N
BURGESS & NIPLE
Engineers ■ Planners
0
1,100
2,200
4,400
6,600
8,800
Feet


Year 2022 Wet Weather Model Results Non-Bolted MHs
All Proposed Developments
Current Existing Wastewater System
City of Kyle Wastewater System
N
Barton Middle School Lift Station
Indian Paintbrush Lift Station
Kensington Trails Lift Station
Southlake Lift Station
Lehman High School Lift Station
Masonwood Lift Station
Bunton Creek Lift Station
Bradford Meadows Lift Station
WWTP
Depth Above Pipe Crown (ft)
0.00 - 2.00
>2.00001
Bunton Creek Interceptor
ConnectingLinesMap
Elliot Branch Interceptor
Lift Stations
Force Mains
Existing Wastewater Lines
Pipe Size (Inches)
4
6
8
10
12
15
18
21
24
27
30
Future Developments
Reflected in Model Results
Not Reflected in Model Results
B&N
BURGESS & NIPLE
Engineers ■ Planners
0
1,100
2,200
4,400
6,600
8,800
Feet


Full Build-Out Wet Weather Model Results
All Proposed Developments
Suggested Improvements To Wastewater System
City of Kyle Wastewater System
N
Barton Middle School Lift Station
Indian Paintbrush Lift Station
Kensington Trails Lift Station
Southlake Lift Station
Lehman High School Lift Station
Masonwood Lift Station
Bunton Creek Lift Station
Bradford Meadows Lift Station
WWTP
Surcharged Pipes
Depth Above Pipe Crown (ft)
0.00 - 2.00
>2.00001
Bunton Creek Interceptor
ConnectingLinesMap
Elliot Branch Interceptor
Lift Stations
Force Mains
Pipe Size
4 in.
6 in.
8 in.
10 in.
12 in.
15 in.
18 in.
21 in.
24 in.
27 in.
30 in.
36 in.
54 in.
Future Developments
Reflected in Model Results
Not Reflected in Model Results
B&N
BURGESS & NIPLE
Engineers ■ Planners
0
1,100
2,200
4,400
6,600
8,800
Feet

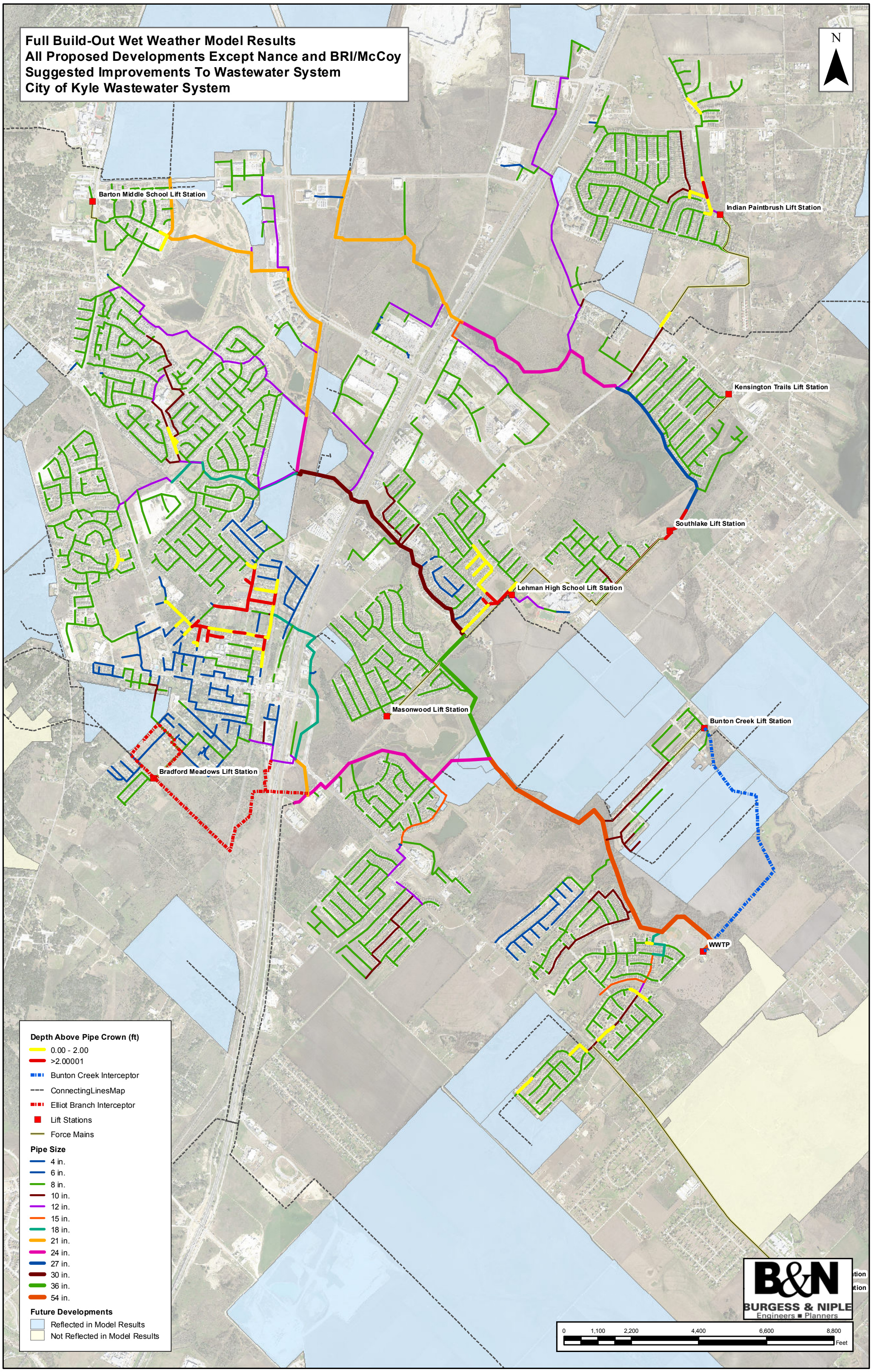

Full Build-Out Wet Weather Model Results
All Proposed Developments Except Nance and BRI/McCoy
Suggested Improvements To Wastewater System
City of Kyle Wastewater System
N
Barton Middle School Lift Station
Indian Paintbrush Lift Station
Kensington Trails Lift Station
Southlake Lift Station
Lehman High School Lift Station
Masonwood Lift Station
Bunton Creek Lift Station
Bradford Meadows Lift Station
WWTP
Depth Above Pipe Crown (ft)
0.00 - 2.00
>2.00001
Bunton Creek Interceptor
ConnectingLinesMap
Elliot Branch Interceptor
Lift Stations
Force Mains
Pipe Size
4 in.
6 in.
8 in.
10 in.
12 in.
15 in.
18 in.
21 in.
24 in.
27 in.
30 in.
36 in.
54 in.
Future Developments
Reflected in Model Results
Not Reflected in Model Results
B&N
BURGESS & NIPLE
Engineers ■ Planners
0
1,100
2,200
4,400
6,600
8,800
Feet

Figure 8.0.1: Wastewater Improvement Recommendations
City of Kyle Wastewater Collection System

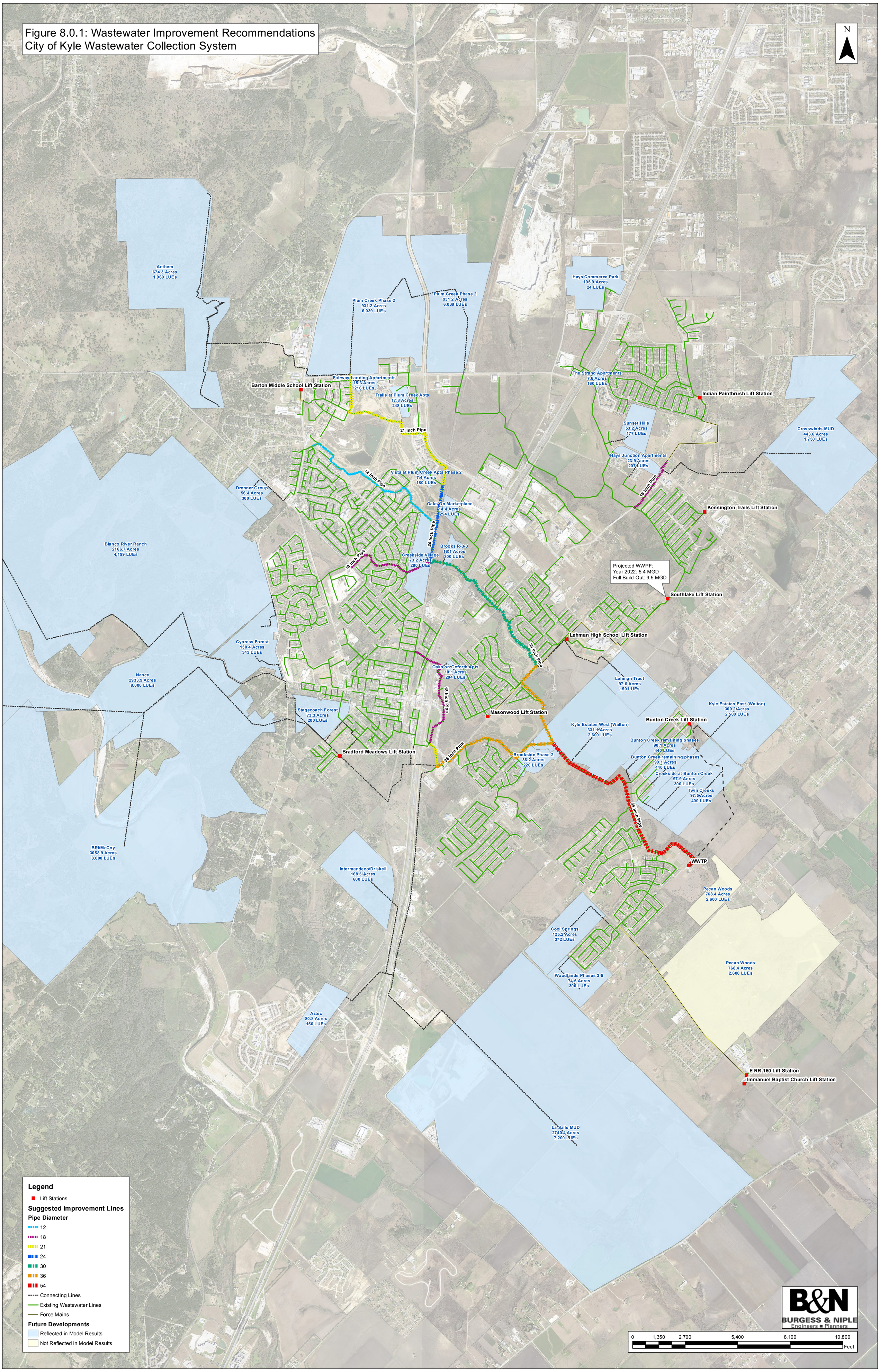


Table 11.0.2: Estimated Construction Costs for Recommended Improvement Projects											
Improvement Project	**Pipe Size[2]**	**Total Footage**	**Estimated Number of Manholes**	**General Topography**	**Depths**	**Estimated Preliminary Construction Cost**	**Estimated Engineering Cost[1]**	**15% Contingency[1]**	**Total Estimated Cost[1]**	**Development Triggers**	**WWPF[3] at Full Build-Out (MGD)**
WWTP Interceptor Improvement Phase 1[5]	54 Inch	6,060	21	Grass/Open Field	11-17 feet	$2,598,900	$389,900	$448,400	$3,437,200	ANT, AZT, BRR, BRI, BRK, BSP2, BCRP, CS, CSBC, CV, CM, CF, DG, FLA, HCP, HJA, I/D, KEW, LS, LT, NA, OGA, OM, PC, SF, SH, SA, TPCA, VPCA, WP	48.0
WWTP Interceptor Improvement Phase 2[5]	54 Inch	4,080	14	Grass/Open Field	9-18 feet	$1,745,400	$261,900	$301,100	$2,308,400	ANT, AZT, BRR, BRI, BRK, BSP2, CV, CM, CF, DG, FLA, HCP, HJA, I/D, KEW, LS, LT, NA, OGA, OM, PC, SF, SH, SA, TPCA, VPCA	46.0
Four Seasons Farms Interceptor Improvement	36 Inch	6,320	22	Grass/Open Field	6-30 feet	$2,371,000	$355,700	$409,100	$3,135,800	AZT, BRR, BRI, CF, I/D, LS, NA, SF	22.4
Center Street Village Wastewater Improvement	18 and 24 Inch	7,240	28	Grass/Alongside Road	5-15 feet	$1,333,600	$200,100	$230,100	$1,763,800	Collector Line for Upstream Improvements/Developments	2.6
North Trails Interceptor Improvement	36 Inch	4,340	15	Grass/Open Field	9-26 feet	$1,627,540	$244,200	$280,800	$2,152,600	ANT, BRK, CV, CM, CF, DG, FLA, HCP, HJA, LT, OGA, OM, PC, SH, SA, TPCA, VPCA	22.5
Steeplechase Interceptor Improvement	30 Inch	7,380	28	Grass/Asphalt Road	6-12 feet	$4,873,800	$731,100	$840,800	$6,445,700	ANT, BRK, CV, FLA, OM, PC, TPCA, VPCA	11.2
Plum Creek Interceptor Improvement Phase 1	18 Inch	4,310	18	Grass/Drainage Easement	6-15 feet	$726,400	$109,000	$125,400	$960,800	BRR, CV, CF	3.0
Plum Creek Interceptor Improvement Phase 2	24 Inch	3,460	12	Grass/Along Rail Road	6-15 feet	$992,900	$149,000	$171,300	$1,313,200	ANT, CV, DG, FLA, TPCA, VPCA	5.3
Plum Creek Interceptor Improvement Phase 3	21 Inch	8,440	29	Grass/Alongside Road	6-20 feet	$1,622,000	$243,300	$279,800	$2,145,100	ANT, FLA, PC, TPCA	4.0
Dacy Lane Wastewater Improvement	18 Inch	2,680	9	Grass/Alongside Road	5-14 feet	$437,600	$65,700	$75,500	$578,800	CM	3.8
Plum Creek Pipeline Wastewater Improvement	12 Inch	7,780	27	Grass/Asphalt Road	5-25 feet	$2,695,640	$404,400	$465,100	$3,565,200	CV, DG	1.2
Southlake Lift Station Improvement[4]	_ _ _	_ _ _	_ _ _	_ _ _	_ _ _	$3,201,500	$480,300	$552,300	$4,234,100	CM, HCP, HJA, SH, SA	9.5
									$32,040,700		

[1]Costs are presented in 2015 dollars and are based upon the unit costs presented in Table 11.0.2E

[2]Pipe size is assumed to convey peak flow (WWPF) at existing pipeline slope. Pipeline design, route and sizing (preliminary engineering) is required.

[3]WWPF: Wet Weather Peak Flow

[4]South Lake Lift Station Improvement is based upon all upstream flow conveyed through the lift station. Should the Bunton Creek interceptor be extended to relieve the South Lake Lift Station, the flow capacity requirement for the lift station should be re-evaluated.

[5]Improvement projects assume flow discharges to the existing WWTP site and all known projected developments occur.

Priority 1: Wastewater Improvement Recommendations
City of Kyle Wastewater Collection System

N

Anthem
674.3 Acres
1,960 LUEs

Plum Creek Phase 2
931.2 Acres
6,039 LUEs

Plum Creek Phase 2
931.2 Acres
6,039 LUEs

Hays Commerce Park
105.9 Acres
24 LUEs

Barton Middle School Lift Station

Fairway Landing Aptartments
15.3 Acres
216 LUEs

Trails at Plum Creek Apts
17.8 Acres
248 LUEs

21 Inch Pipe

Plum Creek Interceptor Ph.3
Wastewater Improvement

The Strand Apartments
7.6 Acres
160 LUEs

Indian Paintbrush Lift Station

Sunset Hills
53.2 Acres
177 LUEs

Crosswinds MUD
443.6 Acres
1,750 LUEs

Hays Junction Apartments
23.9 Acres
207 LUEs

Vista at Plum Creek Apts Phase 2
7.4 Acres
180 LUEs

Drenner Group
56.4 Acres
300 LUEs

Oaks On Marketplace
14.4 Acres
254 LUEs

Kensington Trails Lift Station

Blanco River Ranch
2166.7 Acres
4,199 LUEs

Brooks R-3-3
16.1 Acres
300 LUEs

Creekside Village
73.2 Acres
280 LUEs

18 Inch Pipe

Southlake Lift Station Upgrades
Wastewater Improvement

Plum Creek Interceptor Ph.1
Wastewater Improvement

Southlake Lift Station

Lehman High School Lift Station

Cypress Forest
130.4 Acres
343 LUEs

North Trails Interceptor
Wastewater Improvement

Oaks on Goforth Apts
10.1 Acres
204 LUEs

Nance
2933.9 Acres
9,000 LUEs

Lehman Tract
97.6 Acres
150 LUEs

Center Street Village
Wastewater Improvement

18 Inch Pipe

Kyle Estates East (Walton)
300.2 Acres
2,500 LUEs

Stagecoach Forest
73.3 Acres
200 LUEs

Masonwood Lift Station

36 Inch Pipe

Bunton Creek Lift Station

Kyle Estates West (Walton)
331.1 Acres
2,600 LUEs

Bunton Creek remaining phases
90.1 Acres
440 LUEs

Bradford Meadows Lift Station

21 Inch Pipe

Brookside Phase 2
36.2 Acres
220 LUEs

Bunton Creek remaining phases
90.1 Acres
440 LUEs

Creekside at Bunton Creek
97.9 Acres
300 LUEs

Twin Creeks
97.5 Acres
400 LUEs

BRI/McCoy
3058.9 Acres
8,000 LUEs

WWTP

Intermandeco/Driskell
168.5 Acres
600 LUEs

Pecan Woods
768.4 Acres
2,600 LUEs

Cool Springs
125.2 Acres
372 LUEs

Pecan Woods
768.4 Acres
2,600 LUEs

Woodlands Phases 3-5
74.6 Acres
300 LUEs

Aztec
80.8 Acres
150 LUEs

E RR 150 Lift Station

Immanuel Baptist Church Lift Station

La Salle MUD
2740.4 Acres
7,200 LUEs

Legend

- LiftStationSuggestedImprovements
- Lift Stations

Suggested Improvement Lines

Pipe Diameter

- 12
- 18
- 21
- 24
- 30
- 36
- 54
- Connecting Lines
- Existing Wastewater Lines
- Force Mains

Future Developments

- Reflected in Model Results
- Not Reflected in Model Results

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0 1,350 2,700 5,400 8,100 10,800 Feet

Table 11.02A Priority 1: Estimated Construction Costs for Recommended Improvement Projects											
Improvement Project	Pipe Size[2]	Total Footage	Estimated Number of Manholes	General Topography	Depths	Estimated Preliminary Construction Cost	Estimated Engineering Cost[1]	15% Contingency[1]	Total Estimated Cost[1]	Development Triggers	WWPF[3] at Full Build-Out (MGD)
Center Street Village Wastewater Improvement	18 and 24 Inch	7,240	28	Grass/Alongside Road	5-15 feet	$1,333,600	$200,100	$230,100	$1,763,800	Collector Line for Upstream Improvements/Developments	2.6
North Trails Interceptor Improvement	36 Inch	4,340	15	Grass/Open Field	9-26 feet	$1,627,540	$244,200	$280,800	$2,152,600	ANT, BRK, CV, CM, CF, DG, FLA, HCP, HJA, LT, OGA, OM, PC, SH, SA, TPCA, VPCA	22.5
Plum Creek Interceptor Improvement Phase 1	18 Inch	4,310	18	Grass/Drainage Easement	6-15 feet	$726,400	$109,000	$125,400	$960,800	BRR, CV, CF	3.0
Plum Creek Interceptor Improvement Phase 3	21 Inch	8,440	29	Grass/Alongside Road	6-20 feet	$1,622,000	$243,300	$279,800	$2,145,100	ANT, FLA, PC, TPCA	4.0
Southlake Lift Station Improvement[4]	– – –	– – –	– – –	– – –	– – –	$3,201,500	$480,300	$552,300	$4,234,100	CM, HCP, HJA, SH, SA	9.5
									$11,256,400		

[1]Costs are presented in 2015 dollars and are based upon the unit costs presented in Table 11.0.2E

[2]Pipe size is assumed to convey peak flow at existing pipeline slope. Pipeline design, route and sizing (preliminary engineering) is required.

[3]WWPF: Wet Weather Peak Flow

[4]South Lake Lift Station Improvement is based upon all upstream flow conveyed through the lift station. Should the Bunton Creek interceptor be extended to relieve the South Lake Lift Station, the flow capacity requirement for the lift station should be re-evaluated.

Priority 2: Wastewater Improvement Recommendations
City of Kyle Wastewater Collection System

N

Anthem
674.3 Acres
1,960 LUEs

Plum Creek Phase 2
931.2 Acres
6,039 LUEs

Plum Creek Phase 2
931.2 Acres
6,039 LUEs

Hays Commerce Park
105.9 Acres
24 LUEs

Barton Middle School Lift Station

Fairway Landing Aptartments
15.3 Acres
216 LUEs

Trails at Plum Creek Apts
17.8 Acres
248 LUEs

The Strand Apartments
7.6 Acres
160 LUEs

Indian Paintbrush Lift Station

Sunset Hills
53.2 Acres
177 LUEs

Crosswinds MUD
443.6 Acres
1,750 LUEs

Hays Junction Apartments
23.9 Acres
207 LUEs

12 Inch Pipe

Vista at Plum Creek Apts Phase 2
7.4 Acres
180 LUEs

Drenner Group
56.4 Acres
300 LUEs

Plum Creek Pipeline
Wastewater Improvement

Oaks On Marketplace
14.4 Acres
254 LUEs

Kensington Trails Lift Station

Blanco River Ranch
2166.7 Acres
4,199 LUEs

Brooks R-3-3
16.1 Acres
300 LUEs

Creekside Village
73.2 Acres
280 LUEs

Southlake Lift Station

Lehman High School Lift Station

Cypress Forest
130.4 Acres
343 LUEs

Oaks on Goforth Apts
10.1 Acres
204 LUEs

Nance
2933.9 Acres
9,000 LUEs

Lehman Tract
97.6 Acres
150 LUEs

Kyle Estates East (Walton)
300.2 Acres
2,500 LUEs

Stagecoach Forest
73.3 Acres
200 LUEs

Masonwood Lift Station

Bunton Creek Lift Station

Kyle Estates West (Walton)
331.1 Acres
2,600 LUEs

Bunton Creek remaining phases
90.1 Acres
440 LUEs

Bradford Meadows Lift Station

Brookside Phase 2
36.2 Acres
220 LUEs

Bunton Creek remaining phases
90.1 Acres
440 LUEs

Creekside at Bunton Creek
97.9 Acres
300 LUEs

Twin Creeks
97.5 Acres
400 LUEs

54 Inch Pipe

WWTP Interceptor Ph.1 & Ph.2
Wastewater Improvement

BRI/McCoy
3058.9 Acres
8,000 LUEs

WWTP

Intermandeco/Driskell
168.5 Acres
600 LUEs

Pecan Woods
768.4 Acres
2,600 LUEs

Cool Springs
125.2 Acres
372 LUEs

Pecan Woods
768.4 Acres
2,600 LUEs

Woodlands Phases 3-5
74.6 Acres
300 LUEs

Aztec
80.8 Acres
150 LUEs

E RR 150 Lift Station

Immanuel Baptist Church Lift Station

La Salle MUD
2740.4 Acres
7,200 LUEs

Legend

- Lift Stations

Suggested Improvement Lines

Pipe Diameter

- 12
- 18
- 21
- 24
- 30
- 36
- 54
- Connecting Lines
- Existing Wastewater Lines
- Force Mains

Future Developments

- Reflected in Model Results
- Not Reflected in Model Results

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0 1,350 2,700 5,400 8,100 10,800 Feet

Table 11.02B Priority 2: Estimated Construction Costs for Recommended Improvement Projects											
Improvement Project	Pipe Size[2]	Total Footage	Estimated Number of Manholes	General Topography	Depths	Estimated Preliminary Construction Cost	Estimated Engineering Cost[1]	15% Contingency[1]	Total Estimated Cost[1]	Development Triggers	WWPF[3] at Full Build-Out (MGD)
WWTP Interceptor Improvement Phase 1[5]	54 Inch	6,060	21	Grass/Open Field	11-17 feet	$2,598,900	$389,900	$448,400	$3,437,200	ANT, AZT, BRR, BRI, BRK, BSP2, BCRP, CS, CSBC, CV, CM, CF, DG, FLA, HCP, HJA, I/D, KEW, LS, LT, NA, OGA, OM, PC, SF, SH, SA, TPCA, VPCA, WP	48.0
WWTP Interceptor Improvement Phase 2[5]	54 Inch	4,080	14	Grass/Open Field	9-18 feet	$1,745,400	$261,900	$301,100	$2,308,400	ANT, AZT, BRR, BRI, BRK, BSP2, CV, CM, CF, DG, FLA, HCP, HJA, I/D, KEW, LS, LT, NA, OGA, OM, PC, SF, SH, SA, TPCA, VPCA	46.0
Plum Creek Pipeline Wastewater Improvement	12 Inch	7,780	27	Grass/Asphalt Road	5-25 feet	$2,695,640	$404,400	$465,100	$3,565,200	CV, DG	1.2
									$9,310,800		

[1]Costs are presented in 2015 dollars and are based upon the unit costs presented in Table 11.0.2E

[2]Pipe size is assumed to convey peak flow at existing pipeline slope. Pipeline design, route and sizing (preliminary engineering) is required.

[3]WWPF: Wet Weather Peak Flow

[5]Improvement projects assume flow discharges to the existing WWTP site and all known projected developments occur.

Priority 3: Wastewater Improvement Recommendations
City of Kyle Wastewater Collection System

N

Anthem
674.3 Acres
1,960 LUEs

Plum Creek Phase 2
931.2 Acres
6,039 LUEs

Plum Creek Phase 2
931.2 Acres
6,039 LUEs

Hays Commerce Park
105.9 Acres
24 LUEs

Barton Middle School Lift Station

Fairway Landing Aptartments
15.3 Acres
216 LUEs

Trails at Plum Creek Apts
17.8 Acres
248 LUEs

The Strand Apartments
7.6 Acres
160 LUEs

Indian Paintbrush Lift Station

Sunset Hills
53.2 Acres
177 LUEs

Crosswinds MUD
443.6 Acres
1,750 LUEs

Hays Junction Apartments
23.9 Acres
207 LUEs

18 Inch Pipe

Vista at Plum Creek Apts Phase 2
7.4 Acres
180 LUEs

Drenner Group
56.4 Acres
300 LUEs

Oaks On Marketplace
14.4 Acres
254 LUEs

Kensington Trails Lift Station

Plum Creek Interceptor Ph.2
Wastewater Improvement

Dacy Lane Pipeline
Wastewater Improvement

24 Inch Pipe

Brooks R-3-3
16.1 Acres
300 LUEs

Blanco River Ranch
2166.7 Acres
4,199 LUEs

Creekside Village
73.2 Acres
280 LUEs

Southlake Lift Station

Steeplechase Interceptor
Wastewater Improvement

Lehman High School Lift Station

30 Inch Pipe

Cypress Forest
130.4 Acres
343 LUEs

Oaks on Goforth Apts
10.1 Acres
204 LUEs

Nance
2933.9 Acres
9,000 LUEs

Lehman Tract
97.6 Acres
150 LUEs

Kyle Estates East (Walton)
300.2 Acres
2,500 LUEs

Stagecoach Forest
73.3 Acres
200 LUEs

Masonwood Lift Station

Bunton Creek Lift Station

Kyle Estates West (Walton)
331.1 Acres
2,600 LUEs

Bunton Creek remaining phases
90.1 Acres
440 LUEs

Bunton Creek remaining phases
90.1 Acres
440 LUEs

Bradford Meadows Lift Station

36 Inch Pipe

Brookside Phase 2
36.2 Acres
220 LUEs

Creekside at Bunton Creek
97.9 Acres
300 LUEs

Twin Creeks
97.5 Acres
400 LUEs

Four Seasons Farms Interceptor
Wastewater Improvement

BRI/McCoy
3058.9 Acres
8,000 LUEs

WWTP

Intermandeco/Driskell
168.5 Acres
600 LUEs

Pecan Woods
768.4 Acres
2,600 LUEs

Cool Springs
125.2 Acres
372 LUEs

Pecan Woods
768.4 Acres
2,600 LUEs

Woodlands Phases 3-5
74.6 Acres
300 LUEs

Aztec
80.8 Acres
150 LUEs

E RR 150 Lift Station

Immanuel Baptist Church Lift Station

La Salle MUD
2740.4 Acres
7,200 LUEs

Legend

- Lift Stations

Suggested Improvement Lines

Pipe Diameter

- 12
- 18
- 21
- 24
- 30
- 36
- 54
- Connecting Lines
- Existing Wastewater Lines
- Force Mains

Future Developments

- Reflected in Model Results
- Not Reflected in Model Results

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0 1,350 2,700 5,400 8,100 10,800 Feet

Table 11.02C Priority 3: Estimated Construction Costs for Recommended Improvement Projects											
Improvement Project	Pipe Size[2]	Total Footage	Estimated Number of Manholes	General Topography	Depths	Estimated Preliminary Construction Cost	Estimated Engineering Cost[1]	15% Contingency[1]	Total Estimated Cost[1]	Development Triggers	WWPF[3] at Full Build-Out (MGD)
Four Seasons Farms Interceptor Improvement	36 Inch	6,320	22	Grass/Open Field	6-30 feet	$2,371,000	$355,700	$409,100	$3,135,800	AZT, BRR, BRI, CF, I/D, LS, NA, SF	22.4
Steeplechase Interceptor Improvement	30 Inch	7,380	28	Grass/Asphalt Road	6-12 feet	$4,873,800	$731,100	$840,800	$6,445,700	ANT, BRK, CV, FLA, OM, PC, TPCA, VPCA	11.2
Plum Creek Interceptor Improvement Phase 2	24 Inch	3,460	12	Grass/Along Rail Road	6-15 feet	$992,900	$149,000	$171,300	$1,313,200	ANT, CV, DG, FLA, TPCA, VPCA	5.3
Dacy Lane Wastewater Improvement	18 Inch	2,680	9	Grass/Alongside Road	5-14 feet	$437,600	$65,700	$75,500	$578,800	CM	3.8
									$11,473,500		

[1]Costs are presented in 2015 dollars and are based upon the unit costs presented in Table 11.0.2E

[2]Pipe size is assumed to convey peak flow at existing pipeline slope. Pipeline design, route and sizing (preliminary engineering) is required.

[3]WWPF: Wet Weather Peak Flow

Table 11.02D Development Abbreviations		
Development Name	**Abbreviation**	**Area (Acres)**
Anthem	ANT	674.3
Aztec	AZT	80.8
Blanco River Ranch	BRR	2166.7
BRI/McCoy	BRI	3058.9
Brooks R-3-3	BRK	16.1
Brookside Phase 2	BSP2	36.2
Bunton Creek remaining phases	BCRP	90.1
Cool Springs	CS	125.2
Creekside at Bunton Creek	CSBC	97.9
Creekside Village	CV	73.2
Crosswinds MUD	CM	443.6
Cypress Forest	CF	130.4
Drenner Group	DG	56.4
Fairway Landing Aptartments	FLA	15.3
Hays Commerce Park	HCP	105.9
Hays Junction Apartments	HJA	23.9
Intermandeco/Driskell	I/D	168.5
Kyle Estates East (Walton)	KEE	300.2
Kyle Estates West (Walton)	KEW	331.1
La Salle MUD	LS	2740.4
Lehman Tract	LT	97.6
Nance	NA	2933.9
Oaks on Goforth Apts	OGA	10.1
Oaks On Marketplace	OM	14.4
Pecan Woods	PW	768.4
Plum Creek Phase 2	PC	931.2
Stagecoach Forest	SF	73.3
Sunset Hills	SH	53.2
The Strand Apartments	SA	7.6
Trails at Plum Creek Apts	TPCA	17.8
Twin Creeks	TC	97.5
Vista at Plum Creek Apts Phase 2	VPCA	7.4

Table 11.0.2E : Estimated Construction Unit Costs for Recommended Improvement Projects		
Description	**Unit**	**Unit Price**
Hot Mix Asphalt Concrete Pavement	SF	$18.00
Native Grassland Seeding and Planting	SY	$3.50
Pipe, 10" Dia., PVC Type (All Depths) Including Excavation and Backfill	LF	$85.00
Pipe, 12" Dia., PVC Type (All Depths) Including Excavation and Backfill	LF	$95.00
Pipe, 18" Dia., PVC Type (All Depths) Including Excavation and Backfill	LF	$130.00
Pipe, 21" Dia., PVC Type (All Depths) Including Excavation and Backfill	LF	$155.00
Pipe, 24" Dia., PVC Type (All Depths) Including Excavation and Backfill	LF	$250.00
Pipe, 30" Dia., PVC Type (All Depths) Including Excavation and Backfill	LF	$325.00
Pipe, 36" Dia., PVC Type (All Depths) Including Excavation and Backfill	LF	$328.00
Pipe, 54" Dia., PVC Type (All Depths) Including Excavation and Backfill	LF	$365.00
Manhole, Standard Pre-Cast Manhole With Pre-Cast Base, 48-Inch Diameter	EACH	$5,500.00
Manhole, Standard Pre-Cast Manhole With Pre-Cast Base, 60-Inch Diameter	EACH	$9,000.00

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