

QLDC Urban Designer's Report

Response to issues raised in submissions & further submissions to

Plan Change 16

Three Parks Zone

August 2009

- 1 *Issue Raised: Two submitters highlighted the absence of an urban design report component in the Section 32 analysis and contended that the proposal neglects the principles of urban design and/or that new policies, objectives and rules are needed in order to require good urban design outcomes.*
- 16/21 (**Infinity**) paragraphs 4 and 5. *The proposal ignores the principles of good urban design and there is no specialised UD report in the Section 32.*
 - 16/33 (**Shotover Park**) para 2.2.7 – *that it enables a poorly designed and landscaped 2nd Town Centre and there is no UD report and relief (iv) that new objectives, policies, and rules that require good UD need to be introduced*

Evaluation:

- 1.1 The Plan Change has been developed through its various stages in consultation with at least three urban designers, including Kobus Mentz and Ian Munro from Urbanism Plus, and embodies good practise urban design principles such that when it reaches maturity it will feature:
- A consolidated mixed use neighbourhood centre.
 - Higher density housing within the neighbourhood centre ped shed.
 - Large format retail as anchors to street based pedestrian oriented neighbourhood retail.
 - Parking lots behind or alongside retail as opposed to in forecourt locations.
 - Higher densities dispersing towards lower densities further from neighbourhood centre.
 - Provisions to promote landuse patterns that reinforce the public realm, such as the sleeving of LFR frontages to main streets and the relationship of houses to streets in the residential zones fostering streetscapes that define, address, and provide passive surveillance over, the public realm.
- 1.2 Such measures are adequately covered in the planner's Section 32 report. Planning and Urban Design are not two unrelated disciplines, rather they are closely interrelated such that good planning practise embodies sound urban design principles. The absence of a separate urban design report need not be a shortcoming.

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- 2 *Issue Raised: The pros and cons of zoning for a large scale mixed use environment as opposed to just several large format retail outlets for which some submitters feel there is a clear mandate from the community. A considerable number of submissions question why so much is being zoned when really the plan change should just be allowing a couple of big box retail stores to satisfy current demand.*
- 16/27/5 – **Mount Cardrona Station** submits that the Plan Change should only include provision for industrial and large scale retail and business continuous to the existing industrial zone. Three Parks is close enough to the Town Centre to not require its own Town Centre.
 - 16/1 (**Ardmore**), 16/2 (**Noosa Holdings Ltd**), 16/3 (**Pembroke Body Corporate**) and 16/37 (**Trinity Group**) submit that the Plan Change should include a very precise business zone which

only enables large format retail and custodial residential uses so as to not detract from the existing Town Centre (and its ongoing redevelopment) and to avoid fragmented retail/ commercial development

- *16/4 (**Alistair Madill**) contends that the Plan Change has morphed from a residential subdivision with a second supermarket into a predominantly commercial subdivision, which will have a significant effect on the existing Town Centre.*
- *16/20/1 (**Gavin Humphrey**) opposes the inclusion of smaller retail due to its effect on the Town Centre*
- *16/27/1, 16/27/6, and 16/27/7 and 16/27/9 (**Mount Cardrona Station**) suggests that providing an over-supply of business land, enabling a mixed use community, providing for tourism and community facilities, and a range of residential uses will reduce the vibrancy of the Town Centre and result in fragmentation.*
- *16/33/5(**Shotover Park**) Introduce objectives policies and rules that deliver good urban design & integration with surrounding landscape(including deletion of policy 5.5).*

Evaluation:

- 2.1 The immediate demand may well at present equate to a limited area of large format retail (LFR), however the plan change covers 100 hectares, and at maturity will represent a significant enlargement of Wanaka. LFR will service the demands of the wider Wanaka area, however on its own would do nothing to alleviate dependency on private vehicular while creating a low amenity urban environment dominated by parking. The smaller format specialty retail will to a large extent respond to local need, from the establishing residential component to Three Parks, in particular the higher density residential zones in close proximity. In addition it enables the eventual delivery of a higher quality of urban amenity that is not achievable with stand alone LFR.
- 2.2 The alternative to a mixed use neighbourhood centre with a diversity of business activities and higher density residential, is to expand on the existing Wanaka model of a single town centre surrounded by an expanding sprawl of low density suburbia with the introduction of LFR surrounded by parking at Three Parks into what would become a further low density suburb. This is not widely regarded as a sustainable urban growth model.
- 2.3 Part of the difficulty in breaking the above model lies in getting the critical residential mass within a compact enough area in order to support neighbourhood centres with smaller scale retail. Often spot zoning is created in new subdivisions for neighbourhood retail activities, but such activities don't eventuate as the surrounding residential density is insufficient to make them viable. LFR, allied with higher densities of residential activity in close proximity, can be a useful catalyst to the formation of a neighbourhood centre by creating anchor tenancies that enable the viability of the smaller format shops that become the neighbourhood foci.
- 2.4 Analysis undertaken by Council planners and informed by the work of economist Phil Donnelly suggests that LFR locating on the periphery of the town centre is unlikely to feasibly occur. I have not been involved in this analysis but I accept that if this conclusion is correct, it is better to direct the location of LFR in a manner and location that utilises its ability to attract activity in a positive manner.
- 2.5 There is currently a wide variety of smaller format specialty retail appearing sporadically in Wanaka outside the existing town centre. Three Parks offers only limited opportunity for specialty retail in the short term, however to the extent that it does, it enables a rationalised approach to locating specialty retail, while initiating the kind of building scale, form and intensity that can create a high amenity pedestrian focused retail streetscape to eventually sleeve the LFR and co-requisite car parking areas from the main street.
- 2.6 It is anticipated that the LFR will be the first stage of the development of the Commercial Core. However the Outline Development Plan assessment criteria requires the building envelope of the LFR to be set back from the street frontage to enable later development of small scale retail sleeving, or alternatively that the LFR be located along street frontage with

the capacity to be further compartmentalised at a later stage, in order to promote a greater intensity and finer grain of urban form fronting the street as a long term outcome. The applicant is required to propose mechanisms (such as consent notices or restrictive covenants) in order to ensure such intensification occurs in a reasonable timeframe. The diagram in the notified version of the Plan Change entitled 'Large Format Retail Adaptively – Main Street situation' indicates how the transition may occur for both LFR that is set back and later sleeved and LFR that is built to the boundary and later compartmentalised. These provisions of the Plan Change are relied upon to eventually deliver a high quality main street urban environment. In my opinion, in their current form these provisions are insufficient to assure that desired outcome in that:

i/ where LFR is set back from the main street, uses suggested in the diagram for the set back space in the interim period are public space or carparking. Whereas public space brings no direct return to the developer and may act as an incentive for the developer to give effect to the specialty retail sleeve, carparking forecourts have direct benefit to LFR in that they encourage convenience shopping, i.e. passing traffic can make a quick stop they may not otherwise have made when they spot a free carpark. This becomes a significant disincentive to later giving effect to the specialty retail, and is regarded as detrimental in both the short and long term to urban amenity.

ii/ where the LFR is built to the street edge, the built form has already been set to suit LFR, so that by the time the compartmentalising takes place, other than an increase in number of shop entries, there is no guarantee of a finer grain of built form without going to the expense of a major rebuild.

iii/ the mechanisms proposed to ensure the desired long term outcome may become reliant on Council to enforce them, with the developer likely to be resistant unless there is a clear commercial benefit.

2.6 Therefore should the plan change be approved I recommend that these provisions are reviewed. Changes recommended include:

i/ prohibiting, as opposed to enabling, the use of the set back space between LFR and main street for carparking.

ii/ requiring that where LFR is built up to main street frontage, the scale of the built form will from the outset be broken down and articulated in a manner that anticipates the intended long term compartmentalised outcome and reflects the scale and rhythm of Wanaka's traditional shopping streets.

3 *Issue Raised: Whether the Scale of the proposed Commercial Core is excessive and will have adverse impact on the character and vitality of the Town Centre, other commercial areas in Wanaka and outlying towns close to Wanaka, in that it has the potential to meet all current and projected demand for large format retail.*

- 16/29/ - **(Chris Norman)** 1.1 Capacity and Demand, paragraph 8 "The proposed retail area of Three Parks suggests that all retail growth projections for the region will be met entirely within the Three Parks proposal."
- 16/34 - **(Sir Clifford Skeggs)** "The Southern Wanaka Structure Plan in Plan Change 16 allocates an extensive area (21ha) approx. to the Commercial Core which will have the following consequences: ... enable development of a second retail centre, which is double the size of the historical town centre ..."
- 16/36/1 and 16/36/2 – **Sustainable Wanaka** submits that a further capacity study is needed of all existing retail and commercial areas in Wanaka and believes that needs can be met within these areas
- 16/28/1 – **Nicholls Garden Centre** submits that sufficient land should be re-zoned to address the shortfall in land for large format retail

- 16/39/1 – **Wanaka Hardware** submits that there is insufficient suitably zoned land for large format retail and that there is little room for expansion and potential for reverse sensitivity in the Anderson Heights business zone
- 1641/3 - **Willowridge** submits that the Plan Change is necessary to meet the foreseeable retail needs of Wanaka and that 12,000m² is an appropriate amount for the first stage

NB – a number of other, more general submissions express concern about the effect on the Town Centre while 3 submissions do not think there will be an adverse effect on the Town Centre.

Evaluation:

- 3.1 The issue of the scale of the commercial core, and its capacity to entirely meet the retail growth demands of the broader Wanaka region, is in my opinion very significant. The submissions above that support the plan change (Nicholls Garden Centre, Wanaka Hardware & Willowridge) argue for sufficient land to be zoned to meet demand for LFR. However regardless of the extent of the demand, it is not clear why all such current and future demand should be met in one location. There is a strong tendency for LFR to co-locate, to the extent that given the opportunity such collocation is most likely to occur. Although this tendency may be to the commercial benefit of LFR, scope for future assessment needs to be made to ascertain whether this is the most suitable and sustainable growth model for Wanaka as a whole.
- 3.2 The impact of a significant LFR hub only two kilometres from the Wanaka Town Centre, will inevitably impact on the character of the town centre. The questions are, to what extent these effects will be negative, and what the alternative scenarios might be?
- 3.3 A parallel is readily drawn with the transition of the Queenstown Town Centre towards a more tourism oriented retail/entertainment focus since the advent of the Remarkables Park retail centre, with the consequence of the town centre becoming less the provider of many locals daily shopping needs. The Draft Wanaka Town Centre Strategy has as its vision statement “*A relaxed yet vibrant town centre where locals and visitors naturally choose to congregate ...*” and has identified among five key issues, Issue 3: “*How to maintain a mix of retail, commercial, social and administrative services within the town centre that is relevant to locals and visitors alike*”.
- 3.4 Furthermore the ability to create further viable retail hubs around Wanaka and in outlying settlements such as Hawea and Luggate, contributing to a more consolidated settlement pattern around these hubs and eventually a viable public transport network, may become compromised if all future uptake of LFR is to occur in one location.
- 3.5 The counter rationale is that Wanaka has recently experienced rapid growth and needs to anticipate and plan for its future growth. With growth a degree of change is inevitable. As LFR establishes, it rapidly influences consumer behaviour while contributing positively to the affordability of living in its catchment. The current lack of sites that can cater for LFR in a rational and well planned layout has led to LFR locating in areas such as Anderson Heights where it hasn’t been anticipated. The alternative of attempting to locate significant volumes of LFR within the existing Wanaka town centre, if achievable, would in itself pose a threat to the town centre’s character, scale and intimacy. Co-location of a quantum of LFR on a green fields site offers the opportunity to plan and rationalise infrastructure, in particular roading on which it places heavy demand. In addition it enables the ease of comparison shopping between different stores, as well as bulk shopping at a number of stores, within a single centre.
- 3.6 When taking into account the total area of the commercial core sub zone together with the 15m height limit (see issue 4 below) it is easy to appreciate the unease of submitters when considering the potential floor area build out in comparison with the existing town centre. However, it needs to be appreciated that filling the entire area set aside for Commercial Core would take a very long time and only a small part would be expected to be developed initially. Members of the team project team have suggested to me that the most important indicator of

the scale of the Commercial Core is not the size of the Commercial Core Subzone in land area but the amount of development that is in fact enabled without the need for a resource consent for future retail development. While I understand this view point I question the need to rezone the land if there is not an expectation that it will be utilized in the foreseeable future and question the signals and perception that showing this much land for commercial development provide.

3.7 Recommendations:

(i) – that the criteria for the release of further quantum of retail capacity for Three Parks beyond the 12,000m² that the plan change enables initially be carefully rationalised so that future extensions of the area consider relevant scenarios. This should include the consideration of whether the Three Parks is in fact delivering the positive urban outcomes anticipated and also allow for the reassessment of retail patterns and whether LFR (if there is a demand) can feasibly locate in or around the Town Centre given the circumstances at the time a future application is considered. There should also be an assessment matter that provides for changes in the future strategic planning of the community / Council. I would suggest one matter that future ODPs in the Commercial Core should be assessed against is whether there has been a change in the strategic planning undertaken for Wanaka or the wider area, such as future iterations of the Wanaka Structure Plan such that the viability of other commercial areas needs to be given consideration.

(ii) – that the commissioners consider whether to amend the Structure Plan or Zone boundary so as to make the proposed Commercial Core smaller than what is shown.

4 Issue Raised: *The appropriateness of the various proposed new height rules (in all subzones) –*

- 16/40 – **Wanaka Residents Association**. Paragraphs 7 (MDR), 8 (business), 9 (tourism subzone), 10 (commercial core)
- 16/10 – **Costello** – 15 m height is more liberal than Town Centre height rules

Evaluation:

- 4.1 LDR, MDR and Tourism/Community Facilities zones all impose maximum numbers of floors, as opposed to a maximum height above ground level, in order avoid flat and lifeless roof-forms while offering no commercial advantage to maximizing building height over the full building envelope. A diversity of roof forms also enables concealment of roof top located mechanical plant.
- 4.2 It is however recommended that max height limits be set to close the potential loop hole of double height volumes being created and later filled with an extra storey. Also having no max height may inspire some unintended vertical follies.
- 4.3 The Commercial Core is potentially more problematic with a 15m height enabling up to 5 storey buildings, particularly when taking into account the size of this sub zone.
- 4.4 Should the initial stage of commercial core development be realized as LFR as the applicant anticipates, some of the submitter's concerns may be mitigated by the fact that LFR generally occupies a single storey and requires a very large area of adjacent parking which will occupy open space.

- 4.5 However the five storey height limit still remains a concern in that it introduces a height limit that is not consistent with existing Wanaka built form. Furthermore building to five levels may soak up commercial office and/or residential demand at a rate that could slow and impede the eventual maturation of the commercial core; and in the long term threaten the vitality of the town centre by over-catering to office demand.
- 4.6 A further threat the 15m height limit entails is for the potential of LFR to have overly high perimeter walls to create a visual presence well in excess of what is required to contain their internal volumes (e.g. Mitre 10 Dunedin).
- 4.7 In response to Wanaka Residents Association submission that building height in the commercial core be restricted to two stories, Willowridge state that “3 storey buildings in the commercial core would provide for a vertical mix of land uses and would provide the opportunity to integrate other buildings in with the large format retail. 3 storey buildings would not be out of character in the commercial core.” I support that view, however point out that it overlooks the fact that the 15m height limit enables 5 storey buildings.
- 4.8 It is recommended that the maximum height permitted in the commercial core zone be restricted to 12m and a maximum of 3 stories.
- 4.9 For the Business Zone a maximum height of 10m is prescribed with a proviso that any part of a building within 3m of a street boundary, other than in the main street precinct, shall not exceed 8m. This is generally in keeping with the Wanaka Town Centre Zone, but more attuned to the flatter roof profiles associated with a business zone, while enabling the full height to be expressed up to a mainstreet. One short coming may be in that although this could be expected to generally enable two storey construction fronting streets (other than in the mainstreet precinct), and three storey construction elsewhere, it is conceivable to squeeze three levels into 8m.
- 4.10 It is therefore recommended that maximum numbers of storey's should also be set for the Business Zone, with a 3 storey limit to the 10m areas and two a storey limit to the 8m areas.
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5 Issue Raised: *The appropriateness of commercial core site coverage rule enabling up to 100% site coverage.*

- 16/10 – **Costello** – 100% coverage in commercial core (coupled with height) further erode Town Centre's ability to compete.

Evaluation:

- 5.1 100% site coverage enables the intensity of activity required to foster a robust, ped focused compact urban core. The large volumes of LFR anticipated are however likely to generate large areas of commercial core area dedicated to car parking, which isn't included in site coverage calculations. Areas dedicated to LFR are not likely to exceed 50% site coverage.
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6 Issue Raised: *Whether it is appropriate to not allow rear lots at all in the Medium Density Residential subzone.*

- 16/41 – **Willowridge**. See relief requested under “H3” in their submission – to allow up to 10% of lots to be rear lots in the MDR zone, in the same manner as is allowed in the other zones – in order to maximize development efficiency.

Evaluation:

- 6.1 Rear lots are regarded as increasingly problematic with rising residential density. Good practise urban design promotes urban layout patterns that reinforce, define and activate the public realm (the streets, squares and parks), in order to foster a sense of neighbourhood community. In higher density residential environments, it becomes increasingly important to establish a good balance between the positive contribution of built form to the public realm, with adequate levels of privacy for each dwelling unit and between dwelling units. To achieve this balance a well established principle of urban design is to orient building frontages with well defined entrances and strong visual connections between the more communal parts of the dwelling towards the public realm, while orienting backs of buildings containing the more private zones of the dwelling towards the backs of other buildings with adequate separation distances between them (often set at 20m minimum). Thus fronts face fronts across streets (or other public space) and backs face backs across rear yards (often used as shared open space). Imposing rear lots on this layout immediately undermines the pattern.
- 6.2 Placing rear lots in the midst of higher density development creates privacy and overlooking issues for both the rear lot dwelling units and the dwelling units on surrounding lots. Whereas in low density development privacy can more adequately be addressed by fencing and window placement, higher densities with higher built form require far more space around a rear lot to offset the effect of direct lines of view between windows. Such spaciousness itself runs counter to the higher yields the zoning anticipates. Furthermore the ability to offset window placement from direct line of view from neighbours is limited where a significant proportion of unit perimeter is in shared party walls, requiring a high proportion of glazing to the external walls for adequate light, outlook, solar gain and ventilation to each unit.
- 6.3 Public safety issues can also be more prevalent with rear lots. Medium to high density back-lots tend to be accessed by shared drives and these then double as visitor access and parking. It can often become unclear as to what is public and what is private creating space that is poorly cared for, particularly when opportunities for passive surveillance are difficult to achieve. Such spaces are frequently identified by police statistics as hot spots for antisocial incidents (ranging from people urinating to assault).
- 6.4 As opposed to low density development, that can occur autonomously on separate sites, higher density development is by nature more comprehensive. There is therefore no need at the outset of a green fields subdivision to divide down to such a fine grain so as to include back lots, rather a whole block, or a significant portion of a block, can be comprehensively designed and unit-titled subject to the unit layout. It is in fact a constraint on the designer if the lots have already been defined, prior to the design of the built form and often implies that the unit form has been anticipated by the surveyor. The intricacies and principles of higher density residential layout are not likely to be adequately addressed where this is the case. However, for the reasons set out above, it is important that the overall neighbourhood layout creates block sizes that are sufficiently compact so as to avoid the need for rear lots.
- 6.5 In summary, as residential densities increase it is increasingly important to prioritise public and private amenity outcomes over the higher yield in terms of number of residential units per area of land that back lotting enables.

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- 7 Issue Raised: *The appropriateness of the proposed new LDR rules including setbacks from street, living room windows facing the street, and front fence heights not exceeding 1.2m*
- 16/40/3 – **Wanaka Residents Association (WRA)**. *That the rules in the low density zone .. relating to a required set back of 3 – 4.5m, living room windows facing the street, and fence heights of 1.2m maximum, be deleted from the plan change*
 - 16/5/1 – **Allenby farms** – *supports aspects relating to outdoor living sections and houses designed to optimize energy efficiency*

Evaluation:

- 7.1 The rules regarding front setbacks, living room window facing the street and front fence height collectively support a strong relationship between the street and the dwellings that reinforce the public realm and streetscape. The close proximity of the houses to the street together with the low front fences mean that a relatively consistent line of dwellings spatially define and contain the street, as opposed to blank high front fences or walls doing so, or a more random pattern of house placement occurring. The large living room window facing the street enables passive surveillance between dwellings and street, while further ensuring that the streetscape is enlivened or activated as opposed to being fronted by comparatively blank facades.
- 7.2 The narrow front setbacks furthermore promote the location of the bulk of the dwelling in a forward position on the site enabling a larger area of private back yard open space. This promotes a neighbourhood relationship of house 'fronts' facing 'fronts' across streets and rear yards abutting neighbouring rear yards where higher fences can ensure suitable levels of privacy. This is the kind of suburban neighbourhood that prevailed in NZ (and elsewhere) in suburbs that predated the predominance of private vehicles, when the focus of daily events was more oriented towards the street.
- 7.3 Allenby Farms contention that these rules collectively restrict the ability to position a house for maximum solar gain is valid for some scenarios. However the outline development plan process actively seeks a street pattern that will maximise the proportion of streets aligned on a north south axis. This would result in houses that conform to the front setback rule benefiting from morning and afternoon sun in their front and rear yards which will not be shaded by neighbouring houses as the separation distances (front to front across streets and back to back across generous rear yards) enable the lower morning and afternoon sun angles to reach the houses. This is of increasing significance on smaller sections where houses are packed tighter with narrow side yards.
- 7.4 For streets aligned on an east west access houses on the north side of the street have the advantage of having their private rear yards to the north, and will also benefit most from being located close to the street boundary. The large living room window facing the street would however face south, whereas promoting good solar gain and a strong relationship between living room and private outdoor space would favour locating living rooms and the majority of their glazing to the north. A wider interpretation of what constitutes a living room, including kitchens or dining areas would enable more flexibility.
- 7.5 Houses on the south sides of streets aligned on an east west axis present the most conflict between complying with the rules and enabling good solar gain. Complying with the rules means the rear yard spaces are shaded by the house and face south. Positioning the house for best solar gain suggests pushing the house further back on the site to enable a larger sunny front yard area, which is likely to create a desire to position higher fences along the front boundary in order to establish reasonable levels of privacy. Such factors need to be weighed up against the benefit of the cohesive neighbourhood streetscape environment that the rules promote. A compromise that enables a portion of the house to be further set back with a higher fence along that portion of frontage is one option that the assessment matters could enable, in particular for houses located on the south side of streets.

8 Issue Raised: *The appropriateness of having shops along the arterial, in terms of access, functionality and efficiency of the road –*

- 16/40/1 – **Wanaka Residents Association.**

Evaluation:

- 8.1 In common with Wanaka town centre, locating main street shopping along an arterial will help to foster the vitality needed to sustain and render viable a neighbourhood shopping centre. Many examples occur where strong neighbourhood retail areas have grown and thrive on the strength of a location along arterials and where arterials intersect. Newmarket, Grey Lynn, Mt Eden, & Dominion Road in Auckland are all examples of where neighbourhood shopping nodes thrive because they occur along arterials with significantly greater vehicle numbers than can be anticipated in Wanaka for years to come. Closer to home is the example of Frankton Corner. The eventual completion of the street network in Three Parks and its immediate vicinity will see a number of alternative routes to get around town provided an effectively interconnected grid is achieved within the later secondary network.
- 8.2 It is important that the function of streets is not solely determined by the efficiency of their traffic function, but rather that they facilitate and support a high urban amenity in the destinations that occur along them.
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9 Issue Raised: *The effect of providing the tourism and community facilities subzone at 3 parks – on the Town Centre and other small growing communities*

- **16/27 Mt Cardrona Station.** para 1.15 and relief 2.8

Evaluation:

- 9.1 In terms of tourism facilities the town centre will always retain the considerable benefit of its lake front location. However the ongoing establishment of further attractions around the urban area such as Puzzling World, add to the wider attraction of the District.
- 9.2 The town centre strategy has set out a deliberate intention of locating Wanaka's most significant Council funded community facilities in the town centre. This would limit Three Parks to private community facilities, or such public facilities that would cater to the local neighbourhood.
- 9.3 Smaller "growing communities" are likely to depend on localised attractions as draw-cards, such as proximity to ski fields and/or scenic attractions, that shouldn't conflict with Three Parks more urban attractions over and above a level of trade competition.
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10 Issue Raised: Restrictions on cul de sacs in low and medium density residential zones are unwarranted as they promote grid networks that enable intrusion of extraneous traffic, excessive speeds and intersection accidents, with Christchurch cited as an example of the failure of a grid layout.

- **16/40/5 Wanaka Residents Association** supported by further submission by Willowridge developments ltd

Evaluation:

- 10.1 Excessive use of cul de sacs is not considered good subdivision practise in terms of urban design outcomes for any level of residential density for several reasons. Cul de sacs reduce connectivity within and between neighbourhoods for all modes of transport. More direct connections are cut off by the dead-end geometry significantly lengthening travel distances to

even physically close locations. For pedestrians and cyclists the increase in travel distance is significant to the extent that such modes are discouraged by requiring overly circuitous routes. American research has shown that people in car based cul de sacs are on average 2.7kg heavier than people living in an open grid network. For vehicles cul de sacs reduce options and tend to force traffic through a street hierarchy that tends to promote congestion at key intersections.

- 10.2 The options for cyclists and pedestrians can be alleviated by cycle and pedestrian linkages sometimes including linkages through neighbourhood pocket parks in mid-block zones. However although these alternatives improve pedestrian and cycle connectivity, they are susceptible to other issues regarding personal safety owing to poor standards of passive surveillance common to such alternatives, and an increased susceptibility to burglary within the cul de sacs owing to the provision of an escape route.
 - 10.3 Further US research points towards cul de sacs having some of the highest traffic accident rates involving young children with the main cause of death in injuries to under 5's as by being backed over.
 - 10.4 With regard to Christchurch's issues with its grid system is noted that Christchurch City Council protects its grid system as part of its heritage character and advocates for grid layouts in new neighbourhood subdivisions.
 - 10.5 It cannot be denied that cul de sacs "*discourage intrusion of extraneous traffic*" however this very factor delivers a corresponding increase in demand on the surrounding through routes and it has also been argued that the very low traffic levels result in reduced passive surveillance associated with reduced personal safety.
 - 10.6 It is therefore recommended that restrictions on cul de sacs are retained.
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