

An aerial photograph showing a two-lane asphalt road winding through a dense forest of green trees. To the right of the road, there are large, open agricultural fields with varying shades of green and brown, suggesting different crops or stages of growth. The overall scene is a mix of natural and agricultural landscapes.

Jurisdictional Scan

AGGREGATES AND AGRICULTURE: UNDERSTANDING THE IMPACTS OF AGGREGATE PRODUCTION ON AGRICULTURE AND IDENTIFYING MITIGATING STRATEGIES

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Introduction

As part of the research, this project has produced a scan of other jurisdictions' approaches to aggregate extraction policy to better understand the effect of aggregate policy on Ontario's agricultural production. We have therefore examined a number of jurisdictions that are socially, culturally and economically similar to Ontario, including the policies and best management practices of two provinces, Alberta and British Columbia, the United Kingdom, and three states in Australia. Aside from these jurisdictions all having significant legislation governing the extraction of aggregate and other minerals, each one has produced, either the state itself, or the state in collaboration with an aggregate production association, a *Code of Practice*, often accompanied by a guide to the code of practice, as in the cases of Alberta and BC, for leading prospective aggregate producers through the permitting process for aggregate operations, including recommended best practices for pit siting, operation and final reclamation. These guides provide a sense not only of the legislation pertinent to aggregate extraction, but they also demonstrate the states' concern for the aggregate industry's integration into the surrounding communities as the best practices demonstrate how aggregate operations' presence is perceived in terms of effects on the land and the local communities.

The most significant observation is the almost total disconnect between aggregate policy and its attendant guidance regarding agricultural production and practice. While a number of the codes and guides demonstrate an implicit awareness that aggregate extraction occurs primarily on agricultural land and provide a clear imperative for returning the exhausted pit to agricultural use, there appears to be little concern for agriculture as a productive, neighbouring industry. Each of the guides clearly articulates at all stages in the process – pre-production, in-production and post-production – a deep concern for effective reclamation and return of the land to agricultural production. The second most critical issue appears to be concern for and avoidance of ecological damage in the operation of the pit, as all jurisdictions scanned similarly

demonstrate awareness that aggregate extraction disrupts local ecosystems with the potential for significant environmental damage, all of which recommend developing plans for mitigating potential damage or providing offsets for any damage that may occur. Some form of environmental assessment is recommended in most guides and species at risk are directly mentioned in each. The final area of concern is what the Australian states refer to as *environmental concerns*, which in this case generally refers to social nuisances created by pit operation which impact residential neighbours. Issues such as dust, noise, and traffic receive attention, but seem to be recognised primarily as quality of life issues rather than for their potential impacts on agricultural productivity. Overall, agriculture does not appear as a significant concern in these guides.

The results of these scans are presented below and show a summary of key advice provided by each jurisdiction to prospective aggregate operators.

Jurisdictional Scans

Alberta

Alberta's economy is primarily resource based, with the energy and mining sector generating approximately \$80 billion in 2020 (Alberta, 2021). According to the Alberta Sand and Gravel Association (ASGA, 2018), aggregate production contributed \$480 million to the province's GDP (in 2015), which is about half that of the beef industry (ASGA, 2018) and compares favourably with Ontario's aggregate output at approximately 35 million tonnes to Ontario's 63 million tonnes estimated output for 2020 (GC, 2021). Overall, agriculture is a crucial industry in Alberta and exports approximately \$12 billion annually of agricultural products (AAF, 2020). Alberta is split into two land administration areas: the Green Area, comprising approximately 60% of Alberta's lands, is sparsely populated and primarily favours grazing and rangeland agricultural activities

carried out on crown lands, while the White Area surrounds the major cities, largely focused on the Edmonton – Calgary corridor, as well as the other major cities, and mixes livestock agriculture with crop production on predominantly privately held lands.

Two sets of legislation form the basis of aggregate and agricultural regulation in Alberta. The 2009 *Alberta Land Stewardship Act* (ALSA) addresses agricultural land use and is focused on agricultural land preservation in terms of reducing fragmentation and increasing the overall quality of agricultural land. Alberta's approximately 2,600 aggregate pits (ASGA, are regulated by the *Environmental Protection and Enhancement Act* (EPEA), which is directed at the entire resource sector. The aggregate industry is also subject to the *Water Act*, which regulates Alberta's waterways and water bodies, all of which are property of the Province. A separate *Code of Practice for Pits* and the *Conservation and Reclamation Regulation*, both of which are derived from the EPEA, have been produced by the Alberta Environment Sand and Gravel committee to direct the planning, operation and rehabilitation of aggregate pits in Alberta. It is also important to note that while aggregate extraction itself is provincially mandated in Alberta, important aspects of the aggregate extraction operation such as siting, hours of operation, buffers, noise and dust control, and haul routes and traffic are municipal responsibilities. Perhaps most significant in Alberta is the almost total separation of aggregate extraction and agricultural land use legislation.

Alberta Environment's (2004b) *Guide to the Code of Practice for Pits* promotes the principle of "continuous improvement" in the aggregate industry by "continuously review[ing] operating practices and equipment with the objective of improving environmental performance" (p. 4). The *Code* (AE, 2004a) and the *Conservation and Reclamation Regulation* (Alberta, 2021) set out clear parameters for operators to plan, operate and reclaim aggregate pits which have been transformed into a coherent set of best practices in the *Guide*. However, these best practices tend to frame the relationship between aggregate production and agricultural production in

terms of the pits' final disposition in terms of reclamation planning, rather than in-production relationships.

Best Management Practices

The *Guide's* best practises can be separated into three broad categories: pre-production, in-production and post-production. Pre-production best practices focus primarily on planning, with attention paid to potential ecological impacts and avoiding any serious damage. There is also a close focus on working with the landowners to secure permissions and then to prepare for the final disposition of the lands once the pit is exhausted, including a site grading and revegetation plan.

- Prepare a detailed plan for pit operation and for ultimate reclamation, taking into consideration post-extraction land-use. This must include a pre-extraction map of soils qualities and depths, as well as soil depths above water table.
- Carefully assess the proposed site for environmentally sensitive features and plan for their avoidance/impact mitigation. Be especially aware of rare species (Species at Risk) and perform a rare species survey, if warranted. (AE, 2004b)

It is also strongly recommended at this point to engage local residents (urban and rural) early in the planning process to understand and address their concerns and “describe the operating plans and environmental protection measures that will be employed, including the final reclamation goals for the pit” (AE, 2004b, p. 36). It is specifically recommended that this communication be maintained throughout the life of the pit.

In-production BMPs include monitoring pit water quality (total suspended solids, pH and hydrocarbons) and carefully managing the salvaged soils for eventual reuse.

- Topsoil should be maintained no less than 5m and subsoil no less than 3m from the pit face to avoid soil loss/erosion.
- Salvaged soils must be stockpiled separately and in such a way as to limit or prevent erosion of the soil and to facilitate its replacement in reclamation. (AE, 2004b)

It is also highly recommended that progressive rehabilitation be begun at this time to ensure that the site is reclaimed as quickly as possible following exhaustion of the deposit.

Post-production BMPs focus almost entirely on the return of the land to agricultural use. The *Code* clearly specifies that salvaged soils should be returned in such a way that *the land is returned to at least the same CLI class* as it was prior to extraction activities (AE, 2004b, p. 23). Guidance is provided that land intended to be returned to cropping should be graded to a slope no greater than 10:1, and for land to be returned to forage production a slope of 6:1 is acceptable, both of which reinforce the recognition of the close connection between aggregate and agricultural production. Finally, Alberta's *Code* specifies that all records must be retained for a minimum of five years once the site is certified as rehabilitated for final use (AE, 2004a).

British Columbia

British Columbia's economy is also largely resource-based, with agriculture limited to a number of fertile pockets and regions, such as the Fraser Valley and the Okanagan, which are formally identified as Agricultural Land Reserves (ALR) (ALC, 2014). The Agricultural Land Commission (ALC) protects these lands by ensuring that agriculture is regarded as primary over all other uses, and extends extra protections to the lands' agricultural potential. Most policies in this act focus on limiting disturbance of agricultural land, unless the land transformation is in the service of agricultural production. This act, in combination with parts of other acts, guarantees rehabilitation of land within ALRs to pre-extraction levels of productivity. Aggregate policy tends

to focus on local disturbances (nuisances) and environmental issues, but is written largely to address community disruption, rather than directly addressing impacts on agriculture except for specifying rehabilitation outcomes in terms of agricultural production outcomes. For example, ALC Policy P-13 (2021) states, in part, that “Reclamation is a very important consideration when determining if an aggregate extraction activity is consistent with the commission’s mandate of preserving agricultural land for farming and ensuring that this use will not negatively impact future agricultural production.”

Best Management Practices

Aggregate extraction is regulated by a number of separate departments, ministries and agencies at federal, provincial and local levels, and by a similarly large and diverse number of legislations, such as the *Mine; Local Government; Wildlife; Waste Management; Land; Soil Conservation; Forest Land Reserve; Highway; Forest; Range; Forest Practices Code; Heritage Conservation; Water; and Environmental Assessment* Acts. However, specific regulations relating to agriculture within these legislations tend to be limited to regulations such as:

- Aggregate removal without a permit cannot exceed 500 m³ and rehabilitation must occur in accordance with good agricultural practice as soon as reasonably practicable. (ALC, 2021)

As of the writing of the *Aggregate Operators Best Management Handbook for British Columbia* in 2002, BC is moving toward a best management practices approach to aggregate extraction and, as such, has produced multiple guidance documents. The most comprehensive is the two volume *Aggregate Operators Best Management Practices Handbook for British Columbia* (MEM, 2002a & 2002b) produced by the Ministry of Energy and Mines, which outlines reasonable operational practice for BC aggregate operations. It is accompanied by the *Environmental Objectives and Best Management Practices for Aggregate Extraction* handbook

prepared by the Ministry of Water, Land and Air Protection for the Vancouver region (Bracher, 2002). Agriculture does not figure explicitly in British Columbia's BMPs, which tend to be focused on production capacity, as well as good neighbourly relations.

In the pre-production stage of aggregate planning, the Handbook recommends that producers make themselves aware of potential disturbances to the human and ecological environments and that they focus specifically on planning for reclamation. As such, they should:

- Prepare a comprehensive plan to be submitted with the initial permit application, showing the configuration of the site upon completion.
- Survey soil characteristics, including consistency and depth above bedrock in preparation for rehabilitation.
- Prepare biological inventories for proposed extraction area, respecting especially sites with rare or sensitive ecosystems. (MEM, 2002a)

In-production, agriculture related BMPs shift to the recommendation to engage in progressive rehabilitation, with the bulk of recommendations focusing around social nuisances and the potential for environmental damage:

- Ensuring appropriate water treatment using mechanical and biological means.
- Ensuring erosion control, and dust and noise management.
- Avoiding site contamination with fuel through responsible storage and transfer. (MEM, 2002b)

Post-production, BMPs shift to reclamation, focusing on the site's final disposition. While replanting is a core focus, agriculture is not explicitly mentioned at this phase. Instead, the focus appears more to favour return to naturalised habitat:

- Sites should be revegetated using native species; large nursery stock is preferred to accelerate return to pre-production state. Fall and spring planting is recommended to maximise survival; plant survival should be monitored, with replanting to remediate poor survival. (MEM, 2002b)

United Kingdom

Aggregates extraction is regulated in the United Kingdom in part by the Minerals Planning Authority (MPA), as well as by local county councils and either the unitary authority or the national park authority, creating a multi-level structure which manages access to mineral reserves with the mandate of ensuring ongoing access to these critical resources. Due to the UK's high population density and island status, it is especially crucial to carefully safeguard aggregate reserves from sterilisation by development, which prioritises continued access to and working of aggregate deposits. The British Geological Society's *Open Report: Managing aggregates supply in England* states that "A key objective for mineral planning in MPS1 and a central force shaping the purpose of the managed aggregates supply system, is 'to secure adequate supplies of minerals needed by society and the economy within the limits set by the environment, assessed through sustainability appraisal, without irreversible damage'" (Gunn, et al., 2008, p. 10, emphasis in original). Much of the legislation surrounding aggregate supply consequently favours access and extraction activities and thus much of the legislation and guidance is contingent on local working conditions. In spite of its similar importance, agriculture receives little direct mention in minerals legislation or guidance documents, being addressed primarily through reference to environmental effects or nuisances and end-uses of minerals extraction sites.

Best Management Practices

The Ministry of Housing, Communities & Local Government produced a minerals extraction planning guide, *Guidance on the planning for Mineral Extraction in Plan Making and the Application Process* (2014), which recommends (in part) that prospective extraction operations take into consideration that:

- working is a temporary use of land, although it often takes place over a long period of time;
 - working may have adverse and positive environmental effects, but some adverse effects can be effectively mitigated;
 - since extraction of minerals is a continuous process of development, there is a requirement for routine monitoring, and if necessary, enforcement to secure compliance with conditions that are necessary to mitigate impacts of minerals working operations; and
 - following working, land should be restored to make it suitable for beneficial after-use.
- (MHCLG, 2014, para 001)

The planning guide recommends that future aggregate development considers potential negative environmental outcomes that will affect all neighbours and that they consider all potential stakeholders in their planning process.

Minerals operators should look to agree [to] a programme of work with the mineral planning authority which takes into account, as far as practicable, the potential impacts on the local community and local environment (including wildlife), the proximity to occupied properties, and legitimate operational considerations over the expected duration of operations. (MHCLG, 2014, para 015)

The guide lists common nuisances that should be incorporated into the operational plan, such as operational noise, dust, air quality, lighting, visual impact, landscape character, archaeological and heritage features, traffic, risk of land contamination, soil resources, blast vibration, land stability/subsidence, site restoration and aftercare, surface and ground water issues, and water abstraction. It does, however, specifically mention *impact on best and most versatile agricultural land* (MHCLG, 2014, para 013), acknowledging the potential impact that aggregates extraction could have on agricultural land, aside from the other specified nuisances.

Perhaps due to the UK's high population density, most mitigation measures are articulated more in terms of best management practices than as legislated practice, and a case by case approach to site design and nuisance management is undertaken. For example, the guide outlines that:

- Buffers between working areas and occupied residential properties “may be appropriate in specific circumstances” and “should be established on a site-specific basis and should be effective, properly justified, and reasonable.” (MHCLG, 2014, para 018)
- Noise abatement should maintain sound levels to within 10dB (A) of initial background noise levels within working hours. Where it will not be practicable to maintain the noise limit to an increase of 10dB (A) within working hours, the total noise from operations shall not exceed 55 dB (A). (MHCLG, 2014, para 021)
- Dust control measures should be determined according to a *dust assessment study* which provides an initial baseline for site-specific dust conditions, site activities that could produce dust, local conditions that may increase dust impacts, recommend mitigation measures, and propose monitoring and reporting methods to maintain compliance. (MHCLG, 2014, para 023)

Overall, aggregate safeguarding and aggregates extraction in the UK is considered to be a national priority and consequently appears to receive a certain amount of legislative leeway.

Australia

Extractive industries are regulated at the state level in Australia, resulting in a great deal of variability in how they are administered. In general, gravel extraction is “governed by a combination of the laws that regulate mining, local government, road building, and environmental protection” (EDOWA, 2011, p.1). This comment by the Environmental Defender’s Office of Western Australia specifically references aggregate extraction policy structure in Western Australia; however, the jurisdictions assessed in this scan, Western Australia, Victoria and Tasmania, all align closely with these same divisions of responsibility. While the states differ in details of their legislation, they all differentiate aggregate from subsurface minerals, defining aggregate as part of the surface and thus privately owned. Aggregates are consequently assigned to surface rights and, as a result, aggregate extraction activities are almost wholly administered at the municipal level. While much of the land is held fee simple in Australia, it is important to note that governments have a right to enter land, including private, to access gravel reserves for local infrastructure projects, having only the obligation to give notice and to fairly compensate landowners (public or private) for the aggregate extracted and for damages, which may significantly affect attitudes toward aggregate extraction in Australia. This does affect agriculture because, while Western Australia limits entry to lands that have not been cultivated, land planted for pasturage is excluded from these protections (WALGA, 2021, p. 11).

The guidance document reviewed for Western Australia specifically addresses local government access, and is thus limited in scope; no general guide for private extraction has been found. The states of Victoria and Tasmania have both produced a code of practice guide outlining general

regulations and best practices for aggregate extraction within the states. It is, however, worth emphasising that municipal codes and local conditions will often be the overriding consideration in aggregates planning and operation within any Australian state. Across the board, all three guides express a deep concern for environmental considerations. The Western Australia guide offers a typical claim that goals for the industry include to “maintain or improve material extraction policies and processes including planning, environmental protection, rehabilitation and compensation for damage” (WALGA, 2021, p.6). The guidance provided to prospective aggregate operators by the individual states is highly variable, with many of the criteria for aggregate extraction being designated on a local, a site-specific or a user-determined basis.

Best Management Practices

The collected best practices suggest that environmental protection is the most significant guiding principle, with generalised (lumped in with “environmental” in the guides) nuisances a close second. In each of these guides, agriculture is not directly mentioned, except as one of a number of possible end uses of the land upon completion of site rehabilitation. Heritage, and especially Aboriginal heritage, receives significant protections under Australian law. Common features of the guides include:

Environmental considerations

- Dieback management – *Phytophthora cinnamomi* is a common and critical soil-borne disease in Australia that can be transported from site to site in contaminated soil. All states recommend avoiding importation of soil unless absolutely necessary and then exercising extreme care in selecting imported soils to avoid importing this disease.
- Drainage and erosion control to ensure stable landforms (for safety) and to mitigate downstream water contamination; they also advocate for careful water storage and discharge practices.

- Destruction of native vegetation is addressed by both Victoria and Tasmania, requiring assessments and consequently permits prior to removing native vegetation, especially when threatened or nationally significant flora or fauna are indicated.

Community considerations

- All three states acknowledge the importance of protecting heritage sites and objects, requiring that a Cultural Heritage Management Plan (CHMP) be prepared (Victoria; Tasmania similar) and that if objects are uncovered during work they must be reported and a CHMP be prepared to continue work (Victoria, 2010, p. 6).

The codes of practice produced by Victoria and Tasmania are very similar and share a common interest in mitigating environmental nuisances created by aggregate production. Both guides address noise and propose limiting noise as a nuisance by controlling operational hours (0700 – 1900 hours M-F and 0800-1600 Saturday in Tasmania; and 0700-1800 M-F and 0700-1300 Saturday in Victoria). Only Tasmania sets a maximum value to noise at 45 dB (A) during the day, 40 dB (A) during the evening, and 35 dB (A) overnight. However, these limits can be adjusted according to local conditions.

Both codes of practice demonstrate a significant concern for rehabilitation and related issues with the visual character of the extraction site. Operators are advised to align their laneways and extraction operations to limit the visual disturbance of the area. Laneways should have at least one bend so that passersby cannot see directly in, and the working face should be approaching the public side of the pit so that rehabilitated land is seen past the work face, rather than a raw working face being presented. It is also recommended that progressive rehabilitation be undertaken to ensure that the pit appears to be well cared for.

Rehabilitation and end-use is a significant concern in the *Guides* for Victoria and Tasmania, while Western Australia only requires an acknowledgement of what actions will be taken, if any.

This is the only direct mention of agriculture, as there is a consideration of top soils storage and return to usability. Site parameters are not mentioned (i.e. soils depth, slope, etc.), but a concern for cropping following the closing of the site is addressed. As mentioned above, progressive rehabilitation is recommended, as it eases the burden on the operator in terms of visual quality, as well as regarding cost of rehabilitation due to less handling of materials and lower risk of damaging and/or losing the top and sub-soils.

Discussion and Conclusions

Overall, aggregate legislation focuses primarily on aggregate production and reserves its attention on agricultural production for rehabilitation and reclamation of spent aggregate sites. This is not in itself a problem, but it does suggest that states preparing aggregate legislation do not perceive the use of agricultural land and consequently the co-existence of aggregate extraction and agricultural industries in close proximity to warrant special consideration. While the industries themselves do not directly interfere with each other, except for competition for the use of the specific land for aggregate extraction, many of the peripheral but critical activities of each industry, such as transportation and water provision and use, require the same resources. As mentioned above, the various *Guides* recognise the common interest in the land and therefore emphasise effective rehabilitation practices, but the intimate relationship of aggregate extraction and agricultural production is not otherwise recognised in legislation or best management practices.

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