SAGE CREEK SPRINGS WORKSHOP

AND

TOUR OF THE RAWLINS WATER SUPPLY

RAWLINS GROUNDWATER SUPPLY FIELD VISIT AGENDA

Stop 1. Water Treatment Plant

The treatment plant was commissioned in 1979 and treats about a million gallons a day. The treatment plant typically draws water directly from the Sage Creek Basin Springs Pipeline and adds water from Peaking Reservoir when the pipeline cannot meet instantaneous demand. Water from Atlantic Rim Reservoir may also be diverted into the pipeline, if necessary, to meet demand. The system is designed to make maximum use of the Springs, which have the highest quality water. Atlantic Rim Reservoir is primarily filled with spring water, at times when it is not immediately needed. Additional water comes from the Nugget wellfield (flowing wells) and the North Platte River (pumped up from Ft. Steele) to augment the Spring-water supply when necessary.

The Spring's water quality is so good that a Diatomacious Earth (DE) filter and chlorine gas disinfection is sufficient treatment to meet current EPA standards. When reservoir or Platte River water is introduced, turbidity levels are such that pretreatment is necessary.

The pre-treatment process consists of powdered activated carbon (PAC) and an ACTIFLO system. Treatment downstream of the pre-treatment system employs diatomaceous earth (DE) filters and a chlorine gas disinfection system. The pre-treatment removes T/O with PAC. The ACTIFLO system was constructed to remove high levels of turbidity and TOC prior to DE filtration. DE filtration operates very well with low turbidity water (less than 5 NTU).

Stop 2. Pipeline

Stretching from the Springs, 32 miles south of the City, to the water treatment plant. The pipeline gravity flows nearly a billion gallons of high quality water to the City every year. Originally a wood stave pipe. The wood stave was replaced with a steel pipe in the 90's.

Stop 3. Miller Hill Vault

The Miller Hill vault sits at the junction of the Nugget Wells pipeline and the Sage Creek Springs pipeline. Up until last year, the wells flowed into the pipeline under their own pressure, but it takes 80 psi to push water into the pipeline at this point. To increase the yield of the wells, two 50hp pumps were added to boost the well water into the Springs' pipeline. With the booster pumps off, the wells contribute 750 gpm to the Springs' pipeline flow. With the pumps on, the well flows increase to 1250 gpm. (There are no pumps in the wells themselves.)

Stop 4. Nugget Wellfield

There are three wells into the Nugget Sandstone, between 1625 and 1743 feet deep. Although the aquifer is fine-grained and only 100 ft. thick, fracturing has greatly increased its permeability. With a natural pressure of 120-140 psi at the wellhead, the wells provide an abundant, free-flowing groundwater resource. The well water is more mineralized than the spring water, however, so the springs remain the source of choice.The Nugget Sandstone dips down to the east at this point. Its pressure is contained by the overlying shale formations. Water gets into the Nugget where it is close to the surface, beneath the deposits on top of Miller Hill to the southwest. You can see the layer of Browns Park Formation forming a cap on Miller Hill from this point.

Stop 5. Cloverly Well

The Rawlins-Cloverly Well is approximately 1 mile southwest of the Nugget wellfield, along the alignment of the original Sage Creek Springs pipeline, to which it contributed flow. The well is not connected to the new Springs' pipeline but could be used to provide construction water to local projects. There are remnants of the old wood stave pipeline in the Cloverly Well area.

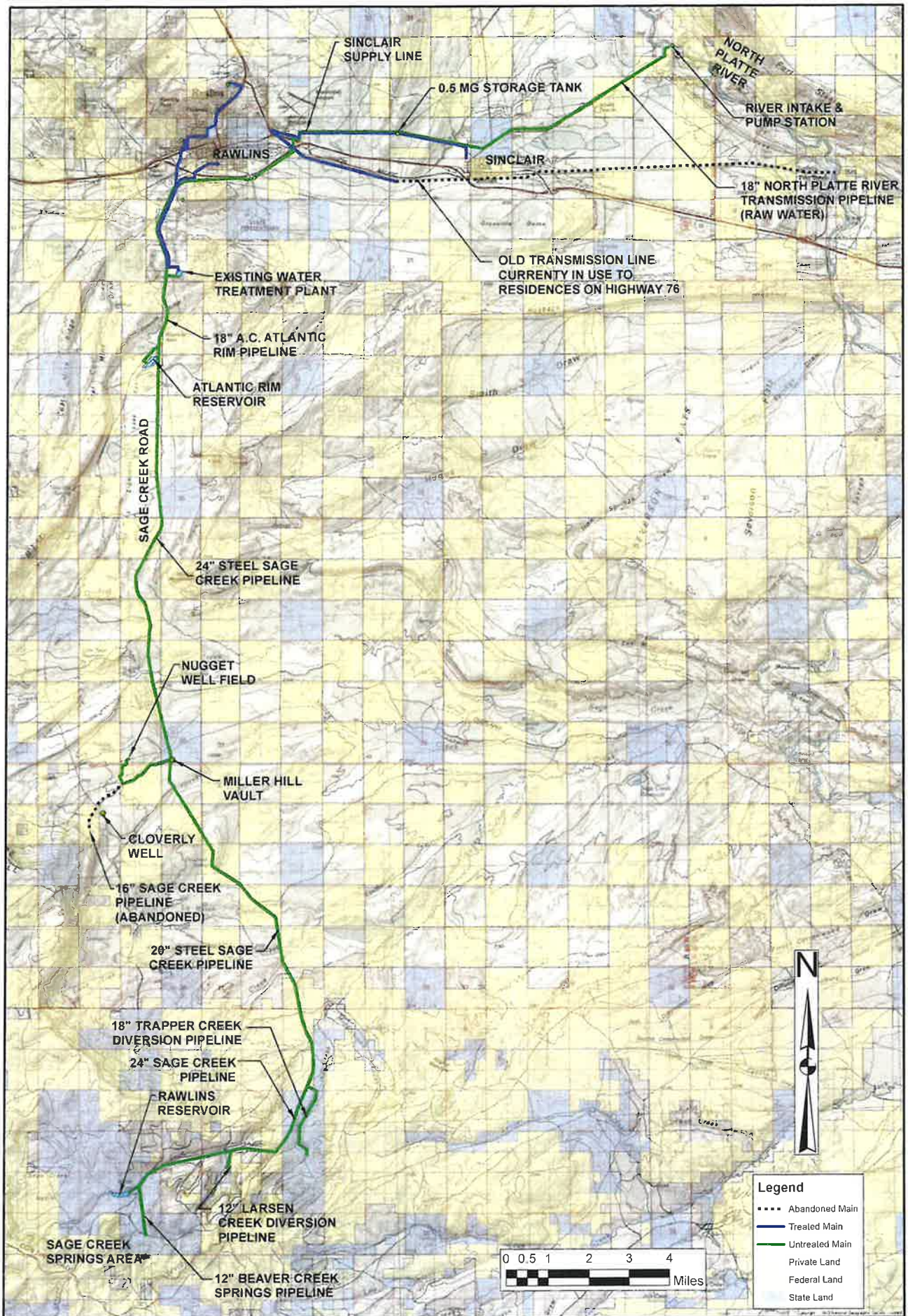
Testing of the well in 1984 found a shut-in pressure of 126 psi. The well flows 75-100 gpm to the surface. It was taken out of the municipal water-supply system around 40 years ago due to its small contribution, deteriorating condition, and wellhead water-quality issues. At this point, the well mainly serves to represent the potential of the Cloverly Formation at this location.

Stop 6. Upper Sage Creek Basin Springs

1. Sage Creek Basin SnoTel - Tucked into a small drainage, The Sage Creek Basin SnoTel, has been reporting since October of 2001. Data from this site is used in water management decisions for the City water system and can be accessed on the web at: http://www.wcc.nrcs.usda.gov/nwcc/site?sitenum=1015.
2. City of Rawlins Spring #7 - The concrete spring box was constructed over the original spring sometime in the fifties. The collection system to the east springs is still the original wood stave pipeline.
3. Previously damaged Springs' collection line. Repaired by the Public Works Department in the spring of 2015. The wooden stave pipeline required excavation and addition of stainless clamps. The repair improved the water delivery by approximately 200 gpm.
4. Private Corrals – Owned by the Overland Trail Ranch. The ranch has run as many as 2500 head of cattle in the Basin. The cattle congregate around the springs and could be negatively impacting the pipeline and springs function.
5. Snow Fence – Built in the 90's when the west collection system was upgraded from wood stave to plastic pipe. The snow fence collects winter snow and improves spring water production.
6. High View – This is where your water comes from. While a remote place it's still vulnerable to mineral and energy development, poorly managed livestock grazing, aging collection system and neglect.

NOTES:

QUESTIONS:



JOB NO. 15053.00	DRAWN BY: BM	DATE: 01-19-15	PMPC CIVIL ENGINEERS	118 E. Bridge PO Box 370 Saratoga, WY 82331 P 307-326-8301 F 307-326-8301	RAWLINS WATER SUPPLY PIPELINES
FILE NAME 15 0115 OVERALL MAP.MXD	CHECKED BY: KS	DATE: 01-19-15			CITY OF RAWLINS ENGINEER
SCALE N.T.S.	APPROVED BY	DATE			CITY OF RAWLINS, WYOMING

FIGURE 1

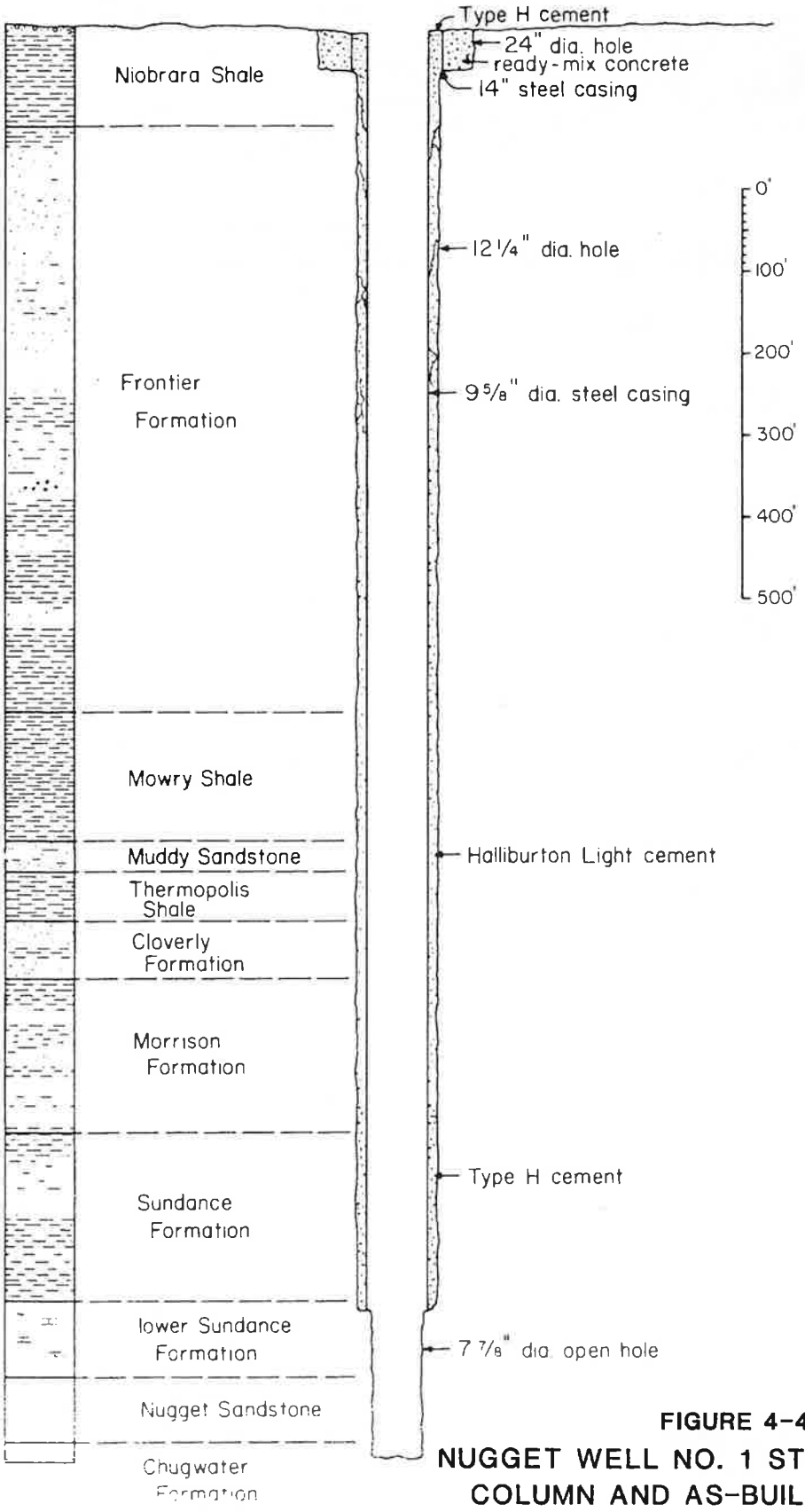
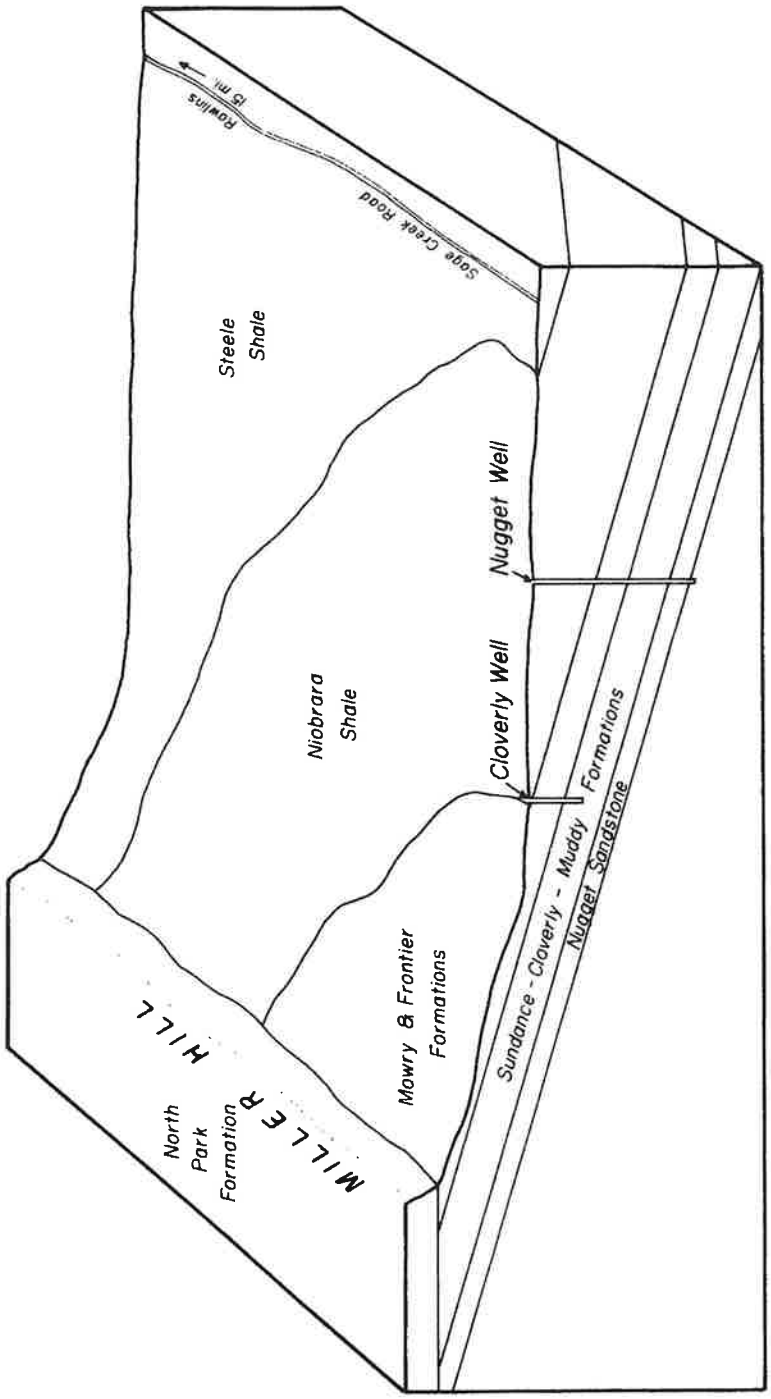


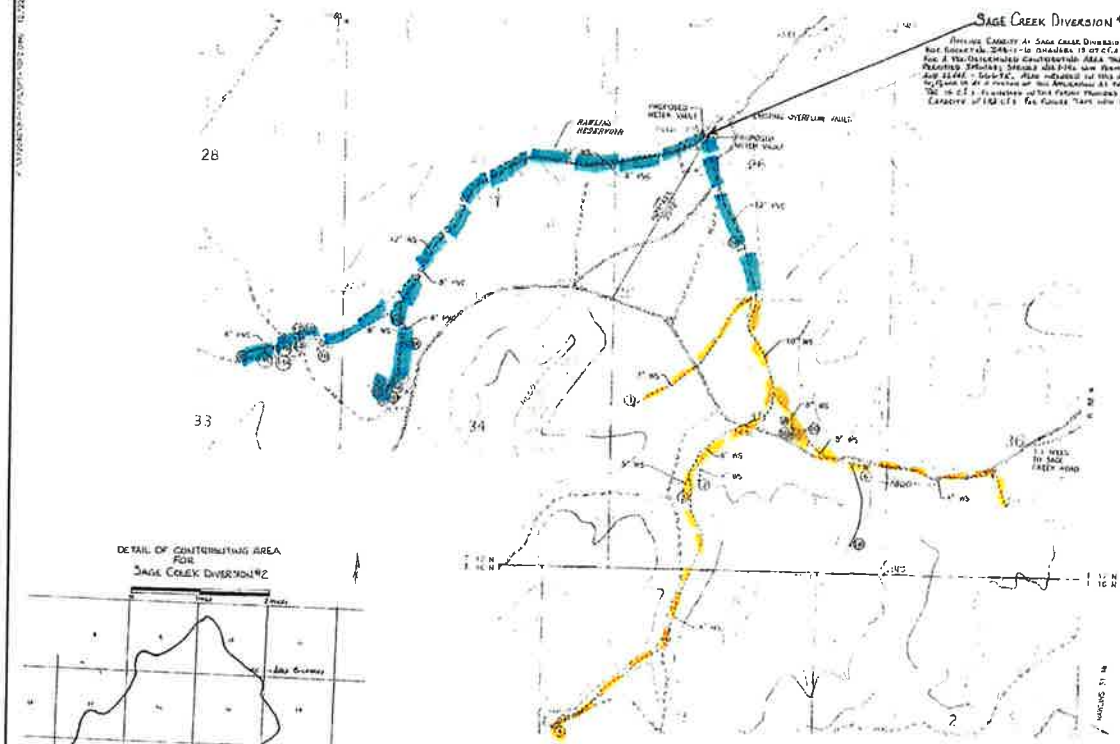
FIGURE 4-4

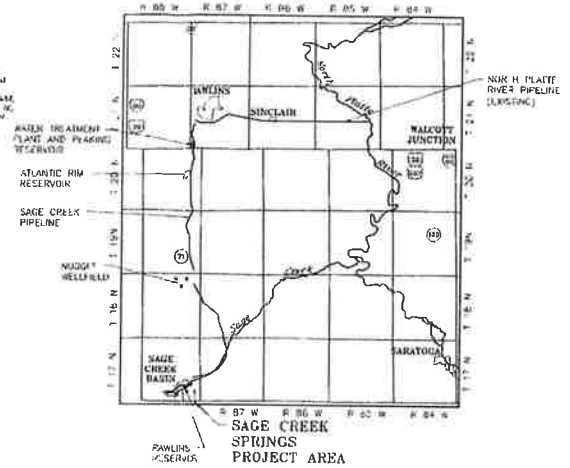
NUGGET WELL NO. 1 STRATIGRAPHIC COLUMN AND AS-BUILT DIAGRAM



Schematic Diagram of Miller Hill Study Area

Figure 2





DETAIL OF CONTRIBUTING AREA FOR SAGE CREEK DIVERSION #2

EXPLANATION

- IMPROVED ROAD
- UNIMPROVED ROAD
- ORIGINAL WOOD STAVE PIPE
- RECENT IMPROVEMENTS
- PROPOSED IMPROVEMENTS
- (3) SPRING NUMBER

BASE MAP WAS DIGITIZED FROM 1924 MAP ACCOMPANYING APPLICATION FOR WATER SUPPLY PIPE LINE FOR THE CITY OF RAWLINS. DRAWN BY WEKAND ENGINEERING CO

NOTE: PROFILES OF LAWSON CREEK SYPHON AND TRAPPER CREEK PIPELINE ARE SHOWN ON SHEET 2 OF 2. HYDRAULICS CONSIDERATIONS FOR EACH ARE SHOWN BELOW.

LAWSON CREEK PIPELINE	TRAPPER CREEK PIPELINE
ELEVATION #1 = 7,580 FT	ELEVATION #1 = 7,580 FT
ELEVATION #2 = 7,520 FT	ELEVATION #2 = 7,440 FT (HGL CONTROLLED BY RAWLINS PIPELINE)
DIAMETER = 12" IN	DIAMETER = 18 IN
LENGTH = 3,000 FT	LENGTH = 10,500 FT
HAZEN-WILLIAMS C = 130	HAZEN-WILLIAMS C = 120
Q = 8.8 CFS	Q = 8.8 CFS
V = 8.5 FPS	V = 3.1 FPS

HYDRAULICS COMPUTED BY UNSTEADY FLOW MODULE, VERSION 3.21 ©1990 HAESTAD METHODS INC., 37 BRANSIDE RD. WATERBURY, CT 06708

ORIGINAL WOOD STAVE PIPE
PVC PIPE CIRCA '97-'99

PROFILE OF RAWLINS PIPELINE IS ON RECORD IN STATE ENGINEER'S OFFICE UNDER PERMIT NO. 23074.

STATEMENT OF ENGINEER

I, PAUL A. REDMOND, P.E. & L.S. OF LARAMIE, WYOMING HEREBY STATE THAT THIS MAP WAS DIGITIZED FROM 1924 MAP ACCOMPANYING APPLICATION FOR WATER SUPPLY PIPE LINE FOR THE CITY OF RAWLINS, ON FILE IN STATE ENGINEER'S OFFICE. DRAWN BY WEKAND ENGINEERING CO

12-23-97
DATE

PAUL A. REDMOND, PE & LS

Approved September 7, 1998
Gordon W. Fassett
GORDON W. FASSETT, STATE ENGINEER

1000 FT
SCALE

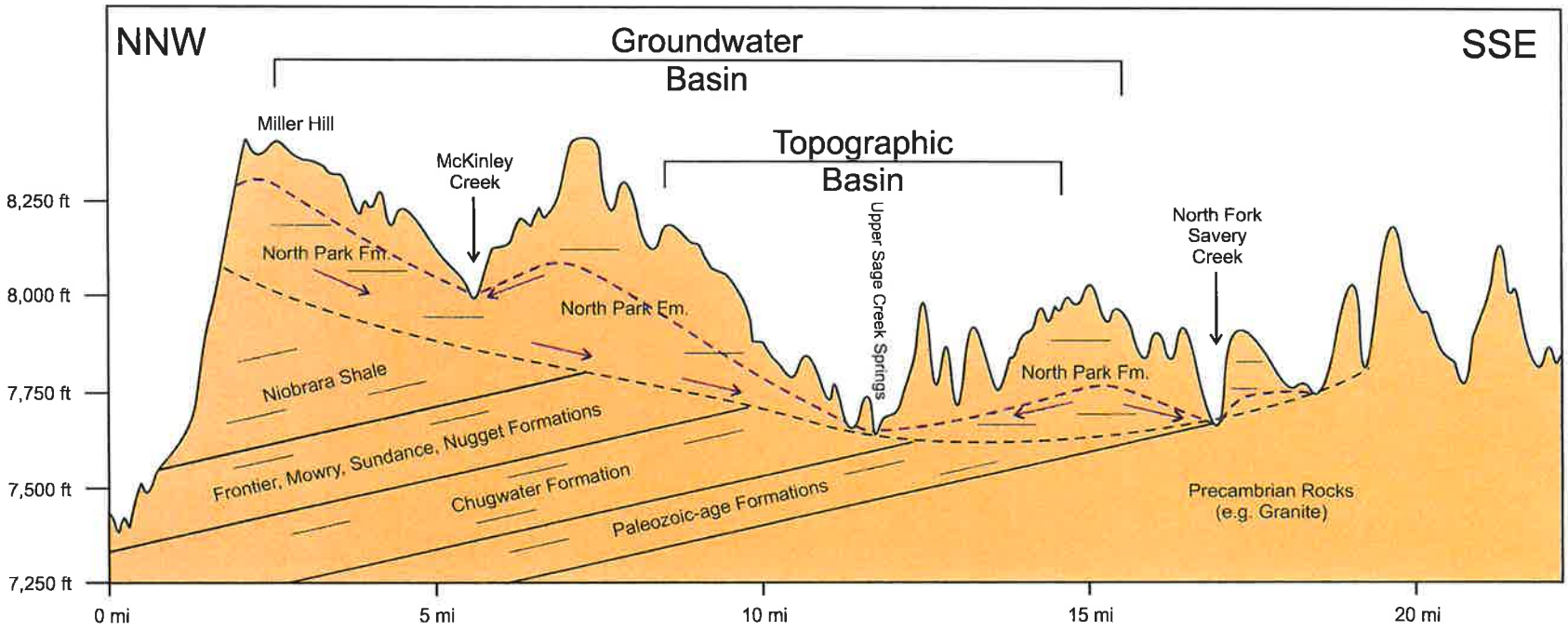
MAP TO ACCOMPANY

APPLICATION FOR PERMIT TO APPROPRIATE WATER FROM SAGE CREEK THROUGH THE RAWLINS PIPELINE.

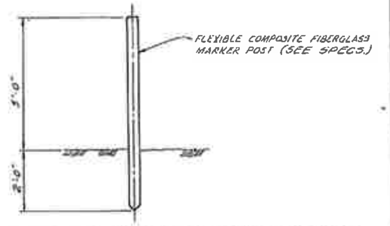
APPLICANT
CITY OF RAWLINS
P.O. BOX 953
RAWLINS, WYOMING 82301

DRAWN BY:	CHECKED BY:	DATE: 12/23/97	SHEET NO: 1 OF 2
SDG	PAR		

TF 292-4/257 File: A-3 DEC 01 1998 31977-31979



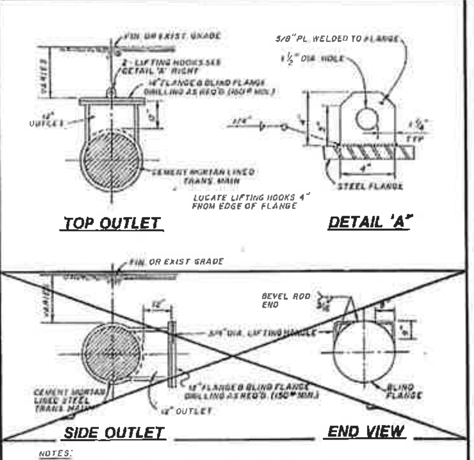
Topographic and Geologic Cross-section
through Rawlins Springs in Upper Sage Creek Basin



NOTE:
MARKER POSTS SHALL BE INSTALLED FOR GENERAL TRANSMISSION PIPELINE LOCATION AT 1000 FT. INTERVALS AND AT VAULTS, ELECTRICAL TEST STATIONS, ACCESS OPENINGS, BURIED VALVES, BLOWOFFS, AND A.V.A.R. VALVES. MARKERS WILL NOT BE REQ'D IN WELL FIELD AREA, EXCEPT AS VAULT & WELL LOCATORS. MARKERS SHALL BE CARSONITE UTILITY I.D. POSTS OR EQUAL & SHALL BE YELLOW WITH REFLECTIVE BLUE LETTERING WITH IDENTIFIERS AS FOLLOWS:

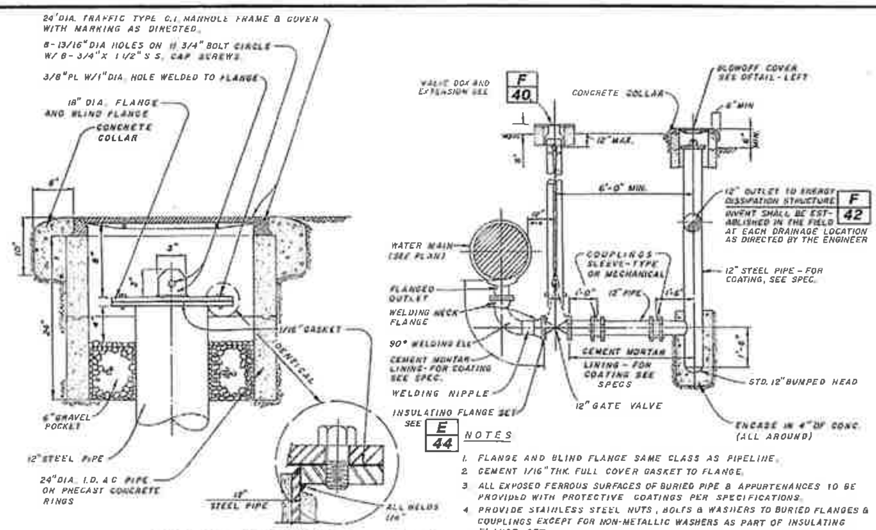
LOCATION	LETTERING
GENERAL PIPELINE LOCATORS AT 1000 FT. INTERVALS	WATER PIPELINE
ELECTRICAL TEST STATIONS	ETS
VAULT LOCATORS	VAULT
EXISTING WELLS	WELL Nº. ?
ACCESS OPENINGS	PIPELINE ACCESS
BLOWOFFS	BLOWOFF
A.V.A.R. VALVES	AVAR
ISOLATION VALVES	VALVE

MARKER POST DETAIL A / VAR



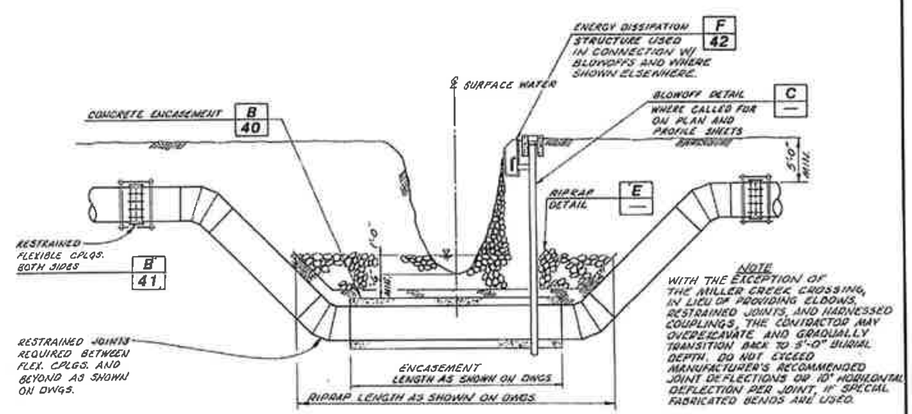
NOTES:
1. ALL FERROUS SURFACES OF BURIED PIPE AND APPURTENANCES TO BE PROVIDED WITH PROTECTIVE COATINGS PER SPECIFICATIONS.
2. PROVIDE STAINLESS STEEL NUTS, BOLTS AND WASHERS.

TYPICAL BURIED 12" ACCESS MANHOLE B / VAR



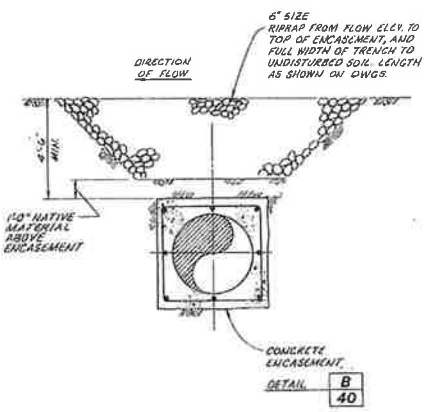
NOTES
1. FLANGE AND BLIND FLANGE SAME CLASS AS PIPELINE.
2. CEMENT 1/16" THK. FULL COVER GASKET TO FLANGE.
3. ALL EXPOSED FERROUS SURFACES OF BURIED PIPE & APPURTENANCES TO BE PROVIDED WITH PROTECTIVE COATINGS PER SPECIFICATIONS.
4. PROVIDE STAINLESS STEEL NUTS, BOLTS & WASHERS TO BURIED FLANGES & COUPLINGS EXCEPT FOR NON-METALLIC WASHERS AS PART OF INSULATING FLANGE SET.
5. DISCHARGE PIPING AND VALVE SHALL BE 8" AT MILLER CREEK CROSSING.

BLOWOFF DETAILS C / VAR

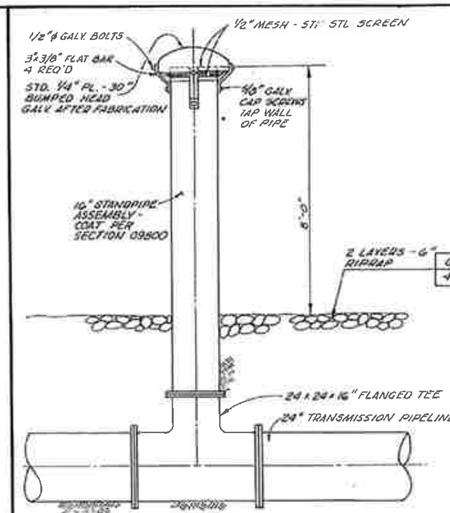


UNDERGROUND CROSSING OF SURFACE WATER COURSE D / VAR

WARNING
THIS DRAWING APPROXIMATELY ONE-HALF ORIGINAL SCALE



RIPRAP DETAIL E / VAR



STANDPIPE DETAIL F / 5
(STATION 33+80)

REV	DATE	BY	DESCRIPTION

SCALE: NONE

DESIGNED JMM
DRAWN JMM
CHECKED G. Anderson

SUBMITTED [signature] PROJECT ENGINEER R.C.E. NO. 1/9/87 DATE
RECOMMENDED [signature] JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC. 4066 R.C.E. NO. 1/10/87 DATE

JAMES M. MONTGOMERY
CONSULTING ENGINEERS, INC.

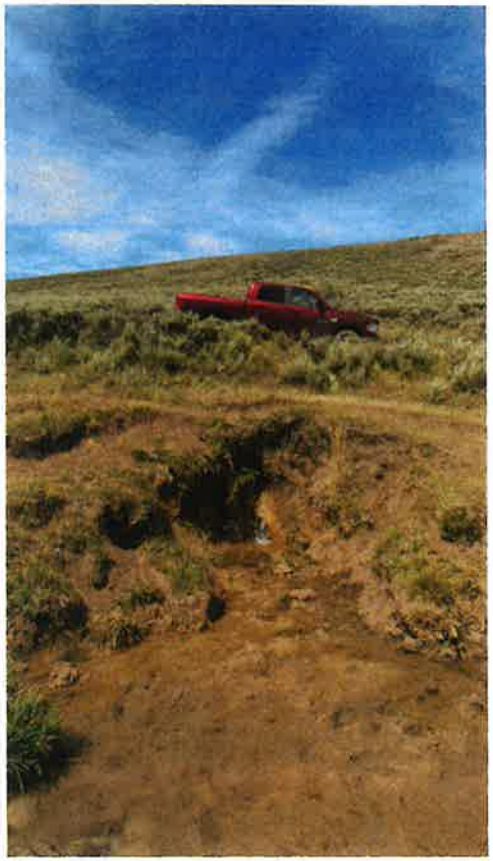
APPROVED [signature] 1-12-87 DATE
APPROVED DATE

CITY OF RAWLINS, WYOMING
SAGE CREEK TRANSMISSION PIPELINE AND WELLFIELD FACILITIES
PIPELINE AND MECHANICAL DETAILS

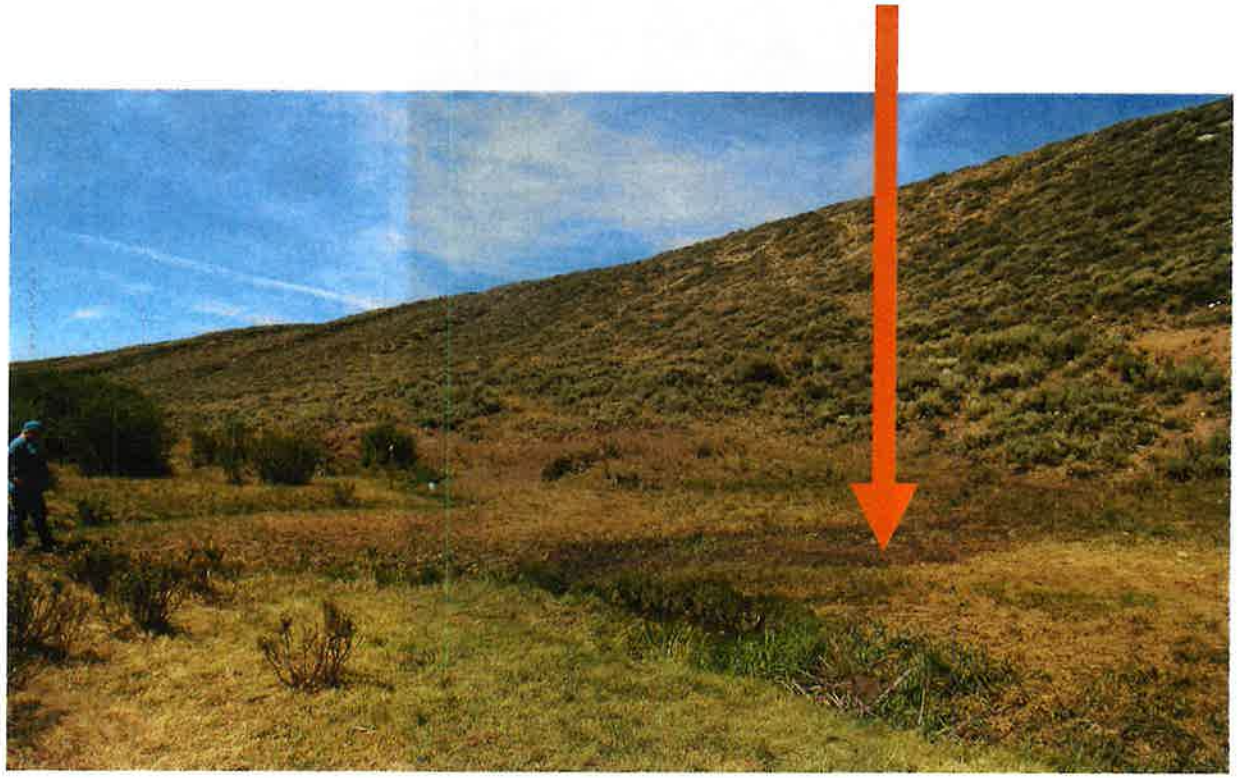
SHEET 43 OF 49 SHEETS


SAGE CREEK GAUGE
SAGE CREEK BASIN SPRINGS REHABILITATION, PHASE I
SPRINGS OVERVIEW MAP
CARBON COUNTY, WYOMING
CITY OF RAWLINS
WWC ENGINEERING
DRAFT

8/11/21
Leak No. 1 on Sage Creek Wood Stave Collection.
Segment No. 200



8/11/21
Leak No. 2 on Sage Creek Wood Stave Collection. Segment No. 200



8/11/21
Leak No. 2 on Sage Creek Wood Stave Collection. Segment No. 200

8/11/21
Sage Creek
Staff

8/11/21
Air Vac on
Segment 200

8/11/21
Rawlins Reservoir view from Dam to West and Damaged Outlet Tower

8/11/21
Rawlins
Reservoir view
from Dam to
West

8/11/21
East side of Rawlins Reservoir outlet pipes.

8/11/21
Marker on East side of Rawlins Reservoir Embankment. May be Sage Creek line to junction.
View East

8/11/21
Marker on East side of Rawlins Reservoir Embankment. May be Sage Creek line to junction.
View West

8/11/21
Sage and Beaver Creek junction box. View East

8/11/21
Sage and Beaver Creek junction box. View West

8/11/21
Junction box
Sage Creek right side Beaver Creek left side.
Total Flow
1.435MGD

VIDEO

8/11/21
Leak?
Below junction box Sage & Beaver Creeks.
Pipe is vault spillway.
View SW

8/11/21
Lone Tree Creek Blowoff Valve
Illegible valve number.

VIDEO

8/11/21
Lone Tree Creek Blowoff Valve

8/11/21
Unnamed
Creek Blowoff
Valve
Damaged but
not leaking
blow off valve
No. 18

8/11/21
Unnamed
Creek

8/11/21
Unnamed
Creek

8/11/21
Miller Creek Crossing
Blowoff on wellfield line.
Moving water in valve
box indicating leakage.

VIDEO

8/11/21
Miller Hill Well
No. 2
View West

8/11/21
Miller Hill Well No. 2

8/11/21
Miller Hill Well No. 2

Typical floor sump at all wells.

Miller Hill Well No. 2

8/11/21
Miller Hill Well
No. 3
View West
Note Sinkhole

8/11/21
Miller Hill
Well No. 3

8/11/21
Miller Hill Well No. 3
Very little flow, but on.

8/11/21
Miller Hill Well No. 1
Well Head Piping

8/11/21
Miller Hill Well No. 1
Erratic movements on Water Meter

VIDEO

8/11/21
Miller Creek
Crossing on West
Side of Hwy 71
Leaking Blowoff

8/11/21
Miller Creek Crossing on West Side of Hwy 71
Leaking Blowoff

8/11/21
Miller Creek Crossing on West Side of Hwy 71
Leaking Blowoff

VIDEO

8/11/21
Miller Creek Crossing on West Side of Hwy 71
Leaking Blowoff

Little Sage Creek leaking blowoff

Little Sage Creek leaking blowoff

8/11/21
Broken valve box and concrete fragments at creek crossing

8/11/21
Broken valve box and concrete fragments at creek crossing

View East

View West

8/11/21
Broken valve box and concrete fragments at creek crossing

TEAM
FRAM
FRAM

FRENCH PLAZA