



City of Lawrence
UTILITIES

2016 REPORT RURAL WATER DISTRICT WATER DEMAND SURVEY

I. Water Supply

The City of Lawrence, Kansas (City) water supply consists of ground water and surface water, derived from three sources: 1) two water intakes from the Kansas River, 2) six wells located in the Kansas River basin and 3) one intake on Clinton Reservoir. The City's rights to the Kansas River supply are protected from junior water rights holders under Kansas law. The Clinton Reservoir supply is a water supply contract with the Kansas Water Office. In addition, the City (along with other major cities on the Kansas River) is a member of the Kansas River Water Assurance District, which provides storage in upstream reservoirs to mitigate water supply problems during drought conditions. The City's water utility service area is supplied from the Kaw Water Treatment Plant and the Clinton Water Treatment Plant, with current treatment capacities of 16.0 and 20.0 million gallons per day, respectively.

II. Water Customers

The City's Utilities Department (Department) provides exclusive treated water for approximately 33,192 customers, most of which are inside corporate City limits. Treated water service is also provided on a wholesale basis to six rural water districts (RWDs) and the City of Baldwin, Kansas, pursuant to long-term contractual arrangements. RWD customers are RWD #1, RWD #2, RWD #4, RWD #5 and RWD #6, as well as RWD #13 (for which wholesale water is provided on an emergency need basis only). Wholesale water rates are based on the reasonable projected cost of service including, but not limited to, peak demand service cost, administrative cost, rate of return on City investment and related reasonable capital improvement costs associated with wholesale water service.

III. Annual RWD Water Demand Survey

Annually, the Department surveys all RWD customers for water usage and demand information for the just-ended year. The survey also asks if the RWD wants to renegotiate its contract sometime in the next year. In addition, pursuant to contractual agreement, RWD #2 and RWD #5 provide updated five-year projections of maximum water demands and any service area expansion plans. The Department uses this information to evaluate and monitor usage, contract compliance and future needs.

No surveyed RWD indicated an interest in renegotiating its respective contract other than RWD #1, the contract for which expires December 15, 2017. All responders indicated satisfaction with the quality, quantity, value, contractual arrangement and pressurization of City-provided water.¹ RWD #2's five-year water demand projection is in the 55 – 61 million gallons per year range, with no anticipated boundary changes in 2017. RWD #5's five-year water demand projection shows a decrease from 117,165,000 gallons in years 2017 and 2018 to 5 – 15 million gallons in years 2019 and beyond. RWD #5 is part of Public Wholesale Water Supply District #25 (PW #25), activities of which include construction of a new water treatment plant with estimated Fall 2018 completion.

¹ RWD #4 did not provide customer satisfaction data; RWD #6 did not return a completed survey.

The following Tables summarize wholesale water demand activities and customer service based on respective contractual arrangements, RWD-provided information and City billing records. RWD meters are read on the last day of each month for an annual total of 365 days.

Table 1 : Service Meter, Usage & Contract

| RWD | Meters in Service (12/31/16) | New Meters Installed (12/31/16) | Meters on Waiting List (12/31/16) | New Meter Requests (estimated) | Max Gallon/Day Demand Per RWD (GPD) | Max Gallon/Day Usage Per | Contract Effective Date | Contract Term |
|----------------------|------------------------------|---------------------------------|-----------------------------------|--------------------------------|-------------------------------------|--------------------------|-------------------------|----------------|
| RWD #1 | 397 | 4 | 0 | 7 | 113,000 | 180,000 | 12/15/1977 | 12/15/2017 |
| RWD #2 | 479 | 3 | 0 | 4 | 200,000 | 151,500 | 9/8/2011 | 12/31/2031 |
| RWD #4 ¹ | 1,181 | 17 | 0 | 6 | 996,840 | NA | 9/17/2013 | 12/31/2053 |
| RWD #5 | 1,238 | 7 | 0 | unknown | 302,400 | 642,000 | 10/7/2008 | 12/31/2040 |
| RWD #6 ² | NR | NR | NR | NR | NR | 202,500 | 5/31/1979 | 5/31/2019 |
| RWD #13 ³ | 1,029 | 23 | 1 | 12 | NA | Emergency basis only | 11/15/1990 | Annual renewal |
| TOTALS | 4,324 | 54 | | | | | | |

Table 1 Notes

- RWD #4 also receives water supply and meters from a source other than the City. The Survey does not how many of the meters in service related to City-provided water. The Maximum GPD Demand is from all sources.
- RWD #6 has not provided a completed 2016 Survey.
- Per emergency basis contract, RWD #13 maximum limits are 200 gallons per minute, a total 8,000,000 gallons during any emergency and 50,000 gallons per month for maintenance and testing. One meter was forfeited in 2016.

Table 2: Water Usage Per City Records & As Reported by RWD

| RWD | 2016 Annual Usage Per City Records (gallons/year) | 2016 Average Daily Usage Per City Records (GPD) | 2016 Average Daily Water Demand Per RWD Survey (GPD) |
|----------------------|---------------------------------------------------|-------------------------------------------------|------------------------------------------------------|
| RWD #1 | 36,010,600 | 98,659 | 105,000 |
| RWD #2 | 28,383,600 | 77,763 | 75,175 |
| RWD #4 ¹ | 47,190,800 | 129,290 | 195,400 |
| RWD #5 | 59,184,900 | 162,150 | 195,000 |
| RWD #6 | 14,799,700 | 40,547 | No response |
| RWD #13 ² | 117,200 | 321 | 288,995 |

Table 2 Notes

- Variance in daily usage per City records and as reported by RWD is due to another water source in addition to the City.
- In 2016, water usage occurred in nine of twelve months according to City records.

Table 3: Customer Service Survey

| Survey Questions | | RWD | | | | | |
|------------------|-----------------------------------------------------------------------|-----|----|----|----|----|-----|
| | | #1 | #2 | #4 | #5 | #6 | #13 |
| 1 | The City of Lawrence provides a quality of water that is acceptable. | 3 | 3 | NR | 3 | NR | 3 |
| 2 | The City of Lawrence provides a quantity of water that is acceptable. | 3 | 3 | NR | 3 | NR | 3 |
| 3 | The value of water received by my district equals the cost. | 3 | 3 | NR | 3 | NR | 3 |
| 4 | The current contract with the City of Lawrence is acceptable. | 3 | 3 | NR | 3 | NR | 3 |
| 5 | The City of Lawrence provides water at a pressure that is acceptable. | 3 | 3 | NR | 3 | NR | 3 |

Table 3 Notes: 3 = agree; 2 = neutral/doesn't apply; 1 = disagree; NR = no response

- Attachment 1: 2016 Water Production Report
- Attachment 2: 2016 RWD Metered Consumption from Clinton Reservoir

**2016 Water Production Report
City of Lawrence KS**

| <i>Date</i> | <i>Kaw Raw Pumped</i> | <i>Kaw Finished Pumped</i> | <i>% Loss</i> | <i>Clinton * Raw Pumped</i> | <i>Clinton * Finished Pumped</i> | <i>% Loss</i> | <i>Total Raw Pumped</i> | <i>Total Finished Pumped</i> | <i>Total % Loss</i> |
|--------------|---------------------------|--------------------------------|-------------------|---------------------------------|--------------------------------------|-------------------|-----------------------------|----------------------------------|-------------------------|
| Jan-16 | 48,301,758 | 43,484,911 | 9.97% | 208,857,422 | 198,396,955 | 5.01% | 257,159,180 | 241,881,866 | 5.94% |
| Feb-16 | 106,330,078 | 97,821,900 | 8.00% | 139,337,891 | 130,485,155 | 6.35% | 245,667,969 | 228,307,054 | 7.07% |
| Mar-16 | 265,209,045 | 256,777,152 | 3.18% | 0 | 0 | 0.00% | 265,209,045 | 256,777,152 | 3.18% |
| Apr-16 | 151,490,234 | 143,735,825 | 5.12% | 155,458,984 | 141,009,240 | 9.29% | 306,949,219 | 284,745,065 | 7.23% |
| May-16 | 122,320,313 | 112,525,214 | 8.01% | 170,833,984 | 163,950,800 | 4.03% | 293,154,297 | 276,476,014 | 5.69% |
| Jun-16 | 246,448,730 | 235,301,666 | 4.52% | 249,027,344 | 234,664,143 | 5.77% | 495,476,074 | 469,965,809 | 5.15% |
| Jul-16 | 210,048,828 | 198,896,780 | 5.31% | 271,656,250 | 258,165,109 | 4.97% | 481,705,078 | 457,061,890 | 5.12% |
| Aug-16 | 207,787,109 | 200,614,000 | 3.45% | 253,248,047 | 243,734,644 | 3.76% | 461,035,156 | 444,348,643 | 3.62% |
| Sep-16 | 142,935,547 | 132,179,047 | 7.53% | 221,757,813 | 211,873,602 | 4.46% | 364,693,359 | 344,052,650 | 5.66% |
| Oct-16 | 140,407,227 | 134,084,203 | 4.50% | 209,833,984 | 198,189,602 | 5.55% | 350,241,211 | 332,273,805 | 5.13% |
| Nov-16 | 129,033,203 | 124,695,186 | 3.36% | 167,048,828 | 156,480,649 | 6.33% | 296,082,031 | 281,175,835 | 5.03% |
| Dec-16 | 118,208,984 | 113,560,130 | 3.93% | 144,730,469 | 134,013,332 | 7.40% | 262,939,453 | 247,573,463 | 5.84% |
| Total | 1,888,521,057 | 1,793,676,015 | 5.02% | 2,191,791,016 | 2,070,963,231 | 5.51% | 4,080,312,073 | 3,864,639,246 | 5.29% |

* Clinton Water Treatment Plant was shut down for repairs in March 2016.

Yearly Comparisons

| <i>Date</i> | <i>Monthly</i> | | | | <i>Cummulative</i> | | | |
|--------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| | <i>2016 Total Finish Pumped</i> | <i>2015 Total Finish Pumped</i> | <i>2014 Total Finish Pumped</i> | <i>2013 Total Finish Pumped</i> | <i>2016 Total Finish Pumped</i> | <i>2015 Total Finish Pumped</i> | <i>2014 Total Finish Pumped</i> | <i>2013 Total Finish Pumped</i> |
| Jan-16 | 241,881,866 | 244,420,067 | 248,566,186 | 242,149,957 | 241,881,866 | 244,420,067 | 248,566,186 | 242,149,957 |
| Feb-16 | 228,307,054 | 226,066,496 | 229,767,594 | 226,479,260 | 470,188,920 | 470,486,562 | 478,333,780 | 468,629,217 |
| Mar-16 | 256,777,152 | 259,417,144 | 245,222,238 | 250,042,408 | 726,966,073 | 729,903,707 | 723,556,018 | 718,671,626 |
| Apr-16 | 284,745,065 | 272,448,700 | 262,651,816 | 251,472,858 | 1,011,711,137 | 1,002,352,407 | 986,207,834 | 970,144,484 |
| May-16 | 276,476,014 | 273,588,407 | 332,348,331 | 296,732,826 | 1,288,187,151 | 1,275,940,813 | 1,318,556,165 | 1,266,877,310 |
| Jun-16 | 469,965,809 | 317,038,316 | 303,077,968 | 353,214,025 | 1,758,152,961 | 1,592,979,129 | 1,621,634,133 | 1,620,091,335 |
| Jul-16 | 457,061,890 | 391,250,980 | 460,533,243 | 525,729,875 | 2,215,214,851 | 1,984,230,109 | 2,082,167,376 | 2,145,821,210 |
| Aug-16 | 444,348,643 | 426,272,678 | 497,137,940 | 407,456,803 | 2,659,563,494 | 2,410,502,787 | 2,579,305,317 | 2,553,278,013 |
| Sep-16 | 344,052,650 | 391,683,179 | 357,373,509 | 441,227,218 | 3,003,616,143 | 2,802,185,967 | 2,936,678,826 | 2,994,505,231 |
| Oct-16 | 332,273,805 | 401,357,285 | 303,427,370 | 336,128,596 | 3,335,889,948 | 3,203,543,251 | 3,240,106,196 | 3,330,633,827 |
| Nov-16 | 281,175,835 | 259,822,439 | 247,504,886 | 247,200,811 | 3,617,065,783 | 3,463,365,690 | 3,487,611,083 | 3,577,834,638 |
| Dec-16 | 247,573,463 | 226,729,977 | 232,918,991 | 243,975,733 | 3,864,639,246 | 3,960,095,667 | 3,720,530,074 | 3,821,810,371 |
| Total | 3,864,639,246 | 3,690,095,667 | 3,720,530,074 | 3,821,810,371 | 3,864,639,246 | 3,690,095,667 | 3,720,530,074 | 3,821,810,371 |

**Wholesale Water Users
2016 Metered Consumption from Clinton Reservoir, Lawrence Kansas**

| <i>Date</i> | <i>Baldwin</i> | <i>RWD #1</i> | <i>RWD #2</i> | <i>RWD #4</i> | <i>RWD #5</i> | <i>RWD #6</i> | <i>RWD #13</i> | <i>Total RWDs</i> | <i>Clinton * Raw Pumped</i> | <i>Clinton * Finished Pumped</i> | <i>% Loss</i> |
|--------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|--------------------|-----------------------------|----------------------------------|---------------|
| Jan-16 | 12,096,200 | 2,257,900 | 2,210,600 | 3,290,800 | 3,977,000 | 936,200 | 300 | 24,769,000 | 208,857,422 | 198,396,955 | 5.01% |
| Feb-16 | 13,318,500 | 2,014,100 | 2,134,900 | 3,616,900 | 4,246,800 | 1,049,600 | 92,900 | 26,473,700 | 139,337,891 | 130,485,155 | 6.35% |
| Mar-16 | 11,742,400 | 2,133,100 | 1,771,500 | 3,090,400 | 4,052,300 | 1,099,400 | 12,700 | 23,901,800 | 0 | 0 | 0.00% |
| Apr-16 | 12,996,100 | 2,506,600 | 2,104,600 | 3,627,700 | 4,263,600 | 1,303,300 | 2,600 | 26,804,500 | 155,458,984 | 141,009,240 | 9.29% |
| May-16 | 13,694,500 | 2,680,700 | 2,529,000 | 3,282,300 | 4,498,800 | 1,207,700 | 700 | 27,893,700 | 170,833,984 | 163,950,800 | 4.03% |
| Jun-16 | 15,274,000 | 4,739,500 | 3,507,300 | 5,897,500 | 7,134,500 | 1,684,200 | 1,100 | 38,238,100 | 249,027,344 | 234,664,143 | 5.77% |
| Jul-16 | 14,942,500 | 4,348,600 | 2,490,300 | 4,715,100 | 5,854,500 | 1,419,600 | 0 | 33,770,600 | 271,656,250 | 258,165,109 | 4.97% |
| Aug-16 | 16,994,200 | 4,845,500 | 2,827,700 | 4,423,900 | 6,657,400 | 1,504,100 | 4,600 | 37,257,400 | 253,248,047 | 243,734,644 | 3.76% |
| Sep-16 | 14,445,400 | 2,956,000 | 2,081,000 | 3,594,500 | 4,542,300 | 1,148,500 | 1,200 | 28,768,900 | 221,757,813 | 211,873,602 | 4.46% |
| Oct-16 | 15,995,300 | 2,990,200 | 2,099,800 | 3,649,600 | 4,787,600 | 1,239,700 | 0 | 30,762,200 | 209,833,984 | 198,189,602 | 5.55% |
| Nov-16 | 13,932,900 | 2,263,500 | 2,162,500 | 3,184,900 | 4,584,200 | 1,151,800 | 0 | 27,279,800 | 167,048,828 | 156,480,649 | 6.33% |
| Dec-16 | 12,847,100 | 2,274,900 | 2,464,400 | 4,817,200 | 4,585,900 | 1,055,600 | 1,100 | 28,046,200 | 144,730,469 | 134,013,332 | 7.40% |
| Total | 168,279,100 | 36,010,600 | 28,383,600 | 47,190,800 | 59,184,900 | 14,799,700 | 117,200 | 353,965,900 | 2,191,791,016 | 2,070,963,231 | 5.51% |

* Clinton Water Treatment Plant was shut down for repairs in March 2016.

Processing Loss Adjustments

| <i>Date</i> | <i>Baldwin</i> | <i>RWD #1</i> | <i>RWD #2</i> | <i>RWD #4</i> | <i>RWD #5</i> | <i>RWD #6</i> | <i>RWD #13</i> | <i>Total RWDs</i> | <i>Lawrence</i> |
|--------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|--------------------|----------------------|
| Jan-16 | 12,733,971 | 2,376,948 | 2,327,154 | 3,464,307 | 4,186,687 | 985,561 | 316 | 26,074,944 | 182,782,478 |
| Feb-16 | 14,222,091 | 2,150,746 | 2,279,742 | 3,862,288 | 4,534,923 | 1,120,810 | 99,203 | 28,269,802 | 111,068,088 |
| Mar-16 | 11,742,400 | 2,133,100 | 1,771,500 | 3,090,400 | 4,052,300 | 1,099,400 | 12,700 | 23,901,800 | -23,901,800 |
| Apr-16 | 14,327,859 | 2,763,461 | 2,320,266 | 3,999,444 | 4,700,507 | 1,436,854 | 2,866 | 29,551,257 | 125,907,727 |
| May-16 | 14,269,439 | 2,793,244 | 2,635,176 | 3,420,102 | 4,687,674 | 1,258,403 | 729 | 29,064,768 | 141,769,217 |
| Jun-16 | 16,208,883 | 5,029,593 | 3,721,973 | 6,258,471 | 7,571,185 | 1,787,286 | 1,167 | 40,578,558 | 208,448,786 |
| Jul-16 | 15,723,362 | 4,575,848 | 2,620,438 | 4,961,501 | 6,160,443 | 1,493,785 | 0 | 35,535,377 | 236,120,873 |
| Aug-16 | 17,657,514 | 5,034,629 | 2,938,070 | 4,596,573 | 6,917,250 | 1,562,808 | 4,780 | 38,711,624 | 214,536,423 |
| Sep-16 | 15,119,299 | 3,093,902 | 2,178,082 | 3,762,189 | 4,754,205 | 1,202,079 | 1,256 | 30,111,011 | 191,646,802 |
| Oct-16 | 16,935,084 | 3,165,885 | 2,223,171 | 3,864,028 | 5,068,889 | 1,312,537 | 0 | 32,569,595 | 177,264,390 |
| Nov-16 | 14,873,881 | 2,416,369 | 2,308,548 | 3,399,997 | 4,893,802 | 1,229,589 | 0 | 29,122,186 | 137,926,642 |
| Dec-16 | 13,874,491 | 2,456,825 | 2,661,480 | 5,202,435 | 4,952,638 | 1,140,017 | 1,188 | 30,289,073 | 114,441,395 |
| Total | 177,688,275 | 37,990,550 | 29,985,599 | 49,881,734 | 62,480,503 | 15,629,129 | 124,205 | 373,779,995 | 1,818,011,021 |