Eastern Will County
Wastewater Planning Study

Prepared for:
Will County

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EXECUTIVE SUMMARY

This study was initiated by Will County Board to develop a regional plan for providing wastewater service in the six eastern townships. The study was funded in part by a federal Special Appropriations Program STAG grant with additional support from the County, the villages of Beecher, Peotone and Monee, and Thorn Creek Basin Sanitary District. The study area encompasses approximately 234 square miles and includes all of Green Garden, Monee, Crete, Peotone, Will and Washington Townships. This area is experiencing very rapid growth from development pressures of the greater Chicago area. Growth is expected to accelerate in the near future as new development occurs to support the proposed South Suburban Airport, which is to be located near the middle of the study area. The study should be useful with or without the proposed airport as significant population growth is expected in either case. Population in the study area is expected to more than double in the next 20 years, rising from approximately 70,000 in 2008 to 186,000 by 2030. When fully developed the population is projected to ultimately reach nearly 840,000 in 60 to 80 years.

The study developed a conceptual plan for providing future wastewater service when the area has reached full development, with consideration of technical issues, stakeholder interests, regulatory issues, and alternative approaches for governance and management of proposed new facilities.

For the majority of the study area that drains to the Kankakee River, nine alternatives for regional wastewater service were developed and evaluated along with a tenth alternative to continue providing wastewater service by gradually expanding the existing wastewater systems (referred to as the status quo approach). These alternatives were then narrowed through stakeholder input to five alternatives for further analysis. These alternatives included options that were based on one, two or three new regional treatment plants, along with the status quo approach. A preliminary cost comparison indicated that the alternatives with three new treatment facilities appeared to be slightly more cost effective than other options.

For the northern portion of the study area that drains to Lake Michigan, Calumet River or Des Plaines River, it appears the best approach is to continue serving these areas with the existing wastewater providers of Thorn Creek Basin Sanitary District, Aqua Illinois and the Village of Frankfort. For the remainder of the study area that drains to the Kankakee River Basin, several potential management approaches were identified including formation of a new special service

district, expansion of an existing district, creating a new agency formed by intergovernmental agreement, providing service through an investor-owned utility or continuation of the status quo with service provided by individual communities. Advantages and disadvantages of each approach are discussed. The final decision on the preferred approach needs to be developed by the affected communities working together with the County land use department.

Assuming that a regional approach is ultimately endorsed by stakeholders, a preliminary implementation plan was developed that includes proposed construction phasing, determination of a preferred management structure and suggested continuing role to be taken by the County in the implementation process. The implementation plan assumes that it would take approximately 10 to 12 years to complete the additional planning, permitting and construction of proposed new regional wastewater treatment facilities. In order to meet wastewater service needs in this interim period, it appears that expansions of existing facilities at Beecher, Peotone and the Aqua Illinois plant at University Park may be required.

To assure that required new facilities can be in place by the time they are needed, it is recommended that a governance working group be formed as soon as possible to continue progress toward reaching a mutual understanding on the preferred governance approach. Recommended membership in this working group should include representatives from the Villages of Beecher, Monee and Peotone, Thorn Creek Basin Sanitary District, the South Suburban Airport Authority (if established) and Will County. In order to meet the time tables required to bring new facilities into operation, the working group would need to finalize a preferred management approach within 18 months and establish the recommended management entities within another 18 months.

It is also important for the County to continue steps toward implementation of its Land Resources Management Plan adopted by the County Board in 2002. Specific action items are recommended in the study, such as preservation of stream corridors and acquisition of utility rights-of-way for future trunk sewers.

1.0 INTRODUCTION

This study was undertaken to develop a long-term plan for providing wastewater service to eastern Will County, Illinois. The study area consists of the six eastern townships bordered by Indiana on the east, Cook County on the north and Kankakee County on the south. This area is currently served by several different wastewater systems operated by municipalities, sanitary districts and private utilities.

The area has been developing rapidly in recent years and is one of the fastest growing regions in the country. Growth is expected to accelerate in the near future, in part due to the anticipated new South Suburban Airport, which is to be located near the middle of the study area. For planning purposes in this study, it has been assumed that the new airport will be located at the current proposed site as recommended by the Illinois Department of Transportation.

This plan has focused on identifying an approach for providing wastewater service to the entire area when it has reached full development. Whether it takes 60 or 80 years to reach full development, the proposed wastewater facilities should be similar. Consequently, the planning time period is not precisely defined. However, for cost analysis and comparison of costs, the economic analysis was based on a 50-year period.

The study considered existing wastewater systems, regulatory requirements, utility corridors, natural or protected green-space, drainage patterns, projected population growth patterns, infrastructure development, alternatives for wastewater collection and treatment, financing, and governance and management approaches for implementing the proposed wastewater facilities. Each of these important issues is discussed in more detail in the sections that follow.

2.0 PLANNING AREA DESCRIPTION

2.1 Study Area Boundary

The study area includes all of the six eastern townships in Will County: Crete, Monee, Green Garden, Peotone, Will and Washington Townships, as shown in Figure 1. The total area is about 234 square miles and includes all of the villages of Beecher, Monee and Peotone and portions of the villages of Frankfort, University Park, Park Forest, Crete and Steger. There are also numerous residential developments in unincorporated areas of the County.

2.2 Existing Facility Planning Areas

The geographical areas defining existing wastewater service areas are determined by Facilities Planning Area (FPA) boundaries or, in the case of private utilities, by certificated areas approved by the Illinois Commerce Commission. The FPA boundaries and the certificated area boundaries within the study area are shown in different colors on Figure 2. The Frankfort FPA serves the Village of Frankfort, the Deer Creek FPA serves the Villages of Monee and University Park, the Thorn Creek Basin Sanitary District (TCBSD) FPA includes the Villages of Crete, Steger and Park Forest (and additional areas in Cook County outside the study area), the Peotone FPA serves the Village of Peotone, and the Beecher FPA serves the Village of Beecher. Changes in the FPA boundaries require approval of the Chicago Metropolitan Agency for Planning (CMAP) and the Illinois Environmental Protection Agency (IEPA) as explained further in Section 5.2.

Wastewater services in the Deer Creek FPA are provided by Aqua Illinois, except for the sewer collection system in Monee, which is owned by the Village of Monee. Aqua Illinois is a private utility company regulated by the Illinois Commerce Commission. Wastewater service in the TCBSD FPA is provided by Thorn Creek Basin Sanitary District, with treatment provided at their plant located in Chicago Heights. The certificated areas for Plum Creek and Willowbrook are served by facilities owned and operated by Aqua Illinois. The other three FPAs (Beecher, Peotone and Frankfort) have their own wastewater systems provided by each municipality.
As shown in Figure 2, the largest portion of the study area falls outside any designated FPA or certificated area. Wastewater service in these unincorporated areas of Will County is currently provided by individual on-site systems serving a single property in most cases.

2.3 Drainage Basins

Since gravity sewer collection systems rely on natural drainage patterns, the study area was divided into major drainage basins as shown in Figure 3. The basins tributary to a single creek are indicated by the gold lines on Figure 3. For example, basin B-4 drains into Deer Creek, and basin B-5 drains into Plum Creek. Also shown on Figure 3 with heavy brown lines are the major drainage divides within the study area. The area in the northeast quadrant drains north and east into the Great Lakes/Calumet River Basin. The area in the northwest corner drains to the north and west into the Des Plaines River Basin. The remaining areas all drain to the south and west into the Kankakee River Basin.

These drainage basins form a natural dividing line for wastewater services because transfer of flows from one basin to another always requires pumping, which is usually more expensive than gravity conveyance. Transferring flows across the major basin divides may have additional limitations due to intergovernmental agreements or international treaties in certain cases, such as those associated with the Great Lakes Basin Compact.

2.4 Natural Resources

An understanding of existing natural resources in the study area is important so that any proposed facilities minimize disruption to these resources and so they may be protected or enhanced where possible. Some of the major natural resources that should be considered are shown in Figure 4. This shows FEMA flood zones, areas with potential archaeological sites, forest preserves, Illinois Natural Heritage sites, designated wetlands, parks and other existing or proposed open space. These areas affect land development and in general, it was assumed that no development would occur in these protected areas.

2.5 Existing Proposed Corridors

Another consideration for locating new wastewater infrastructure is the location of existing and proposed corridors for roadways, railroads, utilities and trails. In some cases it may be possible to utilize some of these same corridors for new trunk sewers or force mains. In other cases, it may be necessary to try to avoid conflicts with these corridors. Figure 5 shows the major corridors within the study area, which were assembled from a variety of sources including

USGS topographical maps, Will County land use data, airport planning studies and the CMAP 2040 Regional Framework Plan.

2.6 Existing and Future Population

Population estimates are the fundamental basis for projecting future wastewater flows. Existing and future population estimates were determined for the study area based on data from the U.S. Census Bureau and from CMAP. The U.S. Census data showed a population in Will County overall of 502,266 in 2000 and an estimated population of 673,586 in 2007. This corresponds to an annual growth rate of about 4.3%. If growth continued at that same rate, the estimated 2008 population for the entire county would be about 702,550.

For the study area alone, the U.S. Census population in 2000 was 48,893. About 75% of the total population resided in urban areas and 25% was considered rural. As the area develops, one would expect the total rural population to decline slightly and the urban population to increase substantially.

The CMAP data indicated a total estimated population of 49,118 in 2000 and 185,977 in 2030. These values correspond to a uniform annual growth rate of 4.54%. That rate is higher than for the county overall, which would be expected. At this growth rate, the estimated current population for the study area would be about 70,000 in 2008. As explained further in Section 4.2, the projected ultimate population when the area has reached full development is about 840,000. If growth continues at the same annual rate experienced in recent years, this ultimate population would be reached in approximately 2064. In reality, one would expect growth to slow down as it approaches full development, so it may take 60 to 80 years (or more) to reach that population.

3.0 EXISTING WASTEWATER FACILITIES

Wherever possible, the existing facilities will be incorporated into the long-term plan for providing future wastewater service in the study area. The location of all identified permitted wastewater treatment plants (WWTPs) is shown in Figure 6. This includes some small plants that serve only one entity (such as the IDOT rest area or Dovatech, LLC near Beecher). In addition to those shown, there are two significant WWTPs located outside the study area that serve areas within the study area. These are the new Frankfort Regional WWTP which serves an area in the northwest corner and the Thorn Creek Basin Sanitary District WWTP which treats wastewater from all areas within the TCBSD boundaries, including Park Forest, Steger and Crete. Each of the major existing wastewater facilities is described further in the following sections.

3.1 Thorn Creek Basin Sanitary District

The largest wastewater system in the study area is owned and operated by the Thorn Creek Basin Sanitary District (TCBSD). This system collects wastewater from the areas within the TCBSD boundaries, which include all of the Villages of Crete, Steger and Park Forest, and additional areas north of the study area in Cook County. It is also responsible for future wastewater service to nearby areas within the designated TCBSD FPA boundaries as shown in Figure 2. All the wastewater collected by TCBSD is treated at its WWTP located in Chicago Heights.

The WWTP is permitted for a design average flow of 15.94 MGD (million gallons per day) and a design maximum flow of 40.25 MGD. This plant currently has some excess treatment capacity available. In discussions with the TCBSD staff it was indicated that this WWTP should be adequate to meet the foreseeable long-term needs of any new development that occurs within their existing FPA boundaries. It was also noted that the WWTP site is constrained by a railroad and forest preserve, which would limit future expansions at this location.

3.2 Aqua Illinois Wastewater Systems

Aqua Illinois (Aqua) is a private utility that provides wastewater service to several portions of the study area, and they own and operate three wastewater treatment plants within this area. The

University Park WWTP is the largest of these facilities with a permitted design average flow of 2.17 MGD. Aqua is currently proposing modifications to increase the rated capacity to 2.43 MGD. The University Park WWTP serves the Villages of University Park and Monee and this system is referred to as the University Park system. It includes the collection system in University Park which is owned by Aqua. The collection system in Monee is owned by the Village. These areas are all part of the Deer Creek FPA as shown in Figure 2. An FPA expansion to serve additional areas in Green Garden Township has been approved by IEPA and NIPC (now CMAP) and is awaiting final approval from ICC for revisions in the certificated area.

The other two WWTPs owned and operated by Aqua are in their Willowbrook area system, which serves portions of the study area further east in Crete Township. These areas are not part of any official Facilities Planning Area. The Plum Creek WWTP is located near the junction of Route 1 and I-394 and is rated for 0.30 MGD. The Willowbrook WWTP is a lagoon system currently permitted for a design average flow of 0.50 MGD and located near the northeast corner of the study area. Both of these WWTPs discharge into Plum Creek or its tributaries.

3.3 Village of Frankfort Wastewater System

Most of the Village of Frankfort lies north of the study area, but the Frankfort FPA has recently been expanded to include areas in the northeast corner of the study area as shown in Figure 2. Frankfort has constructed a new Regional WWTP (located north of the study area) with a permitted design average flow capacity of 3.5 MGD and discharging into Hickory Creek. This WWTP is designed to serve all future development that occurs within the current Frankfort FPA boundaries.

3.4 Village of Beecher Wastewater System

The Village of Beecher owns and operates its own wastewater collection system and WWTP which serves the wastewater needs of the Village. The Beecher WWTP is currently permitted for a design average flow of 0.60 MGD and there is a proposed expansion to 1.2 MGD awaiting final approval from IEPA. This WWTP discharges into the West Branch of Trim Creek. The Village has indicated that there is potential for a subsequent expansion that could double the capacity again up to a rated capacity of 2.4 MGD if necessary in the future.

3.5 Village of Peotone Wastewater System

The Village of Peotone owns and operates a sewer collection system that serves the Village and has one WWTP rated at 0.85 MGD located at the southeast corner of the Village that discharges into Black Walnut Creek. There is one major lift station on the west side of town along Wilmington Road, rated at 530 gpm with a 6" force main. Peotone has recently added a new 21" trunk sewer to serve new developments on the east side of town. This flow is to be pumped to the WWTP initially, but a sewer extension is planned for the future which would carry the flow by gravity to the WWTP. The Village staff has indicated that the existing WWTP site has sufficient land available to accommodate any future expansions that may be required.

The Village of Peotone has executed intergovernmental agreements with other municipalities to establish future services areas, as shown by the dotted lines on Figure 2. Peotone is currently developing a long-term plan for serving some of these additional areas surrounding their current FPA, including the proposed airport site. This information was not available to include in this study, but it is anticipated that elements of the Peotone wastewater plan can be incorporated into the alternative improvements proposed in Section 6 of this report.

4.0 DESIGN FLOW RATES AND ORGANIC LOADING

The focus of this study is to develop a plan for providing wastewater service when the area is fully developed, and the key parameter that controls the size of future facilities is flow rate. The criteria and approach used for projecting future wastewater flows and loads within the study area is described in the following sections.

4.1 Projected Population and Flows

The projected flow rates at full development were estimated using the following steps:

1. The entire study area was sub-divided into drainage basins and sub-basins based on the natural stream watersheds as delineated in the U.S. Census TIGER stream data base. Where smaller watersheds are tributary to larger streams within the study area, a separate sub-basin was identified. The resulting drainage basins and sub-basins are shown in Figure 7 and key parameters for each sub-basin are tabulated in Table 1. A total of 19 major drainage basins and 87 sub-basins were identified, with individual basins having from 1 to 16 sub-basins. In Table 1, sub-basins S-24 and S-32 are listed separately under basin B-3 because they drain into Butterfield Creek while S-29 and S-46 drain into Thorn Creek. For sub-basins that extend beyond the study area, only the portion within the study boundaries was considered.

2. For each sub-basin, the potential developable area was determined as the total area of the sub-basin minus the conservation areas where no development should occur. The conservation areas include all FEMA 100-yr flood plains, existing forest preserves and other existing park lands, and the Beecher landfill. The total conservation area was approximately 26,550 acres or about 18% of the total study area. These areas are shown in green on Figure 7. Roadways, railroads and other utility corridors were not measured directly but were excluded by applying an area reduction factor as explained in Step 4 below.

3. The potential developable area within each sub-basin was further classified into three different types of areas:
    a. areas outside the proposed airport boundaries,
    b. areas within the inaugural airport boundary, and
    c. areas outside the inaugural boundary but within the ultimate airport boundary.

The area within each category is shown in Table 1. Please note in Table 1 that "Undevelopable" is abbreviated as "Undevel." and potential developable area is abbreviated as "Develop.". Projected wastewater flow from each type of area was determined differently as described in Steps 4 through 6 below.

For areas outside the ultimate airport boundary, projected wastewater flows were based on estimated population at full development. The population at full development was estimated to be 10 persons/acre times the potential developable area times 80%. The 80% area reduction factor is used to account for roads, utility easements, public institutions, and future neighborhood parks where no development will occur. For example, the estimated ultimate population for sub-basin S-30 is 740.4 acres X 80% X 10 persons/acre or 5923 persons, rounded off to the nearest whole number. The average wastewater flow for these areas was then estimated to be 100 gallons/person/day, or approximately 0.59 MGD (million gallons per day) in the example for area S-30.

4. For areas within the airport boundaries, it was assumed that the residential population is zero. Nevertheless, there will be some wastewater flows generated by airport-related activities and commercial/industrial developments. Projected flows from these areas were based on potential developable acres times an estimated flow per acre times a reduction factor to account for areas not developed. The average flow per acre was estimated at 100 gallons/day per acre within the inaugural airport boundary. Since the inaugural airport area will have a larger percentage of land allocated for runways, parking, etc. it was estimated that the actual developable acres would be about 40% of the potential developable acres. For example, sub-basin S-117 in basin B-11 has a potential developable area of 257 acres within the inaugural airport boundary. That area would generate an estimated ultimate wastewater flow of 100 gallons/day/acre X 257 acres X 40% = 0.010 MGD.

Table 1. Projected Population and Wastewater Flows
(see Figure 7 for sub-basin locations)

Basin	Sub-basin	Total acres	2000 Pop.	2030 Pop.	Ultimate Pop.	Undevel. Acres (outside airport)	Develop. Acres (outside airport)	Undevel. Acres (in Inaugural)	Develop. Acres (in Inaugural)	Undevel. Acres (in Ultimate)	Develop. Acres (in Ultimate)	Est. Avg. Flow at Full Devel. (MGD)	Est. Peak Flow at Full Devel. (MGD)
B-1	S-19	8	0	0	11	7	1	0	0	0	0	0.00	0.01
B-1	S-30	997	41	1469	5923	257	740	0	0	0	0	0.59	1.88
Basin 1 Subtotals		1005	41	1469	5934	263	742	0	0	0	0	0.59	1.88
B-2	S-16	2	0	4	19	0	2	0	0	0	0	0.00	0.01
B-2	S-17	28	5	27	227	0	28	0	0	0	0	0.02	0.09
B-2	S-20	152	0	662	1211	0	151	0	0	0	0	0.12	0.45
B-2	S-28	398	21	549	2761	52	345	0	0	0	0	0.28	0.96
B-2	S-31	964	84	1696	6911	100	864	0	0	0	0	0.69	2.15
B-2	S-43	2956	211	6834	18054	700	2257	0	0	0	0	1.81	4.87
Basin 2 Subtotals		4500	321	9772	29183	853	3648	0	0	0	0	2.92	7.26
B-3a	S-24	322	9	458	2525	6	316	0	0	0	0	0.25	0.88
B-3a	S-32	523	14	3447	3511	84	439	0	0	0	0	0.35	1.19
B-3	S-29	377	99	2195	2284	92	286	0	0	0	0	0.23	0.81
B-3	S-46	3793	5025	11571	11716	2337	1465	0	0	0	0	1.17	3.38
Basin 3 Subtotals		5015	5147	17671	20036	2519	2505	0	0	0	0	2.00	5.31
B-4	S-67	5295	7845	16940	25471	1604	3184	0	0	33	485	2.62	6.64
B-4	S-26	506	3276	3512	3579	59	447	0	0	0	0	0.36	1.21
B-4	S-27	650	1959	2150	4401	100	550	0	0	0	0	0.44	1.45
B-4	S-37	670	1430	1971	4055	165	507	0	0	0	0	0.41	1.35
B-4	S-38	79	11	314	382	32	48	0	0	0	0	0.04	0.15
B-4	S-51	2416	799	8404	17698	205	2212	0	0	0	0	1.77	4.79
B-4	S-52	2223	4277	13767	14985	350	1873	0	0	0	0	1.50	4.16
Basin 4 Subtotals		11839	19597	47058	70571	2514	8821	0	0	33	485	7.13	15.15
B-5	S-96	988	30	130	2106	62	263	7	198	20	439	0.28	0.98
B-5	S-100	2728	916	5	372	47	46	71	562	98	1904	0.35	1.17
B-5	S-75	1366	665	384	5538	55	692	0	0	35	584	0.64	2.02
B-5	S-76	1522	818	830	4308	893	538	0	0	3	90	0.44	1.46
B-5	S-81	328	43	23	583	104	73	0	0	34	118	0.08	0.29
B-5	S-36	846	263	385	5693	134	712	0	0	0	0	0.57	1.82
B-5	S-41	1723	991	1053	5363	1054	670	0	0	0	0	0.54	1.73
B-5	S-44	288	160	187	1310	124	164	0	0	0	0	0.13	0.49
B-5	S-50	1552	1424	1474	10128	287	1266	0	0	0	0	1.01	2.99
B-5	S-59	1563	499	515	6952	694	869	0	0	0	0	0.70	2.16
B-5	S-63	3103	746	3849	19033	725	2379	0	0	0	0	1.90	5.09
B-5	S-66	39	6	7	6	39	1	0	0	0	0	0.00	0.00
B-5	S-68	478	126	163	3230	75	404	0	0	0	0	0.32	1.10
B-5	S-77	953	145	150	6635	124	829	0	0	0	0	0.66	2.08
B-5	S-80	1292	239	295	8210	266	1026	0	0	0	0	0.82	2.50
B-5	S-85	2373	385	433	15603	423	1950	0	0	0	0	1.56	4.31
Basin 5 Subtotals		21142	7456	9883	95069	5104	11884	78	760	191	3134	10.01	20.01

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(see Figure 7 for sub-basin locations)

Basin	Sub-basin	Total acres	2000 Pop.	2030 Pop.	Ultimate Pop.	Undevel. Acres (outside airport)	Develop. Acres (outside airport)	Undevel. Acres (in Inaugural)	Develop. Acres (in Inaugural)	Undevel. Acres (in Ultimate)	Develop. Acres (in Ultimate)	Est. Avg. Flow at Full Devel. (MGD)	Est. Peak Flow at Full Devel. (MGD)
B-6	S-99	452	60	59	3546	9	443	0	0	0	0	0.35	1.20
B-6	S-107	536	93	87	4148	18	519	0	0	0	0	0.41	1.38
B-6	S-88	486	48	111	3774	15	472	0	0	0	0	0.38	1.27
Basin 6 Subtotals		1474	201	257	11468	41	1434	0	0	0	0	1.15	3.32
B-7	S-126	1484	129	95	11508	46	1439	0	0	0	0	1.15	3.33
B-7	S-130	209	4	5	1645	3	206	0	0	0	0	0.16	0.60
Basin 7 Subtotals		1693	133	100	13154	49	1644	0	0	0	0	1.32	3.73
B-8	S-163	769	41	63	5905	30	738	0	0	0	0	0.59	1.88
B-9	S-139	466	13	78	3466	33	433	0	0	0	0	0.35	1.17
B-9	S-141	5278	226	666	39088	393	4886	0	0	0	0	3.91	9.25
Basin 9 Subtotals		5744	239	744	42555	426	5319	0	0	0	0	4.26	9.92
B-10	S-91	1816	190	1259	12752	96	1594	0	0	4	121	1.29	3.68
B-10	S-106	3437	308	357	24151	419	3019	0	0	0	0	2.42	6.21
B-10	S-111	2537	1849	8523	17413	224	2177	0	0	6	133	1.76	4.77
B-10	S-116	4240	598	9758	27777	768	3472	0	0	0	0	2.78	6.97
B-10	S-137	2421	146	498	17367	250	2171	0	0	0	0	1.74	4.71
B-10	S-143	3	0	3	23	0	3	0	0	0	0	0.00	0.01
Basin 10 Subtotals		14454	3091	20398	99483	1757	12435	0	0	10	254	9.99	19.98
B-11	S-117	4399	148	1252	17685	273	2211	9	257	150	1500	2.00	5.31
B-11	S-121	1691	51	685	12345	147	1543	0	0	0	0	1.23	3.53
B-11	S-156	1505	24	500	11299	93	1412	0	0	0	0	1.13	3.28
Basin 11 Subtotals		7595	223	2437	41329	514	5166	9	257	150	1500	4.37	10.13
B-12	S-101	1431	120	0	0	0	0	48	780	85	518	0.11	0.41
B-12	S-103	1137	85	0	8	0	1	2	393	61	679	0.12	0.44
B-12	S-129	3335	178	2142	21103	319	2638	0	0	3	376	2.17	5.67
B-12	S-142	2990	78	473	16971	599	2121	0	0	23	247	1.73	4.71
Basin 12 Subtotals		8893	461	2615	38081	918	4760	50	1174	171	1820	4.13	9.67
B-13	S-125	12134	3011	11603	32234	1162	4029	242	1480	431	4791	4.00	9.43
B-13	S-127	545	24	95	4068	37	509	0	0	0	0	0.41	1.35
Basin 13 Subtotals		12679	3035	11698	36302	1199	4538	242	1480	431	4791	4.41	10.21

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(see Figure 7 for sub-basin locations)

Basin	Sub-basin	Total acres	2000 Pop.	2030 Pop.	Ultimate Pop.	Undevel. Acres (outside airport)	Develop. Acres (outside airport)	Undevel. Acres (in Inaugural)	Develop. Acres (in Inaugural)	Undevel. Acres (in Ultimate)	Develop. Acres (in Ultimate)	Est. Avg. Flow at Full Devel. (MGD)	Est. Peak Flow at Full Devel. (MGD)
B-14	S-69	984	814	1281	7305	71	913	0	0	0	0	0.73	2.26
B-14	S-70	1018	881	1099	4761	46	595	0	0	16	361	0.53	1.71
B-14	S-78	1456	254	496	4476	444	559	11	52	210	181	0.48	1.56
B-14	S-87	1364	142	1	3	0	0	0	60	105	1199	0.18	0.66
B-14	S-104	4956	254	4175	24686	660	3086	186	561	99	364	2.55	6.49
B-14	S-105	958	26	39	6900	96	863	0	0	0	0	0.69	2.15
B-14	S-110	994	1578	4297	6267	211	783	0	0	0	0	0.63	1.98
B-14	S-114	387	356	1334	2396	88	299	0	0	0	0	0.24	0.84
B-14	S-148	4351	273	820	29517	662	3690	0	0	0	0	2.95	7.33
Basin 14 Subtotals		16468	4578	13542	86310	2277	10789	198	673	430	2105	8.97	18.30
B-15	S-152	2070	63	393	14586	246	1823	0	0	0	0	1.46	4.07
B-16	S-102	1138	38	112	8247	107	1031	0	0	0	0	0.82	2.50
B-16	S-108	6247	606	9711	41308	1083	5164	0	0	0	0	4.13	9.68
B-16	S-138	1758	80	273	11562	313	1445	0	0	0	0	1.16	3.34
Basin 16 Subtotals		9143	724	10096	61117	1504	7640	0	0	0	0	6.11	13.35
B-17	S-123	639	65	154	4652	57	582	0	0	0	0	0.47	1.52
B-18	S-47	1541	247	1342	10612	215	1326	0	0	0	0	1.06	3.11
B-18	S-48	2643	289	11100	18000	393	2250	0	0	0	0	1.80	4.86
B-18	S-55	332	17	179	1294	170	162	0	0	0	0	0.13	0.48
B-18	S-60	3125	1578	7266	21887	389	2736	0	0	0	0	2.19	5.72
B-18	S-64	1158	173	1564	6370	362	796	0	0	0	0	0.64	2.00
B-18	S-73	1210	57	1045	6669	377	834	0	0	0	0	0.67	2.09
B-18	S-74	1306	168	717	8430	252	1054	0	0	0	0	0.84	2.55
B-18	S-82	1	0	0	8	0	1	0	0	0	0	0.00	0.00
B-18	S-89	1630	82	387	11665	171	1458	0	0	0	0	1.17	3.37
B-18	S-93	2063	155	878	13929	322	1741	0	0	0	0	1.39	3.91
B-18	S-115	1819	65	221	12072	310	1509	0	0	0	0	1.21	3.47
Basin 18 Subtotals		16828	2831	24699	110935	2962	13867	0	0	0	0	11.09	22.19
B-19	S-49	3417	383	5473	22337	625	2792	0	0	0	0	2.23	5.82
B-19	S-61	1514	161	2768	9823	286	1228	0	0	0	0	0.98	2.91
B-19	S-62	2816	325	4475	19230	413	2404	0	0	0	0	1.92	5.13
B-19	S-79	120	2	212	945	2	118	0	0	0	0	0.09	0.36
Basin 19 Subtotals		7867	871	12928	52334	1325	6542	0	0	0	0	5.23	11.76
	Totals	149817	49118	185977	839007	24558	104876	576	4344	1416	14089	86.19	

5. For areas outside the proposed inaugural airport but within the ultimate airport boundary, the approach was similar to that used in Step 5 above except the percentage of potentially developable area actually developed was increased to 60% and the estimated average flow per acre was increased to 250 gallons/day. These intermediate values were selected to account for restricted development in noise corridors and some additional runways and other restricted areas that would generate no wastewater flow. Thus, for the same sub-basin S-117, the area within the ultimate airport boundary would generate an estimated 250 gallons/day/acre X 1500 acres X 60% = 0.22 MGD average flow.

6. The estimated average flow at full development was then determined by summing the flows from each category of land use inside and outside the proposed airport. Continuing with the example of sub-basin S-117, the estimated ultimate population outside the airport boundary is 17,685. This would generate an estimated average flow of 17,685 P.E. X 100 gallons/day/P.E. = 1.77 MGD. When this is added to the estimated 0.01 MGD from the inaugural airport and 0.22 MGD from the ultimate airport, the total estimated average wastewater flow from sub-basin S-117 is approximately 2.00 MGD. The estimated average flow from each sub-basin will be used as the design average flow for sizing proposed wastewater treatment facilities.

7. Once the estimated average flow was determined, the estimated peak flow was calculated using the Illinois EPA peak to average relationship found in Appendix D, Figure 1, of the Illinois Recommended Standards for Sewage Works. That relationship is expressed as:
   $Q_{peak}/Q_{avg} = (18 + P^{1/2}) / (4 + P^{1/2})$, where P is the population equivalent in thousands.
   The value for P was determined from the total estimated average flow divided by 0.1 MGD. This is equivalent to 100 gal/day/P.E. At very large values of P, the above equation would produce a peaking factor less than 2 times for the peak to average ratio. In these cases, the peak to average ratio was set at 2.0, such as for the aggregated flows in Basins B-5 and B-18. All other basins and sub-basins have a peak to average flow ratio above 2.0. The estimated peak flows will be used for sizing trunk sewers and pump stations. It is recognized that where existing sewer systems are already in place, they may have higher peaking factors than indicated by the IEPA method. In some cases, excess flow storage basins are already being provided to reduce the downstream peaks. In other cases, some adjustments may be made to the values in Table 1 in existing developed areas to account for actual peak flows experienced or projected by existing wastewater providers. It should also be noted that the projected flow values in Table 1 are based on current technology and wastewater

generation rates. This should result in a slightly conservative result, since it is anticipated that future emphasis on water conservation, recycling and sustainability should result in some reduction in future flows.

To further support the rationale and assumptions explained above, it is useful to apply some "reasonableness" checks by comparing to other data and past studies. This can be done for each of the area classifications inside and outside the proposed airport boundaries.

For the areas outside the airport, the two main criteria were 10 P.E. per acre at full development and assuming 80% of the potentially developable area would actually be developed into a wastewater generating use. The value of 10 P.E. per acre is similar to design values used by others in this area, such as those used by Baxter & Woodman for the Village of Beecher. They use 10 P.E./acre for new commercial or industrial areas and a range of 6.125 P.E./acre to 18 P.E./acre for residential areas. Most residential development would fall in the low to medium density residential categories, at 8.75 P.E./acre and 12.25 P.E./acre, respectively. Thus, 10 P.E./acre appears to be a reasonable value for overall development in the region.

The 80% area reduction factor is typical as an estimate of actual useable area to total potentially developable area for new developments. Values ranging from 65% to 85% have been used in previous studies, depending on the type of development, topography and other factors. A value of 80% overall should be slightly conservative. When the 10 P.E. per acre is combined with the 80% useable area factor, it gives an estimated population at full development. The resulting projected ultimate population in individual sub-basins can then be compared with the CMAP projected populations in 2030. For sub-basins along the northern boundary which are already developed, it is interesting to note that the projected 2030 population (by CMAP) is very close to the projected ultimate population at full development. For example, please refer to Table 1 and sub-basins S-32, S-29, and S-46 near University Park and S-26 near Steger. This comparison supports the rationale used for estimating population at full development.

Other checks can be applied for those areas within the airport boundary. The Airport Master Plan for the South Suburban Airport Project, prepared by TAMS and dated March 21, 2005, indicates that the projected average daily wastewater flows from the inaugural airport would range from 29,000 gal/day to 58,000 gal/day. The updated master plan prepared by Earth Tech, Inc. and dated March 7, 2008 includes these same estimates. The methodology used in our calculations would result in a projected average flow of 59,200 gal/day in sub-basin S-125,

where the proposed terminal is to be located and a total flow of about 174,000 gal/day for the entire inaugural airport area. This may be slightly conservative but appears reasonable given the fact that the exact location of sources generating wastewater is unknown at this time and the fact that flows from the airport are very small compared with other projected flows. Being slightly conservative on these airport flow estimates should assure that individual trunk sewers and treatment facilities have adequate capacity in the event that most flow from the airport is consolidated into one or two locations, rather than being dispersed into all the different sub-basins that include part of the airport.

Similarly, a September 12, 1997 draft environmental assessment report prepared by TAMS for the proposed airport projected a total water use for all facilities within the ultimate airport boundary to be approximately 1.95 MGD. This compares with our estimated total flow of 2.29 MGD from all areas within the inaugural and ultimate airport boundaries combined. The Airport Master Plan by Earth Tech dated March 7, 2008 includes a projected wastewater flow after 20 years of operation between 0.152 and 0.414 MGD for the entire airport. This also seems reasonable compared with the projected ultimate flow of 2.29 MGD.

The time required to reach ultimate development has not been projected. However, some indication may be obtained by comparing the populations and growth rates from 2000 to 2030 with the projected ultimate population. Based on data from CMAP, the 2000 population for the study area was 49,118 and the projected 2030 population is 185,977. This corresponds to an average growth rate of about 4.54% per year. If growth continues at the same rate after 2030, the projected ultimate population of 839,000 would be reached in about 34 additional years or in approximately 2064. In actuality, one would expect the rate of growth to slow down as the area becomes more developed, so the projected ultimate population may not be reached for another 60 to 80 years or more.

4.2 Organic Loads

The projected organic loads for each sub-basin are not shown on the table, but will be assumed to be equivalent to normal domestic strength wastewater or 0.17 lbs of BOD (biochemical oxygen demand) per P.E. This is equivalent to 1700 lbs BOD per MGD average flow. Where

existing industrial loads are known or projected by existing wastewater providers, those should be added to the basic loading estimated from the 0.17 lbs BOD per P.E. It is also recognized

that the airport may produce some higher strength wastewater from de-icing or other maintenance operations. It has been assumed that these discharges will be adequately contained and regulated by pre-treatment ordinances so that the wastewater reaching the public system is considered to be normal strength wastewater.

For estimating sizing and costs of alternative treatment facilities, it has been assumed that the overall wastewater strength is comparable to that of typical domestic wastewater. Thus, all proposed facilities are based on projected flow rates only. After a preferred alternative plan has been selected and specific treatment plants are being planned, the projected organic loads should be reviewed and adjusted to account for any significant proposed discharges that have higher organic content than normal wastewater.

5.0 REGULATORY ISSUES

This section summarizes the key regulatory issues that may impact the selection, review and approval of future wastewater facilities being considered in this study. It should be emphasized that regulations are always subject to change and that some issues discussed below are currently in the process of being revised by the regulatory authorities. As such, these issues should be reviewed and updated prior to proceeding with any specific projects.

This section discusses the major water quality and regulatory review issues that must be addressed in development of new wastewater collection and treatment facilities proposed for the study area. The rules and procedures are complex and will vary depending on what facilities are proposed and where they are located. The end result of these regulatory issues and the required review processes is that siting and implementing significant new wastewater facilities to serve the long-term needs of this area will involve a complex, lengthy and costly process. For a typical new facility requiring a CMAP Level 1 review and issuance of a new NPDES permit for a proposed wastewater discharge, it is estimated that 8 to 12 years may be required from the time a decision is made to proceed until a new facility is in place and operating. This time frame would be even longer if there were significant problems with zoning changes or other court challenges. More details on the approximate time required for completing this process is presented in Section 9.1 of this report.

It is not anticipated that this study will be submitted directly to any regulatory agency for approval. Nevertheless, it is recommended that the final report be submitted to the Chicago Metropolitan Agency for Planning (CMAP) and Illinois Environmental Protection Agency (IEPA) to keep them informed of the planning process and to solicit their input regarding major regulatory issues that must be addressed in the Facilities Planning process that follows this study. It is important to understand how these regulatory review issues may affect the recommended improvements and what steps for review and approval will eventually be required before proposed facilities can be implemented.

5.1 Facilities Planning Areas

IEPA is the key regulatory agency controlling wastewater facilities in Illinois. When the federal Clean Water Act was first passed in 1972 it required each state to develop a Water Quality Management (WQM) Plan. In Illinois, that requirement was met in part by IEPA establishing

designated geographical areas called Facilities Planning Areas (FPAs) around existing communities or wastewater service districts. These FPAs designated the government entity responsible for planning and providing future wastewater service needs within each FPA. The FPA was not intended to be a mechanism for controlling or limiting growth, but IEPA construction permits were not to be issued in areas outside an FPA. As a result, it has become necessary to amend FPA boundaries to accommodate new development in growing communities. That process provides for public notification and review, and sometimes has resulted in boundary conflicts.

There are currently five major FPAs within the study area: Frankfort FPA, Deer Creek FPA (Aqua Illinois), TCBSD FPA, Beecher FPA and Peotone FPA. Any of these entities could initiate an FPA amendment request to expand their service area.

Prior to submittal of a permit application for constructing any new facilities, the first step is normally to prepare a Facilities Plan that describes a 20-year plan for providing wastewater service within a designated FPA. If any state or federal funding is being considered for the proposed improvements (such as an IEPA revolving loan), then specific requirements for the contents of the Facilities Plan are also spelled out in state regulations at 35 IAC Section 365. Facilities Plans address the wastewater needs for a specific FPA. If wastewater service to areas outside an existing FPA are proposed, then an FPA amendment will also be required as part of the planning process. Within the 234 sq. mile study area there are several existing FPAs and many rural areas not associated with any existing FPAs, as shown in Figure 2. In addition to FPAs, Figure 2 also shows certificated areas, where customers are served by private utilities. Providing new wastewater service by private utilities is further complicated because they are subject to additional rules and regulations under the Illinois Commerce Commission, which must approve proposed rates. In general, this makes it more difficult for these utilities to extend infrastructure to serve future development that may not occur for several years.

Revisions to existing FPA boundaries are called Water Quality Management Plan amendments. Procedures for revising WQM plans are contained in 35 IAC Section 351. In most areas of the state, review and approval of WQM plan revisions are done directly by IEPA, but for the greater Chicago area (including the study area), the initial review responsibility has been delegated to CMAP. Recommended WQM plan revisions approved by CMAP are then referred to IEPA for final approval. The same review process also applies for creation of a new FPA. More details on the CMAP review process are provided below.

5.2 CMAP Reviews

CMAP reviews of FPA amendment requests are administered through its Wastewater Committee and CMAP has well-established procedures for the review process. All FPA modification requests are classified in one of three levels:

Level I requests involve major changes that are anticipated to have area-wide impacts. These applications require a public hearing with 45-days notice and consideration by the CMAP Board after recommendation by the Committee. FPA revisions necessary to implement any of the alternatives proposed in this study would be Level 1 requests.

Level II requests affect only a limited geographical area and are anticipated to have minimal impacts. These applications require a public meeting with 30-days notice and staff issues a draft recommendation for consideration by the Committee. CMAP Board action is not required.

Level III requests involve minor changes in factual information or supporting data. These requests are reviewed and acted upon by staff after a 15-day public notice and comment period and formal Committee action is not required.

It is anticipated that the proposed improvements identified later in this study would result in one or more Level I FPA reviews by CMAP, depending on the implementation phasing and the jurisdictional authority requesting the changes. Following CMAP review and recommendations, the FPA modification requests would be submitted to IEPA for final approval. CMAP requires an application fee of $10/acre with each FPA application package. Additional details are available on the CMAP web site.

5.3 Facilities Plan Reviews and Antidegradation Assessment

In addition to FPA boundary change requests, 20-year Facility Plans prepared for proposed wastewater system expansions are also reviewed first by CMAP, then by IEPA. Since adoption of the antidegradation regulations in 2002, IEPA has required submittal of an NPDES permit application for any new or expanded wastewater treatment plant (WWTP) along with the Facilities Plan. This allows IEPA to perform an antidegradation analysis on the proposed discharge. The antidegradation assessment is required under 35 IAC Section 302.105 and involves a characterization of the receiving water body, identification and quantification of

proposed load increases, purpose and benefit of the proposed project, and alternatives to discharge (such as land application). The IEPA assessment requires public notification and participation if requested by the public, and consideration of comments received by Illinois Department of Natural Resources (IDNR). IEPA has also recommended that an endangered species review be completed by IDNR prior to IEPA initiating the antidegradation review.

A recent decision and order by the Illinois Pollution Control Board (IPCB) issued on April 19, 2007 for the New Lenox case (PCB 04-88) has caused a more rigorous review process for antidegradation. In this case, the Village of New Lenox had applied for an IEPA permit to construct expanded wastewater treatment facilities on Hickory Creek. After IEPA completed its antidegradation analysis and issued a permit, several environmental groups petitioned the IPCB to review the IEPA decision to issue the NPDES permit. In a 51-page ruling, IPCB ordered the IEPA to re-do the antidegradation assessment. As a result of this decision, IEPA will perform a much more rigorous analysis and will require more detailed information be submitted by the applicant for future antidegradation assessments. Since the antidegradation assessment may be different for different water bodies, this issue may become an important factor in determining the preferred location for proposed new or expanded WWTPs. In recent discussion with IEPA, they recommended that the antidegradation process be initiated as soon as possible for any proposed new or expanded discharge.

Another important criteria affecting IEPA review of a Facilities Plan is the time period upon which the plan is based. IEPA review and approval of facility plans is normally based on future needs for a 20-year period. This may complicate approval of potential regional solutions that involve major changes in FPA boundaries or are designed to serve wastewater needs that extend more than 20 years in the future. In other words, the optimum approach to meet 20-year needs may be significantly different than the optimum approach for providing wastewater service at full development. Phasing improvements in 20-year increments may help address this regulatory issue.

5.4 Other Water Quality Issues

Besides antidegradation considerations, there are several other important water quality issues that may influence the siting of a proposed facility and/or the permitted effluent limits if a facility requires an NPDES discharge permit. These issues directly affect the complexity of the review

process and the ultimate cost of facilities required to meet the applicable standards. Some of the key issues are briefly described below:

1. **Size of Receiving Stream** – In general, a larger stream with higher dilution could support higher effluent limits in the NPDES permit. However it appears that most (if not all) the streams in the study area are small and would be expected to have BOD and suspended solids limits of 10 mg/l and 12/mg/l, respectively.

2. **Ammonia Nitrogen Limits** –are dictated by existing stream conditions depending on pH, temperature and other factors. If IEPA does not have good data on the specific receiving stream, it may apply other data from a similar nearby stream. Anticipated ammonia limits were requested from IEPA for potential discharge locations identified in this study, and the IEPA recommended effluent limits for all three proposed WWTP locations are shown below:

	Daily Max	30-Day Average	Weekly Average
Spring/Fall	8.1 mg/l	1.8 mg/l	4.4 mg/l
Summer	6.6 mg/l	1.1 mg/l	2.8 mg/l
Winter	9.1 mg/l	4.0 mg/l	N/A

3. **Phosphorus Limits** – any proposed WWTPs > 1.0 MGD will be subject to the interim phosphorus discharge limit of 1.0 mg/l. In the future, lower phosphorus effluent limits may be applied depending on the outcome of the nutrient water quality standards currently under review. See Appendix A for a recent update on nutrient standards in Illinois. IEPA has indicated that it plans to develop new proposed standards for phosphorus by the end of this year (2008) or sometime next year and that lower limits are anticipated.

4. **Nitrogen Limits** – Other than ammonia, a limit on total nitrogen would not be applied under current regulations. However, as with phosphorus, nitrogen limits may be applied at some future time if new water quality standards are developed for nutrients. Based on current information, IEPA does not anticipate establishing new standards for nitrogen in the near future. However, environmental groups have petitioned USEPA to revise the

definition of secondary standards under the Clean Water Act so that nutrient removal would be included. This may result in new standards for nitrogen and/or phosphorus. Further, there is concern for nutrient loading as a possible contributor to the hypoxia (low oxygen) issue in the Gulf of Mexico near the Mississippi River delta. Although the majority of this phenomenon appears to be related to agricultural runoff, it could eventually result in new nutrient standards for wastewater facilities.

5. **Dissolved Oxygen Limits** – The Illinois Pollution Control Board (IPCB) issued new dissolved oxygen (D.O.) standards on January 24, 2008. The previous D.O. standard for general use waters (35 IAC Section 302.206) was 6.0 mg/l during at least 16 hours of any 24-hour period and at least 5.0 mg/l at all times. This standard was often applied to NPDES permit requirements as a 6.0 mg/l effluent limit. The new standard provides for more variation with lower values required from August through February and higher values during other months. In addition, higher standards were imposed for specific enhanced stream segments to protect more sensitive aquatic life. Although only 8% of streams state-wide were identified in this group, some designated enhanced D.O. stream segments are within the study area, as shown in Figure 6. This may be a consideration in siting proposed wastewater facilities on those streams.

6. **Impaired Waters** – Every two years the Illinois EPA compiles an Integrated Water Quality Report and Section 303(d) List of impaired waters. Potential receiving streams that would be impacted by new or increased discharges include Thorn Creek (HBD-03, HBD-05, HBD-06), Deer Creek (HBDC, HBDC-02) and Plum Creek (HBEC, HBE-02, HBDF, HBDF-04) draining toward the north as shown on Map G-1a from the 2006 report (see Appendix B), and Bull Creek (FRA), Dixie Creek (FQA), Trim Creek (FQ-01), Exline Slough (FKA-01), Marshall Slough (FFB, FFB-01), Black Walnut Creek (FFBA), Rock Creek (FF-01), South Branch of Forked Creek (FBC-02), Forked Creek (FB-02) and Prairie Creek (FA-01), all draining south to the Kankakee River as shown on Map G-10, included in Appendix B. (The letters in parentheses after each stream name refer to the stream segment designation used by IEPA). Five of these potential receiving streams, Thorn Creek, Deer Creek, Exline Slough, South Branch of Rock Creek and Black Walnut Creek were listed as Category 5 impaired streams in the 2008 Integrated Water Quality Report dated June 2008, as shown in red on Figure 6. A stream is listed as Category 5 when one or more stream uses are not attained, and these streams are subject to a TMDL study as explained further below. TMDL studies are currently underway for Deer

Creek and Thorn Creek. The streams tributary to Kankakee River were re-assessed in 2008 based on new data collected in 2005. This resulted in the addition of phosphorus as an impairment affecting water quality in Black Walnut Creek and South Branch of Rock Creek. Exline Slough was added as an impaired stream due to low dissolved oxygen.

7. **Total Maximum Daily Load (TMDL)** – For all Category 5 impaired streams, Illinois EPA will complete (or has already completed) a TMDL study to determine the contributing causes of impairment and to develop a load allocation from all sources which could result in meeting the water quality standard. This may ultimately result in a reduction of current discharge limits for certain parameters, or at the least, make it more difficult to increase the discharge loads for any parameter causing impairment. The status of impaired waters and TMDL studies for any potential receiving stream are considered as part of the antidegradation analysis discussed above.

5.5 Environmental Sign-offs

Before a construction permit can be issued for any new facilities funded through grants or IEPA revolving loans, sign-offs will be required from several agencies. These include the Illinois Historic Preservation Agency (IHPA), IDNR (Division of Water Resources) and the Corps of Engineers for any construction in floodplains or creek crossings. The IHPA sign-off considers potential impact to historic sites and may require archeological investigations if any potential sites are identified. The IDNR sign-off is primarily aimed at protection of endangered species, which should have been addressed prior to the antidegradation analysis as discussed earlier.

6.0 WASTEWATER COLLECTION AND TREATMENT ALTERNATIVES

This section summarizes the rationale used to identify and develop preliminary collection and treatment alternatives to serve the undeveloped portions of the study area. This analysis does not address management authority or suggest that a particular entity should provide specific facilities. Instead, the alternatives have been developed from a technical standpoint to identify feasible options that should be considered regardless of the responsible management entity. Nine alternatives were initially developed for further analysis, and these alternatives were presented to stakeholders to receive their input on preferred alternatives. Based on stakeholder feedback, four alternatives were then evaluated in more detail including a preliminary cost analysis. The preliminary cost analysis indicated that an approach using three new regional treatment plants appeared slightly more cost effective than other alternatives with only one or two treatment facilities. The procedures used to develop and evaluate alternatives are explained in the paragraphs that follow.

6.1 Methodology for Developing Alternatives

The first step in developing alternatives was to identify potential service areas, considering a combination of existing Facilities Planning Areas (in more developed areas) and natural drainage basins (in more undeveloped areas).

A total of 17 service areas were identified, as indicated by numbered white circles on Figures 8 through 16. The estimated ultimate population and wastewater flow was then estimated for each service area using the data generated previously and summarized in Table 1. Where a portion of any drainage sub-basin lay in more than one service area, the projected population and flow from that sub-basin was apportioned according to the percentage of developable area lying in each service area. The resulting projected population and flow for each service area are shown in Table 2.

Table 2. Services Areas for Alternatives

Description	Sub-basin	Dev. Acres	In/out of Airport	Ultimate Pop. at Full Devel.	Avg. Flow (MGD)	Peak Flow (MGD)
Service Area 12	S-19	1	out	8	0.00	0.00
Frankfort FPA	S-30	740	out	5920	0.59	1.88
	S-62	1968	out	15740	1.57	4.34
	S-49	733	out	5860	0.59	1.86
	S-17	28	out	224	0.02	0.09
	S-28	345	out	2760	0.28	0.96
	S-31	864	out	6912	0.69	2.15
	S-47	592	out	4738	0.47	1.55
	S-43	173	out	1380	0.14	0.51
	Subtotals	5443	out	43542	4.35	10.11
Service Area 10	S-20	34	out	274	0.03	0.11
Deer Crk (W of I-57)	S-43	899	out	7194	0.72	2.23
	S-47	734	out	5874	0.59	1.87
	S-48	2029	out	16235	1.62	4.45
	S-61	22	out	178	0.02	0.07
	S-64	470	out	3761	0.38	1.26
	S-74	16	out	128	0.01	0.05
	S-55	155	out	1241	0.12	0.46
	S-60	1641	out	13125	1.31	3.72
	S-108	307	out	2455	0.25	0.86
	S-69	82	out	659	0.07	0.26
	Subtotals	6391	out	51125	5.11	11.53
Service Area 13	S-20	117	out	935	0.09	0.36
Deer Crk (E of I-57)	S-24	316	out	2528	0.25	0.89
	S-32	428	out	3427	0.34	1.16
	S-29	89	out	712	0.07	0.28
	S-43	1185	out	9480	0.95	2.82
	S-46	714	out	5712	0.57	1.82
	S-48	221	out	1764	0.18	0.64
	S-60	888	out	7102	0.71	2.20
	S-67	1686	out	13487	1.35	3.81
	S-67	485	Ultimate	0	0.07	0.28
	S-69	348	out	2780	0.28	0.96
	S-70	220	out	1761	0.18	0.64
	S-70	27	Ultimate	0	0.00	0.02
	S-125	303	out	2420	0.24	0.85
	S-125	36	Ultimate	0	0.01	0.02
	S-52	131	out	1046	0.10	0.40
	Subtotals	6644	out	53155	5.32	11.91
		548	Ultimate	0	0.08	0.32
		7193	Combined	53155	5.40	12.06

Description	Sub-basin	Dev. Acres	In/out of Airport	Ultimate Pop. at Full Devel.	Avg. Flow (MGD)	Peak Flow (MGD)
Service Area 14	S-29	196	out	1570	0.16	0.58
Thorn Creek SD	S-46	750	out	6001	0.60	1.90
	S-26	447	out	3579	0.36	1.21
	S-67	1498	out	11983	1.20	3.45
	S-27	550	out	4401	0.44	1.45
	S-37	507	out	4054	0.41	1.35
	S-36	164	out	1314	0.13	0.49
	S-38	48	out	382	0.04	0.15
	S-51	2212	out	17698	1.77	4.79
	S-52	1739	out	13911	1.39	3.91
	S-63	999	out	7988	0.80	2.44
	S-59	787	out	6292	0.63	1.98
	S-75	583	out	4662	0.47	1.53
	S-75	504	Ultimate	0	0.08	0.29
	S-76	157	out	1254	0.13	0.47
	S-76	88	Ultimate	0	0.01	0.06
	S-81	124	Ultimate	0	0.02	0.08
	S-100	217	Ultimate	0	0.03	0.13
	S-91	117	Ultimate	0	0.02	0.07
	S-125	87	out	694	0.07	0.27
	Subtotals	10723	out	85783	8.58	17.63
		1049	Ultimate	0	0.16	0.58
		11772	Combined	85783	8.74	17.90
Service Area 9	S-106	3019	out	24152	2.42	6.21
WWTP B or PS 9	S-81	67	out	533	0.05	0.21
(gravity portion only)	S-91	1588	out	12704	1.27	3.62
	S-91	10	Ultimate	0	0.00	0.01
	S-116	3472	out	27776	2.78	6.97
	S-96	263	out	2105	0.21	0.75
	S-96	198	Inaugural	0	0.01	0.03
	S-96	139	Ultimate	0	0.02	0.09
	S-100	47	out	374	0.04	0.15
	S-100	103	Inaugural	0	0.00	0.02
	S-100	42	Ultimate	0	0.01	0.03
	S-111	2177	out	17416	1.74	4.72
	S-111	133	Ultimate	0	0.02	0.08
	S-137	2171	out	17368	1.74	4.71
	Subtotals	12804	out	102428	10.24	20.49
		480	in airport	0	0.06	0.24
		13284	Combined	102428	10.30	20.61
Service Area 1	S-117	2210	out	17682	1.77	4.79
Pump Station 1	S-117	1500	ultimate	0	0.23	0.80
	S-121	1543	out	12345	1.23	3.53
	S-156	1412	out	11299	1.13	3.28
	Subtotals	5166	out	41326	4.13	9.68
		1500	ultimate	0	0.23	0.80
		6666	Combined	41326	4.36	10.11
Service Area 2	S-141	4886	out	39090	3.91	9.25
Pump Station 2	S-139	433	out	3467	0.35	1.17
	Subtotals	5320	out	42558	4.26	9.92

Description	Sub-basin	Dev. Acres	In/out of Airport	Ultimate Pop. at Full Devel.	Avg. Flow (MGD)	Peak Flow (MGD)
Service Area 3	S-96	300	ultimate	0	0.04	0.18
Pump Station 3	S-100	1645	Ultimate	0	0.25	0.87
(east end of airport)	S-100	459	Inaugural	0	0.02	0.08
	S-117	257	Inaugural	0	0.01	0.04
	Subtotals	2661	In airport	0	0.32	1.09
Service Area 4	S-69	483	out	3866	0.39	1.29
Pump Station 4	S-70	375	out	3001	0.30	1.03
(west end of airport)	S-70	334	Ultimate	0	0.05	0.20
	S-78	558	out	4460	0.45	1.47
	S-78	52	Inaugural	0	0.00	0.01
	S-78	180	Ultimate	0	0.03	0.11
	S-87	60	Inaugural	0	0.00	0.01
	S-87	1196	Ultimate	0	0.18	0.65
	S-104	561	Inaugural	0	0.02	0.09
	S-104	15	Ultimate	0	0.00	0.01
	Subtotals	1416	out	11326	1.13	3.29
		673	Inaugural	0	0.03	0.11
		1724	Ultimate	0	0.26	0.90
		3814	Combined	11326	1.42	3.97
Service Area 11	S-75	82	Ultimate	0	0.01	0.05
WWTP A	S-75	108	out	866	0.09	0.33
(gravity portion only)	S-110	783	out	6264	0.63	1.97
	S-114	299	out	2392	0.24	0.84
	S-101	780	Inaugural	0	0.03	0.13
	S-101	518	Ultimate	0	0.08	0.30
	S-103	394	Inaugural	0	0.02	0.07
	S-103	679	Ultimate	0	0.10	0.39
	S-125	3641	out	29127	2.91	7.25
	S-125	4755	Ultimate	0	0.71	2.21
	S-125	1480	Inaugural	0	0.06	0.23
	S-127	509	out	4069	0.41	1.35
	S-129	2638	out	21101	2.11	5.55
	S-129	376	Ultimate	0	0.06	0.22
	S-142	2122	out	16972	1.70	4.62
	S-142	247	Ultimate	0	0.04	0.15
	Subtotals	10099	out	80790	8.08	16.79
		2654	Inaugural	0	0.11	0.40
		6655	Ultimate	0	1.00	2.95
		19408	Combined	80790	9.18	18.37
Service Area 5	S-104	3086	out	24685	2.47	6.32
Pump Station 5	S-104	349	Ultimate	0	0.05	0.21
	S-105	863	out	6900	0.69	2.15
	S-148	3690	out	29518	2.95	7.33
	Subtotals	7638	out	61102	6.11	13.35
		349	Ultimate	0	0.05	0.21
		7987	Combined	61102	6.16	13.44
Service Area 6	S-102	1031	out	8247	0.82	2.50
Pump Station 6	S-108	4857	out	38854	3.89	9.20
	Subtotals	5888	out	47101	4.71	10.78

Description	Sub-basin	Dev. Acres	In/out of Airport	Ultimate Pop. at Full Devel.	Avg. Flow (MGD)	Peak Flow (MGD)
Service Area 8	Deer Creek-W of I-57	6391	out	51125	5.11	11.53
WWTP C or PS 8	rest of S-64	326	out	2609	0.26	0.91
(gravity portion only)	rest of S-55	7	out	53	0.01	0.02
	rest of S-60	208	out	1660	0.17	0.61
	rest of S-74	1038	out	8302	0.83	2.52
	S-73	834	out	6668	0.67	2.09
	S-89	1458	out	11664	1.17	3.37
	S-93	1741	out	13929	1.39	3.91
	S-115	1509	out	12072	1.21	3.47
	Subtotals	13510	out	108082	10.81	21.32
Service Area 7	S-62	436	out	3490	0.35	1.18
Pump Station 7	S-49	2059	out	16475	1.65	4.51
	S-61	1205	out	9643	0.96	2.86
	S-79	118	out	945	0.09	0.36
	Subtotals	3819	out	30553	3.06	7.54
Small Systems						
Service Area 15	S-123	582	out	4653	0.47	1.52
Southwest Corner	S-138	1445	out	11562	1.16	3.34
	S-152	1823	out	14586	1.46	4.07
	Subtotals	3850	out	30801	3.08	7.60
Service Area 17	S-88	472	out	3774	0.38	1.27
Southeast Corner	S-99	444	out	3552	0.36	1.20
	S-107	519	out	4149	0.41	1.38
	S-126	1439	out	11508	1.15	3.33
	S-130	206	out	1646	0.16	0.60
	S-163	738	out	5905	0.59	1.88
	Subtotals	3817	out	30533	3.05	7.54
Service Area 16	S-59	82	out	659	0.07	0.26
Northeast Corner	S-76	384	out	3069	0.31	1.05
	S-77	829	out	6634	0.66	2.08
	S-80	1026	out	8208	0.82	2.49
	S-85	1950	out	15602	1.56	4.31
	S-63	1381	out	11044	1.10	3.22
	S-68	404	out	3230	0.32	1.10
	S-44	164	out	1310	0.13	0.49
	S-50	1266	out	10128	1.01	2.99
	S-36	548	out	4380	0.44	1.44
	S-41	670	out	5362	0.54	1.72
	Subtotals	8703	out	69626	6.96	14.86
	Portion not in Aqua	5709	out	45674	4.57	10.51
	Portion in Aqua Area	2994	out	23952	2.40	
Total Developable	Areas	104838	Out of Airport			
		4344	Inaugural Airport			
		14095	Ultimate Airport			
	Total Develop. Acres	123277				

6.2 Service Area Assumptions

Before developing specific alternatives for wastewater collection and treatment, it was necessary to determine some background information on each service area and to formulate certain assumptions regarding wastewater treatment and collection within these areas. These assumptions are summarized below:

- **Service Area 12 – Frankfort FPA**

Within the current Frankfort FPA boundaries in the northwest corner of the study area, it was assumed that this portion would be served by existing or proposed collection and treatment facilities owned by the Village of Frankfort. The total projected average flow at full development is 4.35 MGD. This is slightly more than the rated capacity of the new Regional WWTP (scheduled for completion in 2008), which is 3.5 MGD; however, it is anticipated that the "ultimate" population may never be reached and the actual flow may be close to the design capacity of this new facility. Thus, this area was excluded from further consideration of alternate wastewater options, and it was assumed that wastewater service in this area would continue to be provided by the Village of Frankfort.

- **Service Areas 10 and 13 – Deer Creek FPA**

These two service areas together coincide with the current boundaries of the Deer Creek FPA. The wastewater treatment for this area is currently provided by Aqua Illinois at the University Park WWTP. Since the current facilities are not adequate to provide collection and treatment for the projected ultimate wastewater flows within the entire FPA, the area was further divided into two parts located east and west of I-57. The area to the east was designated as Service Area 13 and the area to the west was designated Service Area 10. The I-57 dividing line was selected for several reasons:

a) Most of the existing development and wastewater infrastructure lies on the east side of I-57.

b) I-57 corresponds roughly to the western corporate limits of University Park.

c) Most of the area east of I-57 drains to the north and east as part of the Great Lakes/Calumet River Watershed, while the portion west of I-57 drains southwest into the Kankakee River Watershed.

d) It was anticipated that the entire FPA could not be served by existing or planned wastewater facilities.

Although interim plans have been developed by others to serve areas on both sides of I-57 with existing facilities operated either by Aqua Illinois or by Thorn Creek Basin Sanitary District (TCBSD) for approximately the next 20 years, it appears that the portion lying west of I-57 would eventually need to be served by new facilities located further south or west. Based on this rationale, projected ultimate wastewater flows at full development were determined to be about 5.4 MGD east of I-57 (Service Area 13) and 5.1 MGD west of I-57 (Service Area 10). A potential plan for expansion of the University Park WWTP to 4.5 MGD has already been developed by others. Thus, it was assumed that the area east of I-57 could potentially be served by an expanded University Park WWTP. The area west of I-57 would initially continue to be served by that same facility, but ultimately would be served by new facilities located further west. Thus, Service area 10 was included in the analysis of regional alternatives.

- **Service Area 14 – Thorn Creek Basin Sanitary District FPA**

The area within the current TCBSD FPA boundaries was also evaluated separately. Based on discussions with TCBSD staff, it was indicated that the existing TCBSD WWTP should be able to serve the areas within their current FPA boundaries. The projected ultimate wastewater flow from the portion of TCBSD FPA lying within the study area was estimated to be 8.74 MGD. This would account for about half of the TCBSD WWTP rated plant capacity, which is currently rated for 15.92 MGD. TCBSD staff indicated that they estimated the capacity allocation for flows within the portion of their FPA lying south of the Will-Cook County line would be about 7.5 MGD. While this is slightly less than the projected ultimate flow of 8.74 MGD, it supports the assumption that this area can continue to be served by the existing TCBSD WWTP located in Chicago Heights. Thus, this area was also excluded from further analysis of alternatives.

- **Service Areas 15, 16 and 17**

These service areas in the southwest corner, southeast corner and northeast corner of the study area were also considered separately. Due to the location of these areas away from existing developments and not readily served by new facilities, it was assumed that these areas would either remain agricultural or would be more cost-effectively served by small

systems. The areas in the southwest and southeast corners (Service Areas 15 and 17, respectively) are totally agricultural at the present and are expected to be the last areas to develop, if development ever occurs. The area to the northeast includes some existing low density development and thousands of acres of forest preserves and other protected areas within the Plum Creek watershed. The protected areas account for approximately 35% of the total area. Of the remaining portion which could be developed (or already has developed), about 35% is being served by the existing Plum Creek WWTP or Willowbrook WWTP facilities owned and operated by Aqua Illinois. Since the existing residential developments in this area are less dense than in most of the study area, it is anticipated that any new development in this corner will also be less dense and may be more effectively served by smaller, distributed collection and treatment facilities or by expanding the existing WWTP facilities. Excluding the areas already served by Aqua Illinois, the remaining potential developable area within all three fringe areas combined is approximately 10% of the total developable area in the study area. The remaining 90% of the study area would be served by existing or proposed regional treatment facilities.

- **Service Areas 3 - East of Proposed Airport**

There are two options for Service Area 3. Service Area 3 is part of a watershed that currently flows north and east into the Great Lakes/Calumet River Drainage Basin. The Village of Crete has done preliminary planning to serve a portion of this area with a Pump Station shown on the alternative figures as 3A. This flow would be treated by TCBSD. The remaining area wastewater flow could be transported by Pump Station 3A to the northeast to be treated by TCBSD or transported by Pump Station 3 to the west to into the main, central sub-basin that drains into Black Walnut Creek.

The other option is to transfer the wastewater flow for Service Area 3 into the main, central sub-basin that drains into Black Walnut Creek by Pump Station 3 shown on the alternative figures. This would allow all flows from the airport to be consolidated into one new trunk sewer running along Black Walnut Creek. This would also allow the airport to initially be served either by its own treatment facility or by the Peotone WWTP, and then eventually be served by a larger regional treatment plant located further downstream.

The option selected for Service Area 3 will be dictated by the timing and nature of future development in Service Area 3 and of the proposed Airport. The cost analysis was based on the option shown as Pump Station 3, but either option should have similar costs.

- **Service Areas 4 - West of Proposed Airport**

A large portion of Service Area 4 lies within the airport boundaries. It is assumed that the wastewater flow from this area would be transported into the main, central sub-basin that drains into Black Walnut Creek by Pump Station 4 shown on the alternative figures. This would allow all flows from the airport to be consolidated into one new trunk sewer running along Black Walnut Creek. As with Area 3, this would also allow the airport to initially be served either by its own treatment facility or by the Peotone WWTP, and then eventually be served by a larger regional treatment plant located further downstream.

- **Service Areas 9 and 11 – Beecher and Peotone**

Service Area 9 includes the Village of Beecher and Area 11 includes the Village of Peotone. The developed portion of these areas is currently within the corporate limits of these communities and wastewater service is being provided by the municipalities. However, since the communities are only a small portion of the overall service areas, it was assumed that eventually these areas would be served by larger treatment facilities located further downstream near the Will County line. The existing facilities will be important for providing continued service during the next 10 to 12 years until the new facilities can be put into operation.

6.3 Alternative Descriptions

Nine different preliminary alternatives were developed for serving Areas 1 through 11 as shown on Figures 8 through 16 and in Table 3. Please note in the figures that proposed facilities located near the outside boundary of the study area have been shown just to the south or west of the study area boundaries to make the maps more readable; however, all of these improvements would actually be located within Will County. In addition to the alternatives shown in the figures, continuation of the current situation with gradual expansion of existing wastewater systems is considered to be another option. The nine alternatives described below include one alternative with a single, centralized new wastewater treatment plant (WWTP), four alternatives that utilize two regional WWTPs and four more alternatives that would utilize three different WWTPs. Each alternative is described further below:

Table 3. Summary of Alternatives

Option 1 - One New WWTP Located at WWTP A (Alternative 1)

Item	Avg. Flow (MGD)	Peak Flow (MGD)	Comments
P.S. 2	4.26	9.93	
P.S. 9	14.56	29.12	Includes PS 2
P.S. 1	18.92	37.84	Includes PS 9
P.S. 7	3.06	7.55	
P.S. 8	13.87	27.74	Includes PS 7
P.S. 6	18.58	37.16	Includes PS 8
P.S. 5	29.84	59.68	Includes PS 1, 3 & 4
P.S. 3	0.32	1.09	
P.S. 4	1.42	3.98	
WWTP A	54.58	109.16	Includes PS 5 & 6

Option 2 - Two New WWTPs located at WWTP A and WWTP B

Alternative 2 - PS 1 & 2 to WWTP B, rest to WWTP A

Item	Avg. Flow (MGD)	Peak Flow (MGD)	Comments
P.S. 1	4.36	10.12	
P.S. 2	4.26	9.93	
WWTP B	18.92	37.84	Includes PS 1 & 2
P.S. 7	3.06	7.55	
P.S. 8	13.87	27.74	Includes PS 7
P.S. 6	18.58	37.16	Includes PS 8
P.S. 5	10.92	21.84	Includes PS 3 & 4
P.S. 3	0.32	1.09	
P.S. 4	1.42	3.98	
WWTP A	35.66	71.32	Includes PS 5 & 6

Alternative 3 - PS 2 to WWTP B, rest to WWTP A

Item	Avg. Flow (MGD)	Peak Flow (MGD)	Comments
P.S. 2	4.26	9.93	
WWTP B	14.56	29.12	Includes PS 2
P.S. 1	4.36	10.12	
P.S. 7	3.06	7.55	
P.S. 8	13.87	27.74	Includes PS 7
P.S. 6	18.58	37.16	Includes PS 8
P.S. 5	15.28	30.56	Includes PS 1, 3 & 4
P.S. 3	0.32	1.09	

Option 3 - Two new WWTPs Located at WWTP A and WWTP C

Alternative 4 - PS 6 & 7 to WWTP C, rest to WWTP A

Item	Avg. Flow (MGD)	Peak Flow (MGD)	Comments
P.S. 2	4.26	9.93	
P.S. 9	14.56	29.12	Includes PS 2
P.S. 1	18.92	37.84	Includes PS 9
P.S. 7	3.06	7.55	
P.S. 6	4.71	10.78	
WWTP C	18.58	37.16	Includes PS 6 & 7
P.S. 5	29.84	59.68	Includes PS 1, 3 & 4
P.S. 3	0.32	1.09	
P.S. 4	1.42	3.98	
WWTP A	36.00	72.00	Includes PS 5

Alternative 5 - PS 7 to WWTP C, rest to WWTP A

Item	Avg. Flow (MGD)	Peak Flow (MGD)	Comments
P.S. 7	3.06	7.55	
WWTP C	13.87	27.74	Includes P.S. 7
P.S. 6	4.71	10.78	
P.S. 5	29.84	59.68	Includes PS 1, 3 & 4
P.S. 2	4.26	9.93	
P.S. 9	14.56	29.12	Includes PS 2
P.S. 1	18.92	37.84	Includes PS 9
P.S. 3	0.32	1.09	
P.S. 4	1.42	3.98	
WWTP A	40.71	81.42	Includes PS 5 & 6

Option 4 - Three New WWTPs at Locations WWTP A, WWTP B and WWTP C

Alternative 6 - PS 6 & 7 to WWTP C, PS 1 & 5 to WWTP A and PS 2 to WWTP B

Item	Avg. Flow (MGD)	Peak Flow (MGD)	Comments
PS 1	4.36	10.12	
PS 5	15.28	30.56	Includes PS 1, 3 & 4
PS 3	0.32	1.09	
PS 4	1.42	3.98	
WWTP A	21.44	42.88	Includes PS 5
PS 2	4.26	9.93	
WWTP B	14.56	29.12	Includes PS 2
PS 6	4.71	10.78	
PS 7	3.06	7.55	
WWTP C	18.58	37.16	Includes PS 6 & 7

Alternative 7 - PS 6 & 7 to WWTP C, PS 5 to WWTP A and PS 1 & 2 to WWTP B

Item	Avg. Flow (MGD)	Peak Flow (MGD)	Comments
PS 5	10.92	21.84	Includes PS 3 & 4
PS 3	0.32	1.09	
PS 4	1.42	3.98	
WWTP A	17.08	34.16	Includes PS 5
PS 1	4.36	10.12	
PS 2	4.26	9.93	
WWTP B	18.92	37.84	Includes PS 1 & 2
PS 6	4.71	10.78	
PS 7	3.06	7.55	
WWTP C	18.58	37.16	Includes PS 6 & 7

Alternative 8 - PS 1, 5 & 6 to WWTP A, PS 2 to WWTP B and PS 7 to WWTP C

Item	Avg. Flow (MGD)	Peak Flow (MGD)	Comments
PS 1	4.36	10.12	
PS 6	4.71	10.78	
PS 5	15.28	30.56	Includes PS 1, 3 & 4
PS 3	0.32	1.09	
PS 4	1.42	3.98	
WWTP A	26.15	52.30	Includes PS 5 & 6
PS 2	4.26	9.93	
WWTP B	14.56	29.12	Includes PS 2
PS 7	3.06	7.55	
WWTP C	13.87	27.74	Includes PS 7

Alternative 9 - PS 5 & 6 to WWTP A, PS 1& 2 to WWTP B and PS 7 to WWTP C

Item	Avg. Flow (MGD)	Peak Flow (MGD)	Comments
PS 6	4.71	10.78	
PS 5	10.92	21.84	Includes PS 3 & 4
PS 3	0.32	1.09	
PS 4	1.42	3.98	
WWTP A	21.79	43.58	Includes PS 5 & 6
PS 1	4.36	10.12	
PS 2	4.26	9.93	
WWTP B	18.92	37.84	Includes PS 1 & 2
PS 7	3.06	7.55	
WWTP C	13.87	27.74	Includes PS 7

Option 1 – One New WWTP A (**Alternative 1**)

This option would consolidate all new flow (not otherwise served by Frankfort, Aqua Illinois or TCBSD) into one new WWTP A located near the county line along Rock Creek. This option would require at least 9 major pump stations, with some flows being pumped long distances before reaching the WWTP. Rock Creek was selected as the potential receiving stream because this is the most centrally located stream that is not listed as impaired on the 303(d) list. The projected ultimate design average flow (DAF) at this treatment plant would be 54.58 MGD when the service area reaches full development.

Option 2 – Two New WWTPs A and B (**Alternatives 2 and 3**)

There are two variations of this option. With Alternative 2 the flow from Pump Station 1 (PS 1) at the downstream end of Exline Slough would be pumped to WWTP B, located at the downstream end of Trim Creek. All other flows would be directed to WWTP A. This scenario results in a DAF of 18.92 MGD at WWTP B and 35.66 MGD at WWTP A. For Alternative 3 the flow from PS 1 is pumped into the WWTP A system. This results in a DAF of 14.56 MGD at WWTP B and 40.02 MGD at WWTP A. Alternatives 2 and 3 would each require 8 major pump stations.

Option 3 – Two New WWTPs A and C (**Alternatives 4 and 5**)

These options are similar to Option 2 except the second WWTP would be located on the west side of the study area near Forked Creek where it crosses Offner Road, instead of at Trim Creek. Again, there are two variations of this option. Alternative 4 diverts PS 6 flows over to WWTP C and results in a DAF of 18.58 MGD for WWTP C and 36.0 MGD for WWTP A. Alternative 5 diverts flow from PS 6 over to WWTP A. This results in a DAF of 13.87 at WWTP C and 40.71 MGD at WWTP A.

Option 4 - Three New WWTPs A, B and C (**Alternatives 6, 7, 8, and 9**)

This approach utilizes all three WWTPs, located at A, B and C. This produces four different variations, depending on how the pump station discharges are directed. Each variation is described in the attached Table 3. These alternatives have the advantage of transporting more flow to the treatment facilities by gravity with less total pumping required. Of the combined total ultimate design average flow of 54.58 MGD, approximately 27 MGD or 50% would flow by gravity to a treatment facility and then be pumped only once at the WWTP. In comparison, Alternatives 2 through 5 with two WWTPs would transport about 30% of the total flow by gravity and Alternative 1 with one centralized WWTP would transport only 11% by gravity.

6.4 Piping Assumptions

In order to develop preliminary concepts for each alternative it was necessary to make a few assumptions regarding how much of the collection system to include and how to size the sewers and force mains. For the trunk sewers, it was assumed that only flows requiring a 24" pipe or larger would be included in the analysis. It was also assumed that the capacity would be based on a sewer installed at minimum slope. If it is determined later that some sewers can be installed at a steeper slope, then some pipe sizes may end up smaller than shown on the figures. It was also assumed that for trunk sewers smaller than 60" diameter, it would generally be more cost effective to install a single pipe rather than parallel smaller pipes. Depending on development patterns and phasing, it may be determined later that parallel sewers are appropriate in some locations. Using these assumptions the following sewer capacities were determined:

Sewer Size	Minimum Slope	Peak Flow Range (MGD)
24"	0.080%	3.00 – 4.13
30"	0.058%	4.14 – 6.37
36"	0.046%	6.38 – 9.23
42"	0.036%	9.24 – 12.41
48"	0.031%	12.42 – 16.24
54"	0.026%	16.25 – 20.56
60"	0.023%	20.56 – 25.38

For force mains it was assumed that at the projected peak flow, the force mains would be sized for a velocity in the range of 5.0 to 6.0 ft/sec. If the calculated size was 20" or less, it was assumed that a single force main would be used. That corresponds to a peak flow of about 7.5 MGD. For flows above this value, it was assumed that at least two parallel force mains would be required to provide adequate velocities at the lower initial flows that occur as development gradually occurs. If the projected peak flow exceeded the capacity of two 24" force mains, it was assumed that 3 parallel force mains would be used. Thus, the maximum flow for two force mains would be limited to about 24 MGD. At higher peak flows three parallel force mains would be required.

It should be noted that these assumptions are only applicable for a preliminary comparison of alternatives. After a preferred approach has been selected, the design assumptions should be

reviewed and revised as needed to match the anticipated phasing and development patterns for each area being served.

6.5 Land Requirements for New Facilities

As discussed further in Section 9, in order to implement any of the alternative improvements discussed above it will be necessary to preserve the corridors needed for proposed sewers and the sites required for proposed pump stations and treatment plants. This may be accomplished by securing easements or purchase options on the required parcels.

As a general guideline, the suggested corridor width for trunk sewers would be about 200 ft. These corridors would generally follow streambeds, with 100 ft on each side to allow for locating the sewer on either side of the stream and for potentially crossing the stream when necessary. For force mains, it may be possible to locate the pipes along existing Rights-of-Way for roadways. Where this does not seem feasible, a minimum width of 50 ft for a force main easement is recommended.

For treatment plants, a large tract of land is desirable to provide for adequate buffer from existing or future residences. Approximately 160 acres would be preferable, although a smaller site may be acceptable in some cases. For pump stations, a minimum of 5 acres is suggested.

After further planning has occurred to define specific facilities and proposed locations, there should be additional evaluations completed on alternate sites and specific land requirements for each facility.

7.0 COST ANALYSIS

This section describes the results and the rationale used to perform a preliminary cost comparison of the four alternatives selected by stakeholders at a meeting on June 18, 2008. The selected options were Alternative 1(single WWTP at location A), Alternative 2 (two WWTPs at locations A and B), Alternative 4 (two WWTPs at locations A and C) and Alternative 7 (three WWTPs at locations A, B and C). The costs for Alternative 9 were also estimated, because it appeared that Alternative 9 costs would be very close to Alternative 7 costs. A cost estimate for the continuation of the status quo was not prepared because there is no definitive end result with this option. For this preliminary analysis, only those components that differ between alternatives were included. Where all alternatives have the same components, such as for most of the trunk sewer system, the costs were omitted from this preliminary cost comparison.

7.1 General Approach

A present worth analysis was used to compare estimated costs of the five selected alternatives over a 50-year planning period. A present worth analysis is a method for estimating the total life cycle cost of a project, including the construction costs and the operation and maintenance costs over a specified time period and specified interest rate. In lay terms, it represents the theoretical amount of money needed to invest initially in order to fund the construction and operation of the facilities over the life of the project. The value of existing assets has not been considered in this analysis because the existing facilities are needed for all alternatives. The interest rate was varied from 3% to 5% to determine sensitivity of the analysis to interest rate. The current IEPA revolving loan interest rate is approximately 3% and this is considered to be near the low end of potential rates.

A 50-year planning period was selected for this analysis. Although full development of the study area is not anticipated within the 50 years, most of the construction phase is anticipated to be complete within that time period. It has been projected that it will take approximately 12 years following completion of this study to have new facilities in place and operational. Thus, it was assumed that the initial facilities could be built in 2020. To simplify the cost analysis, the present worth analysis was based on estimated current construction costs, with the financial analysis beginning in 2020 and extending 38 additional years to 2058. For trunk sewers, the full cost will occur with initial construction and there is no phasing except at a few locations where parallel

trunk sewers were proposed. For pump stations, force mains and treatment plants it was assumed that construction would occur in phases as described below for each component.

7.2 Phasing Assumptions

Phasing assumptions were used to estimate the construction timing of proposed improvements. These assumptions are described for each type of improvement in the paragraphs below.

- **Sewers**

Where single pipes are proposed as new trunk sewers, assume the capital expense occurs in 2020, as part of the first phase of construction. With a few exceptions, the preliminary trunk sewer system is the same for all alternatives and has not been included in this preliminary cost comparison. The exceptions occur where two parallel trunk sewers were proposed (Alternates 1, 2 and 4 only). For those locations with parallel trunk sewers, assume the first sewer is bid in 2020 and the second sewer is bid 30 years later, in 2050. The estimated construction cost of trunk sewers was based on cost curves derived from recent bid prices. The annual O&M costs for trunk sewer maintenance were estimated at 0.5% of construction cost, starting from the time of construction and continuing until the end of the planning period, or 38 years for sewers built in 2020 and 8 years for sewers built in 2050.

- **Pump Stations and Force Mains**

Where single force mains were proposed (Pump Stations 3 and 4 only), assume the complete pump station and force main are built in 2020. Where two parallel force mains were proposed, assume the first phase will include a single force main and triplex pump station bid in 2020. Estimate this will provide one-half the ultimate capacity of the pump station. Assume the second phase of the pump station and second force main is bid 25 years later, in 2045. The second phase would include the addition of two (2) more pumps and would roughly double the capacity, with four (4) pumps running and using both force mains. For the cases where three parallel force mains are required, assume the second phase is built in 2035 and the third phase is built in 2050. Each phase would provide approximately one-third of the full capacity and would include two (2) more pumps and another force main.

Assume a fixed O&M cost for maintenance labor and equipment replacement is 1% of pump station construction cost per year starting in the year of construction and continuing to the end of the planning period. Assume the energy cost for pumping increases as a uniform gradient

series at the rate of 6% per year beginning in year 2020, the initial daily pumping rate is 10% of the projected ultimate average flow, and the initial power cost is $100/day per MG pumped. For example, at Pump Station 2 the projected ultimate average flow is 4.26 MGD. Thus the initial daily pumping would be 0.426 MGD and the annual power cost during the first year would be 10% X 4.26 MGD X $100/day/MG X 365 days = $15,549/yr. (Note that the energy cost is estimated to increase 6% per year while estimated flow increases 5.3% per year as shown in the following section. This accounts for energy costs rising slightly faster than other costs.) To check the sensitivity of the analysis to variable O&M costs, the annual rate of increase was varied from 5% to 8%.

- **Treatment Plants**

It is anticipated that all WWTPs will require the same degree of treatment, including tertiary filtration and nutrient removal. The total projected ultimate population within the service areas tributary to proposed new regional treatment facilities is 525,266 and the projected 2030 population for the same areas is 90,806. (Note: These values exclude the existing FPA areas for Frankfort, Thorn Creek Basin Sanitary District and the Deer Creek FPA east of I-57, all of which are proposed to be served by existing or expanded WWTPs already serving those areas.) If the ultimate population is reached in 2064 (see Section 4.1) and the population growth rate is steady, then the annual growth rate within the regional service areas would be approximately 5.3%. This growth rate can be used to determine a rough estimate of future population to be served in intermediate years and results in the following population projections for the service areas tributary to the proposed new treatment plants:

Year	Total Est. Pop.	% of Ult. Pop.
2008	29,153	5.6
2020	54,179	10.3
2030	90,806	17.3
2040	152,194	29.0
2050	255,083	48.6
2058	385,575	73.4
2060	427,529	81.4

Using the above projections as a guide, it was assumed that the initial treatment plant capacities would be built for 25% of the ultimate capacity in 2020 and this would be adequate for approximately 15 years. In 2035 the plant capacities would be doubled to 50% of the ultimate

capacity, which should be adequate for approximately another 15 years. Then a third phase of treatment capacity (to 75% of ultimate) would be built in 2050, which should be adequate for the remainder of the 50 year planning period used for this preliminary cost analysis.

Estimated treatment plant construction costs were based on updated EPA cost curves from EPA 430-980-003 published in 1980. From Figure 1 of that report, the estimated total construction cost for an advanced waste treatment plant with nutrient removal was:
C (in $mil) $=3.52Q^{0.89}$ based on 1979 dollars, where is Q is the rated design average flow in MGD. Updated to 2008 dollars using the ENR construction cost index, this becomes:
C (in $mil) $= 9.57Q^{0.89}$. For example, if the required ultimate capacity were estimated to be 40 MGD, then the first phase would be built at 10 MGD for a cost of $74.3 million in today's dollars.

Plant annual O&M costs were estimated based on a fixed component for labor and maintenance and a variable cost component for power and sludge processing. Based on actual O&M cost data for 2 large plants in central Illinois, it was estimated that the annual fixed O&M cost would be 1% of initial construction cost and the initial annual variable O&M cost would be approximately $75,000/MGD treated. The variable O&M costs were assumed to increase as a uniform gradient series at the rate of 5% to 8% per year, using the same approach used for the pump station variable costs. The initial flow estimate was assumed to be 10% of the ultimate plant capacity. Using the same example above, the estimated fixed annual O&M cost would be $743,000 and the initial variable annual O&M cost would be 10% X 40 MGD X $75,000/MGD = $300,000 for the first year.

7.3 Construction Cost Curves

The construction cost curves developed for trunk sewers, pump stations and force mains are shown in Figure 17. A best fit curve was determined for each component with the resulting equations as shown on Figure 17. For example the equation shown for pump station cost is $y = \$371710\ (x^{0.895})$, where x is the rated capacity in MGD and y is the estimated construction cost in 2008 dollars. The equations for trunk sewers and force mains indicate cost per foot, so need to be multiplied by the estimated length of pipe in each case. These cost curves have been developed only for the purpose of comparing costs for different alternatives. They should not be applied in general to other projects and could be significantly different by the time new facilities are actually constructed.

7.4 Results

The present worth cost of each alternative is shown in Tables 4, 5 and 6. Table 4 is based on an interest rate of 5% and variable O&M increase of 6% per year. Table 5 is based on an interest rate of 3% and variable O&M increase of 5%. Table 6 has the same interest rate of 3% but increases the variable O&M to 8% per year. Note that in every case, Alternatives 7 and 9 with three wastewater treatment plants appear to have a cost advantage over the others. The three plant options compared with the single plant option appear to have a lower cost by approximately 13% to 16%, depending on the assumptions used for interest rate and variable O&M increase. In each case the rank order of the alternatives is the same, Alternative 9 is the lowest cost followed by Alternative 7, Alternative 2, Alternative 4 and Alternative 1 as the highest cost. The cost difference between Alternative 7 and Alternative 9 is only about 0.2%, which is negligible compared with other uncertainties in this analysis. These two alternatives should be considered as equivalent cost for future planning purposes. This cost analysis does not include costs that were common to all alternatives and should only be used as a cost comparison between alternatives.

7.5 Recommended Alternative

The recommended alternative is to construct three new wastewater treatment plants near the locations shown in Figures 13 through 16. Although costs were not calculated for Alternatives 6 and 8, it is anticipated that these would have a slightly higher cost than Alternatives 7 and 9 because less pumping is required in the latter alternatives. Thus, Alternative 7 or Alternative 9 is recommended as the preferred alternative. The only difference between these two alternatives is that Service Area 6 is pumped to WWTP A in Alternative 9 and is pumped to WWTP C in Alternative 7. Alternative 7 also results in all three plants being approximately the same size, which could enhance operations or result in some additional savings during design and construction. The choice between these two preferred alternatives may be influenced more by political or jurisdictional issues than by technical considerations. The three plant option (compared with one or two plants) also has more flexibility for phasing improvements and adapting to unpredictable growth patterns. Thus, the phasing plan discussed in Section 9 for implementing a regional approach will be applicable for either Alternative 7 or 9, with proposed treatment plants sited near locations A, B and C.

Table 4. Preliminary Cost Comparison (Interest rate 5% and variable O&M increase 6%/yr)

Alternative	Component	PW - Const.	PW-Fixed O&M	PW-Var. O&M	Total PW
Alt. 1	Sewers*	$ 13,548,347	$ 1,021,656	$ -	$ 14,570,003
	Pump Stations	$ 36,265,089	$ 5,326,108	$ 16,591,007	$ 58,182,205
	Force Mains	$ 27,253,659	$ 1,993,031	$ -	$ 29,246,690
	WWTPs	$ 167,742,157	$ 24,344,015	$ 17,749,622	$ 209,835,794
	Totals	$ 244,809,252	$ 32,684,810	$ 34,340,629	$ 311,834,691
Alt. 2	Sewers*	$ 8,154,808	$ 652,729	$ -	$ 8,807,537
	Pump Stations	$ 21,812,552	$ 3,242,027	$ 8,987,917	$ 34,042,496
	Force Mains	$ 20,297,365	$ 1,513,905	$ -	$ 21,811,271
	WWTPs	$ 180,182,531	$ 26,149,456	$ 17,749,622	$ 224,081,609
	Totals	$ 230,447,257	$ 31,558,118	$ 26,737,539	$ 288,742,913
Alt., 4	Sewers*	$ 13,735,460	$ 1,072,479	$ -	$ 14,807,939
	Pump Stations	$ 27,726,314	$ 4,101,055	$ 12,200,713	$ 44,028,083
	Force Mains	$ 19,064,736	$ 1,415,100	$ -	$ 20,479,836
	WWTPs	$ 180,110,612	$ 26,139,019	$ 17,749,622	$ 223,999,252
	Totals	$ 240,637,122	$ 32,727,653	$ 29,950,335	$ 303,315,111
Alt. 7	Sewers*	$ 8,341,921	$ 703,553	$ -	$ 9,045,474
	Pump Stations	$ 13,273,778	$ 2,016,974	$ 4,597,623	$ 19,888,374
	Force Mains	$ 12,108,442	$ 935,974	$ -	$ 13,044,417
	WWTPs	$ 189,271,004	$ 27,468,444	$ 17,749,622	$ 234,489,070
	Totals	$ 222,995,145	$ 31,124,946	$ 22,347,244	$ 276,467,335
Alt. 9	Sewers*	$ 7,481,209	$ 630,961	$ -	$ 8,112,170
	Pump Stations	$ 13,273,778	$ 2,016,974	$ 4,597,623	$ 19,888,374
	Force Mains	$ 12,684,400	$ 979,643	$ -	$ 13,664,043
	WWTPs	$ 188,979,520	$ 27,426,142	$ 17,749,622	$ 234,155,283
	Totals	$ 222,418,906	$ 31,053,720	$ 22,347,244	$ 275,819,870

* The cost for sewers only includes the trunk sewers along the county line from S. Branch of Rock Creek to PS 5, the last segment on Rock Creek leading to WWTP A and the sewer going north into WWTP C or PS 8. All other trunk sewers are the same for all alternatives and were not included in this cost comparison.

Table 5. Preliminary Cost Comparison (Interest rate 3% and variable O&M increase 5%/yr)

Alternative	Component	PW - Const.	PW-Fixed O&M	PW-Var. O&M	Total PW
Alt. 1	Sewers*	$ 15,363,959	$ 1,407,458	$ -	$ 16,771,417
	Pump Stations	$ 42,949,921	$ 7,647,209	$ 20,599,322	$ 71,196,452
	Force Mains	$ 32,402,926	$ 2,865,724	$ -	$ 35,268,650
	WWTPs	$ 201,190,207	$ 35,205,010	$ 22,037,853	$ 258,433,070
	Totals	$ 291,907,013	$ 47,125,401	$ 42,637,175	$ 381,669,589
Alt. 2	Sewers*	$ 8,680,608	$ 883,451	$ -	$ 9,564,059
	Pump Stations	$ 25,494,986	$ 4,620,103	$ 11,159,358	$ 41,274,447
	Force Mains	$ 23,621,368	$ 2,151,496	$ -	$ 25,772,864
	WWTPs	$ 216,111,211	$ 37,815,943	$ 22,037,853	$ 275,965,007
	Totals	$ 273,908,172	$ 45,470,994	$ 33,197,211	$ 352,576,377
Alt., 4	Sewers*	$ 15,025,272	$ 1,462,158	$ -	$ 16,487,430
	Pump Stations	$ 32,580,949	$ 5,861,615	$ 15,148,352	$ 53,590,916
	Force Mains	$ 22,298,165	$ 2,015,615	$ -	$ 24,313,780
	WWTPs	$ 216,024,951	$ 37,800,849	$ 22,037,853	$ 275,863,653
	Totals	$ 285,929,336	$ 47,140,238	$ 37,186,205	$ 370,255,779
Alt. 7	Sewers*	$ 8,341,921	$ 938,152	$ -	$ 9,280,072
	Pump Stations	$ 15,126,013	$ 2,834,510	$ 5,708,388	$ 23,668,911
	Force Mains	$ 13,516,607	$ 1,301,387	$ -	$ 14,817,994
	WWTPs	$ 227,011,939	$ 39,723,393	$ 22,037,853	$ 288,773,185
	Totals	$ 263,996,480	$ 44,797,442	$ 27,746,241	$ 336,540,163
Alt. 9	Sewers*	$ 7,481,209	$ 841,354	$ -	$ 8,322,563
	Pump Stations	$ 15,126,013	$ 2,834,510	$ 5,708,388	$ 23,668,911
	Force Mains	$ 14,173,626	$ 1,362,686	$ -	$ 15,536,312
	WWTPs	$ 226,662,332	$ 39,662,218	$ 22,037,853	$ 288,362,403
	Totals	$ 263,443,180	$ 44,700,767	$ 27,746,241	$ 335,890,188

* The cost for sewers only includes the trunk sewers along the county line from S. Branch of Rock Creek to PS 5, the last segment on Rock Creek leading to WWTP A and the sewer going north into WWTP C or PS 8. All other trunk sewers are the same for all alternatives and were not included in this cost comparison.

Table 6. Preliminary Cost Comparison (Interest rate 3% and variable O&M increase 8%/yr)

Alternative	Component	PW - Const.	PW-Fixed O&M	PW-Var. O&M	Total PW
Alt. 1	Sewers*	$ 15,363,959	$ 1,407,458	$ -	$ 16,771,417
	Pump Stations	$ 42,949,921	$ 7,647,209	$ 38,702,413	$ 89,299,543
	Force Mains	$ 32,402,926	$ 2,865,724	$ -	$ 35,268,650
	WWTPs	$ 201,190,207	$ 35,205,010	$ 41,405,153	$ 277,800,370
	Totals	$ 291,907,013	$ 47,125,401	$ 80,107,566	$ 419,139,979
Alt. 2	Sewers*	$ 8,680,608	$ 883,451	$ -	$ 9,564,059
	Pump Stations	$ 25,494,986	$ 4,620,103	$ 20,966,422	$ 51,081,511
	Force Mains	$ 23,621,368	$ 2,151,496	$ -	$ 25,772,864
	WWTPs	$ 216,111,211	$ 37,815,943	$ 41,405,153	$ 295,332,307
	Totals	$ 273,908,172	$ 45,470,994	$ 62,371,575	$ 381,750,741
Alt., 4	Sewers*	$ 15,025,272	$ 1,462,158	$ -	$ 16,487,430
	Pump Stations	$ 32,580,949	$ 5,861,615	$ 28,461,023	$ 66,903,587
	Force Mains	$ 22,298,165	$ 2,015,615	$ -	$ 24,313,780
	WWTPs	$ 216,024,951	$ 37,800,849	$ 41,405,153	$ 295,230,952
	Totals	$ 285,929,336	$ 47,140,238	$ 69,866,176	$ 402,935,749
Alt. 7	Sewers*	$ 8,341,921	$ 938,152	$ -	$ 9,280,072
	Pump Stations	$ 15,126,013	$ 2,834,510	$ 10,725,032	$ 28,685,555
	Force Mains	$ 13,516,607	$ 1,301,387	$ -	$ 14,817,994
	WWTPs	$ 227,011,939	$ 39,723,393	$ 41,405,153	$ 308,140,485
	Totals	$ 263,996,480	$ 44,797,442	$ 52,130,185	$ 360,924,107
Alt. 9	Sewers*	$ 7,481,209	$ 841,354	$ -	$ 8,322,563
	Pump Stations	$ 15,126,013	$ 2,834,510	$ 10,725,032	$ 28,685,555
	Force Mains	$ 14,173,626	$ 1,362,686	$ -	$ 15,536,312
	WWTPs	$ 226,662,332	$ 39,662,218	$ 41,405,153	$ 307,729,703
	Totals	$ 263,443,180	$ 44,700,767	$ 52,130,185	$ 360,274,132

* The cost for sewers only includes the trunk sewers along the county line from S. Branch of Rock Creek to PS 5, the last segment on Rock Creek leading to WWTP A and the sewer going north into WWTP C or PS 8. All other trunk sewers are the same for all alternatives and were not included in this cost comparison.

8.0 GOVERNANCE AND MANAGEMENT ALTERNATIVES

The previous sections of this report considered the wastewater collection and treatment needs of the Eastern Will County Study Area and presented facility alternatives for meeting those needs. This section considers the need for institutional leadership in developing and managing the required facilities and outlines organization choices. For this discussion of institutional governance needs, the study area will be considered in two separate areas.

8.1 Institutional Control for Areas North of Major Drainage Divide – Status Quo

The portion of the study area north of the major drainage divide (shown as a brown line on Figure 3) drains into the Lake Michigan/Calumet or Des Plaines River watersheds. During the data gathering and analysis stage of this study it became clear that the area north of this divide should be considered separately from the area that drains south within the Kankakee River basin. The study showed that the existing facilities in place providing wastewater service to areas lying north within the Lake Michigan, Calumet and Des Plaines River basins appear to be sufficient for current needs. The wastewater service providers in this area include long-standing municipalities, private utilities, and a major sanitary district all of which appear to have generally sufficient authority and standing to provide for the future needs in their constituent service areas.

There will probably prove to be exceptions to this conclusion in the future, and there may be advantages found for sewer users to consolidate some of these authorities by merger with or acquisition by adjacent organizations and/or by transferring service area to control of other entities which can serve them more efficiently. However, it does not appear advantageous at this time to seek formation of a single new entity to provide for future services anticipated for these drainage basins. Therefore, it is recommended that the service organization status quo be continued for the foreseeable future for the area on the north side of the drainage divide.

8.2 Institutional Control for Areas South of Major Drainage Divide – Status Quo or Regional Authority

The land area south of the major drainage divide and lying within the Kankakee River Basin is generally rural with existing municipalities providing for their own wastewater service needs. Three of the municipalities (Beecher, Peotone and Monee) have developed intergovernmental understandings on future growth boundaries between them and have also established land use

plans implemented with adopted zoning regulations to control growth within their own corporate limits. The rural areas are subject only to county zoning and development regulations which specify rules for on-site wastewater systems. Some private developments have formed associations to provide limited central collection and treatment systems. Development pressures in some of these rural areas are significant now with expectations to increase when the South Suburban Airport is fully operational.

Section 6 of this report identified nine alternatives for positioning interceptors, pump station and wastewater treatment facilities to serve the future fully developed Kankakee River Basin portion of the Eastern Will County Study area. Review of the alternatives with stakeholder municipalities and area service providers narrowed the alternatives to four which present one, two and three treatment plant locations. Trunk sewer and interceptor locations would be the same for all alternatives. Economic analysis showed that the three-plant alternative has an apparent advantage. Because the costs of the alternatives considered are similar, the choice of the approach to take appears to be primarily a political and management decision on the part of the entity responsible for implementation of the selected plan with the consent of those paying the initial and future costs.

The alternatives described allow considerable flexibility and variation to meet unknown problems and opportunities. It is realistic to expect that although decision makers may select an ultimate layout, the facilities developed will be a hybrid of the alternative initially selected because the components will be created over the next several decades in response to needs and opportunities now unforeseen.

It is, therefore, very important that the question of what governmental agency or agencies will take the lead in creating the future facility be resolved early. Once a decision on direction is made, the agency should be established and engaged in the early decisions and planning and especially in creating the critical working relationships and agreements with all stakeholders in the system that is ultimately chosen.

There are numerous possibilities for institutional control but most are variations on the following themes:

- Maintain the governance status quo which is essentially all agreeing to continue development of wastewater service through each municipality's efforts to provide for its own needs.

- Form a regional entity to provide for the common needs of wastewater interception and treatment. The types of entity selected for discussion herein are:
    - Formation of a new special district
    - Expansion of an existing special district
    - Crafting a new agency through an intergovernmental agreement between municipalities of the service area and, possibly, Will County
    - Allowing an investor-owned utility to provide facilities.

8.3 Organizing Principles and Required Authority

Whether a new authority is formed or the area is served by the continuing work of existing municipal authorities (status quo approach) the area needs focused leadership that will balance the needs of and be accountable to all equally within the entire service area. If a new governing entity is formed some important organizing principles are offered for consideration before outlining specific organizational alternatives.

An over-arching principle in formulating a new regional authority is, to the extent possible allowed in law, that it should not become another intrusive overlay of government. Rather the intent is to form an organization to which can be delegated tasks that are now being fully undertaken by individual municipalities and private corporate entities for the benefit of constituents of those entities. The corporate entity formed should be as close to an operating partner with its client members as possible with only the authority required to prosecute its delegated tasks. Tasks delegated should be those activities which are either burdensome to individual municipalities, more cost-effectively accomplished at larger scale or which require special talents not generally within the scope of municipal staff.

Another important consideration is that control of local growth should remain primarily with municipalities. A new regional control entity should not have authority to enable development by extending sewer service to undeveloped areas and over-ride municipal control. On the other hand the new regional entity should be able to determine how collection and treatment facilities are best positioned to enable regionalization of service. Ideally a regional authority would not extend services to individual users and side-step municipal land use control. Whatever approach to regional governance is taken there needs to be a strong, institutional charter that makes this principle clear and binding.

Other specific considerations are as follows:

- Include the ultimate service area in planning when first formed so rules are clear from the start to ultimate development. This may not be possible in the beginning, but should be able to accomplish incrementally over time.
- Accountability to public specified in enabling charter. This includes clear requirement for public notices and openness to public review of actions and records.
- Growth and land use decisions left to municipalities. New entity must agree to have interception and treatment capacity in place according to municipality growth plans so it is not the limitation on growth.
- Extension of laterals to individual customers generally to remain with municipalities.
- New agency to have only corporate and municipal clients. The owners of the lateral system should stand between the Governing Agency and the individual customer within the boundaries of a municipal corporation. The one exception would be a corporate entity such as an industry located outside a municipality.
- New entity to support the Will county Land Resources Management Plan policies such as maximized joint use of lands for infrastructure and other public uses.
- Some method of acquiring ROW and facility sites early on to reserve their availability for use possibly decades before actual need.
- Narrowly focused mission with no charter authority to overlap client authority. No authority unless expressly stated in charter.
- Planning function critical because of the lead-time required for bringing regional scale facilities on line compared to local service extensions.
- New entity to have primary responsibility for meeting water quality standards and IEPA permitting requirements.
- New entity to have a strong role in coordinating and, when appropriate, initiating FPA boundary changes in partnership with the designated FPA lead agency.

Any governing service organization formed must have the following minimum authority and powers for successful start-up and continued operation:

- Legal authority to form a governmental entity.
- A governing board with fiduciary responsibility for setting policy, hiring management, planning, setting charge rates, acquiring debt and real property and representing interests of constituents of a public enterprise.
- Capable management, administrative staff and skilled operations employees with adequate training and required certifications.

- Authority to issue debt instruments.
- Authority to acquire and construct adequate physical facilities.
- Authority to acquire and own rights-or-way, including authority for eminent domain.
- Contracting authority for professional engineering, auditing, construction, maintenance, materials purchasing services.
- Ability to enter into agreements with other public and private entities.
- Authority to establish and enforce rules and regulations appropriate to the entity's chartered function.
- Ability to extend service area and to extend facilities to clients as the area develops.

The remainder of this section discusses some organizational alternative approaches to governance, including continuing the status quo. Alternatives are described in terms of how they are formed, basis for authority and other features that allow comparison. Note that the descriptions are brief summaries and are in no way to be understood as legal opinions. They are based on portions of state statutes. The next step in selection of an alternative governance approach would include assistance by an attorney experienced in municipal and utility law, including a formal legal opinion on the enabling legal basis for the selected alternative.

8.4 Continuation of Individual Municipal System Development (Status Quo)

One option for developing wastewater service facilities for the Eastern Will County study area is for municipalities to continue providing for their own needs and planning for their own interests. Municipalities would continue to develop and fund wastewater service expansions to provide for expected growth. Some mutual service arrangements may occur between municipalities through intergovernmental agreements when it is seen to be mutually beneficial.

Presumably, in order to control the rate, type and quality of growth, municipalities will not extend sewer service outside corporate limits. This leaves the growth of the rural areas located outside municipal boundaries without options for municipal sewage collection facilities. Rural development would be limited to that which could support individual on-site systems or systems run by private associations of residents. Investor owned utilities might see opportunity to apply for certificates of need to operate in some rural areas. In all cases growth in rural areas would be subject to county development rules.

Summary - Advantages/Disadvantages of Alternative

Advantages:

- Communities would not see drastic changes in facility planning and management responsibilities.
- Close control of service availability and positioning of all facilities will be maintained.

Disadvantages

- Loss of economies of scale in capital intensive and long service life facilities such as interceptors and treatment works.
- Each municipality must contend with complex environmental regulations with their own resources.
- Staff or management and operation of facilities are costly and difficult to obtain for small communities.
- Land use planning goals may not be realized across the entire study area. Rural development will be more difficult to control with likely proliferation of individual and small-scale private sewage systems that may pose significant regional problems in the future as systems fail.

8.5 Formation of a New Special District

Illinois law provides for the formation of a special district for wastewater treatment services, which could encompass part or all of the study area. Thorn Creek Basin Sanitary District (TCBSD) is an example of a special district formed under Illinois Law. The enabling law is very comprehensive. Following are highlights of the some of the provisions.

- **Purpose**

A sanitary district is a municipal corporation, organized under Illinois Statutes, whose boundaries are contiguous and encompass one or municipalities or parts thereof, formed to collect and purify wastewaters for preservation of the public health. (A Sanitary District may not purvey potable water to the public.)

- **Enabling authority**

A Sanitary District may be organized under authority of the Sanitary District Act of 1917 (70ILCS 2405/). There are other similar enabling acts but the 1917 act appears to present the most comprehensive provision of powers required. A sanitary district organized under the 1917 Act is considered, under law, to be a municipality of the State of Illinois.

- **Formation**

There are two ways to form a special district to provide wastewater collection and treatment services—a voter referendum according to the provisions of the 1917 act or by an act of the state legislature.

Forming a special district by referendum is done in the following manner. Any 100 legal voters of a proposed district may petition the Circuit Court of the county in which the district lies to put the question of formation before the legal voters of the proposed district. The petition must include an accurate description of the proposed district boundaries and the name of the district. The proposed territory must lie within an incorporated municipality or within 6 miles of a municipal boundary and not include territory of another sanitary district.

The Circuit Court then appoints a three-person commission to verify the details of the petition and to hold a public hearing on the proposed boundaries. All residents within the proposed district may testify before the commission. A vote of two out of three commissioners is required to commend the petition to the Circuit Court. The Circuit Court then submits the question of formation to the legal voters of the proposed district following the procedures required by Illinois Public Elections law. If approved by a simple majority of those voting, the district is then deemed an organized sanitary district and may commence business according to the laws of the state immediately.

The other method would be to seek the aid of a state representative to place special legislation before the legislature. This would allow supporters to modify the 1917 act to customize it for the Will County service area and existing municipalities and yet retain the benefits of a regional special district. At the passage of the act, the district would be deemed organized.

- **Governance**

A sanitary district is governed by a board of trustees which is the corporate authority of the district with authority to exercise all powers to manage and control all the affairs and property of the district. If a district lies entirely within one county, a board of trustees of three members serving staggered 3-year terms is appointed by the county board chairman and ratified by majority vote of the county board. If a district lies in two or more counties the board members are appointed by the members of the Illinois General Assembly of the legislative districts encompassed by the district. The appointing authority fills vacancies. There are no special requirements for service as a trustee except no trustees may have a financial interest in any

business of the district. Owning property against which taxes are assessed by the district is not tacitly a conflict of interest. Trustees may be paid up to $6,000 per year for service.

- **Public Accountability**

The district is subject to roughly the same rules as a municipality for openness to the public. The Illinois Open Meetings and Freedom of Information Acts apply with only select limitations on access to property acquisition and legal proceedings and employee information. Annual audits of district funds must be published. Hearings are required for annual budgets and most ordinances. Public referenda are required on tax levies beyond that authorized in the act for annual operations. The board members are seated by vote of a county board in open meetings except for some districts in which directors are appointed by State Representatives. The public may petition the Circuit court to put a question before the voters to dissolve a district.

- **Territory and Boundaries**

The enabling act allows districts to change their corporate boundaries in a number of ways. Questions on specific cases of concern should be reviewed with an attorney conversant with the Act and associated case law. A summary of methods for annexation and de-annexation are as follows (see also sections 23 and 24 of the act):

- Ten percent of the voters in areas contiguous to existing district boundaries may petition the circuit court for referendum for inclusion. If approved, the residents of the added area assume a proportionate debt obligation with other district territory.
- Owners of lands contiguous who are not resident within may petition the district board of trustees directly for inclusion. If approved, the petition may be enacted by board ordinance without referendum.
- The board may annex contiguous land parcels less than 60 acres in extent which are surrounded by the District by ordinance without voter approval.
- Land owned by the district or land owned by others dedicated exclusively for public rights-of-way which is contiguous may be annexed by board ordinance. Territory contiguous to the district which is served by district sewers may be annexed. Territory not contiguous to the district but which is served by the sewers of a municipality which is connected to the district's sewers may be annexed by ordinance.
- Ten percent of the legal voters of an area within a district may petition the Circuit Court for a referendum to disengage the described territory from a district. A simple majority of voters voting decides the question.

A specific concern for Will County decision makers is the desired limits of authority of a governing entity in acquiring new territory once formed. The Sanitary District Act appears to enable a district to serve territory outside a municipal boundary. If local control of sewer availability were to be maintained by municipalities, then some policy constraint respected by the district board would be required.

- **Operational Authority**

The board has power to plan, design, construct and operate facilities for disposal of sewage and drainage from any municipality and unincorporated area within the district. The district may not cause sewage, treated or otherwise, to flow into Lake Michigan and must discharge treated wastewater to other surface waters of the state in accordance with state and federal law. The board may also contract for operations and management services. The enabling act explicitly states that nothing in the act requires the board to construct service lines to individual residences or buildings.

- **Fiscal Authority—Capital Improvements**

By ordinance, the district board may issue revenue bonds for construction of capital improvements which must be paid for by user fees. The district may also obtain IEPA Low Interest loans for capital improvements to be repaid by user fees. The board may seek approval to issue general obligation bonds which are paid through assessment of property taxes. Total general obligation bond indebtedness may not exceed 5.75% of the district's total EAV.

The board may lease facilities through a public building commission which can issue bonds for construction of facilities on behalf of the district. The district would pay a lease fee equal to the debt service on the bonds.

- **Fiscal Authority—Service Charges and Fees**

The district may charge fees for all services provided, including sewer connection fees and may make special assessments for capital improvements.

- **Fiscal Controls**

Public budget hearings and annual audit by a public accountant are required.

- **Taxing Power**

The district may assess an annual property tax for corporate purposes up to 0.083% of the district's total Equalized Assessed Valuation (EAV) without referendum. The tax may be increased to 0.166% EAV by public referendum. An additional 0.03% EAV tax may be assessed to fund wastewater disinfection costs without referendum. This may be increased to 0.05% EAV by referendum.

It is unknown how the Will County tax cap would limit the taxing authority of a new sanitary district. This should be investigated further by the work group proposed in Section 9.2.

- **Real Property Acquisition**

The district may purchase property and rights-of-way within and outside the district boundary to accomplish purposes authorized by the Act and can negotiate directly with sellers. A district has power of condemnation by right of eminent domain to acquire rights-of-way for any improvement the district is authorized to make within or without its corporate boundary.

- **Acquisition of Existing Facilities**

The board may acquire a private utility using power of eminent domain by petition to the Illinois Commerce Commission if the district has been in existence for at least 20 years and will continue to provide the same level service provided by the private utility.

The board may acquire the facilities of a municipal system within its boundaries or may acquire another existing sanitary district lying within 20 miles of its boundaries. Acquisition must be by mutual agreement of parties through an intergovernmental agreement.

Privately owned facilities may be acquired, by agreement or by eminent domain, if they lie within the Facilities Planning Area of the district and are not within another existing district. The facilities to be acquired need not be located within the district's boundaries but must be within 15 miles of the nearest boundary.

- **Management and Labor**

The board may retain services of a district treasurer, attorney and engineer as deemed necessary and may employ a manager and staff required to manage and conduct the business and operations of the district.

- **Regulatory and Police Powers**

The board may enact all necessary rules and regulations for the proper management and conduct of the business of the district and may levy fines and impose sanctions for violation of the regulations. The board may establish standards for construction of any sewer connected to district facilities and may set rules for discharge of waste into any sewer that is tributary to district facilities. Rules for sewer construction may be imposed on new sewers constructed outside the district within three miles of its boundaries. The board has police power to protect water supplies and district facilities which must be exercised in cooperation with municipal police forces when authority overlaps. The board may apply to the Circuit Court for injunctive relief or writ of mandamus as may be necessary to protect the property and facilities of the district.

- **Amendments to Corporate Charter**

Only the state legislature can amend the enabling act which grants the district its powers. The board can choose not to exercise some of its powers or change operating rules but it cannot extend its own powers outside the enabling statute.

Summary—Advantages/Disadvantages of Alternative

Advantages:

- A special district formed under the 1917 Act embodies most of the desired requirements for a regional control entity described in Section 8.3.

- Limited intrusion into other interests of client communities.

- A district as formed under the 1917 Act is a well-known entity in Illinois familiar to regulatory agencies, other municipalities and financing entities.

- Professional associations of districts exist in Illinois which provides advocacy for common legislative and legal interests of members.

- No duplication of expensive management and operations personnel.

- Organization has a single purpose and will take complex task of waste treatment from burden of client municipalities. Public accountability approximately the same as for municipal government.

- Clearly defined powers in the enabling act. A significant body of case law has accrued which helps to define the terms of the act and resolve conflict with other Illinois legislation.

- May be dissolved by the voters of the district.

Disadvantages:

- Power to levy property taxes is granted by the 1917 Act. It is not clear how a new district would be limited by the Will County Tax Cap.

- May be difficult to establish by referendum. Will require full support of local leaders and extensive public education effort on the nature of a special district.

- Some loss of immediate control of facilities by municipalities.

8.6 Expansion of an Existing Special District

An alternative to forming a new special district as described above would be to include the Eastern Will County Service area in an existing sanitary district. Thorn Creek Basin Sanitary District (TCBSD) located just north of the Lake Michigan/Calumet divide may be a possibility.

- **Corporate Charter**

TCBSD was organized under the authority of the Sanitary District Act of 1917 and has the powers and limitations described in the previous section. The rules and ordinances of TCBSD now in effect have not been reviewed. If this alternative is to be considered a legal review should be sought with an opinion on their applicability to the new service area.
All the descriptions in the previous section on formation of a new district under the 1917 Act would also apply to the powers of TCBSD.

- **Current Corporate Service Area**

The current corporate territory of the TCBSD lies generally north of the Lake Michigan/Calumet River divide and serves communities in both Will and Cook Counties.

- **Governance**

Because TCBSD lies in two counties the board of trustees is appointed by consensus between the representatives of the district to the Illinois General Assembly.

- **Statutory Power to Expand Service Area to Kankakee Basin**

The enabling act allows adjacent contiguous areas to petition for inclusion in an existing sanitary district. (See the previous section on Boundaries and Territory.) The enabling act is explicit on how contiguity is determined. A legal study of the provisions of the act should be done to verify the feasibility of inclusion of the study area. If a legal area that is favorable for accomplishing this union were legally possible then the question would have to be put to referendum according to the Act.

- **Property and Facility Acquisition**

TCBSD would have the full powers of the act to acquire existing facilities and rights-of-way. The district could assume ownership of existing treatment and interceptor facilities through an intergovernmental agreement to transfer ownership. Such an agreement would specify details of capital reimbursement and future costs.

- **Taxing Power**

While a district organized under the 1917 Act has power to levy property taxes as described above, the Will county tax cap limits TCBSD's ability to do so within Will County. It does not now levy a property tax. All revenues are derived from user charges and fees.

- **Other Special Issues**

There are numerous details that would need study before this approach could be selected. One, of course, is a clear understanding of the initial financial obligations that would come to the newly included territory from TCBSD's user rate structure and, most importantly, the debt load of the district that would be shared. Currently the district has no debt.

Summary-Advantages/Disadvantages of Alternative

Advantages:

- A special district formed under the 1917 Act embodies most of the desired requirements for a regional control entity described in Section 8.3.

- Limited intrusion into other interests of client communities.

- A district as formed under the 1917 Act is a well-known entity in Illinois familiar to regulatory agencies, other municipalities and financing entities.

- Professional associations of districts exist in Illinois which provides advocacy for common legislative and legal interests of members.

- No duplication of expensive management and operations personnel.

- Organization has a single purpose and will take complex task of waste treatment from burden of client municipalities.

- Public accountability approximately the same as for municipal government, except that Board members are not elected.

- Clearly defined powers in the enabling act. A significant body of case law has accrued which helps to define the terms of the act and resolve conflict with other Illinois legislation.

- May be dissolved by the voters of the district.

- Currently TCBSD has no debt load and has accumulated a substantial improvements fund for facility expansion.

- TCBSD is a known organization in Will County and has long experience providing the needed services. The district appears to have good standing with all interviewed for this study.

- Competent staff employed with requisite planning experience to continue developing the service area plan specifics.

- Powers of the 1917 Act which are required by a competent organization in providing the desired services.

- Power to tax by the 1917 Act is capped by Will County tax cap which may eliminate a potentially major voter objection to the proposition of becoming part of TCBSD.

Disadvantages:

- Broadened district area may dilute some focus on new area interests. Planning for the new service area will require considerable upfront time by staff. Additional staff may be required.

- Possible loss of control on some matters by local municipalities.

- Considerable study required for understanding how existing TCBSD operating policies may work with the proposed new service area annexation.

- Public referendum required. May require considerable public educational effort. Doubles educational requirement in that public must understand the nature of a special district and the implications of joining an existing district.

8.7 Intergovernmental Compact

Under the Illinois constitution agencies of the state may form mutual agreements for mutual benefit. This provision could be used to form a very precisely focused regional wastewater agency to serve the signatory municipalities. An example of such an entity is the Kankakee River Metropolitan Agency (KRMA) which operates wastewater facilities for the City of Kankakee and Villages of Aroma Park, Bourbonnais and Bradley, all of Kankakee County.

- **Purpose**

The entity would be formed for the specific purpose of providing wastewater services with the authority specified in the agreement.

- **Enabling authority**

Article VII, Section 10(a) of the Illinois Constitution provides that units of local government and school districts may contract mutually, with the state, other states and the United States government for mutual benefit. It further authorizes participating governments to use their financial resources to pay costs and to service debt associated with intergovernmental activities.

The Intergovernmental Cooperation Act (5ILCS 220/1) provides that any powers which participating parties possess may be jointly exercised, but only to the extent they are mutually possessed, and may contract jointly for their exercise.

The Municipal Joint Sewage Treatment Act (5ILCS 220/3.4) provides that two or more municipalities and/or counties may form a joint sewage treatment agency. The entity formed has the standing under this act as an Illinois municipality.

- **Formation**

A "Municipal Joint Sewage Agency" is formed by agreeing parties which can only convey power that each possesses except a county may participate. The law recognizes that a county has different powers than a municipality and states that counties may participate without forcing a limitation of the agreement powers to the county's scope.

- **Parties to the Agreement**

For the Will County Study area the existing municipalities and, possibly, Will County would be participating parties. In crafting an agreement the advice of TCBSD or KRMA leadership would be very helpful.

- **Provisions of the Agreement**

The entire scope of the Municipal Wastewater Agency would have to be specifically defined in the intergovernmental agreement. The agreement forms the Agency and conveys its powers entirely through the terms of the agreement. The Agency would have no powers that were not specifically conveyed to it by the agreeing parties. An agreement could be structured to convey the more desirable terms of the Sanitary District Act of 1917 and exclude those provisions found objectionable or not applicable. The description of the 1917 Act above follows an outline of topics that should be addressed in the formation of the Agency.

The Intergovernmental Agreement Act does make specific provisions for a few specific matters that should be recognized in the agreement, if applicable. These are: revenue bond issuance, (5ILCS 220/3.4), transfer of public employees to the agency formed (5ILCS 220/5.1) and county participation with municipalities (5ILCS 220/9). Except for these matters, parties are enabled to adopt specific terms befitting their own purposes.

- **Ratification of the Intergovernmental Agreement**

The agreement would be in force and the agency created by the ratification of the agreement by participating parties. No public referendum is required.

- **Amendments to Intergovernmental Agreement**

The agreement would be amended by provisions for such action contained within the initial agreement

Summary—Advantages/Disadvantages of Alternative

Advantages:

- The Joint Sewage Agency agreement can be crafted precisely to limit the agency to only those powers required for the Will County service area.

- The agency can be closely controlled by specified provisions, such as participant appointment of board members with provisions for a representative seat for each.

- Fiscal powers and accountability to participating agencies can be precisely specified.

- No public referendum required to ratify the agreement.

Disadvantages:

- Drafting the agreement requires the work of a skilled attorney advised by a public accountant and engineer and perhaps a labor specialist.

- Many of the advantages of being precise in crafting an agreement from scratch may become disadvantages in unforeseen circumstances. The provisions of the 1917 Act have evolved from nearly a century of district operations. Also the courts are familiar with the act and case law in its interpretation has been accumulated.
- Bonding agencies are familiar with the 1917 Act's terms but would not be familiar with a newly crafted Agency agreement. This may be reflected in cost of capital.

8.8 Privatization – Investor Owned Utility Company

The need for sewage services in the study area may be met by one or more investor owned utilities. Efforts to provide service would be entirely at the initiative of investors who seek to form a company to do so or by the management and boards of existing utility companies.

- **Purpose**

A utility corporation exists to provide wastewater collection and treatment facilities and services and to earn an expected return on shareholder investment. A public or closely held for-profit corporation is fundamentally different from other alternatives considered here which are essentially governmental units. Aqua Illinois, Inc. is an example of a public investor-owned utility.

- **Enabling authority**

The Illinois Public Utilities Act governs operations of all monopolistic corporations. The entity can be a for-profit investor-owned stock or closely held corporation or a not-for-profit association. The Illinois Commerce Commission (ICC) has developed administrative rules for development and operation of utilities for various purposes.

- **Formation**

Well-run investor owned utilities are attractive investment opportunities for shareholders. However, because of the initial capital and numerous unknowns of start-up it is unlikely that investors could be attracted to form a new utility to provide regional collection and treatment services. It is possible that an existing utility would be interested in expanding its operations to provide those services in part or all of the study area. In order to do so, a utility would need to do its own feasibility study and, if found feasible, the utility would develop a proposed rate structure and petition the Illinois Commerce Commission for a Certificate of Need and Necessity for the intended service area. The petition would include a clear definition of the service area, a facilities plan, a proposed customer rate structure and rules of operation. Review involves public input and commission hearings and normally takes a minimum of a year for a ruling.

Once a service area certificate of need is approved, the utility has exclusive rights over other investor owned utilities to provide the specified services. A municipality or other governmental body would not be excluded from providing services within the certified area.

- **Governance**

A private utility is governed by a corporate board of directors that would have a legal fiduciary responsibility to shareholders for the expected operation of the company. Shareholders elect the directors. The board's primary interest would be the safety of shareholder investment and returns. Customer interests would be foremost to the extent they align with those of shareholders.

- **Public Accountability**

Utility customers would have no right of access to board of director actions and records more than is required of a publicly traded company. Customer grievances would usually be appealed to the ICC for redress. Directors would be accountable to the ICC for operating within ICC charter and regulations. Annual rate proceedings and company petitions for changes in certificate of need or operating rules before the ICC would allow for input and review by customers but final decisions would be made by the ICC on utility rate change requests.

- **Territory and Boundaries**

Utility investment and operations would be confined to clearly defined certificated areas. Changes in boundaries would be by petition to ICC. A decision to expand operations would be based upon the potential for reasonable return on investment.

- **Fiscal Authority—Capital Improvements**

Utilities are limited on how much investment can be made in developing future service capacity so that current and near future rate payers do not bear the load of distant future users. This policy severely limits development of facilities like interceptors, treatment plants and property acquisition that have a long-term service life. The result is usually that short-term development takes away long-term economy of scale. The typical payback on capital investment is 5 years rather than the 30-year bonding window for public organizations. Utilities also strive to maintain a balance of debt and paid-in capital. User rates include a component of cost for this payback amount. Payback is to the providers of capital that is usually raised partly from shareholder investment and leveraged capital from investment bankers. The Utility would raise capital from the commercial bond market that usually rates well-run utilities highly compared to other corporate bond offerings. The Utility would not have authority to levy property taxes.

- **Fiscal Authority—Utility Rate Charges**

Customer charges for services include a component for capital and for operations costs. Operations costs include the direct costs of labor, materials and services plus depreciation and taxes. Utilities petition the ICC for rate increases. Proceedings usually take about 12 months and allow for public input in the process.

- **Fiscal Controls**

Financial disclosures required depend upon the utility's type of charter corporation. Publicly traded companies require prospectus offerings to stock purchasers and annual report to stockholders. Privately held companies have no such requirement. During user rate proceedings financial data must be submitted with requests for changes and would be available to the public.

- **Real Property Acquisition**

Utilities have the same rights to acquire and divest of property as any other public corporation plus with the certificate of need they are granted right of eminent domain within certified areas. Eminent domain acquisitions must follow Illinois Statues on such actions.

- **Acquisition of Existing Facilities**

Utilities have the same right to acquire existing facilities as any other public corporations, however they may not be granted the right of condemnation. For the acquisition of existing wastewater facilities, the ICC would probably require concurrence of customer base in some way, say in the case of privatization of a municipal utility enterprise. A utility may contract with a municipal owner to operate and maintain existing facilities without having to acquiring title.

- **Management and Labor**

The ICC has no unique rules for management of a utility. All employee policies are subject to Illinois Department of Labor rules. If municipal employees are transferred to a utility through an acquisition or contracting arrangement those employees no longer have public employee status and eligibility for municipal retirement fund participation.

- **Regulatory and Police Powers**

The utility may establish rules for customer use and connection to its owned facilities. The ICC must approve all utility rule making. A Utility has authority to enforce approved regulations that

is usually affected by ceasing service, filing property liens and legal bill collection proceedings. The Utility would have no other police powers.

- **Future Changes in Corporate Charter**

The Illinois legislature may amend the Public Utilities Act (IPUA) to change a corporate charter. The ICC would write procedural rules to implement legislative changes in the IUPA. The Illinois Joint Committee on Rules must further review any new ICC rules. A utility may apply for a change in a Certificate of Need and Necessity amendments and/or a Customer Rate structure that can modify operating strategies to a limited extent.

Summary - Advantages/Disadvantages of Alternatives

Advantages:

- A publicly owned or privately held for-profit utility has the advantage of its ability to raise capital from investors because of its closely regulated monopoly status and certainty of return from a captive customer base.

Disadvantages:

- Severely limited in ability to invest for future needs.
- Governing board not necessarily responsive to local political interests and needs.
- Limited service area in Certificate of Needs and Necessity rules.
- Broader service area may be attractive to more than one utility company.
- Utility is subject to all the Federal and State environmental rules bearing on any other organization.
- Utilities must charge fees sufficient to cover corporate taxes and return on investment for shareholders, costs not included in government entity rate structures.

9.0 IMPLEMENTATION PLAN

This section describes a general plan for implementing the proposed wastewater facilities. The plan has been presented in three major components: a construction phasing plan, a governance plan and a suggested continuing role for Will County in execution of the overall program. Each of these components is discussed separately, but they will all need to occur together in order to meet the preliminary timelines discussed below.

9.1 Construction Phasing

This preliminary phasing plan describes a general approach for adding new wastewater facilities and expanding existing facilities to serve new developments over the next 10 to 15 years. This will be the most critical time for providing continuing wastewater service as development occurs and there is a transition from service by existing systems to a combination of new and existing wastewater systems. The proposed plan is based on an ultimate system that includes three new wastewater treatment plants (WWTPs) along with several existing WWTPs.

The phasing plan is focused on treatment facilities, because they will establish the time critical path that affects the overall system development. It should also be recognized that this plan presents only one approach for implementation and phasing of new facilities, but there could be many variations depending on the locations and timing of new developments. It is understood that expansion of the collection systems will also need to occur on an ongoing basis to meet the needs of new development, and it is assumed that extending lateral service to individual customers would remain the responsibility of individual communities, rather than any regional wastewater authority that may or may not be established. Due to the long lead time for siting and constructing any new or expanded treatment facilities, it is very important to reach consensus on the management approach soon after completion of this study.

In the cost analysis it was assumed that new treatment plants could be operational in about 12 years. That implies that alternate means of providing wastewater service must be identified for at least that time period. Consequently, we have organized this construction phasing plan into three main topics:

- Implementation of new WWTPs,
- Expansion of existing WWTPs, and

- Descriptions of how wastewater service can be provided until about 2020 for each service area identified in the analysis of alternatives.

Although the study identifies an overall plan for serving the area until it reaches full development, this implementation plan only addresses the initial years through the time that new WWTPs are completed and operating. It is assumed that once the management structures have been established and new facilities are operating, then the normal planning mechanisms will be in place to plan ahead for future growth and subsequent plant expansions.

- **New Treatment Plants**

Table 7 shows an estimated schedule for completion of major tasks associated with siting and constructing a new WWTP in eastern Will County. Before any new treatment plants can be sited, it will be necessary for the communities to first decide on a management approach. The time table shown in Table 7 assumes this can be accomplished within 18 months after completion of this study. If no consensus is reached or it takes longer to reach consensus, then the dates will all be delayed accordingly.

As shown on Table 7, the earliest expected date for bringing a new WWTP on line with full operational status is estimated to be in 2020. The target dates shown for interim milestones are based on typical timeframes for each step and do not allow for any legal challenges or third party interventions that could result in significant additional delays. For planning purposes it has been assumed that proposed new WWTPs could be operational by 2020.

- **Expansion of Existing Treatment Plants**

As described below in the discussion of individual services areas, it has been projected that an expansion will be needed at the University Park WWTP, the Peotone WWTP and the Beecher WWTP. It appears that all of these expansions would be needed by approximately 2017. Aqua Illinois has initiated a process for re-rating the University Park WWTP to 2.43 MGD, Peotone has initiated planning to expand their service area and Beecher has a plan already in place to double their WWTP capacity to 1.20 MGD. As discussed further for Service Area 9 below, the planned expansion at Beecher should be sufficient to meet the projected needs through 2020. However, based on projected growth, further expansions in WWTP capacity at University Park and Peotone will be required by approximately 2017. Meeting this timeline will require beginning the planning process soon after completion of this study, or approximately January 2011. Using this as a start date for planning, a preliminary schedule of key milestones and target completion

dates for expanding the Peotone and University Park WWTPs was developed as shown in Table 8.

Table 7. Implementation Schedule for New Treatment Plants

Item	Target Completion Date
Planning Study Completed	November 2008
Stakeholders Agree on Approach	May 2010
Stakeholders Establish Management Authorities	November 2011
Begin Critical Site and Easement Acquisitions	January 2012
Hire Consultant(s) for Facilities Planning and Anti-degradation Analysis	March 2012
Facilities Plan(s) Completed	June 2013
Anti-degradation Studies Completed	June 2013
NPDES Permit Applications Completed	September 2013
Facilities Plan Submitted for CMAP Review	October 2013
CMAP Review & Approval	April 2014
IEPA Review & Approval of Facilities Plan(s)	October 2014
Design of Phase 1 Improvements Begins	January 2015
Re-zoning for WWTP Sites Approved	April 2015
Design of Phase 1 Improvements Completed	January 2017
Complete Property & R.O.W. Acquisitions	June 2017
IEPA Construction Permit(s) Issued	July 2017
Bidding and Contract Award for Phase 1	November 2017
Phase 1 Construction Begins	December 2017
Phase 1 Construction Completed	December 2019
Start-up and Training	June 2020
Full Operation Status Achieved	July 2020

Table 8. Implementation Schedule for Expanding Existing Treatment Plants

Item	Target Completion Date
Re-rate Existing University Park WWTP to 2.43 MGD	June 2009
Begin Planning for Expansions of University Park WWTP and Village of Peotone WWTP	January 2011
Facilities Plans and Anti-degradation Completed	January 2012
NPDES Permit Applications Completed	March 2012
Facilities Plan Submitted for CMAP Review	March 2012
CMAP Review & Approval	September 2012
IEPA Review & Approval of Facilities Plans	December 2012
Design of WWTP Expansions Begin	March 2013
Design Completed	June 2014
IEPA Construction Permit Issued	December 2014
Bidding and Contract Award for Plant Expansions	March 2015
Construction Begins	June 2015
Construction Completed	December 2016
Full Operation Status Achieved	January 2017

The University Park WWTP expansion would initially serve new development within the entire Deer Creek Facilities Planning Area (FPA). The University Park WWTP is currently rated for 2.17 MGD and the facility is planning to seek a re-rating to expand the capacity to 2.43 MGD. The projected expansion required at University Park WWTP would increase the capacity to about 4.5 to 5.4 MGD, as explained further in the discussion for Area 13 below. After a new WWTP is constructed at location C, then the added capacity at University Park would become available for continued growth within the eastern half of the Deer Creek FPA east of I-57.

The Peotone WWTP expansion would be needed to temporarily serve the airport related developments and new growth north of Peotone between the airport and current village limits. Upon completion of a new WWTP at location A, the Peotone WWTP could continue to operate to serve the Village itself, or could be converted to a peak shaving or excess flow storage facility, with the majority of the flow being treated at the proposed new WWTP A. The existing Peotone WWTP is rated for 0.85 MGD and the proposed expansion would boost the capacity to

about 1.35 to 1.64 MGD as discussed further under Area 11 below. If construction of a new WWTP at location A can be accelerated, it may not be necessary to expand the Peotone WWTP.

There is a potential complication with expansion of these existing WWTP facilities at University Park and the Village of Peotone, because both plants discharge into Category 5 impaired streams that are listed on the 303(d) list due to phosphorus impairment. In general this means that no additional phosphorus load would be approved by regulatory authorities. However, since neither facility is currently providing phosphorus removal it may be possible to expand the plant capacity if this were done in conjunction with addition of phosphorus removal, so that the total permitted phosphorus load would not be increased. Aqua Illinois has indicated that they are proposing the addition of phosphorus removal at University Park along with the planned re-rating to 2.43 MGD. That request has not yet been approved, and the potential for future expansion beyond 2.43 MGD should be further explored with IEPA.

- **Implementation Plan by Service Area**

Area 1

This service area is drained by the Exline Slough and has a current population of less than 500. The area is agricultural and is expected to remain undeveloped until sometime after proposed WWTP B has become operational. Development that may occur after that time would be served by a pump station near Exline Slough discharging to the proposed WWTP B near Trim Creek.

Area 2

Area 2 consists of the Pike Creek drainage basin north of the county line. This area is similar to Area 1 and currently has less than 400 population. The area is largely agricultural and is expected to remain undeveloped at least until WWTP B becomes operational. Thus, there are no interim plans for serving this area. Future service after 2020 would be provided by a pump station near Pike Creek discharging to WWTP B near Trim Creek.

Area 3

This area encompasses the east end of the proposed South Suburban Airport and lies completely within the ultimate airport boundaries. It is anticipated that this area would be served by a new pump station (PS 3) that would be constructed as part of the initial airport development. The proposed location for PS 3 is adjacent to the west side of the Beecher landfill site with a force main discharging into the Black Walnut Creek trunk sewer. The timing of this

improvement would be dependent on the airport development and no interim service would be provided before the airport is established.

As discussed in Section 6.2, it may also be possible to serve portions of this area by a pump station located at 3A and discharging into the TCBSD system.

Area 4

Area 4 is located at the west end of the proposed airport and is intended to serve future development in the upper end of the Rock Creek drainage basin. As shown on the map for Alternative 7 (Figure 14), most of this area lies within the proposed airport boundaries; however a portion in the northwest corner (north of Pauling Road and adjacent to Monee) is outside the airport. About half of this portion is already developed and is not expected to change significantly. The remaining half could be served by a separate pump station connected to the Monee sewer system. If that were done, it would leave only about 160 acres outside the airport that would be served by Pump Station 4. Including flows from the airport, that would drop the total projected flow to PS 4 down to about 0.42 MGD average and 1.39 MGD peak at full development. The proposed location of PS 4 could also provide wastewater service for the IDOT rest area at I-57. If this is done, flows from the rest area should be added to the above estimates.

It is proposed that PS 4 be constructed in conjunction with the initial airport facilities at a peak capacity of 1.4 MGD with a 10" force main (plus additional flow from I-57 rest stop, if applicable). In addition to the proposed PS 3 and 4, a segment of trunk sewer extending from the airport to the Village of Peotone WWTP should be constructed as part of the initial airport infrastructure. This would allow interim service to the airport, including PS 3 and 4, by the Village of Peotone as described further below for Area 11. An intergovernmental agreement may be required between Peotone and the Airport Authority to provide this service. As part of such agreement, it may be appropriate for the Airport Authority to pay for part or all of the proposed Peotone WWTP expansion and connecting sewer.

Area 5

This area is currently undeveloped and may remain so until after proposed WWTP A is operational. If development in this basin occurs near the Village of Peotone or north of Peotone, it may be possible to provide interim service by constructing a portion of the Rock Creek trunk sewer (from approx. I-57 and further north) and adding a temporary pump station to discharge

this new flow into the Peotone sewer system. If this were done, the estimated additional flow to Peotone WWTP would be approximately 0.17 to 0.29 MGD by 2020. If the trunk sewer in Area 5 is constructed as described above, consideration may be given to extending it all the way up to PS 4, which could eliminate the need for PS 4. In the analysis of alternatives, we included PS 4 with proposed airport improvements to allow airport development independent of Area 5. The preferred approach for serving Areas 4 and 5 may be best determined jointly by the future airport authority and the Villages of Peotone and Monee.

Area 6

The projected 2020 population in this area is about 3700 using an exponential growth projection and up to 6300 based on a linear growth pattern. The current population is this area is small but potential developments have been proposed and Aqua Illinois has considered the possibility of serving the northern portion of this area. That may only be feasible if the University Park WWTP can be expanded beyond 2.43 MGD. If any interim facilities are constructed, the pump station should be located along the S. Branch of Forked Creek to facilitate later abandonment of the lift station and connection to a trunk sewer extending downstream after WWTP A or C becomes operational.

Area 7

This area is similar to Area 6, with very little current population but the potential for growth in the near future. Projected population in 2020 varies from about 3100 to 5400, depending on the growth assumptions used. If the initial development occurs in the upper end of the drainage basin, it may be feasible to provide interim wastewater service by pumping to the Village of Frankfort or into the Aqua Illinois system along Manhattan-Monee Road. Aqua Illinois has considered expanding to serve the eastern most portion of this area (between Center Road and Elsner Road), but this may only be feasible if the University Park WWTP can be expanded beyond 2.43 MGD. For this reason, it may be preferable to provide interim service by pumping to the Village of Frankfort, which should have available WWTP capacity. Any interim pump stations should be located near Prairie Creek to facilitate future abandonment of the pump station and connection to a trunk sewer extending further downstream after proposed WWTP C becomes operational.

Area 8

This area cannot be readily served until WWTP C is completed and operational. There is some potential for providing interim service in the upstream portion of the basin by pumping into the

Aqua Illinois system, but this appears unlikely due to the capacity limitations at University Park WWTP, which are discussed further for Area 13 below.

Area 9

Most of the current population in this area resides in or near the Village of Beecher and is currently being served by the Beecher WWTP. The plant is currently rated for 0.60 MGD with a planned expansion to 1.20 MGD within the next five years.

Assuming that approximately 20% of the area is downstream of Beecher, the estimated 2020 population upstream of Beecher (including the village) is about 9,600 to 12,000. Thus it appears the proposed expansion to 1.20 MGD should be adequate to serve further development in this area through 2020. The portion of Area 9 downstream of the Beecher FPA cannot be readily served and it is assumed this portion will remain undeveloped until WWTP B becomes operational. In order to facilitate future wastewater service to all portions of the area north and east of Beecher, any future extensions of the Beecher collection system should be planned to ultimately connect with the proposed main trunk sewer along Trim Creek. As portions of this trunk sewer are constructed they should be sized to serve the ultimate development anticipated in this drainage basin.

Area 10

This area is currently part of the Deer Creek FPA and wastewater service is provided by Aqua Illinois with treatment at its University Park WWTP. However, since most of the area naturally drains into the Forked Creek basin, it is proposed that this area would be served eventually by WWTP C located further downstream on Forked Creek. By extrapolating from the CMAP population data for 2000 and 2030, the estimated 2020 population in this service area is about 8,700 to 13,800, depending on the growth patterns used. Interim service in this area can continue to be provided by Aqua Illinois up to the capacity of its system. The projected total population served by the University Park WWTP is about 2.81 to 3.62 MGD in 2020. Since this exceeds the proposed plant capacity of 2.43 MGD after re-rating, there would need to be a subsequent expansion of the University Park WWTP before 2020 or the population growth in this area may be limited to the capacity of the Aqua Illinois system. The potential for expanding the University Park WWTP beyond 2.43 MGD is discussed further under Area 13 below.

It should also be noted that as an alternative to expanding the University Park WWTP, this area could be served by a connection into the Thorn Creek Basin Sanitary District (TCBSD) system.

A merger of these two systems with treatment provided by TCBSD was recently under discussion, but is no longer being planned. Our projections indicate that the TCBSD plant should have adequate reserve capacity to treat all the wastewater projected for University Park WWTP up to 2020. Although this would provide a feasible alternative for interim service up to approximately 2020, there would still be need for expanded capacity at either University Park WWTP or TCBSD to provide enough treatment capacity for projected flow at full development in Areas 13 and 14. This is discussed further for those areas below.

Area 11

This area includes the drainage basins of Black Walnut Creek, Marshall Slough and the South Branch of Rock Creek. These three streams converge about a mile south of the county line. A preliminary elevation check indicates that a trunk sewer could be constructed near the county line to take flows from the South Branch and Marshall Slough basins over to Black Walnut Creek by gravity. Area 11 includes the Village of Peotone which currently operates its own WWTP near Black Walnut Creek that is currently rated for 0.85 MGD.

The eastern portion of this area that is drained by Marshall Slough and S. Branch of Rock Creek is currently undeveloped and cannot readily be served prior to completion of WWTP A. It has been assumed that those areas will remain undeveloped until the new WWTP A becomes operational.

Excluding the eastern portion described above, the projected 2020 population in Area 11 is about 10,700 to 12,400, depending on the growth assumptions used. In addition to the residential population, the projected flow from the inaugural phase of the proposed airport is about 0.11 MGD. Thus the total projected average wastewater flow for Area 11 in 2020 is about 1.18 to 1.35 MGD.

In addition to Area 11 itself, there is potential for some development in Area 5 upstream of Peotone, as described above for Area 5. The projected flow from this portion of Area 5 would add an estimated 0.17 to 0.29 MGD flow to the Village of Peotone. Thus the total flow to the Village of Peotone WWTP in 2020 is estimated to be 1.35 to 1.64 MGD. An expansion of the Peotone WWTP to handle this additional flow is recommended, with the proposed schedule shown in Table 8.

Area 12

Area 12 consists entirely of the existing Frankfort FPA and is expected to be served by the Village of Frankfort at its new Regional WWTP that was recently expanded to 3.5 MGD capacity. The sewer collection system will need to be expanded as new development occurs. The projected wastewater flow from this area in 2020 is about 0.40 to 0.69 MGD, so there should be additional available capacity which could be used to provide interim wastewater service to some parts of Areas 7 and/or 10. Any interim wastewater service outside the Frankfort FPA would be subject to agreement by the Village of Frankfort.

Area 13

This area consists of that portion of the existing Deer Creek FPA which lies east of I-57 and generally drains into Thorn Creek or Deer Creek, which are both tributary to the Great Lakes/Calumet watershed. The area includes nearly all of the Villages of University Park and Monee and a small portion of Park Forest. The entire area is now served by Aqua Illinois with treatment at its University Park WWTP. Assuming that plant is re-rated for 2.43 MGD, there should be adequate capacity to serve this area only (excluding Area 10) at least through 2020.

After 2020, the west half of Deer Creek FPA (Area 10 in this study) is proposed to receive wastewater service as part of the WWTP C system. However, Area 13 would continue to be served by the University Park system. When the area is fully developed, the projected wastewater flow from Area 13 is 5.40 MGD. Preliminary discussions with Aqua Illinois indicate they have considered future expansions of the University Park facility up to a maximum rated capacity of 5.38 MGD, as additional capacity is needed. This should be adequate to serve Area 13 at full development.

Area 14

This area lies entirely within the existing TCBSD FPA and currently receives wastewater service from TCBSD. A rough allocation of potential long term capacity to serve this area was estimated by TCBSD staff to be approximately 7.50 MGD (Note: the total plant capacity is currently rated for 15.92 MGD but this includes flow from several communities north of the county line.). The projected 2020 population in Area 14 is about 35,300 to 38,200, which would generate a corresponding flow of about 3.53 to 3.82 MGD. This indicates that TCBSD could provide up to about 3.5 MGD of “extra” capacity which could be used to provide interim service to some areas outside the TCBSD boundaries up until the proposed new WWTPs become operational. This could be an alternative to expanding the University Park WWTP beyond 2.43 MGD until

sometime after 2020 or 2030, but eventually as the TCBSD area continues to develop, the "extra" capacity would be needed to serve Area 14.

Areas 15, 16 and 17

As discussed in the analysis of alternatives, these areas were assumed to either remain undeveloped or to be served by small, localized wastewater facilities. Consequently, these areas are not included in the phasing plan outlined above.

9.2 Governance Plan – Next Steps

This study of wastewater facility needs for Eastern Will County with the details and recommendations presented in this report has provided sufficient breadth and depth of information about the study area and its needs for stakeholders to review the service alternative options and decide upon a specific direction for the future. Engineering and planning work required from this stage forward will be expensive and time consuming so clarity on direction is critical, but not as crucial as the leadership and communication among stakeholders that will be required to implement a coordinated plan from this point on. Therefore, it is most critical now that stakeholders come to agreement on what institutional entity (or entities) will take this leadership. Certainly discussion of the report details and data can continue but agreement on the governance approach must be foremost.

Section 9.1 on construction phasing discussed the schedule that must be met to develop new wastewater collection and treatment facilities on pace with projected future needs. That schedule allowed about 18 months to resolve the governance question and an additional 18 months to establish the responsible management authorities before undertaking the next engineering steps. Following is a suggested plan and schedule for the next two years. Three major steps are proposed:

1) Formation of a stakeholder-led working group to further study governance and decide upon the institutional arrangement best for the area,
2) Establishing the chosen governance entity(s), and
3) Consideration of financial requirements.

- **Stakeholder Governance Working Group**

It is recommended that stakeholders form a working group to decide the governance matter. The suggested group's work product would be a detailed memorandum of understanding on the form of governing entity(s) that will take the lead on facility development with an outline of

powers and responsibilities desired. If continuation of the status quo is selected the memorandum of understanding should define the means of cooperation for the future between existing entities in as great a detail as possible. Future questions requiring further study should also be identified.

Recommended institutional membership in the working group is as follows:

- Village of Beecher
- Village of Peotone
- Village of Monee
- Will County
- South Suburban Airport Authority (when formed)
- Thorn Creek Basin Sanitary District

The working participants may be managers and staff representing these governmental bodies, but each governmental body should appoint an elected official to serve on the working group.

Professional support is also recommended including, at least, the following skills:

- Wastewater planning/engineering with facility planning experience
- Legal with municipal law experience
- Financial with municipal finance experience including bonds

Staff support should be provided for administrative work.

A first order of business might be a brief understanding on how business should be conducted with a plan and schedule. It is recommended that the expectation for the group's approval of the content of the memorandum of understanding be unanimous and require ratification of the member corporate boards.

The proposed schedule for working group deliberation is twelve to fifteen months to reach a decision on form of governance and desired powers of the proposed management authority(s), or agreement on responsibilities for continuation of the status quo presentable for ratification by constituent boards.

The ratification process, given meeting cycle times and deadlines on agenda information submittal, would probably take another two to three months. This time is essential to be used for bringing decision makers on board especially if formation of a new regional entity is decided

by the working group. At some point a public hearing of other institutional stakeholders and the public would be desirable after the governance working group reaches a decision.

Estimated cost for professional services to support the working group might range from $125,000 to $175,000 depending upon the complexity and detail of the study questions posed by the working group. These initial services do not include the costs for additional planning and design that would be required after the management approach is finalized.

- **Establishing the Chosen Governance Entity**

The scope, cost and schedule for implementation of this work will depend entirely upon the choices made by the governance working group. The preliminary schedule included in the construction phasing plan allowed an additional 15 to 18 months for establishing any new entities that may be formed, resulting in a total of about 36 months before any additional engineering design or planning could proceed.

Further detailed planning and engineering work should not be undertaken until the desired governance entity is formed or the cooperation agreements are implemented.

- **Financial Considerations**

This first phase study could not fully address financing alternatives without knowing whether a regional or status quo approach for developing new wastewater facilities is favored. The financial issue should be a priority for consideration by the working group once agreement is reached on the form of governance.

This study included a comparative economic analysis of alternative wastewater collection and treatment approaches as presented in Section 7. As was noted, the costs developed were comparative estimates that excluded some costs which all alternatives shared in common. Thus the costs presented are incomplete.

Capital formation will be a major consideration in selecting the governance approach. All governance alternatives discussed in Section 8 are not equal in their ability to form capital. Existing municipalities, a special district formed under the 1917 Sanitary District Act, and a Joint Sewer Agency formed through an intergovernmental agreement between municipalities and Will County would all have equal powers to raise capital. An investor owned utility is limited to

capital for investment that can be returned in a shorter period than a municipality as determined by the Illinois Public Utilities Act and the Illinois Commerce Commission.

Municipalities may raise capital by issuing revenue bonds, general obligation bonds and alternative bonds. Revenue bonds and alternative bonds are repaid through commitment of service fee revenue and may be issued by ordinance without public referendum. General Obligation bonds repaid through property tax receipts may be issued only by voter approval in a public referendum. (The alternative bonds may also require a public referendum if voters so petition.)

Municipalities may also use the Illinois Environmental Protection Agency Revolving Loan program which makes funds available for projects according to an IEPA priority system and according to the availability of state matching funds approved by the state legislature. Loans are repaid by user fee revenues.

Capital will be required for at least the following stages of wastewater facility development.

- Phase 2 of the regional study to select a governance approach and form the entity or continuing status quo intergovernmental agreements. Estimated capital and time required for this phase was discussed under the proposed working group.
- Organizational start-up operations for an initial period for staffing, rule and policy development and detailed facility planning up to the point of acquiring and/or constructing collection and treatment facilities. Capital required for this phase is highly dependent upon the governance approach selected no attempt was made at an estimate.
- Facility construction and acquisition and funding of continuing operations. Capital required and timing will depend upon the detailed facility plan(s) developed to implement the recommended improvements.

9.3 Critical Continuing Role for Will County Government in Regional Wastewater Facility Development

The previous section proposed next steps for stakeholders to follow in the continuing development of wastewater facilities to serve the Eastern Will County Study Area. Regardless of what facility plan and institutional means of development are ultimately selected by stakeholders, the Will County Board and staff will have a critical continuing role to play in ensuring orderly development of the study area. Some of these key responsibilities are outlined below along with specific suggested follow-up actions for each.

- **Continued Execution of the Land Resources Management Plan**

This study of eastern Will County wastewater facility needs was begun with a promise to the Will County Land Use Committee that, while the main focus of the planning study would be on developing plans for future wastewater service needs for the Eastern Will County Study Area, land use management matters would be carefully considered. This understanding recognizes that the positioning and timing of availability of infrastructure, particularly wastewater facilities, is a precise means of growth control as well as an essential public service for community health and welfare.

In order to fulfill this commitment and to understand the County's hopes for development of the study area, we gave careful study to planning work previously done by Will County as documented in the Land Resources Management Plan (LRMP) adopted by the Will County Board in 2002. This plan, developed through wide participation by county leadership and its citizens, presents a clearly stated vision for the quality of life in Will County that can be assured through balanced land use and growth. This vision is to be realized through accomplishment of reasonably achievable goals based on practical strategies.

The Land Resources Management Plan's prescriptions are to be accomplished with as much local decision-making and control of land resources as possible with the County Board and staff in an involved, continuing role to help coordinate decisions between municipal authorities and to take leadership in ensuring that broad common infrastructure planning needs are met.

The Land Resources Management Plan (LRMP) shuns the command and control role for the county in favor of the prescribed facilitation and coordination role that more effectively fits the County Board's political charter and its relationships with county municipalities. While this approach can be more effective, we believe that it is a more difficult role, especially for leadership to maintain the execution momentum required over a long time with many other issues clamoring for County Board attention and resources.

ACTION:

We recommend the Land Use Committee, as the County Board's expert body, consider at least one work session to revisit the LRMP and discuss progress on the plan in general and, specifically, progress on tasks assigned to the County in the plan and report findings back to the Board at large. Because of the excellent citizen participation that was evident in the LRMP

development, the Board might also consider making a courtesy progress report to stakeholders and participants of record.

Appendix C to this report is a summary of the Land Resources Management Plan structure and a compilation of quotes of sections taken directly from the LRMP that assign tasks requiring continuing County leadership.

- **Facilitation and Communication for Intergovernmental Cooperation**

The County has served the facilitation role well by initiating this study of wastewater needs for Eastern Will County. There will be continuing need for the County leadership as the next steps in development of wastewater infrastructure are undertaken. The County's specific role should be negotiated with entities which are stakeholders in the process and outcome.

ACTION:

The LRMP calls for the County to develop *"a mechanism whereby the role of the County in land resource management, relative to other jurisdictions, is articulated and agreed to."* County staff should explore developing this mechanism for Board review and implementation.

- **Stream Corridor Acquisition and Open Space Coordination**

This study considered nine alternative configurations for wastewater treatment plant locations and interceptor alignments to serve the study area. The interceptor alignments are common for all the alternatives and generally follow natural drainage ways. Once a preferred alternative is selected, acquisition of sewer interceptor rights-of-way should begin as soon as possible. Regardless of which entity develops and manages the system these rights-of-way will be ultimately required.

ACTION:

The corridors required for interceptor construction coincide with those recommended for preservation in the LRMP which calls for establishing development setbacks of 100 feet along each side of a stream. Currently, the County's Stream and Wetland Protection Ordinance prohibits development within 75 feet of the stream bank. It is recommended the County change that setback to 100 feet. These stream corridors will provide for future trunk sewers, and the LRMP recognizes the multiple use potential of these corridors for recreation and environmental preservation.

Environmental preservation may become a limiting factor in the ability to provide adequate wastewater services in the future. As discussed in Sections 5.3 and 5.4, receiving stream water quality is an important regulatory consideration that may impact the siting of new treatment plants. Research by conservation biologists on other watersheds has shown that much can be done both along stream corridors and within tributary watershed areas to offset the negative impact of development on stream water quality.

ACTION:

The County's LRMP establishes policies for conservation development which, along with stream corridor management, will go a long way toward achieving the desired preservation goal. Because this preservation goal is so critical to ensuring that treatment plant capacity can be provided in the future, we recommend that the County take the lead in acquiring the stream corridors and establishing responsibility for proper management to meet multiple use and environmental preservation goals. The LRMP recognizes that the Will County Forest Preserve District may be the appropriate expert agency for corridor acquisition and management. Communication and collaboration needs to occur between the Forest Preserve District and the County Land Use Department regarding open space and land acquisition of these corridors. The LRMP calls for the County to *"explore a mix of tools and mechanisms to finance and preserve open space, including outright land acquisition".*

- **Control of Rural Development Outside Municipal Boundaries**

A consistent theme in the Land Resources Management Plan is the County's continued commitment to enabling local control of land use decisions and by encouraging new development within or closely adjacent to municipal boundaries. The later goal is accomplished by insisting on new development being served by municipal water and wastewater systems.

The County can subvert its own good intentions by allowing uncontrolled low-density land development in unincorporated areas. This matter can be better addressed with specific written understanding with municipalities and other water and wastewater service providers.

If a new regional entity is established for governing a regional wastewater system serving the southern portion of the study area the charter should somehow address extending services outside municipal boundaries. The LRMP specifically calls for the County to assist in resolving Facility Planning Area Boundaries established by the Illinois Environmental Protection Agency. This matter should be among issues considered in evaluating establishment of a new regional service entity.