

January 9, 2014

Rick Hecht, Chairperson of the Sac County Board of Supervisors
Trustees of Drainage Districts 32, 42, 65, 79, 81, 83, 86
& Joint Drainage Districts 2-51, 19-26, 64-105
100 NW State Street, Box 4
Sac City, Iowa 50583

Gary Nicholson, Chairperson of the Calhoun County Board of Supervisors
Trustees of Joint Drainage District 2-51
Calhoun County Courthouse
416 Fourth Street
Rockwell City, IA 50579

Dale Arends, Chairperson of the Buena Vista County Board of Supervisors
Trustees of Joint Drainage Districts 19-26, 64-105
Buena Vista County Courthouse
215 E. 5th
Storm Lake, Iowa 50588

RE: Sixty-day Notice of Intent to Sue

“A river is more than an amenity, it is a treasure. It offers a necessity of life that must be rationed among those who have power over it.”

Justice Holmes in *State of New Jersey v. State of New York*, 283 U.S. 336, 342, 51 S.Ct. 478, 479, 75 L.Ed. 1104, as quoted in *Iowa Natural Res. Council v. Van Zee*, 261 Iowa 1287, 1297-98, 158 N.W.2d 111, 117-18 (1968).

Dear Sir or Madam:

INTRODUCTION

This letter is submitted on behalf of the Board of Water Works Trustees of the City of Des Moines, Iowa (DMWW) a municipal water utility organized and acting under Chapter 388, Code of Iowa. This letter is a sixty-day notice under the citizen suit provision of the Federal Water Pollution Control Act (commonly known as the “Clean Water Act” or the “CWA”), 33 U.S. C. § 1251, et seq. and under the citizen suit provision in the Iowa Code, Chapter 455B.111.

This letter communicates the intent of DMWW to sue Drainage Districts 32, 42, 65, 79, 81, 83, 86, and 2-51, 19-26, 64-105 managed or jointly managed by the Sac County Board of Supervisors, Buena Vista County Board of Supervisors, and Calhoun County Board of

Supervisors (collectively the “Drainage Districts”) for the discharge of pollutants into the Raccoon River in violation of the Clean Water Act, Iowa Code § 455B.186, and for other claims under state statute and common law of nuisance, trespass, and negligence. This letter is provided pursuant to the notice requirements of the citizen suit provision of the CWA, 33 U.S.C. 1365(b)(1)(A) and its implementing regulations, 40 C.F.R. §§ 135.2-135.3 and the citizen suit provision in the Iowa Code § 455B.111.

BACKGROUND

1. Des Moines Water Works and the Pervasive Challenge of Nitrate Pollution

Des Moines Water Works is a regional utility that provides drinking water to approximately half a million Iowans both by direct service and by wholesale service to other water utilities and districts. DMWW seeks to operate with fiscal discipline while delivering superior quality water in reliable quantities. DMWW obtains its raw water supply from the Raccoon and Des Moines Rivers by means of direct river intake and by access to shallow alluvial aquifers and surface waters recharged by the rivers. These sources have suffered a long term increase in levels of nutrient pollution, particularly nitrate which is a serious concern to DMWW because the regular treatment processes used in two of its three water treatment plants are unable to remove nitrate. As the quality of its source water has declined, DMWW has invested millions of dollars in capital infrastructure including a nitrate removal facility built in the early 1990s at a cost of \$4.1 million and designed to operate on an as needed basis when nitrate levels are too high.

In the past two years persistent peaks in nitrate levels have reached record highs with the Raccoon River reaching 24 milligrams per liter (mg/L) and the Des Moines River reaching 18.6 mg/L.

In the summer of 2013, the nitrate load in DMWW’s raw water supply in one week was greater than the *entire* nitrate load in 2012. In order to comply with the Environmental Protection Agency’s (“EPA”) 10 mg/L maximum contaminant level (“MCL”) for nitrate under the Safe Drinking Water Act, DMWW was forced to issue a voluntary conservation request to its customers and to rely on its nitrate removal facility for 74 days during peak demand in the summer. This facility has a maximum capacity of 10 million gallons per day, and costs over \$7,000 per day to operate. During the weeks of crisis, DMWW expended over \$500,000 to treat the source water burdened by excessive nitrate levels.

In 2014, despite a difference in both average temperature and precipitation from 2013, the nitrate load in DMWW’s water supply was again record setting. In the month of July the average nitrate concentration in Des Moines in the Raccoon River was 11.98 mg/L, the 3rd highest average in the last forty years. Similarly, in September, October and November, and December the average nitrate concentration was 11.89 mg/L, 13.23 mg/L, 13.43 mg/L and 12.56 mg/L respectively. On December 4, 2014, DMWW had to again rely on its costly nitrate removal facility and continuous use of the facility has been required as nitrate concentrations continue to exceed safety standards under the Safe Drinking Water Act.

Unfortunately these historic levels of nitrate are merely new manifestations of a long upward trend, which threatens the security of the water supply upon which DMWW and its customers must rely. The health risks associated with nitrate contamination, such as blue baby syndrome and endocrine disruption, are but some of the many consequences of this pollution. Eutrophication and the development of hypoxic conditions in the Gulf of Mexico's dead zone are also directly attributable to nutrient transport from agriculture into the tributaries of the Mississippi, including the Raccoon River and Des Moines River.

The nitrate problem in the watersheds from which DMWW obtains its water has been observed and studied for many years but there has been no adequate legislative, executive, or regulatory response. As set forth in the Iowa Nutrient Reduction Strategy, over 90% of the nitrate entering Iowa streams come from agricultural sources and yet there is no plan to reduce the nitrate pollution other than to advocate for largely unfunded voluntary measures to be adopted by private parties. This nutrient "strategy" is contrary to existing law and regulation and ignores the unique situation of the Raccoon River and Des Moines River watersheds, including a massive artificial subsurface drainage infrastructure. These elaborately engineered government drainage systems consisting of pipes and conduits have been overlooked as point sources under the CWA but they transport high concentrations of nitrate and are the main source of nitrate pollution into the Raccoon River and Des Moines River.

As explained more fully below, the discharge of nitrate by the Drainage Districts into navigable waters of the United States is pollution by a point source in violation of the CWA and Iowa Code § 455B.186(1) and a National Permit Discharge Elimination System ("NPDES") permit is required.

In order for DMWW to continue to provide clean and safe water at an affordable price and to protect the state from a further environmental and health crisis, the discharge of pollutants from drainage infrastructure must be addressed and compliance with existing regulatory systems under the CWA and Chapter 455B is a vital first step in this process.

2. Iowa's Agricultural Drainage

Drainage in Iowa began in the 1800s when early settlers in the central and northwestern parts of Iowa found the region to be nearly uninhabitable due to the swampy landscape resulting from glaciers that had previously covered the state but which melted and formed a prairie pothole region. This region is referred to by scientists as the "Des Moines Lobe". The tallgrass prairie and the wetland plants that developed helped form the region's tremendously rich soil. A few decades after their arrival in Iowa, settlers realized that with the help of artificial drainage the soil found under the wetlands was ideal for the cultivation. Thereafter, networks of agricultural tile were installed to turn native wetlands into a terrain suitable for farmland. *Kanwar, R. S., H.P. Johnson and J.L. Baker, Comparison of simulated and measured nitrate losses in tile effluent. Transactions of the ASAE 26(5): 1415-1457 (1983).*

Although the original purpose for drainage by early Iowa settlers was limited to improving the natural waterlogged conditions of the land, by the end of the 19th century the practice of drainage expanded to water management, raising crop yields, broadening the range of land use, and lowering production costs. *L.K. Smedema & D.W. Rycroft, Land Drainage: Planning and Design of Agricultural Drainage Systems (1983)*. Because the installation of drainage was costly, labor intensive, and required cooperation, legislation was enacted to facilitate the formation of drainage districts. *McCorvie, Mary R. & Christopher L. Lant, Drainage District Formation and the Loss of Midwestern Wetlands, 1860-1930, 67 Agric. Hist. 13 (1993)*. By the late 1920s over 2.5 million hectares of Iowa land were managed by drainage districts. *Schilling, K E, C S Jones, A. Seeman, E Bader, and J. Filipiak, Nitrate-Nitrogen Patterns in Engineered Catchments in the Upper Mississippi River Basin. Ecological Engineering 42:1-9 (2010)*. Today more than 9 million acres or twenty-six percent of all Iowa farms are drained and the number of drainage districts in the state exceeds 3,000. *Iowa Drainage District Association; <http://www.iowadrainage.org/Facts.html>*. The vast majority of drainage districts in the state are located in the Raccoon River and Des Moines River watersheds.

Under the Iowa Code there are nearly seventy-five pages of law dedicated to drainage districts. They are created by law for the purpose of constructing, administering, and maintaining levees, drains, drainage tiles, and drainage ditches. *See Iowa Code Chapter 468*. Drainage districts in Iowa are local subdivisions of the county, but maintain only a quasi-governmental status. The majority is managed by a county board of supervisors, but a board of trustees elected by landowners may also govern a district. Any costs associated with installation, maintenance, or repair of drainage tile, drains, or ditches is defrayed by levying assessments on property owners within the district in proportion to the benefit that accrues to each property owner.

Within each drainage district in Iowa there exist two major methods of nutrient transport—subsurface tile and conveyances and surface ditches and channels to which such subsurface tile and conveyances connect. Subsurface tile transports groundwater through a network of porous or perforated pipes made of clay, concrete, or flexible plastic that lie at intervals four to six feet beneath the surface. Subsurface drainage is prolific in the Des Moines Lobe and has the effect of lowering the water table and removing water from the root zone of corn and soybean plants. By lowering the water table or the level at which soil is entirely saturated with water, subsurface drainage tile permits groundwater to drain. This drainage creates less interference with root growth and development of field crops, which require both water and air for production.

Subsurface drainage systems generally outlet to open ditches and streams. This channeling has the hydraulic effect of increasing stream velocity downstream of drainage districts. This occurs when the infrastructure developed by drainage districts eliminates large areas of natural subsurface storage and substantially increases the amount of water discharged into natural streams. For example, changes to stream channels in the Des Moines Lobe by agricultural drainage have been dramatic. Since 1847 channel frequency has increased by over 500% and density by over 430%. Increased stream velocity not only contributes to the frequency of flooding, but also increases the rate at which contaminants such as nitrate are carried to navigable waters.

3. The Impact of Agricultural Drainage

Large nitrate concentrations entering streams and rivers in the Des Moines Lobe are the direct result of drainage-district infrastructure. The rapid removal of water establishes a sequence of biochemical and physical processes that increase the production and transport of nitrate throughout the year and particularly during periods when row crops are not present. Nitrate is a soluble ion of Nitrogen (N) found in the soil that moves only with water. In simplest terms this allows it to be both readily available for plant consumption but also easily leached through groundwater. Under natural hydrologic conditions very little nitrate is discharged from groundwater to streams, but artificial subsurface drainage short-circuits the natural conditions that otherwise keep nitrate from entering streams and rivers.

Subsurface drainage tile artificially lowers the water table by removing water from the saturated zone and expanding the volume of soil in which mineralization can generate nitrate in the unsaturated zone. Rapid mineralization in the unsaturated zone in the absence of perennial vegetation to consume it provides a large source of nitrate and continuous drainage allows little opportunity for natural attenuation or de-nitrification. The result is seasonally large concentrations of nitrate because mineralization rates increase as temperatures rise in spring and remain high late into autumn. The presence of subsurface tiles provides a continuous mechanism for transporting nitrate to streams only reduced during the relatively short (60-70 days) annual-crop growing season when mineralization rates may be in balance with crop uptake demands.

Although there are many misconceptions regarding the source of nitrate pollution, scientific research has shown that nitrate is delivered to streams by groundwater rather than other means such as runoff. For example, one research study, seminal in the discussion of subsurface drainage found that more than 98% of nitrate loss was in groundwater rather than surface water runoff. *Jackson, W.A. & L.E. Asmussen, E.W. Hauser, A.W. White, Nitrate in Surface and Subsurface Flow from a Small Agricultural Watershed, J. Environ. Quality, Vol 2, no. 4 (1973).*

This is especially apparent after rainfall events when nitrate concentrations are diluted following discharge from storm water runoff into the stream, but which are followed within days by rapid spikes in nitrate concentrations as groundwater, rather than storm water, dominates the stream. Because storm water flowing across a field has little opportunity to dissolve nitrate produced by soil microorganisms or to interact with soil containing dissolved nitrate only a very small concentration of nitrate can be found in storm water runoff.

In the Midwest, export of nitrate is among the highest in the United States with as much as 35% of the total nitrogen load delivered to the Gulf of Mexico from Iowa and Illinois alone. . *Schilling, Jones, et al. (internal citations omitted).* This figure is staggering considering there are twenty-seven other states which drain into the Gulf. The role of agricultural drainage as a direct pipeline of nitrate pollution into our streams and rivers and the harm it has caused our state and nation is measurable and significant; it can no longer be ignored and will not be remedied by voluntary measures.

FAILURE TO OBTAIN A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

The CWA was created by Congress to protect sources of drinking water by controlling and eliminating pollutant discharges into waters of the United States. The statute's objective is "to restore and maintain the chemical, physical, and biological integrity of the nation's waters". 33 U.S.C. § 1251. To achieve this objective the CWA prohibits all persons from discharging "any pollutant" unless done in compliance with the federal statute and rules. *Id. at § 1311(a)*.

One of the key tenets of the CWA is the National Pollutant Discharge Elimination System which requires that all "point sources" discharging into navigable waters must have a permit. *Id. at §1342(a)(1)*. When a pollutant is discharged without a NPDES permit a private citizen with an interest "which is or may be adversely affected" may bring a civil action under the CWA. *Id. at §§1365(g)*.

This civil action falls under Section 1365(a)(1) of the Act and may be brought against any person or entity which violates "an effluent standard or limitation". The term "effluent standard or limitation" is defined as "any restriction established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters". *Id. at § 1362*. Since an NPDES permit or permit condition falls within the definition of "effluent standard" a citizen suit can be brought when a person or entity discharges without a permit. *Williams Pipe Line Company v. Bayer Corporation, 946 F.Supp. 1300, 1317 (1997)(internal citations omitted)*.

1. DISCHARGE OF A POLLUTANT

The phrase "discharge of a pollutant" under the CWA is defined as "any addition of any pollutant to navigable waters". 33 U.S.C. § 1362(12). Federal circuit courts have held that when a point source introduces a pollutant into a navigable water and that pollutant would not exist in the same form or concentration but for the point source, an "addition" under the CWA occurs. *Rybachek v. EPA, 904 F.2d 1276, 1285-1286 (9th Cir. 1990)*; *Borden Ranch Partnership v. U.S. Army Corps of Engineers, 261 F.3d 810, 815 (9th Cir. 2001)(interpreting "addition" under CWA)*; *United States v. Deaton, 209 F.3d 331, 335 (4th Cir. 2000)*. Federal courts look to the definition of pollutant or pollution when interpreting this provision. Under the CWA the term "pollutant" is defined as "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water" and the term "pollution" is defined as the "man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water". 33 U.S.C. §§ 1362(6); 1362(19).

The transport of nitrate by artificial drainage is waste that alters the biological integrity of water, meeting both definitions of pollutant and pollution under the CWA. Furthermore, the EPA identifies nitrate as a contaminant and mandates its regulation to protect public health. See *Safe Drinking Water Act 10 mg/L standard for nitrate*.

In 2014, DMWW conducted a program of sampling waters discharged by the Drainage Districts. Such samples contained nitrate concentrations far in excess of the 10 mg/l MCL, and after taking into account transport times, correlated with excessive nitrate concentrations observed at the DMWW Raccoon River intake points. A summary of 2014 sample results compiled by DMWW is attached to this notice of intent as **Exhibit A** and is incorporated herein by reference. The observed nitrate concentrations demonstrate that the Drainage Districts discharged pollutants in violation of the CWA, the Iowa Code, and implementing regulations thereunder on specific dates and in specific amounts as shown by the sampling data. The locations of the sample sites and their relation to each of the Drainage Districts are shown in **Exhibits B and C** and are incorporated herein by reference.

2. POINT SOURCE

The CWA defines “point source as “any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged.” *Id. at §1362*. By definition, a “point source” is a “discernible, confined, and discrete conveyance.” *Id. at § 1362(14)*.

Congress’s inclusion of the word “conveyance” demonstrates Congressional intent that a “point source” does not need to be the original source of the pollutant, but merely the carrier. *S. Florida Water Mgmt. Dist. v. Miccosukee Tribe of Indians, 541 U.S. 95, 105 (2004)*. This is further illustrated by the language which accompanies the word “conveyance” in the definition *Id. § 1362(14)*. “Pipes”, “ditches”, “tunnels”, and “conduits” are all mediums of transportation explicitly named in the statute that do not produce or generate pollution, but rather transfer it. *S. Florida Water Mgmt. Dist., 541 U.S. at 105*.

The infrastructure of the Drainage Districts that carries nitrate from farm fields to the Raccoon River is composed of pipes, ditches and conduits. These systems are specifically included in the definition of “point source” under the CWA.

3. AGRICULTURAL STORMWATER DISCHARGE EXEMPTION

Under the CWA, “agricultural stormwater discharge” and “return flow from irrigated agriculture” are expressly exempt from the definition of “point source” and the requirements of NPDES permitting. *33 U.S.C. § 1362(14)*. “Agricultural stormwater discharge” is not defined in the CWA or by EPA regulation, leaving a determination of the scope of the exemption to a case by case determination. The specific character of the discharge and the facility that conveys it all come into play.

In this case, the high nitrate effluent from artificial drainage systems created and maintained by the Drainage Districts is not exempt from NPDES permitting under the agricultural stormwater discharge exception for the simple reason that the effluent is not a stormwater discharge, but rather is composed of artificially drained groundwater. The nitrate

transported to streams by the Drainage Districts is attributable to groundwater and the high nitrate concentration events arise from the flow of groundwater. Stormwater flowing across a field does not contact nitrate bearing soils or reside on the surface long enough to dissolve measurable quantities of nitrate, and then carry those measurable quantities across the field and into a ditch or stream. Indeed, in the hours and days immediately following rainfall events, concentrations of nitrate in a watershed are rapidly diluted by stormwater flows. These sharp declines in concentration are followed by increases in nitrate concentrations as discharge from groundwater begins to dominate the flow. In short, nitrate pollution introduced into the Raccoon River by the Drainage Districts are conveyed by ground water, not by storm water. The agricultural stormwater discharge exemption under the CWA does not exempt the Drainage Districts from NPDES permitting requirements.

VIOLATION OF IOWA CODE CHAPTER 455B

Under Iowa law “a pollutant shall not be disposed of by dumping, depositing, or discharging such pollutant into any water of the state”. *Iowa Code § 455B.186(1)*. A citizen who is adversely affected may bring a lawsuit against any person or entity who violates the law by discharging a pollutant into a stream or river. *Iowa Code § 455B.111(3)*. To prevail, a citizen must show by a preponderance of evidence that an action was knowingly taken and that action resulted in the discharge of pollutants into the water. *DeCoster, 596 N.W.2d 898, 902 (1999)*. The intentional diversion of groundwater and the discharge of nitrate into the Raccoon River by the Drainage Districts is prohibited under the Iowa Code and pursuant to Iowa Code § 455B.111 legal action is contemplated by DMWW if corrective action is not taken within sixty days of this notice.

Iowa law also requires compliance with the NPDES permitting system of “point sources” which the Iowa Department of Natural resources administers in Iowa. In this regard Iowa law and regulation generally track the text of corresponding federal law and regulations, but do add some clarification of the agricultural storm water discharge exception, which it articulates in Rule 64.4(1)(e) as applying to “Any introduction of pollutants from non-point source agricultural and silvicultural activities, including storm water runoff from orchards, cultivated crops, pastures, range lands, and forest lands...”. The Drainage Districts simply cannot qualify as “non-point agricultural sources”, nor can they meet the test of “storm water runoff” as applied to the ground water discharges that are the source of nitrate pollution for reasons explained above. In accordance with Iowa law, the Drainage Districts require NPDES permits as a matter of Iowa law as well as federal law.

COMMON LAW CLAIMS

The ongoing artificial discharge of high nitrate concentrations into the Raccoon River by the Drainage Districts gives rise to state common law and statutory claims of nuisance, trespass, and negligence in favor of DMWW. *Freeman v. Grain Processing Corp., 848 N.W.2d 58, 66 (Iowa 2014)(stating common law and statutory claims of nuisance, negligence, and trespass are primary theories in which to seek redress for environmental harms)(internal citations omitted)*. It is also the intent of DMWW to pursue such claims.

NOTICE OF INTENT TO SUE

This letter is submitted on behalf of the Board of Water Works Trustees of the City of Des Moines, Iowa (DMWW) whose address is 2201 George Flagg Parkway, Des Moines Iowa 50321. DMWW is a municipal water utility organized and acting under Chapter 388, Code of Iowa. This letter is a sixty-day notice under the citizen suit provision of the Federal Water Pollution Control Act (commonly known as the "Clean Water Act" or the "CWA"), 33 U.S. C. § 1251, et seq. and under the citizen suit provision in the Iowa Code, Chapter 455B.111. Legal counsel in this matter are Richard Malm and Colleen MacRae, attorneys at Dickinson, Mackaman, Tyler & Hagen PC, 699 Walnut Street, Suite 1600, Des Moines, Iowa 50309, (515)-244-2600.

If the Drainage Districts do not cease to discharge pollutants or act within sixty (60) days to correct ongoing violations under the CWA by applying to the Iowa Department of Natural Resources for an NPDES permit, or the state does not intervene as a matter of right, DMWW will seek relief in federal court under the Clean Water Act's citizen suit provision, 33 U.S.C. § 1365(b)(1)(A), under Iowa Code § 455B.111, and for other state and common law claims of nuisance, trespass, and negligence.

Although the primary relief sought is to bring the Drainage Districts into compliance with applicable permitting requirements, DMWW also intends to make claim for other equitable relief as well as damages and fees under all its theories of recovery.

During this sixty day notice period we will be available to discuss effective remedies and actions and the possibility of resolving this matter without litigation, as well as any other facts you believe may be incorrectly set forth or are missing in this notice. You should direct initial correspondence or telephone contacts to my attention at the Des Moines Water Works, 2201 George Flagg Parkway, Des Moines, Iowa 50321 or (515) 283-8705.

Very truly yours,



William Stowe

cc:

Regina McCarthy, EPA Administrator
Environmental Protection Agency
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Karl Brooks, Regional Administrator
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Tom Vilsack
United States Secretary of Agriculture
U.S. Department of Agriculture
1400 Independence Ave., S.W.
Washington, DC 20250

Location	DD86, DD2 (Sac) and DD51 (Calhoun)	DD81, DD79, DD83, DD19 (Sac), DD26 (Buena Vista)	DD42
Site Code	SC15	SC19	SC20
28-Mar			0
1-Apr			2.6
8-Apr			0.04
15-Apr			0
22-Apr			0
29-Apr			2.8
6-May			2.21
13-May			0.38
20-May			1.11
28-May			0.01
2-Jun			0.01
10-Jun	29.34	0.48	3.19
17-Jun	21.28	15.9	40.39
24-Jun	39.21	19.42	6.42
1-Jul	18.16	11.43	1.5
8-Jul	35	18.31	12
15-Jul	37.67	18.77	17.31
22-Jul	31.06	11.57	9.63
29-Jul	28.27	5.95	2.64
5-Aug		1.08	0
12-Aug	29.32	7.25	3.52
19-Aug	20.75	2.1	1.23
26-Aug	13.49	1.15	0.35
4-Sep	30.55	18.79	11.71
9-Sep	31.8	20.07	17.58
16-Sep	31.35	20.61	21.27
23-Sep	34.21	20.64	20.24
30-Sep	33.72	19.96	21.51
7-Oct	34.76	21.11	21.79
15-Oct	32.17	19.12	19.58
21-Oct	32.34	17.47	18.85
28-Oct	30.15	18.28	18.49
4-Nov	31.78	17.68	19.53
11-Nov	38.13	16.23	20.03
18-Nov		16.18	21.91
25-Nov	31.75	14.13	20.32
2-Dec		14.12	19.3
10-Dec	30.63	12.52	15.84
17-Dec	28.15	14.76	12.97
30-Dec			

10- 14.99 mg/L
15- 19.99 mg/L
≥20.00 mg/L

Location	DD83, DD19 (Sac), DD26 (Buena Vista), and DD69	DD79	DD65
Site Code	SC32	SC34	SC36
28-Mar			4.12
1-Apr			3.18
8-Apr			4.63
15-Apr			4.31
22-Apr		9.15	6.13
29-Apr		13.23	4.49
6-May		8.61	5.8
13-May	10.78	23.78	15.44
20-May	38.23	15.36	11.48
28-May	0.01	13.35	10.27
2-Jun	0.58	22.25	12.8
10-Jun	2.18	24.37	
17-Jun	16.45	18.9	17.35
24-Jun	23	33.32	15.04
1-Jul	15.01		7.31
8-Jul	21.18	33.56	14.12
15-Jul	21.49	22.09	21.15
22-Jul	15.41	33.81	19.76
29-Jul	9.06	33.56	17.7
5-Aug	2.36	23.28	13.22
12-Aug	5.98	29.18	18.09
19-Aug	2.35	24.97	15.09
26-Aug	2.97	22.96	13.43
4-Sep	18.94	25.1	16.11
9-Sep	20.39	27.61	20.68
16-Sep	22.37	28.69	20.95
23-Sep	22.86	29.38	21.04
30-Sep	22.61	30.35	20.94
7-Oct	23.57	29.66	20.89
15-Oct	21.31	28.66	19.82
21-Oct	19.9	28.78	17.41
28-Oct	21.05	29.66	19.01
4-Nov	20.24	28.7	18.19
11-Nov	20.41	29.88	16.97
18-Nov	19.57	28.9	17.16
25-Nov	18.41	28.22	15.61
2-Dec		26.94	16.83
10-Dec	16.11	26.95	15.2
17-Dec	16.13	22.42	14.43
30-Dec		26.77	16.53

10- 14.99 mg/L
 15- 19.99 mg/L
 20-100 mg/L

Location	DD19 (Sac) and DD26 (Buena Vista)	DD32	DD64 (Sac) and DD105 (Buena Vista)
Site Code	SC43	SC47	SC52
28-Mar			
1-Apr			
8-Apr			
15-Apr		9.65	6.8
22-Apr		9.92	4.97
29-Apr		9.16	11.26
6-May		8.81	9.8
13-May	20	22.87	21
20-May		14.28	13.84
28-May		11.8	5.23
2-Jun		14.66	14.71
10-Jun		16.18	15.83
17-Jun		25.32	16.68
24-Jun		28.47	24.26
1-Jul	16.45	17.09	14.65
8-Jul	25.37	26.41	22.29
15-Jul	28.8	24.53	21.44
22-Jul		22.78	18.18
29-Jul	21.92		15.67
5-Aug	18.31	23.05	12.18
12-Aug	24.45	17.34	16.15
19-Aug	17.26	17.31	13.58
26-Aug	17.06	15.3	17.74
4-Sep		19.18	13.25
9-Sep	20.46	20.6	16.36
16-Sep	20.86	20.78	
23-Sep	21.15	20.34	17.51
30-Sep	23.12	20.35	17.45
7-Oct	19.36	19.89	16.71
15-Oct	22.36	19.69	16.76
21-Oct	18.98	19.01	15.99
28-Oct	19.5	29.26	16.23
4-Nov	19.61	19.47	16.05
11-Nov	19.22	19.18	15.17
18-Nov	18.31	19.54	15.46
25-Nov	19.32	19.16	14.79
2-Dec	13.1	19.69	15.41
10-Dec	25.51	19.11	14.7
17-Dec	15.44	16.92	13.71
30-Dec	17.81	19.12	14.97

10- 14.99 mg/L

15- 19.99 mg/L

≥20.00 mg/L

Exhibit B

Site Code	GPS Coordinates			Description	Drainage District
	X	Y	Z		
SC15	893135.556	1263586.317	1198.17	Drainage Ditch at 240th St and Xavier	DD86 & 2 (Sac County) and 51 (Calhoun County)
SC19	906562.633	1258784.715	1198.324	Drainage Ditch - Wadsley Ave 0.4 miles noth of 220th St	DD81, 79, 83 and 19-26
SC20	910136.879	1258846.251	1194.208	Drainage Ditch - Wadsley Ave 200 Feet noth of 210th St	DD42
SC32	916546.524	1248326.313	1224.059	Drainage Ditch - Union Ave 0.2 miles North of 200th St	DD83 and 19-26
SC34	910040.901	1251648.965	1213.174	Tile Discharge - 200th St. 0.9 miles West of Voss	DD 79
SC36	905170.637	1234378.525	1226.749	Drainage Dischage - 220th St. 0.6 miles West of Sierra AVe	DD 65
SC43	931511.711	1237879.239	1242.994	Tile at north end of ditch - Sierra Ave 0.3 miles north of 170 St	DD19 (Sac County) -26 (Buena Vista County)
SC47	931801.684	1227675.179	1249.063	Drainage Discharge - 170th St 400 feet East of Quincy Ave	DD 32
SC 52	931819.201	1223326.249	1244.278	Stream - 170th St 0.8 Miles West of Quincy Ave	DD64 (Sac County) and DD 105 (Buena Vista County)

Exhibit C-1

SC 19, 20, 32, 34, 36, 43, 47

DOUGLAS TWP.

R 35 W

JT DD 199 SAC, BV, & POC

POCAHONTAS CO.

BUENA VISTA CO.

CALHOUN CO.

T 89 N



LEGEND

- RIVER
- NATURAL STREAM/CREEK
- DD TILE
- OPEN DD DITCH
- DD WATER SHED BOUNDARY

222 COUNTY DD NUMBER

JT DD 19 SAC & 26 BV JOINT DD NUMBER (FIRST NUMBER IS SAC DD NUMBER)

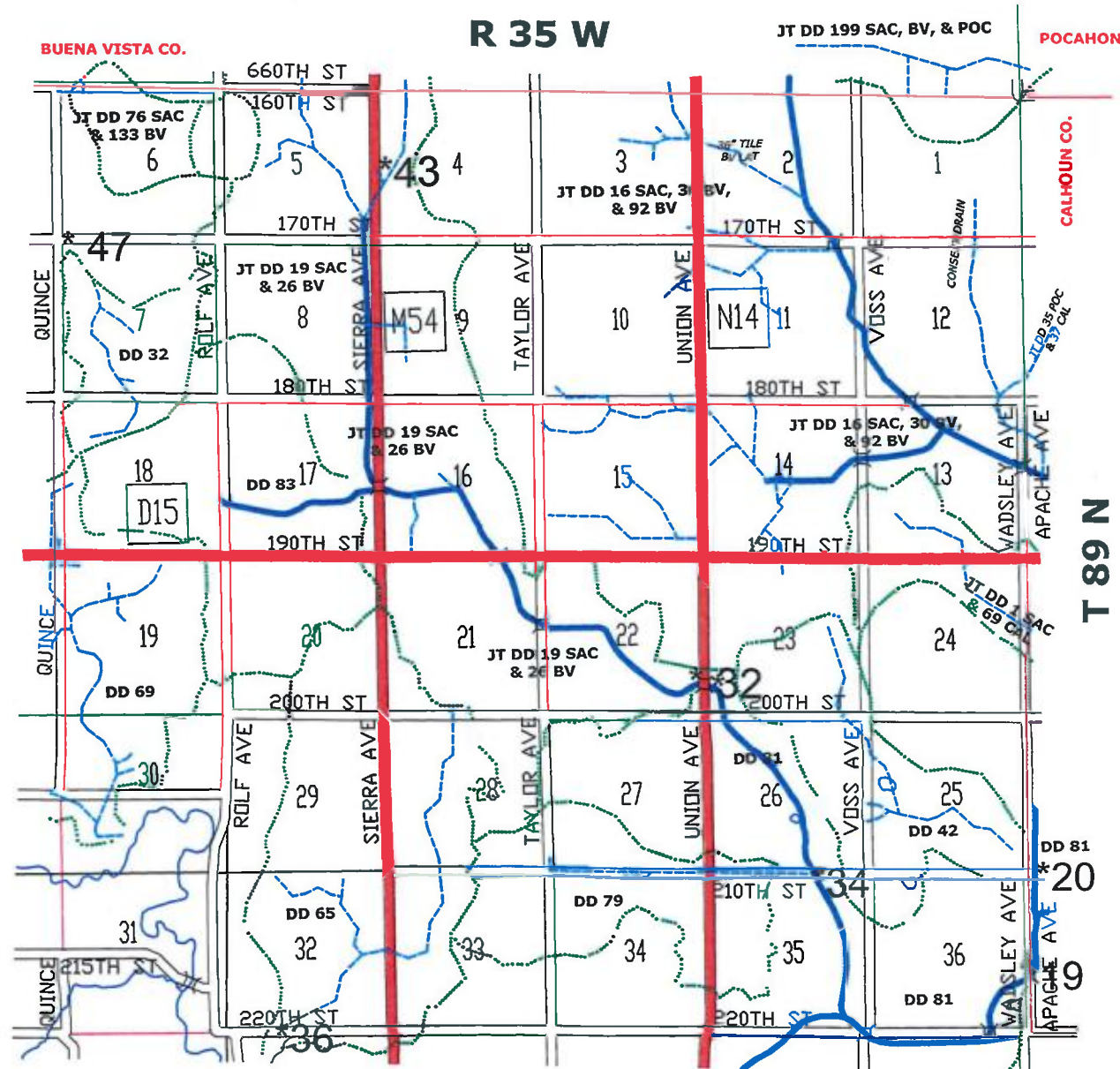
PAVED ROADS

GRAVEL ROAD

BRIDGE

RAILROAD TRACKS

PIPE LINE

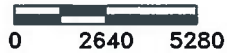


CEDAR TWP.

R 35 W

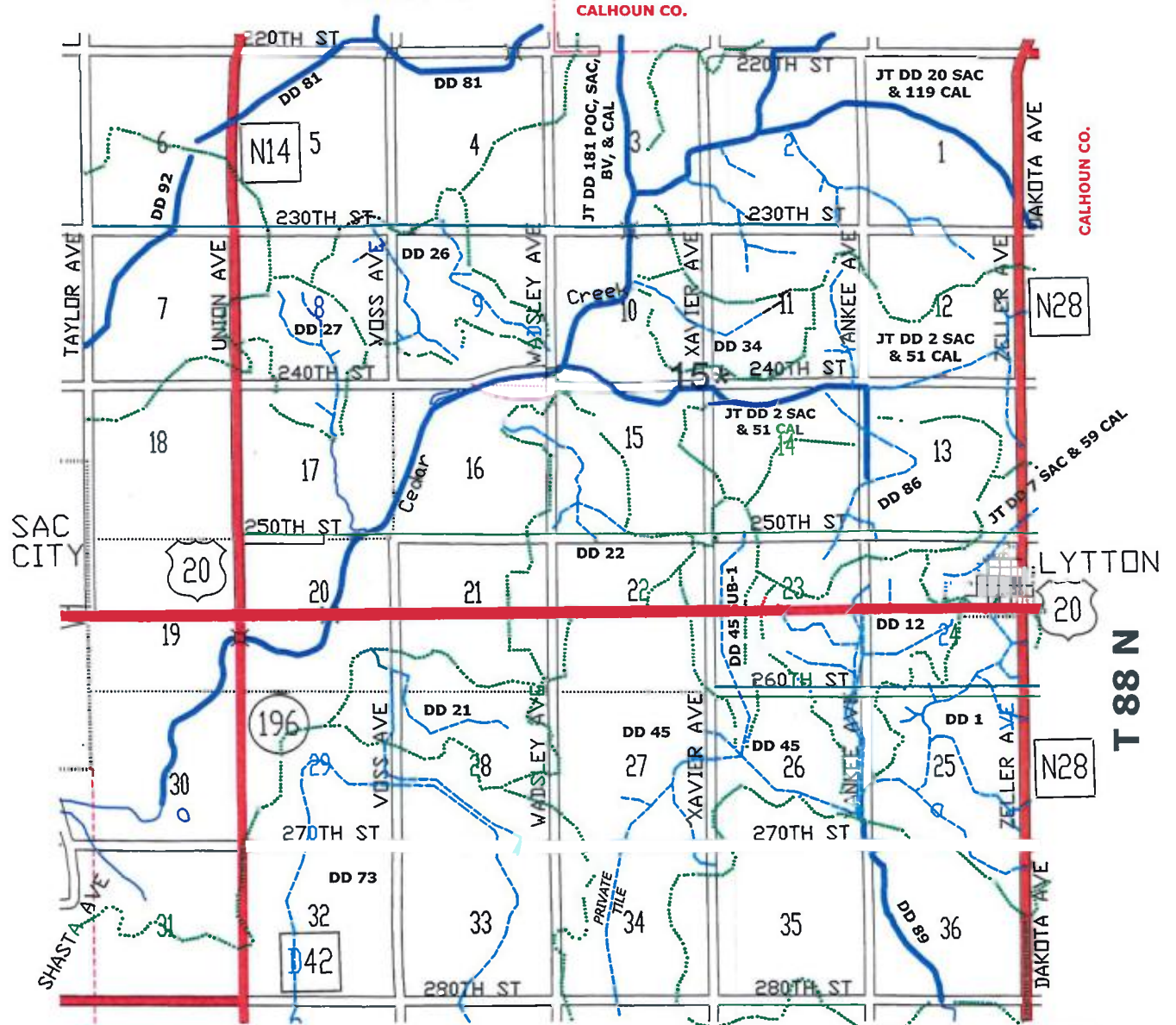
Exhibit C-2

SC 15



LEGEND

- RIVER
- NATURAL STREAM/CREEK
- DD TILE
- OPEN DD DITCH
- DD WATER SHED BOUNDARY
- 222 COUNTY DD NUMBER
- JT DD 19 SAC & 26 BV JOINT DD NUMBER (FIRST NUMBER IS SAC DD NUMBER)
- PAVED ROADS
- GRAVEL ROAD
- BRIDGE
- RAILROAD TRACKS
- PIPE LINE



T 88 N

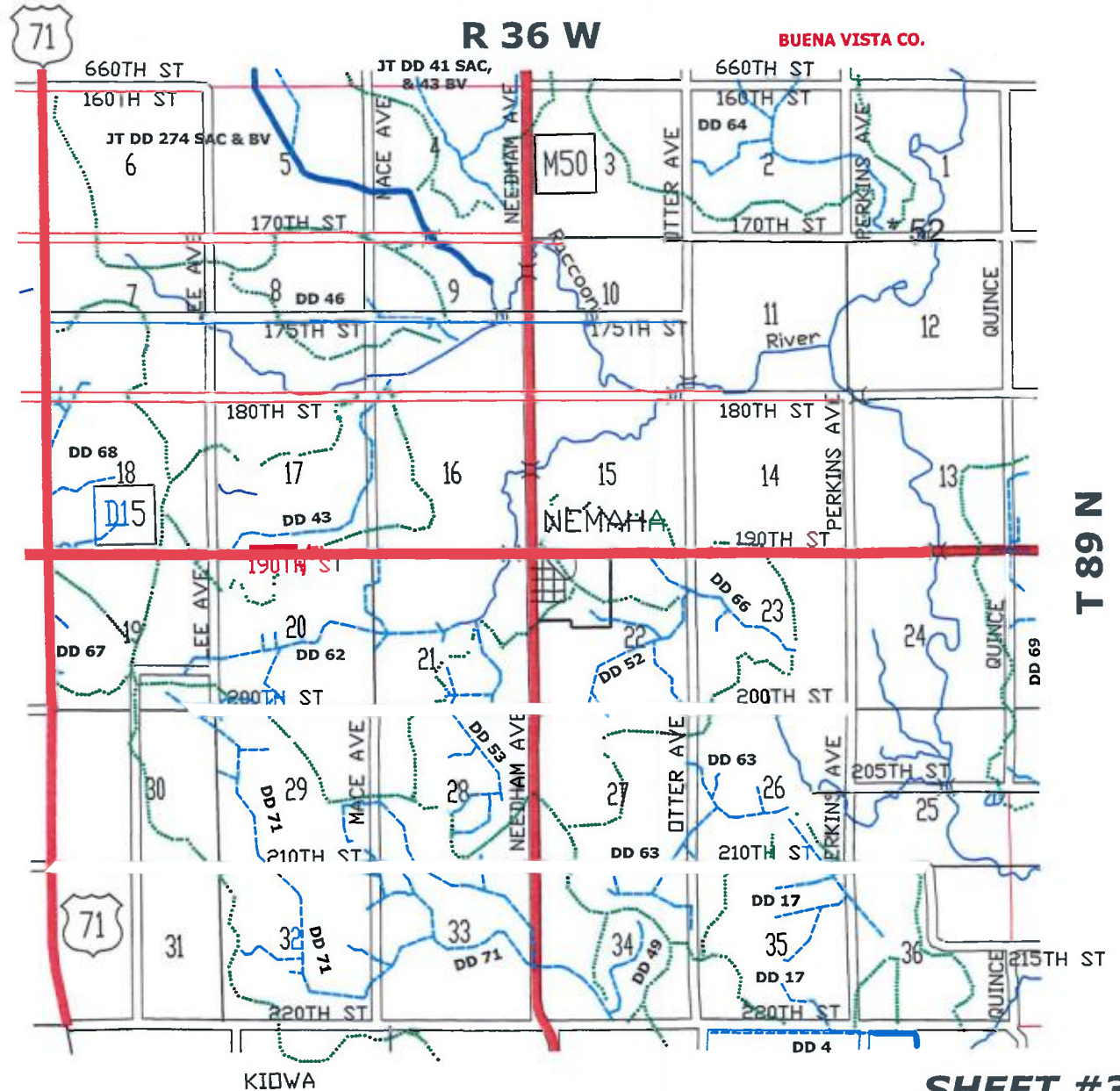
Exhibit C-3
SC 52

DELEWARE TWP.

R 36 W

BUENA VISTA CO.

T 89 N



LEGEND

- RIVER
- NATURAL STREAM/CREEK
- DD TILE
- OPEN DD DITCH
- DD WATER SHED BOUNDARY
- 222** COUNTY DD NUMBER
- JT DD 19 SAC & 26 BV** JOINT DD NUMBER (FIRST NUMBER IS SAC DD NUMBER)
- PAVED ROADS
- GRAVEL ROAD
- BRIDGE
- RAILROAD TRACKS
- PIPE LINE