Natural Soda Inc.'s Proposed Plant Expansion

Natural Soda Inc. (NSI) is proposing to construct an additional processing facility and associated infrastructure adjacent to their existing processing facility (Figure 1) that would increase the current plant design capacity from 250,000 tons per year (tpy) to 500,000 tpy of sodium bicarbonate. The new facilities would be designed conceptually to be similar to existing facilities. Solution mining operations of the well field would continue in a similar manner as in the present with an increase in the number of producing wells required to maintain a reliable feed source for the expanded facility.

Processing Facilities

The Proposed Action would increase the long term disturbance associated with the footprint of the processing facility from 27 acres to 44 acres. This additional area of disturbance would include warehouse and packaging, truck load out, tank farm, and could include an additional waste water pond (Figure 2). The new processing building, screening silo, boilers, and cooling towers would be located within the existing foot print if feasible. If construction and design constraints do not allow for this, the new processing building would be constructed in the proposed warehouse and packaging area. Associated facilities and estimated disturbance are listed Table 1. Lay down areas for equipment and construction supplies would be in existing and proposed facility disturbance areas.

Table 1. Disturbance Associated with Expansion of the Processing Facility

Facility	Existing Long Term Disturbance[1] (acres)	Total New Disturbance[2] (acres)	Short Term Disturbance[3] (acres)	Long Term Disturbance' (acres)
Current Facilities[4] and Proposed Processing Building Screening and Silos Boilers and Cooling Towers	27	0	0	27
Warehouse and Packaging Load out area, Tank Farm, Waste Water Pond, Parking Lot	0	20	3	17
Total	27	20	3	44

[1] Long term disturbance refers to acreage that will not be reclaimed until the end of mining operations (greater than 20 years).
[2]New disturbance is the sum of the short term and long term disturbance.
[3]Short term disturbance refers to acreage temporarily disturbed for construction; these areas should be reclaimed within 2 to 5 years.
[4] From Table 7

Well Field Development and Disturbance

Increased production from 250,000 tpy to 500,000 tpy would require drilling an additional two production well pairs in the years 2015 and one additional production well pair the following years. Typical disturbance per production well pair would be approximately two acres. The average life of each production well pair would be approximately seven years. In addition to the production well pairs, an average of one exploration/monitoring hole could be drilled each year. Disturbance of each exploration/monitoring hole would be 0.75 acre. Annual average total disturbance associated with access for drilling activities is anticipated at 0.25 acres (assumed access road average width of 20 ft). Access would be designed and constructed to meet the intended use. Interim reclamation of production well pads and monitoring wells would reduce the disturbed area to approximately 1.25 acres and 0.25 acres, respectively. At the end of the well pair life the wells would be plugged and abandoned and the well pad reclaimed. Production pipelines from the wells to the processing facilities would be overland insulated surface pipelines supported above the ground on wooden blocks, used pipe, stanchions, or a combination of all three. Installation of the pipeline and pipeline support would involve little to no surface disturbance and would follow or branch off of existing corridors. Table 2 summarizes 20 years of the estimated increase in well field disturbance required for the proposed expansion from 250,000 to 500,000 tpy. Total well field disturbance for the 500,000 tpy proposal would be the sum of Tables 2 and 6 and is summarized in Table 3. All wells would be located within the well field area identified in Figure 1; the BLM would conduct site-specific NEPA reviews as well locations are identified via Mine Plan modifications.

The sodium bicarbonate reserves within NSI's existing leases would allow for the recovery of sodium bicarbonate well beyond 20 years. With changes in market conditions, operating and mining technologies it is anticipated additional modification to the Mine Plan would occur prior to the end of the 20 years. Future Mine Plan modifications would require additional NEPA review.

Table 2. Estimated 20 Year Well Field Disturbances Required to Support Increased Production From 250,000 tpy to 500,000 tpy

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026 to 2034	Total
Annual New Production Well Pairs	2	1	1	1	1	1	1	1	1	1	1	9	21
Annual New Exploration/ Monitoring Wells[1]	1	1	1	1	1	1	1	1	1	1	1	9	20
Estimated Annual Disturbance (acres)[2]	5	3	3	3	3	3	3	3	3	3	3	27 (3 acres annually)	62
Estimated Annual Long Term Disturbance[3]	3	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	(1.75 acres annually)	-
Cumulative Total Well Field Disturbance[4]	3	4.75	6.5	8.25	10	11.75	13.5	12.75	13.25	13.75	14.25	18.75[5]	18.75[5]

[1] Includes disturbances associated with access for all wells production and exploration/monitoring.
[2] Total disturbance for well construction, assumed well disturbance for each type of well.
[3] Remaining un-reclaimed disturbances after interim reclamation. Assumes all exploration/monitoring and access are retained as monitoring. Production well pads would be reclaimed at end of 7 year average well life.
[4]Year 2022 and forward reflects plugged and reclaimed production well pads (7 year well life). Assumes monitoring wells remain until end of project or need for well (20 years plus).
[5] Un- reclaimed well field pad disturbance at year 2034.

The length of the drilling radii for horizontal well bores could require location of the well pad in the well field area (Figure 1) located off of NSI's existing leases. This would allow for the maximum recovery of the sodium resources from the leases. All off lease well pads and access would require a reality authorization. Development of the horizontal production well pads would likely be adjacent to each other.

Project Disturbance

Total surface disturbance of project since commencement of operation in 1990 is approximately 135 acres. Approximately 64 acres of these 135 acres are considered long term disturbances. Table 3 contains the estimated disturbances from the project's start in 1990 through 2034 for the 500,000 tpy production rate.

Table 3. Estimated Acres of Disturbances Through 2034 for 500,000 tpy

Location	Long Term Disturbance (acres)	Short Term Disturbance (Acres)	Un-Reclaimed Acres 2034
Proposed Facilities	17	3	17
Current Facilities[1]	27	0	27
Existing Access (RBC 31)'	30	0	30
Current Well Field and Exploration/Monitoring Wells	7[1]	66	7
250,000 tpy Well Field[3]	5[2]	62	18.75[3]
250,000 to 500,000 tpy Well Field[4]	5[2]	62	18.75[4]
Total	81	193	118.5

[1] From Table 7
[2] Monitoring wells and access to monitoring wells
[3] From Table 6
[4] From Table 2

Mining Methods

Current NSI mining methods would continue to be utilized. This consists of a production well pair of horizontal injection and recovery wells. The targeted mining interval is within the saline zone of the Parachute Creek Member of Green River Formation at a depth of greater than1,900 feet below the ground surface. Various methods of mining have been also employed to recover the sodium resource, including directionally drilled vertical, slant, and horizontal production wells. In addition, currently unknown mining methods and technological advances may be identified and employed in the future. A modification to the Mine Plan and NEPA review would be required prior the implementation of mining methods and technologies not included in the approved Mine Plan.

Directionally drilled horizontal wells could be either injection or recovery wells and could vary in horizontal length from 800 feet to 2,500 feet. Upon well completion, solution mining begins and the mining area is developed. Various types of well pair configurations have been used to

develop cavities as follows: one method uses two horizontal wells, which are interconnected at a strategic point; another method utilizes one long horizontal well and a single or multiple vertical well(s) that intersects the horizontal well. A third, less preferred, method utilizes horizontal wells which are connected into existing horizontal wells at various angles. The proposed plan does not cover every type of configuration available, but tries to indicate the wide range of diversification required to meet production.

Vertical production could be located at strategic points along cavities formed by using the directionally drilled horizontal wells. To ensure the cavities are developed symmetrically, these wells could be orientated and located based on the dip, thickness, and purity of the Boies Bed. These wells may be alternated from injection to recovery and back to control cavity growths and shape. Additionally, vertical wells may be mined as an independent interval, providing an alternative to horizontal borehole mining. The vertical wells provide a larger directional-drilling target that can act to create a sump for settling insoluble material which aids in the recovery of more saturated solutions. Well construction would be similar to vertical wells used for horizontal borehole mining but with an additional string of casing. This mining method also offers research and development opportunities and may improve the efficiency and predictability of horizontal mining.

Any of the above mining methods may be used with controlled leaching techniques. For example, undercutting is a common solution mining practice, in which an inert fluid cap is placed near the top of the mining interval to improve the vertical to horizontal leach rate. Cap material is commonly propane, methane, air, nitrogen, or other inert gas. High-pressure jets can also improve cavity shape by cutting vertical or horizontal slots in the targeted zone prior to mining. Low pressure jetting during the mining phase can also be used to improve the cavity shape. Improved cavity shape enhances subsidence control and resource recovery. Mining control with respect to current preferred technology (dual horizontal wells) is accomplished with retreat mining by establishing multiple injection points through plugging and perforating the injection casing.

Fluid flow through the cavities may be accomplished through injection pressure where no significant leakage is anticipated or detected. In areas prone to communication, submersible pumps will be used, as applicable, to lift the pregnant solution and avoid pressurizing the formation below the Dissolution Surface Aquifer. Mining is anticipated to continue until the cavities are exhausted. Excessive halite or temperature drop are the primary indicators of cavity exhaustion. New solution mining technologies may be employed as needed to improve efficiencies, maximize recovery, maintain cavity control and stability, and overcome adverse geological conditions.

Future mining methods may employ these solution mining methods in various combinations. As with any long range mine plan, modifications may be necessary as mining methods are changed as new technologies are developed and implemented. All modifications would be reviewed and approved by the required Federal, State, and local agencies (e.g., BLM, Environmental Protection Agency, Colorado Department of Public Health and Environment (CDPHE), Colorado Division of Reclamation and Mine Safety, and Rio Blanco County) prior to implementation.

Water

Water for mining and processing is supplied from water supply wells 90-1 and WSW-2. Two additional wells (WSW-3 and WSW-4) drilled and completed in 2014 are anticipated to be added to the water supply system by early 2015. Once WSW-3 and WSW-4 are connected, the 90-1 well would be taken off line and utilized as an A-Groove monitoring well. Two future exploration/monitoring wells would be converted to additional water supply wells to ensure a continuous, adequate raw water supply for full production of the expanded facility. Estimated average water usage is not expected to exceed 430 gallons per minute (gpm) or 694 acre-feet per year.

Water used directly in the mining, crystallization, and surface cooling operations is treated to remove hardness. The raw water is filtered and softened in a water softener unit to remove calcium and magnesium ions. The softener includes a common brine tank to regenerate the resin beds. Softener regeneration wastes drain to the waste water pond. To minimize the water load on the waste water pond, plant water balance is monitored and managed so that waste volume is minimized. The softened water is stored in a 72,000 gallon carbon steel tank located in the process tank farm.

Bottled drinking water is supplied from off-site. Softened process water is supplied to showers, toilets, sinks, safety showers, and other service applications. Plumbing for these systems is such that a potable water treatment system can be added at a later date.

An evaporative cooling tower and distribution system is in service for process cooling requirements. A system is provided to chemically treat the cooling water to prevent scaling and bacteria growth in the cooling water system. The cooling water blowdown system drains to the waste water pond.

A domestic sewage disposal is part of the current facility. The criteria for design of the sewage disposal system were based on CDPHE guidelines. A Rio Blanco County permit was obtained for the sewage disposal system. The existing system would be expanded to meet regulatory requirements.

A pond is located on site for containment of process water and disposal of waste stream. As mentioned above an additional waste water pond could be necessary in the future. The current pond consists of two compartments of approximately three and seven acres. The smaller compartment is provided to contain plant spills or excess process solution overflow. The solutions collected in this compartment are pumped back to the plant for recycling. The larger compartment contains utility waste streams such as cooling tower blow down, boiler blow down, and water softener regeneration purge. In unusual circumstances, the waste water compartment may accommodate overflow from the process compartment. The waste water pond is netted and has a double liner with a leak detection system. The primary liner (top) is made of 60 mil high density polyethylene (HDPE). The secondary liner is made of 40 mil HDPE. Drainage netting was used between the two liners to assist flow of potential leakage from the primary liner to a sump between the liners, where the leakage will be recycled. This design limits potential leakage through the 40 mil liner. The lined earthen dike separating the two compartments is three feet lower than the perimeter dike of the pond. The pond is a maximum depth of ten feet, not including three feet for freeboard. An increase in sodium bicarbonate production could

potentially result in more wash-down and process water. An increase in pond volume, up to seven surface acres, could be necessary to accommodate the increase in sodium bicarbonate production; this additional pond would allow for more flexibility when emptying a pond for maintenance and clean-out.

NSI's mine has been designed as a zero discharge facility in regard to wastewater. Water produced during drilling is conveyed via truck to the waste water pond and no discharge is anticipated. NSI files annual stormwater reports pursuant to Permit No. COR 34-0751.

Disturbed areas associated with access roads, the well field, and plant site are reclaimed as soon as practical following construction. Erosion control measures, such as contour furrowing and water bars, are utilized to minimize erosion until such time that a vegetative cover is established. The product handling and load-out areas would be paved with asphalt or concrete. They are sloped to prevent precipitation runoff from these areas. Since a potential exists for precipitation falling on these areas to become enriched with sodium bicarbonate, this water is directed to containment structures and subsequently removed to the waste water ponds for disposal. Surface runoff is regulated by the NSI Storm Water Discharge Permit.

Air Emissions

Air pollution emission sources include: a natural gas-fired boiler, flash dryers, air classifier bag-houses, and dust collectors. The expansion would include the addition of three new gas-fired steam boilers with associated equipment. New boilers would have best available technology (BAT) emission controls. These boilers burn natural gas in a low nitrogen oxides (NO_x), low pressure steam boiler to heat brine pumped to the well-field. The boiler emission reduction is possible through the use of a low-NO_x burner and flue gas recirculation (FGR). One of these new boilers will be utilized as a backup for the entire processing facilities.

The access road is paved and load out would be paved to limit vehicle dust emissions. Disturbed areas are stabilized as soon as possible. Processing facilities utilize baghouses, filters, and dust collectors to limit emissions. Air Pollution Emission Notices (APEN) submitted by NSI would be approved by the CDPHE prior to startup. Natural Soda Inc. would continue to operate within the emission levels as approved by the CDPHE

Personnel

Construction of the new plant would require up to 150 temporary contract employees. The workers would reside in Rifle and Meeker during the construction phase of the expansion project. Estimated construction activities would last approximately 10 months beginning the spring 2016. Some minor construction activity in preparation for the expansion could commence in 2015. Peak construction workforce demand would begin one month following the start-up of the expansion construction and continue for about seven months.

With the expanded manufacturing facilities, NSI would add 30 full-time employees to its payroll over the next 4 years, reaching total employment of 100, 85 full time employees at the plant and 15 off-site, by 2018. It is anticipated 60 to75 percent would live in Meeker and the remaining employees would reside in communities from Rifle to Grand Junction and Basalt. Another 10-15 transportation contractors would be employed in full-time support of moving product from the plant to warehousing and rail loadout located in Rifle, Colorado.

Traffic
During peak construction activity pickup and car traffic could increase more than 70 roundtrips per week above the current level. Busing of construction workers would also be encouraged. Increase in commercial truck activity for delivery of construction material would be intermittent and of shorter duration.

Weekly product truck traffic would average 371 roundtrips at the operational capacity of 500,000 tpy. Pickup and car traffic would average approximately 420 roundtrips per week. The majority of the traffic would be along Rio Blanco County roads 31 and 5 to Colorado highway 13.

Reclamation
During the operational phase of the mine, NSI would conduct continuous reclamation activities in order to maintain a minimal impact to the ground surface. As of 2013, all well pads have undergone reclamation to some extent. Monitoring well locations are graded and seeded to the greatest extent possible while continuing to allow access for sampling and minor maintenance. Production well pads are also re-graded and reseeded to the maximum extent possible and still allow room for larger rigs to operate when needed. Reclamation activity would occur per NSI's Reclamation Plan.

Natural Soda Inc.'s Current Operation (No Action Alternative)

NSI would produce sodium bicarbonate at the current plant design capacity of 250,000 tpy. Solution mining operations of the well field would continue in a similar manner as in the present.

Processing Facilities

Operations would continue in the current facilities and the long term disturbance of the existing facilities would remain at 27 acres (see Table 1). Operating at the 250,000 tpy capacity would not require construction of a new waste water pond.

Well Field Development and Disturbance

Continued annual production of 250,000 tpy would require the same number of wells annually as the proposed increase from 250,000 tpy to 500,000 tpy, except in years 2015 and 2016. Typical disturbance for production well pairs, exploration/monitoring wells, and access would remain the same as described above in the Proposed Action. Table 6 summarizes 20 years of estimated well field disturbance required for the continued operation at 250,000 tpy. Production development would occur in the same general well field areas (Figure 1).

Table 6. Estimated 20 Year Well Field Disturbances Required for the Current 250,000 tpy Facility

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026 to 2034	Total
Annual New Production Well Pairs	1	2	1	1	1	1	1	1	1	1	1	9	21
Annual New Exploration/ Monitoring Wells[1]	1	1	1	1	1	1	1	1	1	1	1	9	20
Estimated Annual Disturbance (acres)[2]	3	5	3	3	3	3	3	3	3	3	3	27	62
Estimated Annual Long Term Disturbance[3]	1.75	3	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	(1.75 acres annually)	-
Cumulative Total Well Field Disturbance[4]	1.75	4.75	6.5	8.25	10	11.75	13.5	14	13.25	13.75	14.25	18.75[5]	18.75[5]

[1] Includes disturbances associated with access for all wells production and exploration/monitoring.
[2] Total disturbance for well construction, assumed well disturbance for each type of well.
[3] Remaining un-reclaimed disturbances after interim reclamation. Assumes all exploration/monitoring and access are retained as monitoring. Production well pads would be reclaimed at end of 7 year average well life
[4]Year 2022 and forward reflects plugged and reclaimed production well pads (7 year well life). Assumes monitoring wells remain until end of project or need for well (20 years plus).
[5] Un-reclaimed well field pad disturbance at year 2034.

Project Disturbance
Total surface disturbance of project since commencement of operation in 1990 through 2014 is approximately 135 acres. Approximately 64 acres of these 135 acres are considered long term disturbances. Table 7 contains the estimated disturbance from the project's start in 1990 through 2034.

Table 7. Estimated Acres of Disturbances Through 2034 for 250,000 tpy

Location	Disturbance[1] 1990-2014 (acres)	Long Term Disturbance (acres)	Short Term Disturbance (Acres)	Un-Reclaimed Acres 2034
Current Facilities	32	27	5	27
Access (RBC 31)	30	30	0	30
Current Well Field and Exploration/Monitoring Wells	73	7[2]	66	7
250,000 tpy Well Field	0	5[3]	62	18.75[4]
Total	135	69	133	82.75

[1] Disturbance is the sum of the short term and long term disturbance.
[2] Includes monitoring wells and access to monitoring wells.
[3] Monitoring wells and access to monitoring wells
[4] Reflects plugged and reclaimed production well pads (7 year well life). Assumes monitoring wells remain in interim reclamation.

Mining Methods
Mining methods would be the same as the proposed expansion and the existing Mine Plan.

Water
No additional waste water pond would be required and estimated average water usage would not be expected to exceed 210 gpm or 339 acre-feet per year.

Air Emissions
One new gas-fired steam boiler, instead of three, with associated equipment would be added to operations. The new boiler would have best available technology (BAT) emission controls. The load area of the existing facility (Figures 1 and 2) could be paved to reduce dust.

Personnel
NSI's work force would be approximately70 employees instead of 100 and no temporary construction workforce would be required.

Traffic
Weekly product truck traffic would average 185 round trips from the plant facility. Pickup and car traffic would average approximately 280 roundtrips per week.

Reclamation
During the operational phase of the mine, NSI would conduct continuous reclamation activities in order to maintain a minimal impact to the ground surface. As of 2013, all well pads have undergone reclamation to some extent. Monitoring well locations are graded and seeded to the

greatest extent possible while continuing to allow access for sampling and minor maintenance. Production well pads are also re-graded and reseeded to the maximum extent possible and still allow room for larger rigs to operate when needed. Reclamation activity would occur per NSI's Reclamation Plan.

Figure 1

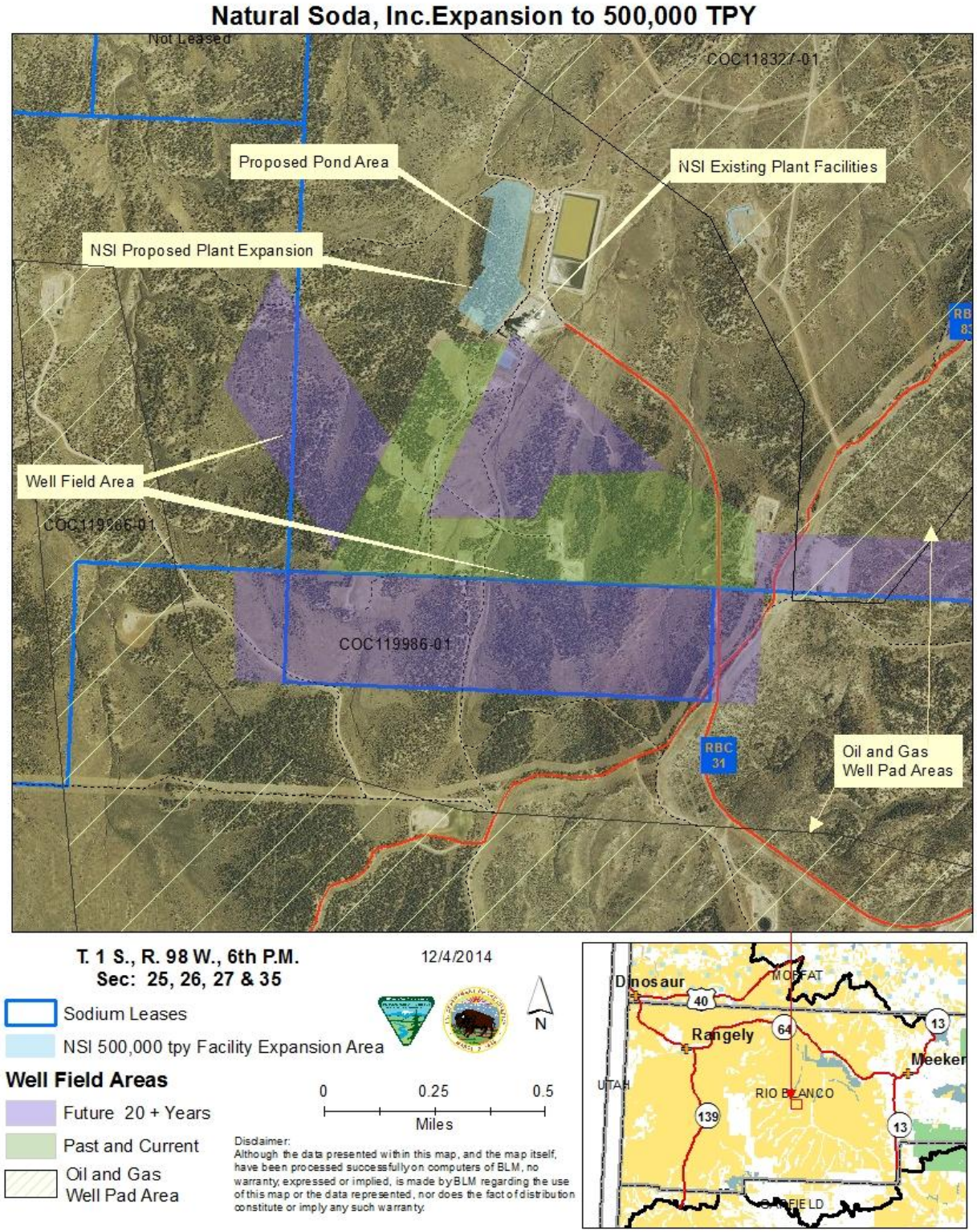
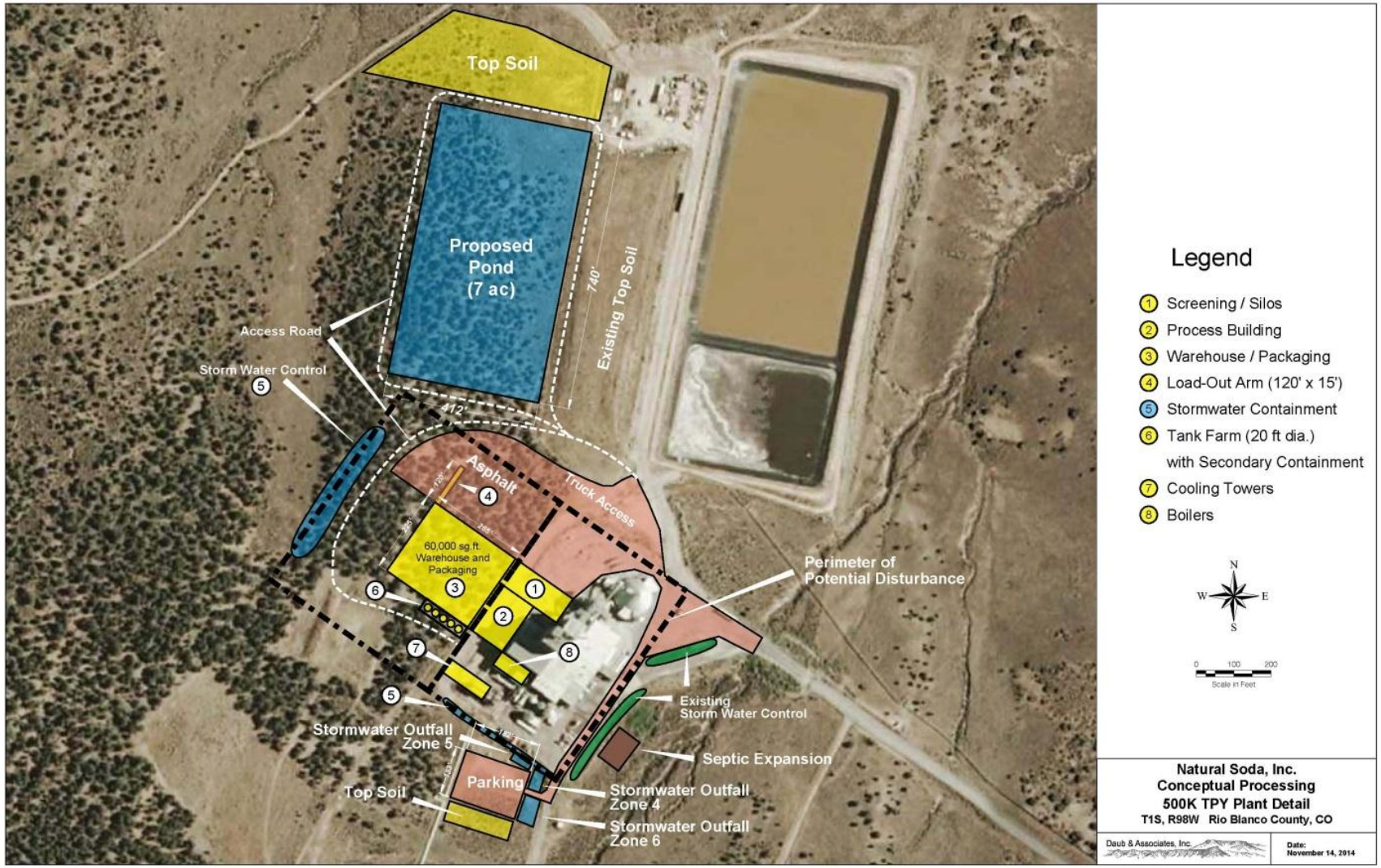

Natural Soda, Inc.Expansion to 500,000 TPY
Not Leased
COC118327-01
Proposed Pond Area
NSI Existing Plant Facilities
NSI Proposed Plant Expansion
Well Field Area
COC119986-01
RBC 31
Oil and Gas Well Pad Areas
T. 1 S., R. 98 W., 6th P.M.
Sec: 25, 26, 27 & 35
12/4/2014
N
Sodium Leases
NSI 500,000 tpy Facility Expansion Area
Well Field Areas
Future 20 + Years
Past and Current
Oil and Gas Well Pad Area
0 0.25 0.5
Miles
Disclaimer:
Although the data presented within this map, and the map itself, have been processed successfully on computers of BLM, no warranty, expressed or implied, is made by BLM regarding the use of this map or the data represented, nor does the fact of distribution constitute or imply any such warranty.
Dinosaur
MOFFAT
40
Rangely
64
13
Meeker
UTAH
RIO BLANCO
139
13
GARFIELD

Figure 2


Top Soil
Proposed Pond (7 ac)
740'
Existing Top Soil
Access Road
Storm Water Control
412'
Asphalt
Truck Access
60,000 sq.ft. Warehouse and Packaging
Perimeter of Potential Disturbance
Existing Storm Water Control
Septic Expansion
Stormwater Outfall Zone 5
Parking
Top Soil
Stormwater Outfall Zone 4
Stormwater Outfall Zone 6
Legend
1 Screening / Silos
2 Process Building
3 Warehouse / Packaging
4 Load-Out Arm (120' x 15')
5 Stormwater Containment
6 Tank Farm (20 ft dia.) with Secondary Containment
7 Cooling Towers
8 Boilers
N
W
E
S
0 100 200
Scale in Feet
Natural Soda, Inc.
Conceptual Processing
500K TPY Plant Detail
T1S, R98W Rio Blanco County, CO
Daub & Associates, Inc.
Date: November 14, 2014