SC6.8 Mining Geotechnical Report Planning Scheme Policy

6.8.1 Purpose

(1) The purpose of this policy is to:

a. provide guidance for producing documentation that identifies the risk to development from any past mining activites including in identified underground or open cut mining influenced areas, features, infrastructure or equipment;
b. identify where more detailed studies, remediation and certification will be required prior to council approval for development in mining influenced areas;
c. identify mitigation measures to be incorporated into the design of the development and associated structures, if the proposed development is assessed as appropriate following the completion of (a) and (b);
d. by identifying potential risks resulting from past mining, and recommending mitigation actions that will successfully manage these risks - reduce the risk presented to persons and property by past mining activities to an acceptable level; and
e. ensure mining assessments remain contemporary to reflect the best available information.

6.8.2 Relationship to the Planning Scheme

(1) This policy is to be read in conjunction with the Mining Influence Areas Overlay Code, and applies to work that requires the preparation of mining geotechnical documentation to demonstrate compliance with the specific outcomes of the Mining Influence Areas Overlay Code.

6.8.3 Main Elements of Mining Constraint

(1) Within the Mining Influence Area, a combination of the following mining constraints may be present, and are represented as the following layers in the overlay mapping:

a. Documented Underground Mine workings;
b. Undocumented Underground Mine workings;
c. Open Cut mined areas;
d. Disturbed Surfaces from mining activities;
e. Mine Tunnels;
f. Mine Shafts;
g. Potential Influence Zones; and
h. GSQ boreholes.

These constraint layers represent the past mining elements that form the main risk components requiring consideration in a Mining Geotechnical Report.

6.8.4 Structure of a Mining Geotechnical Report

In preparing a Mining Geotechnical Report, research and investigations should consider and address the following matters:

(1) The data used for assessment including:

a. available data;
b. the reliability of that data;
c. the accuracy of the data; and
d. interpretation of the data.

(2) The identification of risk, including present or potential risk, and the provision of recommendations for the requirements necessary to minimise these risks.

(3) The geotechnical information resulting from research and investigations, including potential tilt and strain parameters.

(4) This information should conform to current engineering requirements and specifications and be suitable for assisting with a subsequent engineering design. The type and standard of construction necessary for any proposed development at the site should be specified.

(5) The assessment report prepared by a Registered Professional Engineer of Queensland (RPEQ) has been undertaken in the last five years.

6.8.5 Content of a Mining Geotechnical Report

(1) The content and framework of a Mining Geotechnical Desktop should include:
a. **Introduction** - setting out details of the application and the site;
b. **Factual information and evidence** - including information that should be discoverable or available to the developer or their consultants;
c. **Interpretation** - to provide the engineering assessment of the potential mining hazard and potential constraint parameters affecting the site;
d. **Summary or conclusion** – to summarise the factual and interpretive information into a constraints plan and to draw conclusions from the material; and
e. **Recommendations** - recommendations for actions to minimise any risk. This may also recommend more detailed studies where additional evidence and information is required to understand the full extent of the risk.

(2) Additional material / works that may be required including:
a. further detailed studies; and
b. proposals for remediation works - remediation works may be proposed as part of the recommendations (usually following more detailed studies or reports).

(3) Certification:
Mining Geotechnical Reports and proposals for remediation works should be prepared and approved by a suitably qualified professional, being an engineer registered by the Board of Professional Engineers Queensland (RPEQ) experienced in underground mining. It is highly desirable that the person has local experience with underground mining in Ipswich and demonstrable experience in mining operations.

6.8.6 Details of the Required Parts of the Report

(1) The **Introduction** part should:
a. identify the applicants and their consultants;
b. identify the consultants qualifications;
c. clearly identify the development or construction project; and
d. clearly identify the proposed development site.

(2) The **Factual Information and Evidence** part should include the following plans:
a. a site plan that shows the subject lot or number of lots, boundaries and descriptions, along with adjoining properties and features such as roads creeks and rivers;
b. a topographical plan showing the general elevation of the site, and the site in relation to surrounding properties or features;
c. a geology plan showing the prevailing bedrock geology of the site and surrounds - this plan could display known geological formations and fault lines;
d. a mine plan (if available) that clearly shows the proposed development site superimposed on the mine plan. Where more than one plan of mine workings exists, the proposed site should be superimposed on each plan, and be included as separate plans in the report;
e. a plan showing the location of any Geological Survey Queensland coal exploration boreholes if these are not already shown on the mine plans;
f. a constraint plan that summarises the amount and extent of any mine workings, features, or zones into as many defined areas as necessary to fully summarise and define the amount and type of mining that constrains the site; and
g. a development plan that shows the proposed development or construction work locations in relation to the defined areas on the constraint plan.

The factual information and evidence part should mention and describe the factual information with reference to the plans specified above.

(3) The factual information and evidence should also include a written description of:
a. the presence of any tunnel or shaft entries within or close by to the site that could constrain the proposed development;
b. the presence of any underground mine workings within or close by to the site that could constrain the proposed development;
c. the presence of any open cut mining within or close by to the site that could constrain the proposed development;
d. any information or knowledge of past subsidence or mine related problems on or nearby to the site;
e. any knowledge or information of past coal stone deposited on the site and any knowledge or information of past or present coal stone heatings on the site; and
f. any GSQ coal exploration boreholes located on the site.

(4) The **Interpretation** part should include:
a. the location of the proposed development or construction in relation to the defined constraint matters; this could be in relation to actual mining or mining influence items, features, or zones;
b. actual mining, including items or features like tunnels, shafts, subsidence, or settlement holes from

underground or open cut mining;
c. mining influence zones, including the potential influence from the same items of tunnels, shafts, subsidence, or settlement holes from underground or open cut mining;
d. the interpretation of mine pillar stability where applicable;
e. any potential regional subsidence prediction, should the mine pillar stability interpretation indicate potential failure of the mine pillars;
f. a prediction of potential tilt and strain parameters for the site;
g. any potential for sudden collapse-type subsidence (often referred to as 'sinkhole' or 'pothole' type subsidence);
h. comment on any subsidence that may have already occurred and that could still occur;
i. comment on the effects of any faulting in the area that may impact or constrain the site; and
j. potential constraints from past coal stone deposits, or past or present coal stone heating.

(5) The **Summary or Conclusion** part should include a compilation of the factual and interpretive information and evidence into a comprehensive written summary with reference to constraint issues affecting the site that have been discovered during the preparation of the report.

(6) The **Recommendations** part should include a written description of recommendations outlining how the proposed development can minimise the identified risk.

(7) Recommendations can also propose remediation of the constraint, or methods of limiting the constraint so that the development or construction can proceed either in total or in a restricted or limited form. The recommendations for remediation should focus on the identified constraints, while clearly identifying and proposing a course of action to manage any unquantifiable constraints at the site.

(8) The recommendation part, depending on its findings, may make recommendations based on the available information and interpretations that could lead to development approval without further detailed studies. These could include:
a. opportunities for the use of types of development construction such as unrestricted, waffle raft or stump type for development in the undermined or influence zones;
b. optimum positioning of development construction away from mine constraint areas, if this is possible;
c. the ability to use adjustable stump type buildings, or portal frames with flexible cladding in industrial buildings;
d. the ability to relevel or maintain concrete slabs in sheds or industrial site applications; and
e. in-ground services designed with flexibility to cope with potential predicted movement should it occur.

(9) More detailed studies could be necessary (and may be recommended) where additional evidence is required to understand the full extent of the risk. These more detailed studies are likely to require on-site investigations in order to gain further information or to confirm the understanding of the site that has been determined by earlier work.

6.8.7 Remediation Proposals

(1) Proposed additional investigations and remediation works may include:
a. excavator work to investigate items like mine tunnels, mine shafts and even sudden collapse-type subsidence events (often referred to as "sinkholes");
b. drilling boreholes to determine items like bedrock geology, depth to the coal seam or mine workings, thickness of the coal seam and height of mine workings or voids;
c. aerial photogrammetry studies;
d. geophysical / seismic studies;
e. settlement studies undertaken by experienced personnel in settlement analysis to predict the potential long term settlement characteristics from underground mining, open and backfilled voids from open cut mines, or mine overburden spoil piles; and
f. various methods of sealing tunnels, capping shafts, capping coal stone areas, extinguishing coal stone heatings and in some cases, mine filling.

(2) Depending on the type of development or construction, the findings and corresponding ability to remediate the site may or may not achieve the required level of safety to allow approval.

(3) Different development types tolerate different levels of residual risk, for example, particular industrial uses may be more tolerant to subsidence than residential development. There is usually an outcome for a site, but it may not be the original desired outcome for use of the site. Sometimes an alternative use may be the practical outcome, once the extent of mining influence is established.

(4) On-site, any remediation works should be provided and supervised by suitably qualified professional practitioners, and require approval by an engineer registered by the Board of Professional Engineers Queensland (RPEQ) experienced in underground mining.

6.8.8 Certification

(1) Any recommendations or remediation works require certification by suitably qualified professional practitioners as identified in (3) to (6) below.

(2) Certification may consist of four parts:
Part 1 — Assessment of the site with recommendations;
Part 2 — Assessment of any proposed remediation works;
Part 3 — Supervising any remediation works; and
Part 4 — Certification of any remediation works.

(3) Parts 1 and 2 - Assessment of the site with recommendations and Assessment of proposed remediation works must be done by an engineer registered by the Board of Professional Engineers Queensland (RPEQ) experienced in underground mining.

(5) Part 3 - Supervising any remediation works is provided by a person with mining experience or a background and qualifications in mining. This could be a mining engineer or mining personnel with suitable qualifications i.e. engineering, mining geologist, mine surveyor, an RPEQ or someone working with or under an RPEQ.

(6) Part 4 - Certification of any Remediation Works must be provided by an engineer registered by the Board of Professional Engineers Queensland (RPEQ) experienced in underground mining.

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