PLANNING & ENVIRONMENT COURT OF QUEENSLAND

CITATION:	*Energex Ltd v Logan City Council & Ors*
PARTIES:	ENERGEX LIMITED ACN **078** 849 **055** Appellant **-v-** LOGAN CITY COUNCIL Respondent and GREGORY & JANICE ELLEN CADWALLADER First Co-Respondent and MARGAUX FISHER Second Co-Respondent and CAMERON AND DONNA FISHER Third Co-Respondent and JIM KERR AND CHERYL KERR Fourth Co-Respondent and GERARD EDWARD WALTERS Fifth Co-Respondent and VALMAI CARR Sixth Co-Respondent and MALACHY ***CARR*** Seventh Co-Respondent and DANIEL CARR Eighth Co-Respondent and DAVID ROSS TURNER Ninth-Co-Respondent
FILE NO/S:	2604 of 2001
DIVISION:	Planning **and** Environment
PROCEEDING:	Applicant's appeal
ORIGINATING COURT:	Brisbane

DELIVERED ON:	11 January 2002
DELIVERED AT:	Brisbane
HEARING DATE:	19, 20, 21, 23, 27, 28 and 29 November 2001
JUDGE:	Senior Judge Skoien
ORDER:	**Appeal adjourned to date to be fixed**
CATCHWORDS:	Electromagnetic fields induced by electrical current, whether a health hazard; principle of prudent avoidance; amenity; planning principles
COUNSEL:	Lyons QC for appellant Gibson QC for respondent Mrs Fisher for herself and other co-respondents
SOLICITORS:	Clayton Utz for appellant Corrs Chambers Westgarth for respondent

[1] This is an appeal by Energex against the decision of the Council to refuse an application by Energex for a material change of use of land at Tanah Merah to establish a modular electricity substation.

[2] During the hearing of the appeal the Council reached an agreement with Energex on the central technical issue and produced a draft condition of development which Energex is prepared to accept should the appeal be allowed. On that basis the Council took no further part in the proceedings leaving only the co-respondents (objecting submitters) and Energex to continue the appeal.

The Site

[3] The site is on the western side of the Pacific Highway service road, on the southern corner of its intersection with Sewell Road at Tanah Merah. It contains an area of 3,881m^2 and has frontages to the service road and to Sewell Road of approximately

60 metres (including truncation) and 58 metres respectively. It is vacant land and is more or less level. The site shares a common boundary with two existing allotments. The neighbouring allotment in Sewell Road is a commercially designated allotment which was the subject of a previous unsuccessful substation application by Energex. A detached house on this allotment is now disused. The neighbouring allotment on the service road is a large, elongated, vacant property.

Surrounding Land Use

[4] Land in and around Sewell Road has been developed for larger lot rural residential housing on allotments generally ranging from 1500 m^2 upwards to 7,500 m^2. This locality, particularly in the more elevated central and south western parts of Sewell Road, possesses a high level of residential amenity.

[5] Towards the lower or north eastern end of Sewell Road, near the site, the amenity is somewhat degraded by non-residential uses and activities on the Highway service road and by the presence of the eight-lane, very busy, Pacific Highway itself. For example, on the opposite side of Sewell Road to the site is the Dunamis Christian Centre in a large industrial style building fronting the service road but extending into Sewell Road for a distance of some 50 metres.

[6] To the south, development along the service road comprises mostly vacant land but with two large-scale residential uses, the Galaxy Caravan Park and the Jargarra Village townhouse estate.

[7] In the wider area, commercial activities dominate, most notably the Logan Hyperdome and Home Centre retail development opposite the site on the eastern

side of the Pacific Highway. Other commercial uses are on the Highway service road to the north beyond the Mandew Street overpass and an existing retail/commercial centre to the south near the Grandis Street overpass.

[8] Three sites containing existing public infrastructure services are in the general Tanah Merah/Shailer Park area, namely a Council pumping station on the western comer of the intersection of the Highway service road and Alfred Street, a small Telstra telecommunications facility on the Highway service road to the north of Springlands Drive, and a Telstra telephone exchange and mobile phone tower on the western comer of the intersection of Bryants Road and Oliver Street.

Zoning

[9] Under the provisions of the Logan City Planning Scheme, the site is included in the Particular Purpose Zone. The intent of this zone, as set out in Section 10.2.1 of the scheme, is to accommodate development for:

(i) local utilities or public purposes; or

(ii) land subject to a Development Control Plan or a Local Area Plan; or

(iii) specific land uses that, for various reasons, cannot be adequately accommodated in another zone.

[10] The site is in the Shailer Park Business Activity Node Development Control Plan. Thus, planning controls for the site have been transferred from the main body of the scheme to that DCP. Other adjoining areas (including the adjoining site in Sewell Road) are similarly affected. The site is contained within Precinct 1 under the DCP. Under the DCP Table of Development applicable to Precinct 1 the establishment of

a modular electricity substation (defined in the planning scheme as a 'public purpose') falls within Column 4 prohibited development. Pursuant to s.6.1.28(2) of the *Integrated Planning Act*, 1997 ("IPA") an impact assessment application was therefore required to be submitted for approval to establish the proposed use.

[11] The rest of the properties in Sewell Road are in the Residential Zone and within an R1 designation under the relevant Residential Development Density Map. Generally land within this designation may be subdivided into allotments of 2,000 m^2 in area, although some of the land may be affected by conservation issues, which may increase the minimum lot size.

[12] Under the provisions of Council's Strategic Plan, the site is within a Business Activity Node designation. This classification applies to a number of adjoining properties on the Highway service road and to the adjoining property in Sewell Road. Residential areas in Sewell Road are contained in a Residential Low Density designation.

The Proposal

[13] The role of the proposed substation is to 'transform' or to reduce the voltage of electricity which is distributed throughout the metropolitan area. This substation will transform electricity from a 33 kilovolt (kv) feeder line which passes along the service road into an 11kv local network. Subsequently, small pole-mounted transformers will reduce the voltage still further for domestic and commercial use.

[14] Physically each of the two proposed modules of the substation comprises a group of buildings and other structures. These include a single storey switchgear building

(approximate dimensions 12 metres x 5 metres), an unenclosed transformer/radiator (contained in a bunded area measuring approximately 7 metres x 10 metres), a small enclosed capacitor bank (4 metres x 4 metres), a transition kiosk ($5m^2$), and a lightning rod.

These components, apart from ancillary development such as fences and hardstand and vehicle manoeuvring areas, represent the only forms of building development that will occur on the site.

The design of the switchgear building seeks to reflect an Australian 'vernacular' style by adopting a tin structure with a curved roof. The colour of the building is to be of muted 'earthy' tones, most likely a shade of green to blend with the landscaping buffer proposed to be established around the boundaries of the site.

[17] The main building areas and environs will be fenced for security reasons, chiefly to prevent the unauthorised access of human beings and animals. This will be of open mesh coloured black to reduce its visibility. It is to be 2.5m high, topped with three strands of barbed wire. The surface area within the enclosure will be bitumen for vehicle manoeuvring and blue metal elsewhere. These materials are designed to reduce dust nuisance, soil run-off and erosion and also weed control.

It is proposed to establish a landscape buffer, generally 6 metres or more wide, around the entire perimeter of the site, other than at the point of the access driveway to the Highway service road. This landscaping is intended to assist in screening the building development from adjoining properties and the roadway, as well as reducing any noise and lighting impacts. Where practical, existing vegetation will be retained and incorporated into these buffer areas. A landscaped area with a

maximum depth of approximately 20 metres will be provided at the section of the site fronting Sewell Road.

[19] Following construction, the only reason for Energex employees to attend the site (other than to remedy network breakdowns) will be for periodic maintenance and inspection purposes. Access to the site is proposed from a single driveway from the Highway service road approximately 40 metres from the Sewell Road intersection.

[20] All lines and cabling entering and leaving the site will be buried underground. A slender lightning rod will be positioned within the substation to eliminate damage from lightning strikes. The operation of the substation does not involve nor create any form of chemical pollution. The transformer is located within a securely bunded area to capture any unexpected spillage or leaks of oil from the equipment.

Distribution of Electrical Power

[21] An electric power station produces large quantities of electricity for distribution to the wide range and large numbers of consumers within its network. To get that electricity to each consumer in the usual 240v format presents the same sort of problems as face a water authority which, from water retained in a large reservoir has to provide to the consumer water which arrives at the point of consumption in a pipe generally about 1cm in diameter. To send out from the reservoir water in multiple individual 1 cm pipes would be enormously expensive, wasteful of space and the effect of friction between water and pipe would drastically reduce the water pressure. So the water authority uses pumps to create high pressure and forces the water out through large pipes which are progressively reduced in size, as is the

pressure, until the water arrives. at domestically suitable pressure and in domestically appropriate quantities.

[22] So it is, roughly speaking, with electricity. Rather than sending 240v off to separate consumers in multiple separate wires (which would also be enormously expensive: wasteful of space and would, because of the resistance of the wire, result in greatly reduced voltage at the point of consumption), the electrical authority increases the pressure (voltage) to 110kv and sends the current off along large pipes (cables) until progressively the voltage is reduced (to 33kv, 11kv, then 450v) and finally to the desired 240v for each consumer. At each reduction of voltage which is effected by a transformer (initially at a substation, ultimately pole mounted), the network of cables, then wires, increases.

[23] In South-East Queensland this function of delivering electricity for domestic and commercial use has, by statute, devolved on Energex. It is trite to say that, with the exception of a few bold spirits, the entire population relies on the provision of mains electricity for the needs of daily life. There can be no dispute about the reliance our society places on the reliable and safe provision of this source of power. On the broad scale, the efficient and safe control of the movement of aircraft, vehicles and pedestrians, the security provided by street lighting, the operation of radio and TV are some examples of the use to which electrical power is put. Of more relevance here is the satisfaction of the domestic need for electrical lighting, heating, cooling and the powering of those machines which are widely used on a daily basis. To give an example of the importance of domestic electrical power, the breakdown of the household refiigerator for a day or more, especially in mid-summer, causes

repercussions which are always inconvenient, sometimes serious and could even be fatal should dangerous bacteria establish themselves in food.

[24] I have made those rather obvious points simply to remind myself that the reliable supply of electricity is an essential of normal daily life in our community. That does not, of course, say that electricity is so important that it can be distributed ad hoc, willy nilly. The supply of electricity must not only be reliable, it must be as safe as it can reasonably be.

[25] Energex is, under the Electricity Act, 1994, a "distribution entity". As such, under s.40 of the Act, Energex has an obligation to provide to an applicant connection to the supply network, As a distribution entity Energex is required to comply with conduct rules made by the Queensland Competition Authority. Capital constraints have been set by the Authority which have the effect that Energex must deliver cost effective capital projects to ensure that electricity charges do not increase unduly. To relate that to this particular proposed substation, the evidence before me, which I accept, is that growth in the rates of use of electricity of the order of 3% to 8% is being experienced in Tanah Merah and nearby areas. The electricity supply system in those areas has reached the stage where it is critical to build a new sub-station.

[26] Thus Energex is statutorily required to be a commercial entity, and is statutorily required to husband its resources. It has no commercial competition. In this appeal there was no suggestion that its desire to economise for the welfare of the taxpayer was an improper approach. Nor was there any suggestion that its selection of this site, as opposed to any other possible site, was motivated by anything untoward.

So this is an appeal in which a semi-public commercial authority, acting bona fide, is in conflict with 20 submitters who are concerned local residents. None of these submitters has any improper interest in the outcome of the appeal. Their case was forcefully, intelligently and logically put by Mrs Fisher and I have not the slightest doubt that the concerns expressed by her, on behalf of her constituents, are genuinely held. The question, as always, for the Court, is what the evidence which was led before me establishes.

The Issues

The issues which were debated before me can be discussed under three headings, EMF exposure, amenity and planning principles.

E.M.F. Exposure

[29] The most hotly debated issue in this appeal was whether the transmission of 11kv of electricity along overhead lines in streets is likely to be a health hazard, particularly as a cause of cancer and more particularly, leukaemia in children.

I heard evidence from a large number of expert witnesses, each of undoubted expertise. All of them were called by Energex, except one, Mr Doull, a health, safety and environment adviser who was called by telephone by the co-respondents. It must be said that all of those men were impressive experts. In the upshot I reject the evidence of Mr Doull where his opinions differ from the other expert witnesses. In no way do I doubt his honesty or his expertise but it seemed to me that in a number of respects he tended to overstate his argument and some of the references he made in his written report to scientific works were not accurate. The levels of

public exposure which he espoused were considerably more cautious than the levels predicted by virtually all scientific studies.

Man-made electromagnetic fields (EMF) are very common in our environment. Their sources include electric power lines, household electrical wiring, electric motors and computer screens. The EMF produced by power lines is at an extremely low frequency (ELF) and ELF is part of the non-ionising radiation (NIR) portion of EMF. It is thus distinguishable fiom ionising radiation (for example X-rays) which is known to be a cause of cancer.

ELF/EMF fiom power lines must also be distinguished fiom radio waves and microwaves, about which considerable debate exists. Those latter forms of radiation which are of much higher frequencies interact with matter, including human tissue, to cause heating. The amount of energy deposited in the human body from the EMF created even by large power lines is so small as to cause an undetectable rise in temperature.

[33] Electric fields exist whenever there is a difference of electric pressure (voltage) between two objects. Relevantly, there are electric fields present whenever there is energised electric wiring, whether or not electric appliances are operating. So an electrical substation, and the network of cables and wires which emanate fiom it create electric fields. Those fields exist in the space between the cables or wires and the ground, the strength of the field being inversely proportional to the distance between them. In the house, however, the electric field can vary greatly and may be more influenced by the use of electrical appliances such as computer screens, washing machines etc, than any external power line.

When electricity flows in a wire as a current a magnetic field is created. This field diminishes in intensity in direct proportion to the distance from the wire. This intensity is measured nowadays by scientists in Tesla (generally in micro Tesla) but in this case the witnesses more often used the older term Gauss (generally milliGauss). It is the effect of an EMF (measured in milliGuass) on the human body which consumed much of the time in this appeal. That effect is to induce an electric current in the human body, the greater the number of milliGauss the greater the induced current.

The questions raised in this issue in the appeal are:

(a) whether that induced current can cause cancer;

(b) if so, is there a level (and what level) at which there is a recognisable risk of cancer;

(c) if so, will the Energex proposal expose people to that risk.

There has been for many years continuing research by a large number of scientists on the questions posed in (a) and (b). The research has been in the form of statistical studies of people who have been exposed to EMF (including ELFLEMF) as well as actual experiments on volunteers, on laboratory animals and on in vitro tissue. A large number (perhaps hundreds) of papers have been written as a result of this research by individuals and by teams. The various experts who gave evidence before me went into considerable detail in their discussion of this research.

There is a statistical association which some studies have identified between long term exposure to ELFLEMF and the onset of cancer, particularly childhood

leukaemia. That has led to the World Health Organization listing ELF/EMF in its category C, or "possible" causes of cancer.

[38] At first blush that is an alarming fact. But as the witnesses (for example the epidemiologist Professor Elwood) pointed out the category C list is very extensive and contains very many things with which most of us have regular contact (for example coffee and petrol exhaust gases). Some evidence of a connection between a substance and cancer will cause it to be listed as a possible cause. To be removed from the list is an extremerarity because it is virtually impossible to prove a negative.

[39] Even the statistical analyses themselves may not establish what they seem to, that is, a connection between ELF/EMF and cancer. Professor Elwood explained how that could be so, for example, because of the presence of some undetected complicating factor. An apparent statistical connection between factor A and result B does not necessarily prove that A is the cause or even a cause of B.

[40] It would be possible, over very many pages, to discuss the leading studies and the evidence given by the expert witnesses in relation to them. However I do not propose to do so because it is patently clear that no-one, persuasively, has been able to do more in relation to question (a) than answer, as has WHO, "possibly". Indeed it could be said that many experts would answer "doubtful". However responsible experts do not completely dismiss the possibility of a causal connection between the two.

[41] So, as a matter of caution and on the assumption that there is a link between ELF/EMF and childhood leukaemia, I turn to question (b). The existing exposure

set down by the International Commission on Non-Ionising Radiation Protection ("ICNIRP") is 1000 milliGauss for long term general public exposures. That is a more conservative figure than those set down by other advisory bodies (see Appendix C to exhibit 10, Professor Ellwood's report). A vastly more conservative figure of the milliGauss for long term general public exposure has lately emerged as a possibly significant figure in the debate.

[42] Mr Lyons QC, for Energex did not argue that the ICNIRP figure should be applied here. Rather, he submitted that it was not proper to accept 4 multiGauss as an absolute figure for the long term exposure upper limit to provide a safeguard against childhood cancer. He relied upon comments made by a recent English study ("the Doll report") such a:-

> **"141.** The overall interpretation of the Doll committee in regard to the meta-analysis by Ashburn and colleagues (p. 132) is a balanced statement. It states: *In summary, this detailed analysis of studies with direct measurements has not found a significant association of electromagnetic field exposure with childhood cancer across all levels of exposure, but does suggest a relative risk estimate of about 2.0 in the 0.8% of children exposed to 0.4 μT (4mG) or more and also the possibility of the trend in risk with increasing exposure. The increased risk in the higher exposure category is unlikely to be due to random variability but incomplete allowance for confounding variables and selection bias may have accounted for some of it."*

[43] Mr Lyons rightly points out that the tone of the Doll Report is guarded and cautionary and did not, for example, claim that a causal link between ELF/EMF and cancer had been established. Importantly the Doll report did not suggest implications for public health, the laying down of any particular standard or that there should be any change in the management of electrical distribution systems or the use of electrical appliances.

[44] The **conclusion reached by Professor Elwood in his report, exhibit 10 is:-**

> *"In regard to childhood cancers and ELF fields, my conclusions are based largely on assessment of the report of the Doll committee, and the two meta-analyses which relate to studies of exposures to electric and magnetic fields and leukaemia in children. I have also reviewed the original reports from the most important studies.*
>
> *The studies show that there is no indication that leukaemia risks are increased in the vast majority of children who are exposed to domestic magnetic fields in a range of up to 3 or 4 mG. Some of the studies do show an increase in risk in the small number of children exposed to the highest category of exposure, being either above 3 or above 4 mG, depending on the analysis. However, the data are insuflcient to conclude this association reflects causality; I do not conclude from these results that high electric and magnetic fields cause childhood cancer.*
>
> *The main reasons for my conclusions are that:*
>
> - *-First, the results for the highest exposure categories are based on very small numbers of subjects, and those who participated in the studies and had the highest exposure levels may be unrepresentative of the larger groups studied;*
>
> *Second, it is quitepossible that children with exposure to higher levels of electric and magnetic fields also have other exposures or characteristics which may give them an increased risk of cancer; one such exposure may be increased traffic density, as an example.*
>
> *The third reason to treat these results with caution is that there is no consistent evidencefiom cell, animal, or other human studies that magnetic fields even at higher exposure levels are involved in the development of leukaemia or other cancers.*

208. *My overall conclusion is that these results raise questions which need to be addressed by further scientific studies. However, the scientific evidence is insufficient to show a hazard to the population at these low levels of exposure, and is insuflcient to justify deviation from current standards of planning and environmental control in regard to electrical facilities such as the one under question here.*

In regard to other diseases in children or in adults, the amount, quality, and consistency of epidemiological evidence

suggesting a hazard is less extensive than that relating to childhood cancers."

[45] A consistent view was taken by Dr Wood, a biophysicist (whose report provides the basis for my reasons in paras [31]-[34]). In his report, exhibit 11, he concludes that:-

> **"67.** *Having conducted numerous experiments to determine the effects, if any, of power-frequency magnetic fields on biological systems and having been involved in the review process of scientific literature over a period of more than ten years, I am not aware of consistent and convincing evidence of harm at field levels below present scientifically-determined guidelines. Despite the best efforts of theoreticians, a credible biophysical mechanism of interaction of magnetic fields below a few hundred mG with biological tissue to produce any detectable effect has not been identified.*
>
> **68.** *Whereas, according to the AGNIR, the 'possibility remains' that homes in which fields above 4 mG measured as a 24 hour average are associated with childhood leukaemia, I consider the possibility of the magnetic fields as being causative to be very small.*
>
> **69.** *Overall, I do not consider there to be a reasonable basis for concern for residents that exposure to magnetic fields associated with the proposed Tanah Merah substation will lead to health problems."*

The conclusion I reach on question (b) is that the answer is uncertain and demanding of further research. There is, however, some statistical evidence that long term exposure of children to ELF/EMF of greater than 4 milliGauss could be hazardous to their health.

I now turn to question (c). In the overall context of the considerable doubt which exists on the basic question of causation as well as the level at which health hazards may be produced by the flow of electricity, a thoughtful balance must be struck between the degree of risk involved and the reasonable capacity of Energex to meet that risk. That balance must be struck in the context of the obvious demand for

electricity, the actual need for this substation somewhere in the vicinity of the site and Energex's statutory duties, discussed in para [23] – [27].

[48] The correct approach in my view is to apply the policy of "prudent avoidance". That policy has been adopted by the Electricity Supply Association of Australia which includes Energex. It embraces a range of actions which it is sensible to take, having regard to the current state of scientific uncertainty and involves doing what can be done without inconvenience and at moderate expense to avert the possible risk to health from exposure to new high voltage transmission facilities. That course emanates from a recommendation made by Sir Harry Gibbs, who conducted an inquiry into the problems faced by the industry in relation to EMF.

[49] In the present case no new transmission lines are proposed. A new sub-station is proposed, but the magnetic fields which will be generated by it are very low at the boundaries, well below any threshold of danger. It is proposed to use (generally) the existing distribution lines. However, steps which can be taken without undue inconvenience and at modest expense to reduce EMF levels, are embodied in the condition which Energex and the Council have proposed should this appeal succeed [see para [2]]. In my view that this is a more than adequate response to the current state of scientific uncertainty about the effect of EMF exposures which I have discussed.

[50] I consider that the Court can draw support from the position taken by the Council in proposing that draft condition. Its conduct in the course of the hearing demonstrated that it was conducting itself in a responsible and independent manner. In particular it resisted the application principally on grounds related to EMF

exposure; it retained an electrical engineer and a doctor who specialises in electromagnetic fields and health issues to assist it in the case; it retained Senior Counsel and independent solicitors to conduct its case; it actively participated in the case for five days. It has now agreed to a condition (exhibit 29) obviously directed to reducing levels of EMF exposure.

[51] The text of that draft condition is (without reproducing the drawings to which it refers):

"1 Magnetic Field Level

To give effect, in the particular circumstances of this substation, to the policy of prudent avoidance at present recommended by the Electricity Supply Association of Australia to its members, the development of the two (2) module substation will be subject to the following:

(a) The development of the substation shall be generally in accordance with Drawing Number 1.

(b) The substation shall:

(i) not contain more than two (2) transformers each with a capacity greater than 15MVA; and

(ii) supply a load from the two (2) transformers which generally shall not exceed 21 MVA except that a greater load may be supplied in fault conditions, emergencies, when maintenance work is being undertaken or when short lead time loads (generally not exceeding two (2) years) have to be supplied.

(c) The 33 kV and 11 kV feeder lines from the existing overhead network, as shown on Drawing Numbers 2A and 2B, to the substation shall be:

(i) undergrounded and in the case of the 33 kV feeder lines, trefoiled (except under roads) with a minimum cover of 900 mm; and

(ii) located generally in accordance with Drawing Number 3; and

limited to no more than:

(A) four (4) 11 kV feeder lines at initial commissioning of the substation the conduits for which are shown in Drawing Number 4, with any additional 112 kV feeder lines to be undergrounded from the substation to the existing overhead network; and

(B) two (2) 33 kV feeder lines.

(d) Any additional 11 kV feeder lines which originate from the substation and are not connected to the existing overhead network shall be undergrounded.

(e) From the substation to the north along the Pacific Highway service road:

(i) the 33 kV and I I kV feeder lines; and

the 415V feeder lines (where the consent of the owners of Lot 7 on SP 137526 and Lot I on SP 137526 is obtained);

will be undergrounded to the Mandex Street overpass and in the case of the 33 kV feeder line, trefoiled (except under roads) with a minimum cover of 900 mm.

(f) The 33 kV feeder line from the substation to the south along the Pacific Highway service road shall remain as a stand by line to the point where it crosses the Pacific Highway at Grevillia Street.

(g) The existing overhead I I kV feeder lines connected to the substation (other than any 11 kV feeder line in Sewell Road) shall be reverse phased (or alternatively configured) to the nominated junction of each feeder line as shown on Drawing Number 5 to achieve the minimum Average Magnetic Flux Density levels that are reasonably practicable with the objective of achieving where reasonably practicable an Average Magnetic Flux Density not exceeding 4 milligauss at the Locations identified in paragraph (k) (iv), (v) and (vi).

(h) At any of the Locations identified in paragraph (k) (i), (ii) and (iii) the Average Magnetic Flux Density caused by the substation, the feeder lines connected to the substation or any distribution transformer, shall not exceed four (4) milligauss except:

(i) during a declared state of emergency; or

(ii) for a period not exceeding 14 calendar days in total in a calendar year in the case of:

(A) fault conditions; or

(B) emergencies (other than a declared state of emergency); or

(iii) when maintenance work is being undertaken provided the limit is not exceeded for a period not exceeding 7 calendar days in total in a calendar year.

(i) Upon the receipt of a written request by the Council (which written request shall not exceed one every two (2) calendar months), Energex or the operator of the substation shall:

(i) subject to obtaining the consent of the relevant owners or occupiers of the Locations, calculate the Average Magnetic Flux Density at the Locations; and

(ii) within 30 calendar days of the receipt of the written requests from the Council provide to the Council:

a written copy of the results of the calculation of the Average Magnetic Flux Density; and

a written explanation of the basis of the adjustments, sample calculation and such other information relevant to the calculation of the Average Magnetic Flux Density as is necessary to allow the results of the calculation of the Average Magnetic Flux Density to be independently verified by the Council.

(j) Where the Council proposes to calculate the Average Magnetic Flux Density, Energex or the operator of the substation shall, within 30 calendar days of the receipt of a written request from the Council, provide to the Council such information as is necessary to allow the Council to calculate the Average Magnetic Flux Density. The Council shall forward a copy of the measurements and calculations to Energex.

(k) For the purposes of this condition:

"Average Magnetic Flux Density" means the measured magnetic density flux density levels (measured at a Location at a height of one metre above ground level) adjusted to give an average magnetic flux density level by applying the ratio which the annual average load in the Prescribed Source

in the 12 calendar months preceding the date of measurement (and during the first 12 months of operation of the substation a combination of such actual monthly figures as are available together with projections of future monthly demand for an aggregate of 12 months) bears to the load in the Prescribed Source at the time of measurement.

For the purposes of the definition of "Average Magnetic Flux Density", ***"Prescribed Source"*** *means in the case of the Location specified in:*

(i) *paragraph (i), in the definition of "Location", the substation; and*

paragraph (ii), (iii) (iv), and (v) in the definition of "Location", the local 11 kV feeder lines at the respective Locations; and

paragraph (vi) in the definition of "Location", the 11 kV and 33 kV feeder lines at this Location.

"Location" means the point at which the Average Magnetic Flux Density is to be measured being:

(i) a reasonably representative point which is located on a line perpendicular to the common boundary line and which is two (2) metres inside Lot 3 on RP ***91086*** *measured from the common boundary with the substation and the property in Sewell Road adjoining the substation currently being Lot 3 on RP* ***91086;*** *and*

a reasonably representative point which is located on a line perpendicular to the relevant feeder line and which is two (2) metres inside the western boundary (road frontage) of the property in Sewell Road adjoining the substation currently being Lot 3 on RP ***91086;*** *and*

a reasonably representative point which is located on a line perpendicular to the relevant feeder line and which is two (2) metres inside the property boundary of the property in Sewell Road measured 10 metres to the south of:

(A) the existing distribution transformer in Sewell Road currently adjoining Lot 2 on RP ***885956;*** *and*

(C) *any other distribution transformer that is installed in Sewell Road; and*

a reasonably representative point which is located on a line perpendicular to the relevant feeder line and which is fifteen ***(15)***

metres inside the property boundary of the property nearest the midpoint between the substation and the nominated junction of the 11 kV feeder lines as shown on Drawing Number 5 as TMH 6A; and

(v) a reasonably representative point which is located on a line perpendicular to the relevant feeder line and which is six (6) metres inside the property boundary of the property nearest the midpoint between the substation and the nominated junction of the 11 kV feeder lines as shown on Drawing Number 5 as TMH 5A; and

(vi) a reasonably representative point which is located on a line perpendicular to the relevant feeder line and which is six (6) metres inside the property boundary of the property nearest the midpoint between the substation and the nominated junction of the 11 kV and 33 kV feeder lines to the north of the substation along the Pacific Highway service road as shown on Drawing Number 5 as TMH 3A.

Note: Drawing Numbers 1-5 referred to herein are attached to this condition."

[52] A few comments should be made about that condition. On the one hand, it subscribes to the policy of prudent avoidance. The design of the sub-station itself gives effect to that policy, with the result that fields from the sub-station do not exceed 0.5mG at the site boundaries. This is a level well below the level of 4mG referred to in the condition, and in a number of the studies. On the other hand, as I have said, Energex has a statutory obligation to supply electricity to consumers throughout an extensive area in South East Queensland and it is required to do so in a cost effective manner. The circumstances in which it is required to supply electricity will inevitably vary from place to place. There may well be circumstances in which the policy of prudent avoidance will not make it appropriate to reduce fields to 4 milliGauss. Whether a particular level will be appropriate, and what steps Energex should take to reduce field levels, are matters which cannot be dealt with in a blanket proposal and must fall to be determined on a case by case basis. Finally, while the condition expressly refers to Sewell Road, that does not

imply that the effects of EMF in other locations have been ignored or can be ignored. The evidence in this case revolved substantially around Sewell Road.

[53] It might also be noted that the employment of the policy of "prudent avoidance " is consistent with the provisions of s.1.2.3 of *IPA* which in subsection 1(a)(iii) provides that the purpose of *IPA* includes ensuring that the decision-making process applies the precautionary principle.

Amenity

[54] The amenity of the site is very poor because of the proximity of the Pacific Highway and its inclusion in the business node. No persuasive argument has been advanced that the proposal will degrade the local amenity. On the contrary, given the proposed landscaping (which can be enforced by the Council), it will probably be a considerable improvement on what is there now (some poorly maintained scrub) and on what is likely to be established on the site if it is not to be an electrical substation. Given the provisions of the DCP it would most likely be some form of commercial use. That would almost certainly entail considerably more human activity and consequently noise, vehicular movement and the like, than a substation. When landscaped the substation will be barely visible but that would not be so with a commercial use. Even though commercial premises would no doubt also be landscaped the building and its advertising signs would need to be clearly visible.

[55] Under this heading I think it appropriate to mention the aspect of safety to children who might venture onto the site, a possibility to which the co-respondents referred. It is trite to say that no-one can absolutely guarantee the safety of the public, including children. A foolhardy, determined child could presumably scale the fence

which Energex proposes to erect and then could be injured or even killed. But that sort of risk would probably be present whatever the use to which the site might be put. A developer can only be required to take reasonable precautions and in my opinion what Energex proposes is very reasonable, a mesh fence, 2.5m high be topped with three strands of barbed wire. I have little doubt that the highway itself would pose a much greater danger than the proposed substation would represent.

Planning Principles

[56] As I have noted (para [10]), the proposed use for this site which is within Precinct 1 under the relevant DCP is a prohibited use. So, the Logan City Planning Scheme being a "transitional planning scheme" (IPA ss.6.1.19, 6.1.30) the application made by Energex was in effect an application to re-zone the land. That makes applicable the provisions of ss.4.4., 4.5 and 4.5A of the *Local Government (Planning and Environment Act)* 1990 (*"P & E Act"*).

[57] The objective for Precinct 1 as set out in the Strategic Plan for the Shailer Park District leads with the statement:

> "Precinct 1 shall be developed for commercial office purposes and health care practices",

and the policy statements in the Strategic Plan include:

> "Development must be in the form of office based business parks",

all of which, prima facie, would seem to demonstrate strong planning arguments against the Energex proposal. See s.1.14.3.2 of the Strategic Plan. Similar statements are to be found in the preferred dominant land use designations set out in Part 5 of the DCP.

[58] There is only one zone, the Recreation and Conservation Zone which, under the planning scheme, is explicitly suitable for an electrical substation and that only as a permissible development. There is no evidence that any such land is available for the proposed use. The most appropriate area for the establishment of a sub-station under the Strategic Plan is the Special Purposes designation. Oddly, while the Planning Vision of the Strategic Plan (ss.1.3, 1.4) contemplates the provision of roads, drainage, water supply and sewerage, the provision of electricity is not mentioned. Yet it goes without saying that a local government area which plans for substantial growth (as to which, see those "vision" statements) must contemplate the establishment of something as crucial to that growth as a necessary facility for the distribution of electrical power. Existing sub-stations within Logan City are not, so far as the evidence shows, established on areas designated for special purposes under the Strategic Plan Map. There is no Special Purpose designated land in the relevant area which is available to be put to this use. So one is forced to the conclusion that the establishment of an electrical sub-station is left to ad hoc selection.

In this appeal the evidence is that Energex has very carefully selected this site on the grounds of its position within the electrical network, its size, its lack of flooding, its non-residential planning designation, the comparative lack of adverse effect on residences and the proximity of the Pacific Highway. All of these attributes, it seems to me, are relevant planning matters and argue persuasively in favour of the site as suitable for a much-needed use to be developed on it.

I see nothing in the Strategic Plan or the DCP which militates conclusively against this use for this site. They clearly contemplate further development for Precinct 1

and for the wider area generally. It is true that the provisions which I have set out in para [57] seem prima facie to do so, but reference to the Table of Development for Precinct 1 in the DCP suggests otherwise. The column 1 permitted development uses include "local utility", which are defined in the Planning Scheme to include such things as water, sewerage, garbage and public transport facilities. Minor telecommunication facilities are permitted. A large number of uses which are by no means related to commercial offices or health care are listed as permissible development. So the objective and policy statement which I have cited in (para [57]) cannot be taken to be as inflexible as they seem to be.

[61] Thus there is a strong case to conclude that the use of the site for an electrical substation, which has no other specific land set aside for it, is not in conflict with the Strategic Plan or the DCP. But I do not need to go so far as to hold that to be the use. I am quite comfortable in reaching the conclusion that even if there is such a conflict there are sufficient planning grounds (in particular the actual need for a substation in the relevant area, a need which was never put in issue) to justify the use despite the conflict. See *P & E Act*, s.44.5A.

Conclusion

[62] The appeal will be allowed, but at present I merely adjourn it to a date to be fixed to allow the parties to attempt to settle all appropriate conditions, including, of course, exhibit 29.