

2011

**Municipal District
of Peace No. 135**

Mackenzie
Municipal Services
Agency

GRAVEL PIT STUDY



MARCH 8, 2011

Table of Contents

INTRODUCTION.....	3
OBJECTIVES.....	5
DEFINITIONS	6
GRAVEL PIT OPERATIONS.....	8
Existing Gravel Pit Operations	9
Impact of Gravel Pit Operations.....	13
Guidelines and Standards for Controlling Future Gravel Pit Operations.....	17
Location of Potential Future Gravel Pit Operations	23
LAND USE REGULATIONS.....	26
CONCLUSION/RECOMMENDATIONS	27
REFERENCES	29
APPENDIX A – DRAFT GRIMSHAW GRAVELS AQUIFER SAND AND GRAVEL MINING PROCEDURES.....	31
APPENDIX B – LAND USE REGULATIONS	35
APPENDIX C – SAND AND GRAVEL PROJECT ASSESSMENT CHECKLIST	37
APPENDIX D – CHECKLIST OF TYPICAL MUNICIPAL DEVELOPMENT PERMIT APPLICATION REQUIREMENTS FOR SAND AND GRAVEL OPERATIONS.....	42
APPENDIX E – SAMPLE CONDITIONS FOR DEVELOPMENT PERMIT APPROVALS OF SAND AND GRAVEL OPERATIONS.....	44
 MAP 1: GRAVEL PIT STUDY: GRAVEL PIT SITES	
 MAP 2: GRAVEL PIT STUDY: NET PRODUCTIVITY RATING VALUE	
 MAP 3: GRAVEL PIT STUDY: FUTURE GRAVEL PIT LOCATIONS	



Gravel Pit Study

Introduction

Objectives

Definitions

1

INTRODUCTION

The extraction of aggregate (sand and gravel) resources is vital to the growth of Alberta. Readily available supplies of aggregate are essential for development of the roads, buildings and infrastructure on which our society and our economy are built.

Despite the obvious value aggregate extraction brings to Alberta, it has also emerged as an area of potential conflict at the community level. Municipalities and their residents often have concerns with the visual, environmental and economic impacts of sand and gravel operations within their boundaries. There are regulations in place to ensure gravel pit development and operations are planned and operated to mitigate impacts while permitting the extraction of these desired resources. Alberta Environment regulates gravel pit developments greater than five hectares in size¹. Municipalities can control gravel pit operations through zoning and Development Permits, by developing standards and guidelines within land use regulations, regardless of the size of the pit.

Gravel pits are currently regulated through the Municipal District of Peace No.135's Land Use Bylaw No.1-98, Rural Industrial: Gravel Pit District (RI-GP). The Land Use Bylaw outlines site requirements, setbacks, servicing and Development Permit requirements, however, stronger regulations are required to manage these sand and gravel resources in the Municipal District of Peace No. 135.

This "Gravel Pit Study" was initiated in May 2010 by the Municipal District of Peace No.135 Council in response to recent discussions regarding the location and impact of gravel pit development and operations within the Municipal District. As a result, the Mackenzie Municipal Services Agency (MMSA) has prepared this "Gravel Pit Study" for private pits to formulate regulations to guide MD No. 135 in reviewing and approving future gravel pit development and operations within MD No. 135.

This "Gravel Pit Study" is intended to assist the Municipal District of Peace No.135 in preparing guidelines and standard regulations for future gravel pit approvals. It is recommended that a public awareness and consultation process be hosted to gather public input on "restriction zones". Based on the input, the areas under restriction may need to be revised.

¹ Alberta Environment has classified pits into two classes: Class I and Class II. Class I pits are five hectares or greater and Class II pits are less than five hectares.

OBJECTIVES

The objectives of this study are as follows:

1. Identify existing gravel pit operations within the MD No.135
2. Determine impact of gravel pit operations
3. Determine guidelines and standards for controlling future gravel pit operations within MD No. 135
4. Identify future potential gravel pit operation locations based on environmental and other geographical issues within MD No. 135
5. Determine Land Use regulations and mitigation measures for Development Permit approvals.

DEFINITIONS

Activities Plan - A description of the characteristics of the site and the sequential plans for construction, operation and reclamation of gravel pits.

Buffer strip - An area of land used for the erection of a fence and/or the planting and maintaining of a continuous row of coniferous trees or a natural living fence, immediately adjacent to the lot line or portion thereof along which such buffer strip is required.

Class I pits - Cover areas greater than or equal to five hectares on private land and are subject to the requirements of *the Code of Practice for Pits* under the EPEA. Class I pits require a registration (or pre-existing provincial approval).

Class II pits - Cover areas less than five hectares on private land and are not currently subject to the provisions of the *Code of Practice for Pits*. Class II pits are subject to the environmental provisions of the EPEA and specifically the requirements of the Conservation and Reclamation Regulation under the Act.

Drift - Is generally referred to as unconsolidated glacial material deposited directly on the land surface. This material usually consists of silty to sand clay.

Extraction - The removal of sand, gravel, and rock for aggregates, which includes drilling, blasting, and breaking necessary for extraction and transport. Extraction does not include any crushing, screening or similar activities carried out to make the gravel marketable.

Gravel - Rock that is of a specific particle size range.

Infrastructure – Any roads, piping, buildings, structures, facilities, equipment, apparatus, mechanism, instruments or machinery belonging to or used in developing or operating a pit including any storage site or facility, disposal site or facility, access road, haul road, railway or telecommunication line.

Net Productivity Rating - A NPR is a point rating system assigned to soil types based on the soil's ability to produce crops, taking into account soil quality, surface, depth, subsoil, surface texture and other miscellaneous items. The rating system varies with poor soil rated as low as zero and the best as high as 70 points.

Pit – Under the Environmental Protection and Enhancement Act, a pit is an excavation in the surface made for the purpose of removing, opening up or proving sand, gravel, clay, marl, peat or any other substance, and includes any associated infrastructure, but does not include a mine or a quarry.

Private land – Deeded or patent land, special areas board land including Métis Settlements and provincial parks.

Processing - Includes drying, stockpiling, crushing, sorting, screening, mixing or washing of sand, gravel and rock to produce aggregate products but does not include manufacturing.

Public land – Land of the Crown in right of Alberta to which the *Public Lands Act* applies. This may include the bed and shore of water bodies anywhere within the Province.

Rare Species - Any native species that, due to biological characteristics or occurrences in edges of their natural range, or for some other reason, occur in low numbers or in restricted areas.

Restriction Zone- Refers to zones that have been identified as having limitations on their uses which are based on environmental sensitivity and compatibility with neighbouring land uses.

Gravel pit development and operations may be permitted in these zones; however, these zones are subject to conditions set by the Municipal District prior to the issuance of a Development Permit.

Sand and Gravel Pits – A surface mine or excavation used for the removal of sand or gravel for sale.

Transmissivity - Is the volume of water flowing through a cross-sectional area of an aquifer that is 0.30 m (1 ft.) x the aquifer thickness, under a hydraulic gradient of 0.30 m (1 ft. /1 ft.) in a given amount of time (usually a day).

Well capture zone - Is an area that specifically contributes recharge water to a pumping well. Identifying the well capture zone can help protect our water supply source from possible contamination.



Gravel Pit Operations

Existing Gravel Pit Operations

Impact of Gravel Pit Operations

Guidelines and Standards for Controlling Future Gravel Pit Operations

Location of Potential Future Gravel Pit Operations

2

GRAVEL PIT OPERATIONS

Existing Gravel Pit Operations

Sand and gravel are significant non-renewable resources that contribute to our society and to our economy. Gravel is commonly used in road and building construction and is an economically viable resource for infrastructure development. In 2006, Alberta's Energy Resources Conservation Board (ERCB) reported an increase in tonnage produced and revenue generated in sand and gravel extraction. Mineral aggregate demand in Alberta is expected to increase due to the demands of construction and infrastructure activity (ERCB & AGS. 2007. Pp 7).

Considering the importance of gravel extraction, Alberta Environment published "A Guide to the *Code of Practice for Pits*" in 2004 to regulate Class I pits. Alberta has classified private gravel pits into two classes: Class I pits and Class II pits². There are approximately 550 Class I pits on private land in Alberta and approximately 1,500 to 2,000 smaller pits on private lands and 650 pits on public lands in Alberta (Alberta Environment, 2010).

Class I pits cover areas greater than or equal to five hectares on private land and are subject to the requirements of *the Code of Practice for Pits*.

Class II pits cover areas less than five hectares on private lands and are subject to the requirements of the Act and the *Conservation and Reclamation Regulation*. Class II pit operators should refer to the *Environmental Protection Guidelines for Pits* for guidance in operating their pits³.

Regardless of the size of pits, a municipality may set standards, regulations and conditions for Development Permit approvals within their jurisdiction.

Gravel is an important resource in the development of infrastructure and construction. It is also a non-renewable resource and its excavation and utilization need to be sustainable. Gravel aggregates are typically located in river valleys, streams and in glacial deposits. In the Municipal District of Peace No. 135, the majority of gravel aggregates are commonly found within the Grimshaw Gravels Aquifer (refer to Map 1- Gravel Pit Sites)⁴. Extra precautions are required within the Aquifer operation area as mining activity may contaminate ground water. It is important to note that not all gravel aggregates within MD No. 135 are within the Grimshaw Gravels Aquifer.

The Grimshaw Gravels Aquifer is comprised of an underground layer of water-bearing bedrock from which groundwater can be extracted by utilizing a well. The Grimshaw Gravels Aquifer formed with the depositing of sandstone and shale by ancestral rivers and the eroding of underlying bedrock by local stream channel erosion over a long period of time. Unconsolidated materials such as gravel, sand, silt or clay are commonly

² Public: Different regulation is applied to public gravel pits.

³ Source: Alberta Environment. (2004). A Guide to the Code of Practice for Pits. Pp.3

⁴ The Grimshaw Gravels Aquifer provides quality ground water for our residents and it services approximately 7,500 households in an area of about 182 square miles in the north central Peace region.

found in an Aquifer⁵. A majority of the gravel aggregates are located within the Grimshaw Gravels Aquifer area. Operations within the Aquifer may adversely impact the aquifer and possibly contaminate the groundwater. The Municipal District must take appropriate measures to ensure that impacts are minimized. The impacts of gravel pit development are discussed under Section 2 – Impact of Gravel Pit Operations.

Aggregate Materials

To better understand the compositions of materials underground, the Energy Resource Conservation Board (ERCB) has categorized aggregate materials in Alberta into 16 categories.

1. Clean Gravel
2. Clean Gravelly Sand
3. Clean Sand
4. Clean Sandy Gravel
5. Dirty Gravel
6. Dirty Gravelly Sand
7. Dirty Sand
8. Dirty Sandy Gravel
9. Unknown Gravel
10. Unknown Gravelly Sand
11. Unknown Sand
12. Unknown Sand and Gravel
13. Very Dirty Gravel
14. Very Dirty Gravelly Sand
15. Very Dirty Sand
16. Very Dirty Sandy Gravel

The majority of gravel aggregates within the Municipal District have deposits of “Clean Gravel” with small pockets of “Clean Gravelly Sand” and “Unknown Sand and Gravel”. Gravel pit #13 and #14 (Map 1- Gravel Pit Sites) are located on “Clean Gravelly Sand” and no existing gravel pits are located on “Unknown Sand and Gravel”.

Gravel Pit Sites

Based on an inventory of existing pits provided by Alberta Environment, the Municipal District of Peace No. 135, has a total of 30 registered gravel pits. This list was last updated in 2008. The thirty (30) Gravel Pits range from 0.75 to 26.7 hectares in size.

As identified in Map 1- Gravel Pit Sites, there are many gravel pits located close to or in close proximity to highways and municipal roads for easy access and marketability of extracted aggregates. As a general rule, gravel pit development and operations are normally conducted in areas where gravel aggregate extraction is economically viable as transportation to consumers contributes a major portion of aggregate mining costs.

⁵ Grimshaw Gravels Aquifer Technical Report, 1998.

Existing gravel pit operations are developed in clusters partially to take advantage of existing roads and close access to highways. Another reason for an operator to locate developments in clusters is knowledge from existing operators regarding location of deposits.

The first cluster location within MD No. 135 is northwest of Wilderness Park and the second cluster location is north of Duncan's First Nation reserve. Both locations provide easy highway access for the operators.

Major Operator in the Municipal District

Grimshaw Gravel Sales Ltd. is one of the major operators in the area. The site for this gravel pit is located adjacent to Highway 2 on SE 32-83-23 W5M and is located on the Grimshaw Gravels Aquifer. This operation started with a pit of less than five hectares in size and expanded to 25 hectares in size. As a result, the operator has submitted an application for registration with Alberta Environment. A gravel pit operation may last 100 years or more, however, Alberta Environment requires a report every 5 year to ensure compliance with regulations and standards.

The aggregate type found on this site is sand and gravel. Once on-site extraction operations are stopped as a result of resource exhaustion or other reason (s), the proposed reclamation land use is normally grass and cattle grazing. It is understood that clay loam texture soil type is located on top of the aggregate and under the subsoil layer. This is very important because the clay loam texture acts as a drift cover, which helps protect the Aquifer from contamination from extraction activities.



As of July 2010 there were one to three employees working at this site. No excessive dust or noise nuisance was noticed during the site visit. The site is properly fenced with safety precaution signs in place. There are no designated hauling routes determined for this site, but there are several routes utilized to transport aggregates to market. The main transport route is Highway 2.

In order to extract gravel from the ground, the top and subsoil layer must be removed and stockpiled carefully and separately as required by Alberta Environment. The

removal of top and subsoil must be properly restored in the same order after extraction and during reclamation (overburden is replaced first with subsoil on top of it and topsoil on top of the subsoil). The excavation site must also be reclaimed in phases following extraction. This procedure is being followed precisely by the Grimshaw Gravel Sales Ltd. operator.

Gravel extracted from the ground will be processed in a crushing machine on site to filter materials. After processing, the resulting gravel is transported to the consumer. Several of Grimshaw Gravel Sales Ltd.'s major consumers are within the Town of Peace River.

Gravel pit extractions can be conducted satisfactorily when all proper environmental and safety measures are followed.

Land Use Districts

Net Productivity Rating (NPR) is a point rating system assigned to soil type based on its ability to produce crops taking into account soil quality, surface, depth, subsoil, surface texture and other miscellaneous items. The rating system varies from poor soil rated (as low as zero) to a best soil rating (as high as 70 points). For this study, NPR is analyzed into segments of 10 points.

None of the existing gravel pits located within MD No. 135 are located within the extreme high Net Productivity Rating for agriculture zone as identified in Map 2 – Net Productivity Rating Value. This extreme high Net Productivity Rating zone ranges from 61 to 70 points.

Another aspect of importance within MD No. 135 is the Shaftesbury Trail Area. The Shaftesbury Trail Area is classified as an Environmentally Sensitive Area in the Municipal District's Municipal Development Plan and the Land Use Bylaw. There are currently two existing gravel pit operations located in this area.

Impact of Gravel Pit Operations

The location of gravel pit operations within municipalities has been a concern for many residents living in Alberta. Gravel pit construction and operations pose many potential negative environmental and social impacts to residents and their municipalities. As a result, there are numerous cases in Alberta where residents have opposed and protested against new gravel pit proposals.

For example, a gravel pit proposal was submitted to a municipality and after reviewing the application, Council turned down the proposal despite an endorsement by the Municipal Planning Committee. This is one of the many cases where residents have gathered in opposition and protested new gravel pit applications.

The most common impacts of gravel pit development and operations are the lack of conservation of reclamation materials, erosion, dust and noise nuisances, impacts to road condition, negative visual aesthetics and water and soil contamination. These impacts can be minimized through several methods and should be used during the planning and construction phases.

Lack of conservation of reclamation materials

Lack of conservation of reclamation materials, particularly topsoil (stripping and handling), and lack of reclamation is a common impact of pit operations. Operators are handling reclamation better now, compared to the past, however, Alberta Environment notes not all operators adhere to reclamation requirements as a result of previous operational practices.

Erosion

Gravel pit operations, including extraction, excavation and transportation may lead to soil erosion. Wind facilitates removal of sand and other smaller particles from pits and may cause siltation of rivers, lakes and other bodies of water.

Solution: Soil erosion requires serious mitigation consideration during the development and planning stages. Vegetation is a common tool used for controlling erosion by wind and water during the mining process. Other methods include erosion mats, silt fences, mulches and hydro seeding.

Dust

On-site dust is caused by excavation of topsoil, aggregate processing, hauling of gravel and the movement of heavy equipment. Dust may cause health problems, safety concerns in relation to driving, and can affect the cleanliness of



personal property (indoor and outdoor).

Dust can vary in size. Large particles tend to settle quickly whereas smaller particles carry great distances. The smaller the particles, the more dangerous to health they are. Fine particulate matter, 10 microns or less in diameter, can be inhaled and are considered toxic, and smaller particulate matter, less than 2.5 microns in diameter, is even more harmful. The particulate matter can lodge deep within the lungs and tissues of the body and there is no biological mechanism for clearing it from the body.

Recent studies have shown that fine particulates pose a greater danger to our health. Dust particles may lead to increases in cardiopulmonary disease, asthma, bronchitis, emphysema, pneumoconiosis and premature death in those with pre-existing conditions. (Gravel Water Ontario, 2010). Crystalline silica dust is commonly found in gravel operations and is also a known carcinogen (Gravel Water Ontario, 2010). Dust can cause many health and non-health related problems, therefore, serious measures should be taken to mitigate these effects.

Solution: There are several solutions outlined in Alberta Environment's "*A Guide to the Code of Practice for Pits*". Enclosing a crusher to minimize dust levels, misting, watering access roads, placing a screening system around the crushing equipment and/or on the upwind side of the operation and paving roads that have intensive or regular use, are among the few suggestions. Simply using a tarp during the hauling and transporting of aggregates can reduce dust pollution considerably.

Noise

The trucking and crushing of gravel are two of the most common noise pollution issues associated with a gravel pit operation. The backup beepers on the equipment used in gravel pit operations are often the source of complaints and irritation to adjacent neighbourhoods.

The direction of wind can also influence the level of noise pollution from the operation. Wind could make the noise problem even worse especially when the wind is blowing from the operation towards a residence.

Solution: To minimize the impact of noise include strategic placement of stockpiled reclamation materials, plantation of vegetation and berms as a buffer around the operation, setting buffer distances from residential neighbourhoods and other areas of human activity like schools and playgrounds. Hours of operation can also be fixed to mitigate impacts to residents and wildlife.

Haulage and Road Traffic

Hauling gravel to markets impacts road traffic and road conditions. Frequent usage of roads can overburden municipal roads which may affect the municipality financially as the municipality may have to repave or reconstruct damaged roads. In addition, hauling trucks may generate a larger volume of traffic on highways and rural roads and as a result, lead to increased safety concerns, air and noise pollution.

Solution: Ensure routes are available to meet the needs and demands of the operation and secure Road Use Agreements prior to approving new operations to reduce

overburdening municipalities. A traffic impact assessment should also be requested for operations with large volumes of production. Setting hours of operation for hauling may also be considered for haulage routes close to residential areas. Lastly, safety measures such as “Stop” signs and speed bumps could also be considered to reduce speeding of trucks that may pose safety risks to residents. A levy may be applied for sharing maintenance and infrastructure costs based on the operation’s production and road use. The Municipal District has recently adopted a CAP levy of 25 cents per tonne, effective January 1, 2011.

Aesthetics and Other Social Problems

A gravel pit is often considered an eyesore, as it is often aesthetically unpleasing. Residents often believe that a gravel pit in the neighbourhood may lower their property value and their quality of life.

Alberta Environment tries to ensure that the Code of Practice application plans for proper reclamation success and takes into consideration the proposed final land use. Aesthetics may still be a problem after reclamation, as the reclaimed land will still include a large recessed area in the landscape resulting from the extraction operations.

Nobody wants to live near a gravel pit. The dust and noise from the operation is a problem for many individuals. The “NIMBY” (Not In My Backyard) attitude is common and the general public will normally oppose such an operation.

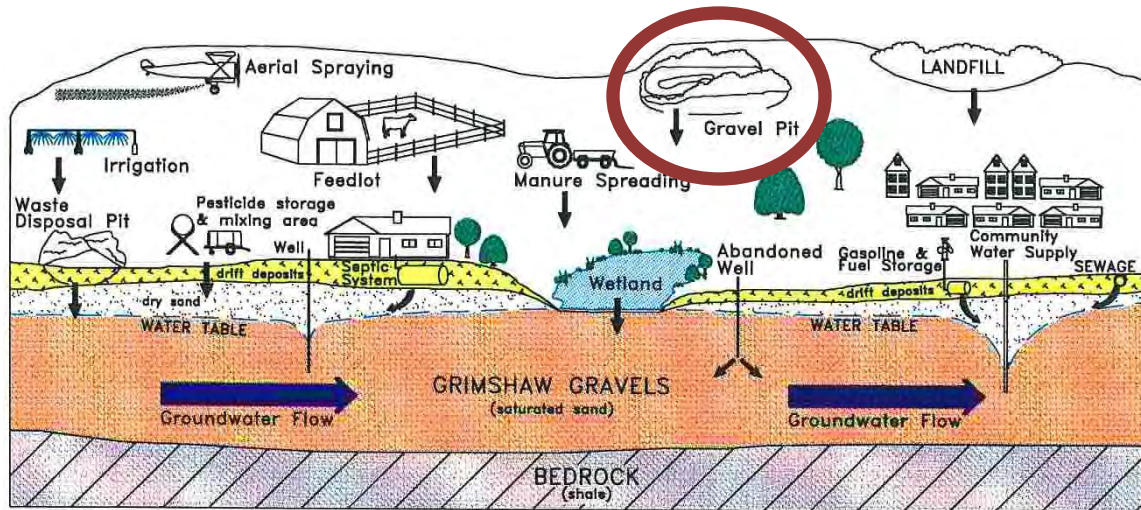


Solution: Provide vegetative buffers and fences around operations. A proper fence should also be placed to secure the site from accidental interference. The registered owner must address proper reclamation of the gravel pit after mining.

As for “NIMBY”, it is recommended that the public is made aware of this report through the public consultation process to provide an opportunity to include their comments into this report. With this approach, the municipality will have effectively consulted the public and obtained their input towards potential gravel pits in their community.

Water Contamination

Activities occurring above an aquifer may have an impact on the underground water and may cause contamination. The diagram below is an illustration of activities that may cause water contamination. Gravel pit operations could potentially cause water contamination. Within the Municipal District of Peace No.135, the majority of gravel pits are located within the Grimshaw Gravels Aquifer.



Source: Grimshaw Gravels Aquifer Technical Report, 1998

Exposing the top of the aquifer may cause contamination to our groundwater. For example, a spill could easily contaminate the underground water without the overlying soil protection to filter the chemicals or contaminants.

Also as stated in the *Grimshaw Gravels Aquifer Technical Report*,

“The only natural protection the Grimshaw Gravels Aquifer has is from overlying drift deposits, however, at some locations, the drift cover has been removed by gravel pit excavations, exposing the top of the aquifer.”
(Grimshaw Gravels Aquifer Technical Report, 1998).

Solution: Test drill to confirm the nature and thickness of the drift cover. Areas with less than 4 metres (13.12 ft) of drift cover are not recommended for gravel pit development as they are designated as potentially highly sensitive areas.

Guidelines and Standards for Controlling Future Gravel Pit Operations

As mentioned in the Grimshaw Gravel Sales Ltd. example on page 11, a gravel extraction operation commences with five acres but subsequently grows into a large mining operation over time, therefore, it is essential to review a proposal considering potential increases in size and production.

Gravel pit operators may require approvals for rezoning and will require a Development Permit from the municipality. As mentioned earlier, there are several impacts associated with gravel pit developments. As a result, the Development Officer may consider the following prior to approving a Development Permit Application for a gravel pit. Note: see Appendix C for a more detailed list of questions to consider.

1. What are the hours of operation? Will the hours of operation create noise that may affect surrounding neighbours? How will the operator address noise from the operation?
2. Will the direction of wind have an impact (noise and dust) on surrounding neighbours? How will the operator address and implement dust and noise control?
3. How will this gravel pit operation affect (road, air, water, wind) residents in the area?
4. Will the proposed gravel pit be in major conflict with other land uses?
5. Will the municipality be financially burdened in the future with the upgrade and improvement of roads repeatedly used by trucks hauling gravel?
6. Does the location of the pit provide easy access to major municipal road(s) or highway(s)?
7. Will the gravel pit operation affect the Grimshaw Gravels Aquifer and water quality?
8. Will the location of the proposed pit be visually unappealing?
9. What will be the proposed land use after reclamation and will there be a conflict with surrounding land uses?
10. Has the operator met all proposed setbacks and requirements?
11. Has the operator met all required provincial and/or federal requirements?

Major Considerations

Undisturbed Buffer Zones

Undisturbed Buffer Zones should be identified in the planning stage of the gravel pit operation. The buffer zone should be located between the property line and the excavation zone to address proper screening requirements. Vegetation for buffering should be placed around the pit operation to prevent erosion and siltation entering a watercourse, to reduce noise and dust, to provide safety for residents and to improve wildlife corridors and aesthetics to the surrounding neighbourhoods.

While reviewing a Development Permit Application, consideration should be given to ensuring the implementation of a buffer strip between the property line and the point of excavation.

Water bodies

For gravel pit operations adjacent to rivers and water bodies, setbacks and buffer zones for river sections that are relatively linear and/or river sections located on the outside of river bends, particularly if the bank or the river is actively eroding, should be enforced.

For minor watercourses such as unnamed creeks, sloughs and the high-water mark of other water bodies, setbacks shall apply and will be subjected to an evaluation by the Municipal District⁶.

The width of the undisturbed buffer zones should be measured from the top of the active bank of the river or water body. All buffers should be identified on the Activities Plan and submitted to Alberta Environment prior to any activity on the operation site.

Extraction Setbacks for Reclamation

During reclamation, the material left in the extraction setback is used to establish a 3:1 slope starting from the edge and running to the pit floor. The extraction setback allows for maximum resource development while maintaining a stable slope.

Environmentally Sensitive Areas

Mitigation measures are recommended to protect and conserve the natural environment, especially in environmentally sensitive areas. Pit location and operations should be avoided if located near or on wetlands, swamps or marshes and other specific habitat areas identified by local or provincial agencies departments. An environmental impact study may be required if operations are to be located in or adjacent to these areas.

If the proposed pit is situated in a natural landscape, particularly a coulee, river valley or other unusual landscape, a rare species survey should be conducted over and above the requirement for an environmental impact assessment.

Well Capture Zone

A well capture zone is an area that specifically contributes recharge water to a pumping well. Identifying the well capture zone can help protect our water supply source from

⁶ Source: Municipal District of Peace Municipal Development Plan No.5/2009

contamination. The “well capture zone is calculated by using basic aquifer data along with the pumping rate of the well, to determine the width of the capture zone and the distance down gradient of the well where groundwater does not move to the well”⁷. No gravel pit development or operation should be located in the well capture zone. As a result of an abandoned and newly added well capture zone, the proposed restriction zone may be revised.

Wildlife Considerations

Wildlife is also an important factor to consider. Adjusting the times when extraction or reclamation activities occur can minimize disturbances to wildlife. Construction during breeding times is usually restricted. Also, wildlife crossings may be a consideration when considering permitting a gravel pit operation.

Shaftesbury Trail Area

The landscape and natural features within this area are considered environmentally sensitive. The close proximity to the river can contribute to source water contamination from gravel pit operations. In addition, pit developments considered within this area may impact the beautiful scenic views of residents and recreational users of the river. Slope stability issues may also be a factor within the Shaftesbury Trail Area. All gravel pit operations within this area should be restricted.

Highways and Municipal Roads

Easy access to highways and municipal roads is an important factor in reviewing potential pit operations. Pits located in inaccessible areas are not recommended. This may cause a burden on municipalities if the construction and upgrade of road networks is required.

Setbacks from Gravel Pits to a Highway are required under the Highway Act. For proposed gravel and sand pit developments located within 0.8 km (½ mile) of a highway, the developer shall provide the Development Officer with an approved permit obtained from Alberta Transportation.

Alberta Transportation has recommended setbacks from provincial highways to the excavation area. The Municipal District also regulates setbacks from property lines to the excavation area of a gravel pit operation.

⁷ Grimshaw Gravels Aquifer Technical Report, 1998.

Grimshaw Gravels Aquifer Sand and Gravel Mining Procedures

Alberta Environment, in conjunction with the Grimshaw Gravels Aquifer Management Advisory Association (GGAMAA), has developed site specific procedures for sand and gravel pits on the Grimshaw Gravels Aquifer.

These specific procedures attempt to prevent further degradation of the Grimshaw Gravels Aquifer including:

- Extraction Depth for New Pits
- Extraction Depth for Existing Pits
- Location of Asphalt Plants
- Cold Mix Sites
- Fuel Storage Tanks
- Spraying of Gravel Box Liners
- Salt Mixing
- Use of Alternative Reclamation Materials
- Exportation of Reclamation Material and Surface Drainage during Operations
- Final Reclamation.

A draft copy of the Grimshaw Gravels Aquifer Sand and Gravel Mining Procedures is attached as Appendix A to this report and should be considered prior to the issuance of a Development Permit.

Net Productivity Rating for Agriculture

The guiding principle of the Municipal District's Municipal Development Plan (MDP) adopted by Bylaw No. 5/2009 states that:

“Protection of agricultural land and natural environment will occur in an orderly, efficient and economically sound manner”⁸.

The Net Productivity Rating (NPR) is a point rating system assigned to soil type based on its ability to produce crops taking into account the soil quality, surface depth, subsoil, surface texture and other miscellaneous items. The rating system varies with poor soil rated as low as zero and the best as high as 70 points. The NPR determines the productivity level of agricultural land within the Municipal District in segments of 10 points – 0-10, 11-20, 21-30, 31-40, 41-50, 51-60 and, 61 -70. The NPR rating is the same as used for the Municipal Development Plan (MDP) with the following exception; for the purpose of delineating restriction areas, 7 ratings are in effect as opposed to 3 used in the MDP.

⁸ Municipal Development Plan Bylaw No. 5/2009, page 1

Recommended Standards for Issuance of a Development Permit

According to the Municipal Government Act, the definition for development includes the following: “an excavation or stockpile and the creation of either of them”⁹,

Based on the observations stipulated above, the following standards, practices and guidelines are recommended. In addition, Appendix D is a checklist of typical Development Permit Application requirements the Development Officer may require.

1. Aggregate developments shall ensure that a 3 metre (9.84 ft) wide vegetation buffer is maintained around the property line. This buffer may be increased depending upon the volume and rate of production.

A buffer strip means an area of land used for the erection of a fence and/or the planting and maintaining of a continuous row of coniferous trees or a natural living fence, immediately adjacent to the lot line or portion thereof along which such buffer strip is required.

2. During reclamation activities, the material left in the extraction setback is to be used to establish a 3:1 slope, beginning at the edge of the 3 metres (9.84 ft) undisturbed buffer and continuing to the pit floor.

The extraction setback allows for maximum resource development while maintaining a stable slope. The extraction setback should be equal to the average depth of the pit multiplied by 1.5 for property boundaries plus the three metre undisturbed buffer zone.

For example, for a pit with an average depth of 4 metres (13.12 ft), the extraction setback would be 4 metres (13.12 ft) multiplied by 1.5 metres + the 3 metre (9.84 ft) undisturbed buffer zone. This totals to 9 metres (29.52 ft).

This is normally enforced by the licensing authority for pits larger than 5 acres (2 hectares), but even smaller pit operators are encouraged to follow this formula.

3. Hours of operation for hauling activities and routes are to be set out in the Road Use Agreement. This should invariably consider residences along the route that may be affected.
4. The applicant shall ensure ongoing communication with adjacent and surrounding property owners regarding the time and duration of crushing activities and major hauling of extracted materials. Such communication may be through newspaper advertisements and/or written/verbal communication to individual property owners. Hours of operations may be restricted depending on location near residences or potential disturbance to wildlife.

⁹ Municipal Government Act, RSA 2000, section 616, page 320.

5. The applicant shall install, at the applicant's expense, a "Stop" sign at the entrance to the pit area for trucks leaving the hauling area. The sign shall conform to regulation (Part 6) in Land Use Bylaw 1-98, as amended from time to time. Other signs related to safety of visitors and employees may also be required.
6. The applicant shall remove all garbage and waste from the lands and keep the land in a clean and orderly manner at the applicant's expense.
7. The applicant shall ensure that weed control is in effect in compliance with the Alberta Weed Control Act.
8. There shall be no dumping of foreign materials or products in the excavation area, however, clean fill or top soil may be considered for reclamation purposes.
9. Agricultural lands with 51-60 and 61-70 soil points are not recommended for gravel pit operations (refer to Map 2 – Net Productivity Rating Value).
10. A 70 metre (229.65 ft) setback from the centerline of a highway to the excavation development area or 40 metres (131.23 ft) from the property line, whichever is greater is recommended by Alberta Transportation.
11. A 20 metre (65.61 ft) setback may be applied to minor watercourses such as unnamed creeks and sloughs and the high water mark of other water bodies subject to an evaluation by the Municipal District¹⁰.
12. A 30 metre (98.42 ft) setback from river sections that are linear and a 60 metre (196.85 ft) setback from river sections located on the outside of river bends is recommended¹¹.
13. Gravel pit operations located in the Grimshaw Gravels Aquifer should follow the Grimshaw Gravels Aquifer Sand and Gravel Mining Procedures (Appendix A).
14. Well capture zones are not recommended for gravel pit development and operations.
15. Road Use Agreements between the developer and the Municipal District are recommended. Levies may be imposed on the tonnage of gravel produced.
16. Notwithstanding the above, the Development Officer may increase the development setbacks for a gravel pit operation due to the characteristics of the proposed site. For small pits (less than 5 hectares), setback distances may be reduced depending on the type of operation and the nature of the proposed site.

¹⁰ Source: Municipal District of Peace's Municipal Development Plan No.5/2009

¹¹ Source: Alberta Environment. (2004). A Guide to the Code of Practice for Pits.

Location of Potential Future Gravel Pit Operations

As we grow as a society, the importance of a well planned community becomes more important. To minimize the environmental and social impacts caused by proposed future gravel pit developments, restriction zones must be in place to control mining extractions in high impact locations.

These restriction zones are to be identified mainly as recommended through an environmental impact assessment. Map 3- Future Gravel Pit Locations illustrates Land Designation areas for gravel pit development and operations. Several elements (listed below) have been considered in determining restriction zones.

1. **Net Productivity Rating for Agriculture** – The guiding principle of the Municipal District's Municipal Development Plan No. 5/2009 states that:

“Protection of agricultural land and the natural environment will occur in an orderly, efficient and economically sound manner.”

In keeping with this guiding principle, a Net Productivity Rating (NPR) was developed to analyze the quality of soil. A NPR is a point rating system assigned to soil types based on its ability to produce crops, taking into account soil quality, surface, depth, subsoil, surface texture and other miscellaneous items. The rating system varies with poor soil rated as low as zero and the best as high as 70 points.

A NPR map determines the productivity level of agricultural land within the Municipal District in segments of 10 points: 0-10, 11-20, 21-30, 31-40, 41-50, 51-60 and, 61-70. For location of gravel pit operations, restrictions are placed in areas with a NPR of 51-70 points.

2. **Well Capture Zones** - A well capture zone is an area where source water is collected and diverted into the nearby municipal well as drinking water for residents. These capture zones (identified in Map 1 – Gravel Pit Sites) are critical because activities in these zones can cause contamination to our drinking water. No pit activity is recommended in these zones.
3. **Environmentally Sensitive Area and Shaftesbury Trail Area** – All gravel pits within the Shaftesbury Trail and Environmentally Sensitive Areas are to be restricted. When a gravel pit operator submits an application to Alberta Environment, the Municipal District should consider environmental impacts.

Restriction for Gravel Pit Development and Operations

Gravel pit development and operations will be categorized into yellow and white zones (refer to Map 3 – Future Gravel Pit Locations). Yellow zones are restriction zones, which include land sensitive to gravel pit development and operations, however, a Development Permit may be granted if all conditions required are met. The conditions will be scenario-based and developed by Council and the Development Officer. A pre-consultation with Council would be beneficial.

The yellow zone protects against incompatible uses, inadequate transportation routes, environmentally sensitive areas, amenities and public values including parks and high Net Productivity Rating areas.

1. New operations are restricted in the extremely high Net Productivity Rating for agriculture area (Map 3 – Future Gravel Pit Locations). To ensure the preservation of good agriculture lands as mandated in the Municipal District, NPR soil point areas of 51-60 and 61-70 are not recommended for gravel pit development (Map 2- Net Productivity Rating Value).
2. New operations are restricted in preliminary well capture zones (Map 3 – Future Gravel Pit Locations). Gravel pit development and operations in well capture zones may contaminate groundwater.
3. New operations are restricted in the Shaftesbury Trail and Environmentally Sensitive Areas.

White zones are the permitted zones for gravel pit development and operations. This zone is subject to provincial and local government approval conditions. Within the white zone, Development Permits for gravel pits are to be as per the location and details of the site as submitted in their application to the municipality. All gravel pit developments must meet the setbacks required.

An applicant is required to submit a detailed statement demonstrating how the location of the proposed gravel pit does not impact the Municipal District's agricultural land, the Grimshaw Gravels Aquifer and surrounding land uses.



Land Use Regulations

3

LAND USE REGULATIONS

In addition to the existing land use regulations under the Municipal District's Land Use Bylaw No.1-98, as amended from time to time, additional land use regulations are suggested as attached in Appendices B and D. These additional land use regulations have been researched through the best practices of several municipalities on the governance of gravel pit operations and procedures.

A checklist of sample Development Permit approval conditions is also attached in Appendix E.



Conclusion

4

CONCLUSION/RECOMMENDATIONS

In 2006, sand and gravel extraction increased in the tonnage produced and revenue generated. Mineral aggregate demand in Alberta is expected to further increase due to the demands of construction and infrastructure activity (ERCB & AGS. 2007. Pp.7). Gravel is an important non-renewable resource commonly used in construction. Well planned gravel pit developments and operations are essential.

Gravel pit issues continue to grow. Urban and rural residents voice concerns related to the location and development of gravel pit operations. These concerns include water, soil and wind erosion, dust and noise nuisances, aesthetics, truck traffic and hours of operation.

To minimize the negative impacts of gravel extractions, Alberta Environment has provided solutions for reducing noise, dust and erosion often created by aggregate extractions. The mitigation measures are described in this report as well as in the "*A Guide to the Code of Practice for Pits*" by Alberta Environment.

Aside from the Municipality restricting gravel pit operations in certain areas and setting regulations, it is also the responsibility of the registered pit operation holders to engage and include local residents in the early stages of the planning process in voicing their concerns.

Based on the analysis expressed within this report, the Mackenzie Municipal Services Agency recommends:

1. That Council adopt the "Restriction Zones" for future gravel pit operation(s).
2. That Council consider initiating a public awareness and consultation process to support the identified "Restriction Zones".
3. That the Development Officer review and consider the following prior to issuing a Development Permit.
 - a. Appendix A:Draft Grimshaw Gravels Aquifer Sand and Gravel Mining Procedures
 - b. Appendix B:Land Use Regulations
 - c. Appendix C:Sand and Gravel Project Assessment Checklist
 - d. Appendix D:Checklist of Typical Municipal Development Permit Application Requirements for Sand and Gravel Operations
 - e. Appendix E:Sample Conditions for Development Permit Approvals of Sand and Gravel Operations

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APPENDIX A – DRAFT GRIMSHAW GRAVELS AQUIFER SAND AND GRAVEL MINING PROCEDURES

Grimshaw Gravels Aquifer Sand and Gravel Mining Procedures (provided by Alberta Environment).

Introduction

The Grimshaw Gravels Aquifer is an important water supply source in the Peace River Region. It is a major source of water for numerous landowners along with water co-ops and the communities of Grimshaw, Berwyn, Brownvale and Whitelaw. As documented in the PFRA report entitled “*Proposed Community-focused Management Strategy for the Grimshaw Gravels Aquifer*” (Earth Sciences Division, April 9, 1998), a large majority of the aquifer has been designated as areas with less than 4 metres (13.12 ft) of protective cover. In some areas the protective cover is minimal or non-existent which increases the potential for contamination of the aquifer during runoff and snow melt. Sand and gravel pits on the aquifer can significantly increase the potential point source contamination of the aquifer since the protective cover has been removed or reduced in thickness.

As a result, Alberta Environment, in conjunction with the Grimshaw Gravels Aquifer Management Advisory Association (GAMAA), developed site specific procedures for sand and gravel pits on the Grimshaw Gravels Aquifer as an attempt to prevent any further degradation of the Aquifer, either in terms of groundwater quantity or quality. Many of the procedures listed below were previously implemented under the former *Environmental Protection and Enhancement Act* approval process for Class I sand and gravel pits. Alberta Environment believes that it is important for current and future operators of sand and gravel pits on the aquifer to be aware of the environmentally sensitive nature of the aquifer and how all sand and gravel pit operators, regardless of the size of the operation, can aid in the protection of the aquifer by making operational changes at their pits.

Operators applying for registration under the *Code of Practice for Pits* should review the legislative requirements under the *Code of Practice for Pits*, and the general provisions in the Guide to the *Code of Practice for Pits*. These mining procedures have been developed and endorsed by Alberta Environment as an attempt to prevent any further degradation of the Grimshaw Gravels Aquifer, either in terms of groundwater quantity or quality, and are applicable to all Class I pits that overlie the Grimshaw Gravels Aquifer that require a registration under the *Code of Practice for Pits* (i.e., pits that are 5.0 hectares or greater in size). For future registration applications submitted under the Code of Practice, these procedures should be reflected in the application and the activities plan. Operators that have pits under 5.0 hectares (Class II pits) are strongly encouraged to follow these procedures.

For the purposes of this document, the area of the aquifer, including a buffer zone, has been defined as:

All lands in the following Townships and Ranges, west and north of the Peace River

TWP 85 - Rg 21-23 W5M

TWP 84 - Rg 21-24 W5M

TWP 83 - Rg 22-26 W5M and Rg 1-2 W6M

TWP 82 - Rg 24-26 W5M and Rg 1-3 W6M

TWP 81 - Rg 25-26 W5M and Rg 1-3 W6M

Extraction Depth (New Pits)

A minimum 3 metre, unmined buffer must be maintained between the high water table of the Grimshaw Gravels Aquifer and the bottom of the pit at all times.

Extraction Depth (Existing Pits)

If applicable, any further mining within the aquifer should be discontinued and a 3 metre aggregate buffer as outlined in item 1a) should be implemented and maintained.

For existing operations where mining within the aquifer has occurred and insufficient aggregate material is available for backfilling to re-establish the aquifer and the aggregate buffer as outlined in item 1a) under Extraction Depth (New Pits), registration holders should provide and implement a drainage plan demonstrating how surface drainage from adjacent lands can be prevented from draining into the exposed aquifer.

Hydro-geological Site Investigations

At the discretion of Alberta Environment and/or the municipality, the operator may require a hydro-geological site investigation conducted by a professional hydrogeologist prior to commencing operations at the pit to determine the appropriate number and location of monitoring wells, and the monitoring requirements. Discussion with the Municipal District and Alberta Environment is required.

Activities at a Pit

Activities that may cause an adverse effect, include but are not limited to those listed below:

Asphalt Plants;

Cold Mix Sites;

Spraying of Gravel Box Liners;

Salt Mixing

are to be located outside of the pit excavation in an area that has been stripped of topsoil and subsoil, but where a minimum of 2.75 metres of overburden or a synthetic liner exists, unless more stringent requirements are put in place by the municipality. A surface drainage control system must be installed surrounding these areas that includes a method of containment.

Fuel Storage Tanks

The Guidelines for Secondary Containment for Above Ground Storage Tanks are applicable if an above ground fuel storage tank is located on site. In addition, all fuel storage tanks should be located outside of the pit excavation that has been stripped of topsoil and subsoil, but where a minimum of 2.75 metres (9.02 ft) of clay overburden or a synthetic liner exists unless more stringent requirements are put in place by the municipality.

Use of Alternative Reclamation Materials

Unless otherwise approved by the Director, Registration holders should not use alternative reclamation materials during the reclamation of the pit location. As per the requirements of the *Code of Practise for Pits*, registration holders should not use any material other than topsoil, subsoil overburden, or reject excavated from the pit for reclamation of that pit. All reclamation materials being used at the pit must originate from the same pit to reduce the risk of any contaminated material being imported into the pit.

Exportation of Reclamation Material

As per the requirements of the *Code of Practise for Pits*, registration holders are not to use any topsoil that has been salvaged from the pit for any purpose other than the reclamation of the pit from which it was salvaged. Registration holders are to ensure that subsoil, overburden, or reject excavated from the pit are for reclamation of that pit rather than being exported out of the pit. This will aid in re-creating sufficient buffers and reclamation of the pit, and to aid in preventing impacts on the aquifer. All reclamation material originating within the pit must be properly salvaged as per the *Code of Practise for Pits* and conserved for future reclamation initiatives within the pit.

Surface Drainage during Operations and Final Reclamation

When developing the activities plans and reclamation plans for the pit, Registration holders should ensure that all surface drainage from adjacent lands is directed around the pit during operations and upon final reclamation. This will aid in protecting the aquifer from potential contamination as a result of surface runoff.

Reference: Alberta Environment. (2010). Grimshaw Gravels Aquifer Sand and Gravel Mining Procedures.

APPENDIX B – LAND USE REGULATIONS

Note: If necessary, additional requirements may be requested from the applicant (Appendix D).

1. Development Permit Applications for a gravel and/or sand pit development shall include the following (notwithstanding any other provisions in this bylaw):
 - a. Type of operation, i.e. dry pit, wet pit, crushing and screening, sand and gravel washing or other;
 - b. Proposed days and hours of operation;
 - c. Information pertaining to the location of access roads, power lines and pipeline rights-of-way within the immediate vicinity of the development;
 - d. Proposed hauling activities and roads;
 - e. A list of all significant topographical features (watercourses, rivers, topography etc.) within the boundaries of the parcel;
 - f. Proposed locations of the topsoil and overburden stockpiles and gravel stockpiles, including the proposed distances between the stockpiles;
 - g. Proposed location of all processing facilities, crusher, washing sites and plants;
 - h. A written description of the measures that will be undertaken on the parcel to minimize dust and emissions generated from the operation. The description will include:
 - i. Dust suppressant materials or methods
 - ii. Estimated frequency for the application of dust suppressant material
 - iii. Number of trucks that will be used for gravel hauling operations.
 - i. A written description of the measures that will be undertaken to address noise nuisance from the gravel pit operation. Description will include:
 - i. Typical methods that will be used to ensure noise levels do not exceed minimum acceptable noise levels.
 - ii. Methods that will be used for monitoring the noise at the pit.
 - iii. Hours of operation and specified days of the week.
2. Extraction setbacks should be identified in the site plan submission as part of the application for a Development Permit by the applicant.
3. A 3 metre (9.84 ft) undisturbed buffer zone from the property line must be identified in the site plan submitted by the applicant.

4. 30 metre (98.42 ft) setbacks are required from river sections that are relatively linear, 60 metre (196.85 ft) setbacks are required from river sections located on the outside of river bends and 20 metre (65.61 ft) setbacks are required from watercourses. These setbacks must be identified in the site plan submitted by the applicant.
5. Gravel pit developments located in the Grimshaw Gravels Aquifer shall follow the procedures identified in the Grimshaw Gravels Aquifer Sand and Gravel Mining Procedures.
6. The gravel pit must be landscaped in such a manner as to limit noise from the development and operations to ensure the safety of the public, which may include the installation of a fence around the perimeter of the excavation area.
7. At the discretion of the Development Officer, a Traffic Impact Assessment may be required.
8. A 70 metre (229.65 ft) setback from the centerline of the highway to the excavation site or 40 metre (131.23 ft) setback from property line to the excavation site is required, whichever is greater.

APPENDIX C – SAND AND GRAVEL PROJECT ASSESSMENT CHECKLIST

This checklist is a more detailed breakdown of the guidelines and standards for controlling future gravel pit operations identified in the report. The list of questions provided below can be used to evaluate potential sand and gravel development proposals.

Planning

- ☐ Are aggregate resources in the MD protected through long-term planning?
- ☐ Will the sand and gravel development conflict with other land uses, and long-term priorities for the community?
- ☐ What is the present land use on the proposed sand and gravel excavation site?
- ☐ What are the adjacent land use(s)?
- ☐ What is the total area that will be disturbed by the pit operation over its lifespan?
- ☐ What is the projected lifespan of the sand and gravel deposit/operation?
- ☐ What is the maximum area that will be disturbed at any one time?
- ☐ Will the operation be a net benefit to the community?
- ☐ What is the nearest Village, Town or City and its distance from the proposed pit?
- ☐ Will the pit be located adjacent to a highway?
- ☐ If the pit has direct access to a provincial highway, has Alberta Transportation been contacted for a Development Permit?
- ☐ Are the lands within 800 metres (½ mile) of a surveyed road allowance?
- ☐ Will access roads be constructed for the pit?
- ☐ Will any road construction or road upgrading be necessary to access the pit's working area?
- ☐ Will the proposed pit affect any other property rights-of-way?

Regulatory Considerations

- ☐ Have the requirements of other regulatory agencies been met?
- ☐ Does the proposed operation comply with:
 - ☐ the Municipal Land Use Bylaw?
 - ☐ the Municipal Development Plan?
 - ☐ Area Structure Plans?
 - ☐ Other municipal bylaws and policies?
- ☐ Have the Development Authority's (the MD) requirements for the issuance of a Development Permit been met?
- ☐ Is there a provision for the renewal of the Development Permit, provided certain conditions have been met, after a set period of time?
- ☐ Is a re-designation required under the Municipal Land Use Bylaw (LUB) to locate the sand and gravel operation in the preferred area?
- ☐ Does the pit development affect a temporary or permanently occurring waterbody? (Alberta Water Act and the Public Lands Act)
- ☐ Does the pit operation require water removal from a stream or the diversion of a watercourse? (License under the Water Act required)
- ☐ Will the operation affect migratory bird flight paths or habitat? (Federal Migratory Birds Act)
- ☐ Will the operation impact the habitat of an endangered or threatened species? (Federal Species at Risk Act)
- ☐ Is there a wellsite or pipeline within 91.44 metres (300 ft) of the proposed pit site?

Mitigation of Impacts

- ☐ Have mitigation measures been identified regarding various identified impacts?
- ☐ Have certain aesthetic requirements, including buffering and screening been incorporated into the Development Permit Application and/or the Activities Plan under the *Code of Practice for Pits*?
- ☐ Has the applicant agreed to install adequate warning and identification signage around the pit and on haul roads to the satisfaction of the MD and as a condition of the granting of the Development Permit?

- Has the applicant agreed to enter into an industrial haul agreement with the MD including any or all of the following provisions:
 - Operational hours for hauling?
 - Dust control measures on access roadway?
 - Participation in the Alberta Sand and Gravel Association central truck registry?

Communication

- Have all residents directly affected by the proposed gravel pit development and operations (those adjacent and within 2 kilometres of the pit property) been personally interviewed and notified in writing of the intent to develop the site?
- Is there a plan in place to notify directly affected residents prior to activation of pit operations?
- Have one or more open houses been held in the community?
- Has input from citizens been integrated into the proposal for a Development Permit?
- Are there provisions for affected residents to be consulted (on an annual basis) throughout the lifespan of the sand and gravel operation?

Pit Operations

- Has an area been designated on the site for all servicing, fueling and rinsing of trucks?
- Will this area be suitably lined to prevent permeation of contaminants into the soil?
- Will this area be graded to prevent surface water from entering the site?
- Are plans in place to install containers to collect used oil and filters?
- Are provisions in place for trash collection and removal that are acceptable to the MD?
- Are there on-site provisions for on-site sewage disposal?
 - Portable toilets?
 - Other?
 - Sewage hauling and removal protocols?

- Is there a workplan, which when used will reduce risk and minimize or mitigate impacts from the sand and gravel operation?
- Does the workplan clearly designate:
 - The proposed development area?
 - Extraction locations?
 - Stockpile locations?
 - Production, washing, crushing locations?
 - Topsoil and subsoil salvage and replacement?
 - Surface and groundwater management measures?
- Is there a reclamation plan that includes final grades, slopes and elevations as well as final land use?
- Does the reclamation plan show cross-sections of existing lands and proposed post-reclamation land?
- Is the reclamation plan and post-development land use consistent with the MD's Area Structure Plan and Municipal Development Plan?
- Have royalty agreements/arrangements been made with landowners?
- Have hours of operation been established in accordance with MD policy or accepted practice for:
 - Stripping operations?
 - Mining/crushing/washing operations?
 - Asphalt production?
 - Concrete production?
 - Hauling operations?
- Has a list of equipment to be used on-site for the pit operation as well as expected times such equipment would be utilized been provided?
- Will sand and gravel washing, pit dewatering or wet pit excavations take place?
- Will any chemicals be used for pit operations?
- Will an asphalt or concrete plant be part of the pit operation?

Environmental Considerations

- Has an assessment of the potential environmental impacts of the proposed operation been conducted? Does it consider:
 - Climatic conditions?
 - Topography?
 - Soil types and their erosion potential?
- Has an Environment Construction Operations (ECO) Plan been established detailing how used oil, filters and accidental spills will be dealt with?

Trucking and Haul Routes

- Have haul routes been established and agreed to?
- Has the number of gravel trucks that will be operating been agreed to?
- Has a traffic assessment been undertaken to address potential traffic issues?
- Are gravel truck operators required to be part of the Alberta Sand and Gravel Association (ASGA) Registry?
- Has a moratorium been placed on hauling during spring road bans of 75% or less?

APPENDIX D – CHECKLIST OF TYPICAL MUNICIPAL DEVELOPMENT PERMIT APPLICATION REQUIREMENTS FOR SAND AND GRAVEL OPERATIONS

The list provided below can be used as a checklist for a Municipal Development Permit Application for Sand and Gravel Operations.

- ☐ Site Plan drawn to scale showing:
 - ☐ Legal description of site;
 - ☐ Dimensions of site;
 - ☐ Other land that may be used in conjunction with the proposed development;
 - ☐ The location of existing and proposed buildings (whether on permanent or temporary foundations), wells, septic tanks, disposal fields, dugouts, lagoons, culverts, and crossings that may be used in conjunction with the development; and
 - ☐ Height, dimensions, and relationship to property lines of all existing and proposed buildings and structures.
- ☐ Other land ownership included in the development supported with signed consent.
- ☐ Utilities, site drainage, existing and proposed grades, grades of roads and sewer servicing.
- ☐ Number of years the sand and gravel pit is proposed to be in operation.
- ☐ Total amount of sand and gravel to be mined out.
- ☐ Projected operating procedures for the pit.
- ☐ Number of people to be employed by the sand and gravel pit operation.
- ☐ Anticipated generation of motor vehicle traffic on a daily, weekly, or monthly basis.
- ☐ Number of vehicles that will be used in the hauling of materials and the proposed hauling route to and from the site.
- ☐ Types and numbers of equipment to be used for each activity.
- ☐ Access locations to and from the site, including roads and highways, traffic generation on each of those roads and highways.
- ☐ Dust control measures to be implemented, including suppressant materials or methods to be used either on the pit floor or on stockpiles and the estimated frequency of applying suppressant materials.

- ❑ The projected impacts of plant (asphalt, gravel crushing, concrete or other) dust or emissions and the methods to be used for controlling such dust or emissions.
- ❑ Frequency for cleaning settled dust from in or around gravel crushing plants.
- ❑ Provisions for loading and parking.
- ❑ Descriptions of any noxious, toxic, radioactive, flammable or explosive materials proposed.
- ❑ Garbage and storage areas and fencing and screening proposed for same, and methods of disposing of garbage.
- ❑ Provision of a written security plan that identifies dangerous situations or areas, typical procedures to be used for monitoring the site during periods of activity and also when activities are suspended.
- ❑ Methods to be used to restrict public access and to protect wildlife, neighbouring livestock and domestic animals.
- ❑ Quantity and quality of well water and soil tests for the system that may be used in conjunction with the proposed development.
- ❑ Amount of water required for the proposed development on a daily, weekly or monthly basis and proposed water source.
- ❑ Engineering feasibility studies on the method of water supply.
- ❑ Engineering feasibility studies on the method of effluent disposal.
- ❑ Profiles and cross-sections showing the original ground level, the proposed depth of any excavation, the finished grade elevation, the depth of over-burden and water table elevations.
- ❑ The method intended to be used for the excavation of the materials contained in the land, back-filling, terracing, compacting, leveling, reclaiming the site and equipment to be used in connection therewith.
- ❑ Reclamation plans and the projected final use of the site.
- ❑ The method to be used for supporting any pit walls.
- ❑ Methods of controlling noise, dust, or drainage from the site, both during and after completion of the operation.
- ❑ Size, number and location of stockpiles of topsoil, overburden and gravel.
- ❑ The days and hours of operation for each activity and any known or regular period of inactivity.

APPENDIX E – SAMPLE CONDITIONS FOR DEVELOPMENT PERMIT APPROVALS OF SAND AND GRAVEL OPERATIONS

1. The applicant is to comply with all requirements of Alberta Environment, including any registrations, permits and approvals. Proof of compliance with said requirements are to be submitted to the Development Officer.
2. This permit is subject to the community aggregate payment levy, the amount of which is to be set by the Municipal District (25 cent levy per tonne).
3. The area being mined is to be staked at all times.
4. All equipment and activity relating to the mining and crushing shall take place in the areas approved for gravel extraction.
5. Reclamation and rehabilitation of the pit shall be to the satisfaction of Alberta Environment and in accordance with the Environmental Protection and Enhancement Act and the Conservation and Reclamation Regulation. Proof of compliance with reclamation requirements shall be submitted to the Development Officer.
6. Any structures or equipment on the land are to be removed upon expiry or cancellation of this permit.
7. Where, in the process of development, areas require leveling, filling or grading, the topsoil and subsoil shall be removed before work commences, stockpiled and replaced following the completion of the work.
8. No topsoil or subsoil is permitted to be hauled off of the said property.
9. Hours of operation are restricted to _____ a.m to _____ p.m. Monday through Sunday.
10. The applicant shall ensure that dust and noise control measures are undertaken to prevent such items from becoming an annoyance to neighbouring landowners.

11. The applicant shall conduct dust control procedures at the request of and to the satisfaction of the Development Officer.
12. Stockpiles shall be located in a position to act as a sound barrier where possible.
13. The applicant shall apply methods of minimizing the noise created from machinery and equipment.
14. The applicant shall keep the area subject to the Development Permit in a clean and tidy condition free from rubbish and non-aggregate debris.
15. The applicant shall locate appropriate traffic and safety signage on and about the subject site and road accesses.
16. Access routes into extraction areas shall be located away from residential areas.
17. A disturbed area shall be reclaimed to a land capability equivalent to the pre-disturbance land capability or to a post-disturbance condition and land use satisfactory to the Development Officer.
18. For pits which are less than 5 hectares in size, the applicant must enter into a surface restoration agreement with the Municipal District and provide a security deposit based on the cost of reclamation to the satisfaction of the Municipal District.
19. Contravention of any conditions of development approval may result in the municipal Council authorizing the cancellation of this Development Permit or jeopardizing the renewal of same.
20. The sand and gravel operation is required to comply with all municipal bylaws and setback requirements.
21. No development, disturbance or alteration of a surface water body is permitted without obtaining the necessary provincial approvals under the *Water Act*. Evidence of a *Water Act* approval or license must be provided to the Development Officer.
22. All reasonable measures must be taken to control erosion in the area of the sand and gravel operation.

23. A Roadside Development Permit must be obtained from Alberta Transportation and all conditions of such permit must be fulfilled.
24. Any required building, electrical, gas and plumbing permits must be obtained.
25. A minimum unmined buffer of 3 metres (9.84 ft) must be maintained between the high water table of the Grimshaw Gravels Aquifer and the bottom of the gravel pit at all times.
26. The applicant must have a hydrogeological site investigation conducted by a professional hydrogeologist prior to commencing operations at the gravel pit to determine the appropriate number and location of monitoring wells, and the monitoring requirements. Consultation with the Municipal District and Alberta Environment is required.
27. The applicant must develop and comply with a monitoring plan as directed and agreed to by the Municipal District and Alberta Environment.
28. A drainage plan must be provided and implemented to ensure that surface drainage from adjacent lands can be prevented from entering into the aquifer.
29. The concrete plant must be located outside of the pit excavation, in an area that has been stripped of topsoil and subsoil, but where a minimum of 2.75 metres (9.02 ft) of overburden or a synthetic liner exists. Independent verification of compaction must be provided. A surface drainage control system that includes a method of containment must be installed surrounding the concrete plant.
30. The asphalt plant must be located outside of the pit excavation, in an area that has been stripped of topsoil and subsoil, but where a minimum of 2.75 metres (9.02 ft) of overburden or a synthetic liner exists. Independent verification of compaction must be provided. A surface drainage control system that includes a method of containment must be installed surrounding the asphalt plant.
31. The asphalt oil storage tanks and fuel storage tanks must be located outside of the pit excavation, in an area that has been stripped of topsoil and subsoil, but where a minimum of 2.75 metres (9.02 ft) of overburden or a synthetic liner exists. Independent verification of compaction must be provided. A surface drainage control system that includes a method of containment must be installed surrounding the storage tanks.

32. Activities that may cause an adverse effect, including but not limited to the following: salt mixing areas, cold mix sites, and spraying of box liners with hydrocarbon or salt type compounds must be located outside of the pit excavation in an area that has been stripped of topsoil, but where a minimum of 2.75 metres (9.02 ft) of overburden with the top 0.5 metres (1.64 ft) compacted to 98% or a synthetic liner exists. Independent verification of compaction must be provided. A surface drainage control system that includes a method of containment must be installed surrounding these areas.
33. All noxious weeds must be controlled.
34. No storage of herbicides or pesticides is permitted within the pit excavation, or on overburden that is less than 2.75 metres (9.02 ft) thick above the aquifer.
35. Gravel washing is not permitted within the mined pit area.
36. When deemed necessary by the Development Officer, appropriate buffering or screening shall be required adjacent to Highway _____.

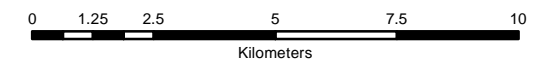


**Municipal District of Peace
No. 135
Map 1: Gravel Pit Sites**

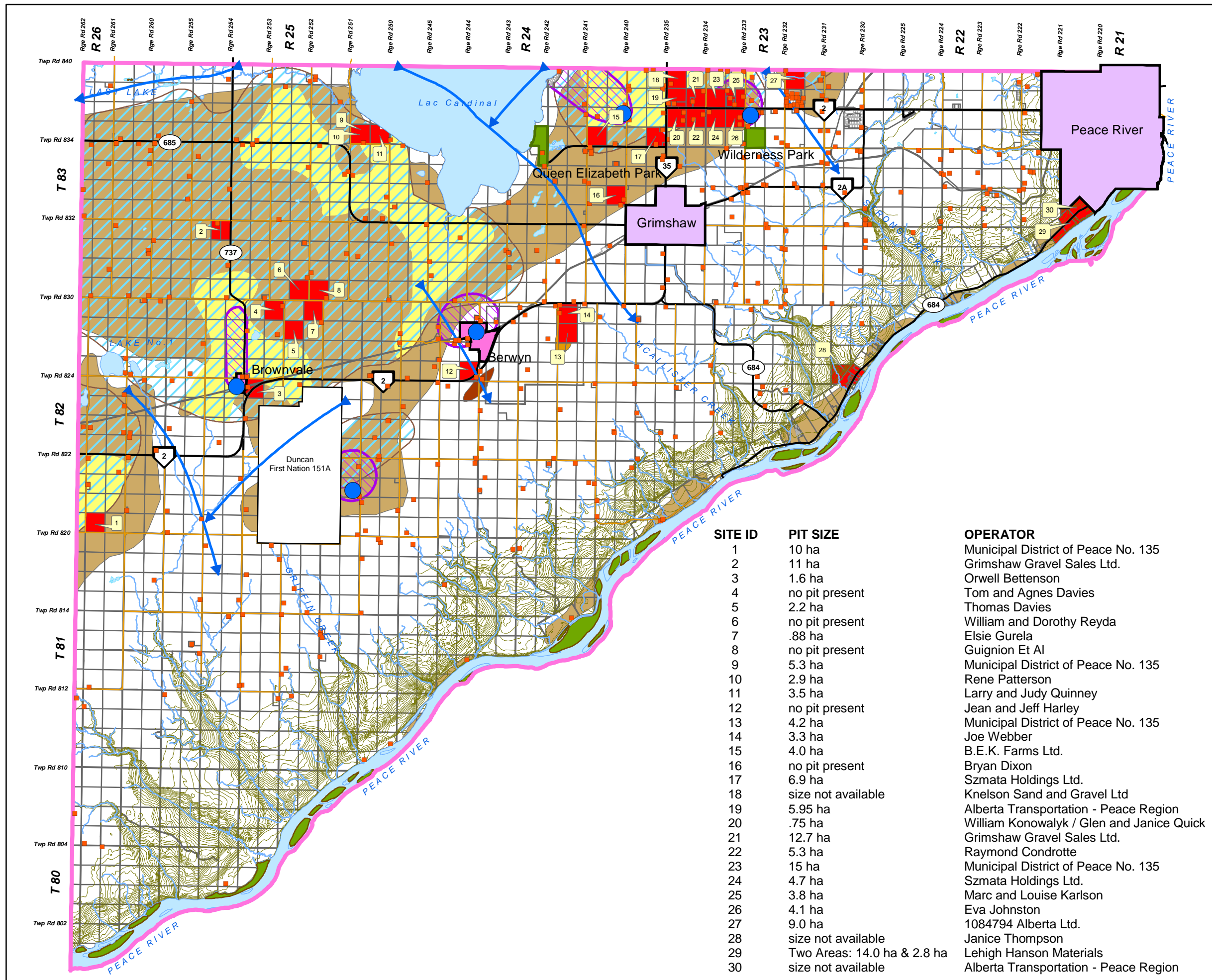
Resource type in relation to
extraction sites

- Gravel Pit Site*
- Grimshaw Gravel Aquifer
- Provincial or Other Park
- Clean Gravel
- Clean Gravelly Sand
- Unknown Sand and Gravel
- Preliminary Well Capture Zone
- Areas Vulnerable to Contamination (<4m Drift Cover)
- Ravines and Environmentally Sensitive Areas
- Approximate Groundwater Flow Direction
- Highway
- Municipal Roads
- River or Stream
- Municipal Well
- Rural Residence and Developed Building

*Note: All gravel pit sites are represented by quarter sections or lots



December 15, 2010

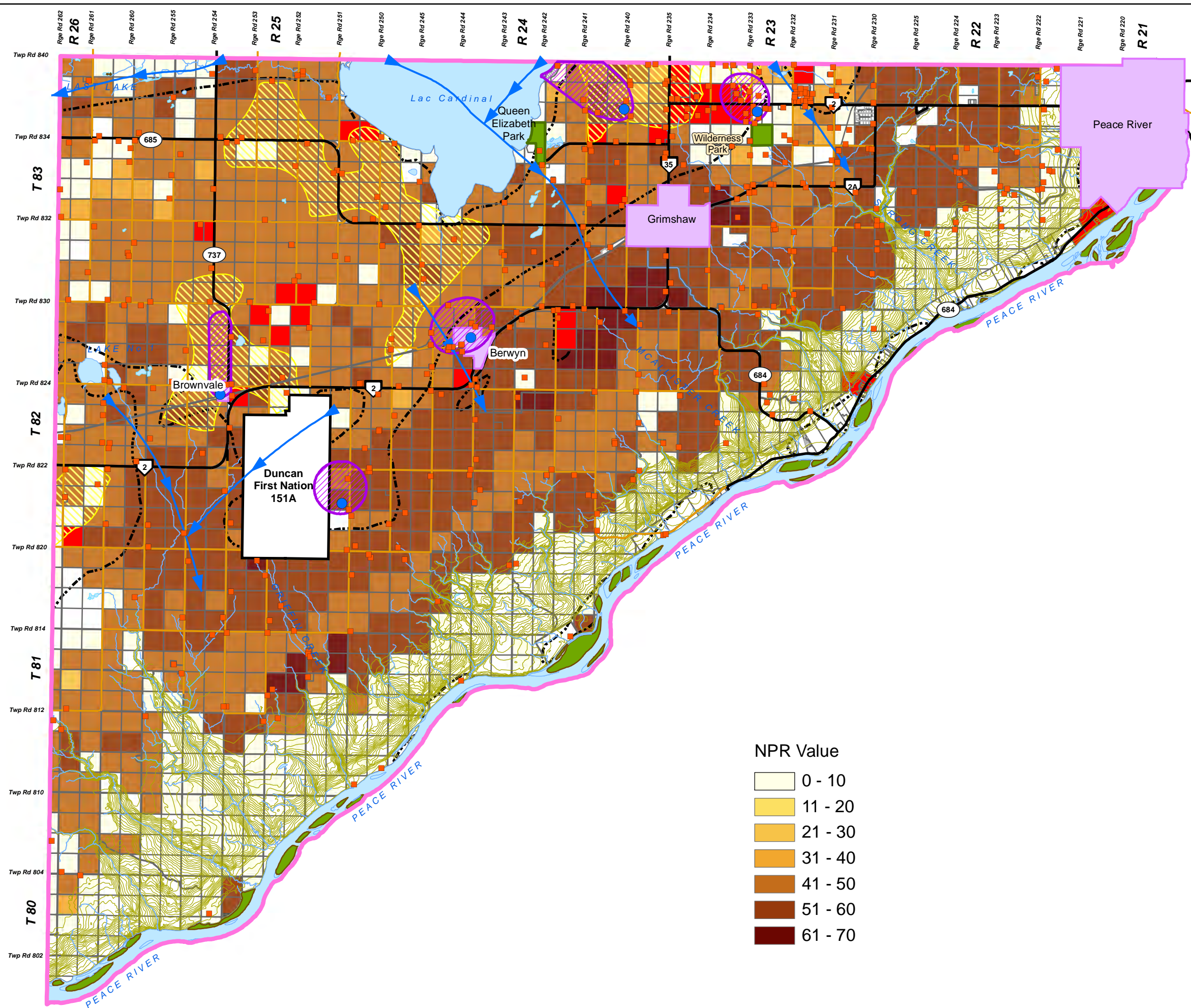




Municipal District of Peace No. 135

Map 2: Net Productivity Rating

Soil type in relation to
extraction sites



- Provincial or Other Park
- Gravel Deposits
- Preliminary Well Capture Zone
- Areas Vulnerable to Contamination (<4m Drift Cover)
- Ravines and Environmentally Sensitive Area
- Approximate Groundwater Flow Direction
- Highway
- Municipal Roads
- River or Stream
- Municipal Well
- Rural Residence and Developed Building
- Gravel Pit Site*

*Note: All gravel pit sites are represented by quarter sections

NPR Value

- 0 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- 61 - 70



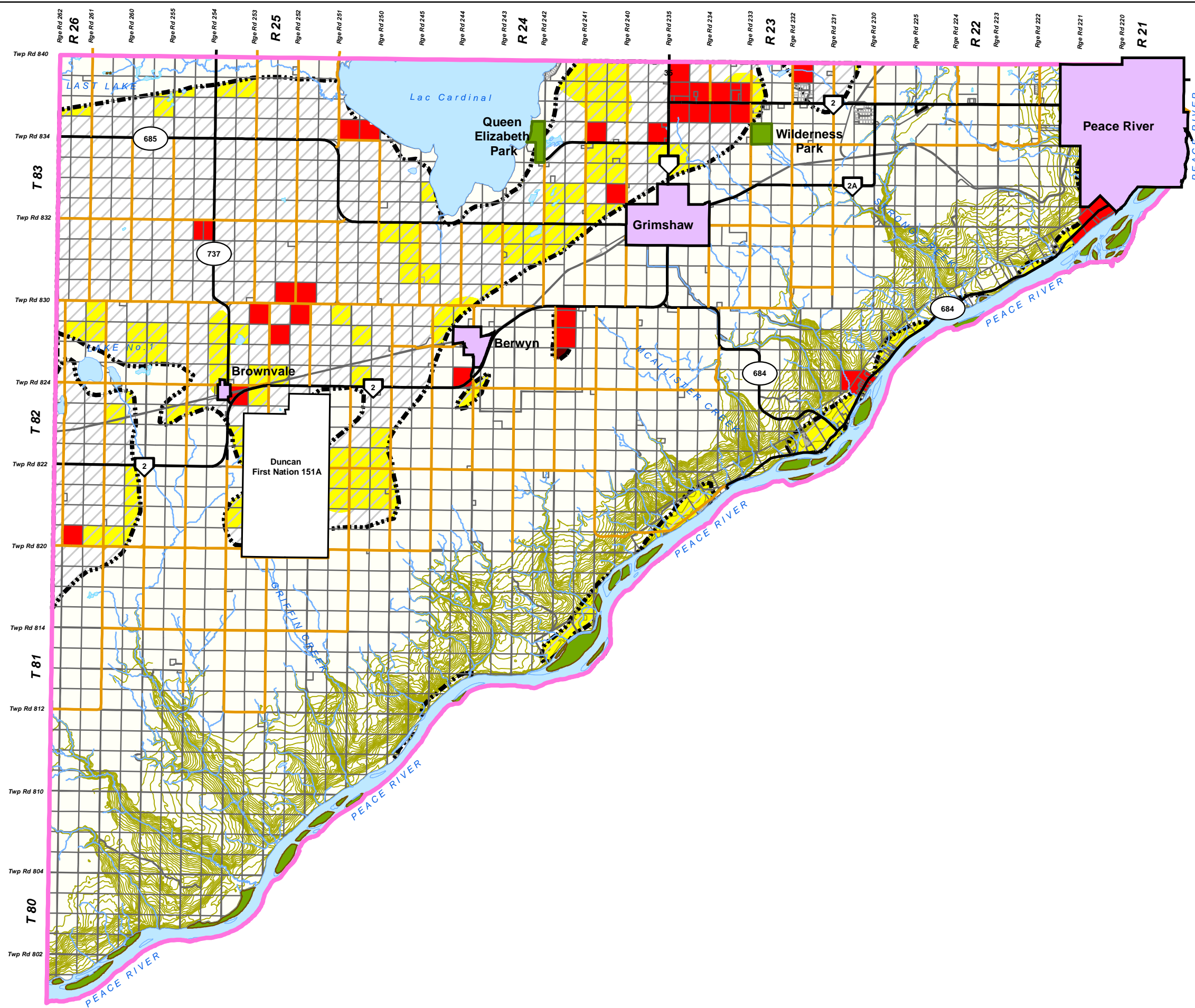
0 1 2 4 6 8
Kilometers



December 15, 2010



Municipal District of Peace No. 135 Map 3: Future Gravel Pit Location

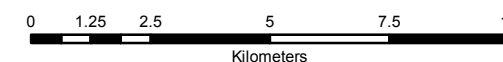
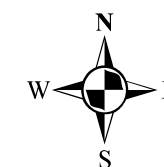


- Yellow square: Restriction Zone within Gravel Deposit
- Red square: Gravel Pit Site*
- Green area: Provincial or Other Park
- Dashed line: Gravel Deposits
- Hatched area: Ravines and Environmentally Sensitive Areas
- Thick black line: Highway
- Orange line: Municipal Roads
- Blue line: River or Stream

*Note: All gravel pit sites are represented by quarter sections

Restriction zones are based on one or more of the following criteria:

1. High NPR (51 – 70)
2. Well Capture Zones
3. Areas along Shaftesbury Trail



December 15, 2010