MAPPING LOCAL SOLUTIONS TO ENTRENCHED TRANSPORT PROBLEMS: KEY LESSONS REGARDING THE USE OF GEOGRAPHICAL INFORMATION TECHNOLOGIES IN COMMUNITY MAPPING WITH DISADVANTAGED COMMUNITIES

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ABSTRACT

There is an increasing interest in the use of information technology as a participatory planning tool, particularly the use of geographical information technologies to support collaborative activities such as community mapping. However, despite their promise, the introduction of such technologies does not necessarily promote better participation nor improve collaboration. In part this can be attributed to a tendency for planners to focus on the technical considerations associated with these technologies at the expense of broader participation considerations.

In this paper we draw on the experiences of a community mapping project with disadvantaged communities in suburban Australia to highlight the importance of selecting tools and techniques which support and enhance participatory planning. This community mapping project, designed to identify and document community-generated transport issues and solutions, had originally intended to use cadastral maps extracted from the government's digital cadastral database as the foundation for its community mapping approach. It was quickly discovered that the local residents found the cadastral maps confusing as the maps lacked sufficient detail to orient them to their suburb (the study area). In response to these concerns and consistent with the project's participatory framework, a conceptual base map based on resident's views of landmarks of local importance was developed to support the community mapping process. Based on this community mapping experience we outline four key lessons learned regarding the process of community mapping and the place of geographical information technologies within this process.

KEY WORDS

community mapping; participatory GIS; participatory mapping; geographical information technologies, transport planning

1. INTRODUCTION

In recent years there has been an increasing emphasis on the need to incorporate the diversity, ambiguity and changeability of community opinion into planning decisions at both the local and regional level. Participatory planning can be broadly characterised as a planning activity which involves interested individuals and groups in planning initiatives to seek their feedback to inform and influence planning decision-making. Most participatory planning initiatives are top-down in that they are instigated by governments or developers to contribute public input to a specific planning project. Involving the community in these participatory planning exercises can be time and resource consuming, rarely fitting easily into the institutional timeframes and budgets that are established for many planning exercises. Participatory planning also involves the added complexity of dealing with stakeholders with comprehension of a range of issues along broad and varying continuums, unequal access to information, time and other resources, and diverse values and views. As a result, public involvement is often seen as a necessary but considerable hurdle in the planning process.

There is a growing interest in bottom-up collaborative planning processes which involve community-initiated and led planning projects where communities identify local issues and potential solutions which they present to decision-makers. These participatory processes emphasise institutional and community capacity building, networks, relationships and the importance of local knowledge as a form of planning expertise.

By its very nature, whether it is participatory or otherwise, planning involves a strong spatial or physical aspect. A desire to seek out ways to address the challenges presented by participatory planning and to adequately reflect this spatial aspect has influenced the growing interest in the use and application of geographical information technologies including conventional geographical information systems (GIS) and related mapping tools.

Planning support tools based on geographical information technologies are employed in participatory planning across a range of fields including resource management and transportation. This adoption is often based on the premise that better access to spatial information will result in a better informed public debate and decision-making (Shiffer, 1995; Bischof, 2004). These technologies are seen to be able to manage and present complex information inputs to planning (Talen, 2000, p.281) with much of the appeal of using them in participatory planning lying in their perceived ability to simultaneously engage and educate participants (Arno et al., 2003, p.10).

The use of geographical information technologies is seen to promote more equal participation through education (Ball, 2002, p.121). This educative element focuses on the participants' ability to learn to use maps and interactive software (either online or in a facilitated group setting) to highlight the complexity of issues and the potential impacts of 'trade-offs' inherent in planning. Through this, the application of geographical information technologies can be conceived as a way of assisting users to express their views and preferences while learning more about complex planning issues, the impacts of proposals and exploring alternative solutions (Bischof, 2004, p.36). The use of these technologies as participatory tools has also been promoted as a way of diffusing conflict by helping participants to move toward shared understandings from an 'informed' position. It has been argued that this is achieved by the work of geographical information technologies in assisting to establish a shared knowledge base when dealing with multiple perspectives in planning dialogues (Envision, 2002, p.7) and supporting the integration of these diverse viewpoints into decision-making (Kyem, 1998). Through shared knowledge, some proponents of the use of geographical information technologies in participatory planning believe that it has the potential to assist in dissipating confrontation and conflict by providing a focus for deliberations (Arno et al., 2003, pp.8-10) and a basis for structured negotiation based on a common understanding (Bischof, 2004. p.36).[1] An associated appeal revolves around the promise of its ability to engage participants in planning processes as new technologies are often perceived as fun and exciting to use (MetroQuest, no date).

While these arguments have some merit, a key criticism levelled at the use of geographical information technologies as a primary participation tool is that they can distance participants from the planning process due to the overwhelming nature of the technology (Al-Kodmany, 2001, p.122). It has also been argued that participants may also experience a reluctance to challenge the "certainty" of the outputs generated by the use of such technologies as they can make proposals appear more authoritative than they might otherwise (Obermeyer, 1998).

[1] While the potential contributions of geographical information technologies in participatory planning activities like community mapping to decision making and conflict resolution through spatial illustration are outlined above, some scholars and practitioners have identified the potential for them to create conflicts, or more accurately, bring latent dormant conflicts into the open (for example see Deddy, 2006).

The adoption of a technological tool to help facilitate and record discussions, especially in the early stages of participation, is attractive. If, however, the technology allows an unbalanced focus on the physical inputs and outputs of geographical information technologies at the expense of broader dialogue, this focus on technology as a primary public involvement tool can come at the expense of good participation and planning outcomes. Such an approach has the potential to, paraphrasing Marshall McLuhan (1964), make the medium the message.

When introducing such technologies into projects, "[t]he appropriate marriage of GIT and participation technique is needed" in order to achieve good results (Ball, 2002, p.99). While geographical information technologies can act as a tool to assist users to make sense of information, it is its place in the broader participatory planning process that ultimately determines its utility because even the best technologies will not achieve positive outcomes if they are not integrated into the right process (Snyder, 2001, p.5). The remainder of this paper considers a community mapping exercise in suburban Australia which was designed to identify and document community-generated transport issues and solutions. We draw on this experience to highlight the importance of ensuring that selected information technologies support participatory planning goals.

2. UNDERSTANDING TRANSPORT DISADVANTAGE IN GOODNA AND GAILES

Goodna and Gailes are neighbouring suburbs located at the boundary of two city councils in south-east Queensland, Australia. Gailes is a small residential community bounded by busy motorways. Residents of the area describe Gailes as 'the twilight zone' and 'the Bermuda triangle', and themselves as being 'the fringe dwellers' in reference to a perceived lack of attention by all levels of government to their service needs (Johnson and Herath, 2004, p.5). Goodna, as the larger of the two communities (with more than 7900 residents compared to Gailes' 1650 residents), is the sub-regional centre for health, social services, education, banking and shopping. Gailes, by contrast, has few local services and accesses education, health and other services from Goodna. This reliance reinforces the view that although the suburbs are distinct, they are connected in their community ties and shared facilities.

Both Goodna and Gailes play a key role in the region as places of low cost public and private housing. As a result, they are also communities where many people with intellectual and physical disabilities reside, with Goodna in particular being home to many people with disabilities living in supported accommodation (Burton and Johnson, 2010, p.224). Based on most objective measures both Goodna and Gailes can be characterised as disadvantaged in an Australian context and score poorly on the Index of Relative Socio-Economic Disadvantage which considers indicators of disadvantage such as low income, high unemployment and low levels of education (Caniglia et al., 2010).

As two distinct yet connected communities, the adjacent suburbs of Goodna and Gailes are characterised by relatively high levels of unemployment and under-employment (refer table 1). Lower income households dominate[2] and more than one-quarter of families are single parent families. About one-third of the residents of these communities were born outside Australia (there is high representation by Samoan, Vietnamese and other South-East Asian migrants) and a significant number of these self-identify as having little or no English language skills.

[2] According to the Australian Bureau of Statistics (2009) lower income households have a mean equivalised disposable household income per week of $409 compared to $692 for middle income households and $1646 for higher income households (amounts expressed in Australian dollars).

Table 1: Characteristics of Goodna and Gailes, by percentage of community

Characteristics	Goodna	Gailes	Queensland
Population	7900	1650	4.1 million
Demographics			
Single parent families	30%	32%	16%
Persons with the need for assistance	5.3%	7.4%	4%
Migrant residents born in a non-English speaking country	22%	24%	8%
Migrant residents who do not speak English	12%	13%	5%
Indigenous residents	6%	6%	3%
Employment and income			
Unemployment rate	8%	9%	4%
Persons in part-time employment	23%	23%	16%
Poorer households with incomes less than $350 per week	16%	21%	13%
Transport			
Persons under driving age (17 years and under)	32%	25%	25%
Households with no car	13%	16%	8%
Households with one car	42%	42%	37%
Households with two cars	27%	26%	36%

(source: Australian Bureau of Statistics, Census data 2006, rounded to nearest whole percent)

For several decades, the residents of these communities identified poor public transport infrastructure, services and networks as disadvantaging residents, inhibiting the development of their communities and impeding residents' access to social, health and community services and employment opportunities. The residents of Goodna and Gailes have argued that they are poorly served by public transport, such as buses, and that the design and availability of local pedestrian and cycling infrastructure is deficient.[3] Although Goodna and Gailes have railway stations, it has been observed that these were not readily accessible for most members of the community because they are more than one kilometre walking distance from the main residential and housing commission estates within these suburbs, and these residents must cross a busy national highway to access them.

Poor access to transport is a key barrier for unemployed residents trying to access training and employment opportunities in the region. It is generally easier to travel the 30 kilometres to the Brisbane central business district by public transport than to travel by public transport to local employment destinations including the nearby industrial estates. Early morning shift workers employed at these industrial estates could not access public transport services because they did not start until later in the morning. Unformed and disconnected roads reduce the ability of residents to rely on walking and cycling as alternate forms of transport to the private vehicle or infrequent, unsuitable or nonexistent public transport services. As a result residents are pushed "to depend on cars that they struggle to afford or to miss out on job opportunities and access to local services" (Burton and Johnson, 2010, p.228).

[3] Many of the difficulties expressed and experienced by Goodna and Gailes residents have been reported in the consultation undertaken in successive local and state government community development initiatives including the Commonwealth Government's Building Better Cities Program starting in the early 1990s and the Queensland Government's Community Renewal Program almost a decade later (Woolcock and Boorman, 2003, p.23).

A group of concerned residents from Goodna and Gailes, representatives from local, state and federal government, and non-government service providers met regularly as the *Goodna Communities Moving Forward Forum* to address issues of critical concern to the local community including transport options and a working group was formed to address these issues. In 2004, members of this working group, residents of the broader Goodna and Gailes communities, service providers, and researchers from Griffith University's Urban Research Program began a collaborative research project for transport service and infrastructure improvements in Goodna and Gailes. This process resulted in the development of the *Goodna Gailes Transport Disadvantage Study.*

Photo 1: Pedestrian overpass, Gailes At the time of the study **t**he residents of Gailes had to use this pedestrian overpass to cross a busy motorway, to access the Gailes Railway Station. The overpass had steep stairs and was located more than 1km isolated walk from the suburb of Gailes. A new pedestrian overpass has now been built which is more user friendly. [photo: Laurel Johnson]

Photo 2: Goodna Community Health Services, Goodna Many of the clients of the Goodna Community Health Centre cannot drive but the centre is located remote from the railway station and regular buses. [photo: Laurel Johnson]

Photo 3: Walking and cycling path, Goodna This isolated walking/cycling path to a major shopping precinct near Goodna is unsealed in sections and is seen as unsafe by residents because it has no passive surveillance as no residents overlook it. [photo: Laurel Johnson]

3. THE GOODNA GAILES TRANSPORT DISADVANTAGE STUDY

Conducted in 2004, the *Goodna Gailes Transport Disadvantage Study*[4] was undertaken to "try and make a difference to the lives of people already suffering transport exclusion and social disadvantage" (Burton and Johnson, 2010, p.222). This university-community collaboration used community mapping as a key research and collaborative planning tool to identify and document the communities' transport concerns, needs and solutions. Community members were involved in the development of the study process design and the approval of timeframes. The approach adopted in this study was considered by Dodson and Sipe (2005, p.8) "to be unique in the Australian context". As shown in figure 1, the study was conducted using a three stage process.

[4] The research was funded by a Griffith University Community Service Grant. A copy of the full report is available from the Urban Research Program website at www.griffith.edu.au/_data/assets/pdf_file/0007/48643/urp-rm06-johnson-herath-2004.pdf

Figure 1: *Goodna Gailes Transport Disadvantage Study* process

The data collection phase of the study involved reviewing the findings of past projects, consultation, plans and reports and participant observation through public conversations, a photo diary and research notes. These findings were ground-truthed through discussions with individuals during key stakeholder interviews and kitchen table discussions[5], and with groups of people during facilitated workshops, focus groups, presentations and discussions at community meetings. The data analysis phase of the study considered inputs about (and from) the community, such as demographic information, and their current transport options, including interrogation of timetables and transport options for key destinations. Literature on social disadvantage and transport disadvantage was reviewed to better understand the relationship between transport access and social outcomes. The findings of this analysis were again verified with community members. The third phase of the study involved the generation and documentation of the communities' transport issues and solutions through a community mapping process, produced collaboratively by the local community, of their community, using their local knowledge as key inputs. These community generated transport solutions were then presented to government decision-makers for action.

To support the community mapping process, study methods included kitchen table discussions with individuals, key stakeholder interviews (including employment and training services and other support agencies), and working with residents in workshop and focus group settings. These face-to-face participatory approaches were supplemented by participant observation, involvement in public conversations, researcher's notes, review of public transport timetables and routes, and the use of a photo diary to assist in preparing community-generated maps of current transport, mobility and access issues in Goodna and Gailes.

The community maps were then presented to community representatives at local forums for their comment and consideration. Referral back to the community and the inclusion of "a reassessment stage where the data are evaluated and reviewed by the community groups, to ensure that outside facilitators have not misrepresented, intentionally or otherwise, the information provided by stakeholders" (Ball, 2002, p.121) helped to ensure community ownership of the issues and solutions generated. This process of ground-truthing for the *Goodna Gailes Transport Disadvantage Study* was undertaken primarily through the

[5] Kitchen table discussions are small informal meetings that take place in someone's home or at a local coffee shop to share ideas on subjects of mutual interest. They are conducted on the basis that everyone's contribution is equally valuable in the free exchange of ideas.

Goodna Communities Moving Forward Forum of government and non-government organisations and residents where the draft findings were presented for feedback.

The final map of community solutions (see Figure 2) was included in a final report (Johnson and Herath, 2004) which outlined recommendations for addressing key transport issues in the Goodna and Gailes area (see Table 2). The recommendations included details of the recommended activity, the transport issue it would address, the source of the recommendation and the status of the recommended activity at the conclusion of the study.

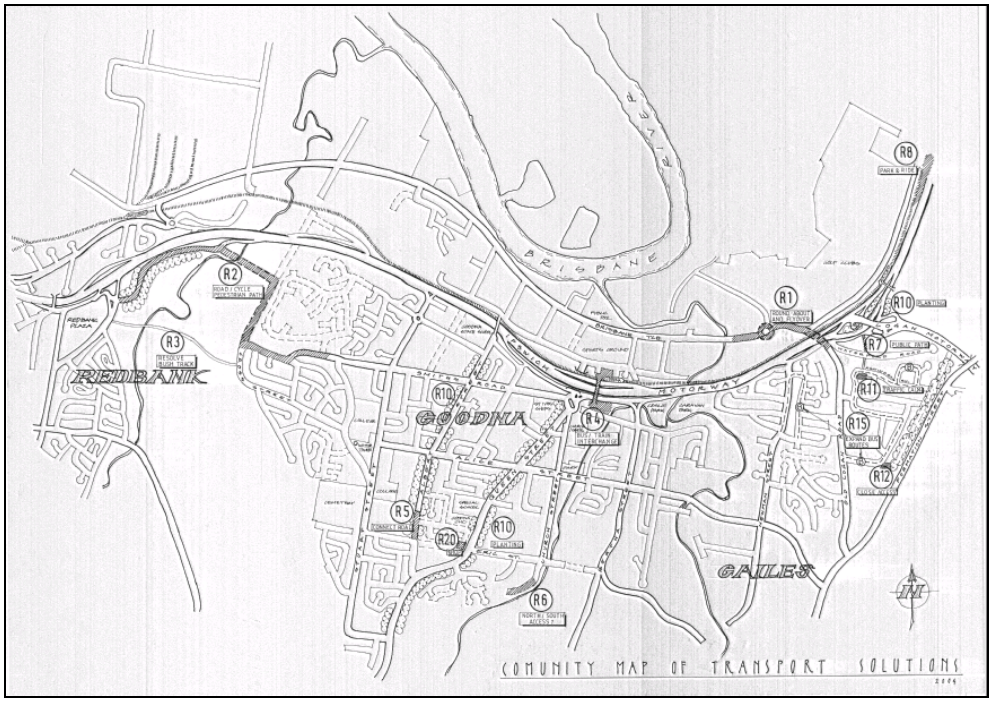

Figure 2: Community Map of Transport Solutions

Table 2: Sample of Recommended Transport Solutions

Recommended Activity	Transport Issue to be Addressed
[R1] Construct flyover at Ipswich Motorway at Gailes (extending Old Logan Road across the motorway to Brisbane Terrace)	The Gailes community would be able to access their railway station and the riverside recreational facilities. They would be able to leave their suburb without complicated merging at 90km/hour onto the Ipswich Motorway.
[R3] Resolve the existing walking/cycle path through the old rifle range site to Redbank Plaza. Maintain it or close it once other walking/cycling access is built.	The walking/cycling path is unsealed and isolated. It is unlit and perceived by local residents to be dangerous.
[R4] Construct a bus/train interchange at Goodna Station on current Queensland Rail car park.	Buses are not synchronizing with trains at Goodna station. This timetabling problem is exacerbated by the physical separation of the two modes by roads and pedestrian bridges (bus drivers can't see the trains).
[R9] Construct additional	The provision is not adequate. These suburbs can have

Recommended Activity	Transport Issue to be Addressed
bus shelters in Gailes and Goodna in all bus services areas.	temperatures over 40 degrees Celsius on summer days.
[R10] Undertake tree planting and provide seating for walkers using Queen Street, Gailes service road (to train station) and Albert Street.	The provision is not adequate. These suburbs can have temperatures over 40 degrees Celsius on summer days.
[R11] Construct a 'build out' and guard rails at Ashworth Street, Gailes	Ashworth is a wide street in Gailes. With no footpath, local residents walk on the road and children play on the verge and the road. A build out and guard rail is recommended for the corner of Gay and Ashworth Streets.
[R12] Close Noble Street (using concrete bollards) and vegetate the strip of land reserved for it.	The Noble Street road reserve is adjacent to many residents in Gailes. It is used as a 'rat run' by 4W drivers accessing Gailes from Formation Street. It is also used for the illegal dumping of rubbish and illegal trail bike riding. The road reserve could be an opportunity to 'buffer' residents from surrounding industry and provide an attractive habitat area for wildlife.
[R13] Erect timetables at all bus stops in Goodna and Gailes	The lack of buses makes timetables critical to bus users in these suburbs. If you 'miss the bus' it is important to know how long the wait for the next.
[R19] Provide recurrent finding to Gailes Community House.	The Gailes Community House was funded for a physical upgrade by Community Renewal. Since that time the Residents Committee Inc has been granted short term funds from a range of programs. A recurrent (continual funding) base would secure the Gailes Community House services in the community. This is a walkable, responsive service in an area of poor public transport access, high unemployment and low car ownership.

The report and accompanying community map of transport solutions was presented to the Government transport provider and funding organisations responsible for the area. Representatives from these agencies submitted responses to the community issues and strategies regarding transport, as articulated in the maps and associated recommendations. These responses became part of the study report, showing the status of the recommendations, according to the Government responses. The community-generated maps were also displayed in non-Government organisations in the local area where they functioned as an advocacy tool for transport improvements.

The *Goodna Communities Moving Forward Forum* included State Government transport representatives who agreed to give priority to the implementation of the community strategies identified in the study. The study also attracted both print and broadcast media (radio) interest, as it gave voice to the concerns of local residents at the time of considerable debate about the future design of the Ipswich Motorway. Many major transport infrastructure improvements identified in the study as community solutions (such as recommended activity R1) are now evident in the Goodna and Gailes community including the new road over the

Ipswich Motorway that effectively connects the divided community and facilitates resident access to the Brisbane River, riverside recreational facilities and the Gailes Railway Station.

While the report's recommendations were not solely responsible for this new transport infrastructure, the study did provide an avenue for the expression of local stories of the limitations of life beside a major motorway with poor public transport access, and these stories attracted local and state-wide media and public interest. The study highlighted the frustrations of the local residents and the difficulties experienced by local service providers and support agencies in serving residents who had poor public transport access and few private transport options to access employment, training and basic services. The community mapping processes provided a platform for sharing stories and experiences, identifying issues and communicating strategies and potential solutions that were based on the knowledge of a range of local residents, including those generally isolated from planning processes and structured consultation endeavours. The community mapping process effectively inverted the usual plan making process of *plan-consult* to *consult-plan* and brought to the forefront the knowledge of the local residents as the key input to identifying transport issues and solutions and generating 'the plan'.

The strengths of this study and its community-oriented and practical outcomes saw the Brisbane City Council "keen to apply the same collaborative transport planning method in a neighbouring community" fund a similar study in the neighbouring community of Carole Park (Burton and Johnson, 2010, p.228; Johnson, 2005).

4. Reflecting on the Use of Community Mapping to Identify Transport Issues and Solutions in Goodna and Gailes

Community mapping was chosen as a key method in this study because transport service networks and infrastructure are predominantly spatial issues and are relatively easily expressed on maps. However, themes of inclusion, transparency, and empowerment are implicit in the practice of community mapping. Because communities use community maps to represent themselves and their issues and to stake claims to resources, community maps "are often self-consciously social and political in their intent" (Parker 2006, p.475).

Community mapping enables communities to map details of where they live and the surrounding infrastructure and services, and is a way of encouraging and empowering communities to take action for themselves. When communities contribute to mapping their own area, they put themselves in a stronger position to establish for themselves what problems they face and to begin to look for solutions. To this end, community mapping can be used to mobilise communities, gather information, lobby government and other decision-makers, and to protect or promote the provision of services (Roaf, 2005, p. 3). Members of the Goodna and Gailes communities had an active and sustained interest in transport improvement, as demonstrated through participation in a decade of area-specific public consultation exercises. Similarly, the long history of effective project-based collaboration in Goodna and Gailes and the experience of the local people in working in groups and across sectors to identify and implement solutions to local problems were also seen as factors which would contribute to the success of such an approach. The involvement of established community 'leaders' who were readily mobilised for local transport improvements through existing resident-based working groups was also seen as a key strength (Johnson and Herath, 2004, p.7). In addition to the more engaged community leaders (such as members of local Management Committees), difficult to access 'community' members such as young mothers, caravan park residents, unemployed people and socially isolated people with mental illness were also included in the study. These and other marginalised residents were consulted in their support group meetings or the meetings of existing volunteer groups. By utilising a range of consultation techniques and attending support groups and network gatherings within

the communities, the researchers were able to record the views of residents who are highly dependent on public transport and local facilities and services to meet their daily needs but who might otherwise not generally participate in such processes.

The engagement strategy for the project sought the authentic 'community' voice of residents, local leaders and paid community representatives. The community mapping technique applied in this study responded to the consultation fatigue and frustration expressed by residents who had been involved in over a decade of interventions in their communities resulting in limited improvement in transport. The community mapping activity represented a significant deviation from the usual *issue driven* planning approaches to a highly consultative local problem solving and local strategy development approach. The community mapping exercise did not just ask 'what is the transport problem' but also asked 'how would you solve this transport problem'. This single question shifts the usual planning paradigm of 'planner as expert' to enable local knowledge and local experience to generate and design the plan. This approach moves up the participation ladder from common practice and towards empowerment (see McCall and Dunn, 2012, pp.83-83).

The community mapping exercises occurred in more than one setting within the community, allowing the communication of many perspectives on community based transport issues and solutions. The researchers attended meetings of the Young Mothers Group, Mental Health Support Group, the local unfunded community centre's volunteer Management Committee, and other local pre-existing networks. By utilising these existing networks and groups, the researchers were able to 'map' the views of residents who might not have attended the public meetings and structured community consultation events of past planned interventions. As a result, the final community maps catalogued transport issues and solutions from a range of resident perspectives which reflected local community identified solutions to resolve many entrenched transport problems.

The researchers had originally intended to use a map of the Goodna-Gailes area which was extracted from the state government digital cadastral database as the basis for the community mapping process. However, at the initial meeting with residents the researchers discovered that the cadastral map outlining house lots and key features was not sufficiently detailed or user-friendly to orient residents (even long term residents) to the study area. In response to these concerns and the confusion caused by the cadastral map, the researchers decided (in consultation with the community map makers) to abandon the cadastral maps in favour of a hand drawn conceptual base map that reflected resident's views of local icons and landmarks. This new base map was used by the community map makers to identify the orienting features that they considered most important to their communities and their understanding of the transport issues faced by these communities. The hand drawn map (shown in figure 3) was used as the base map throughout the study to identify transport issues, concerns and solutions. The new maps were produced an A1 size to allow participants to physically draw their issues and solutions on the base maps.

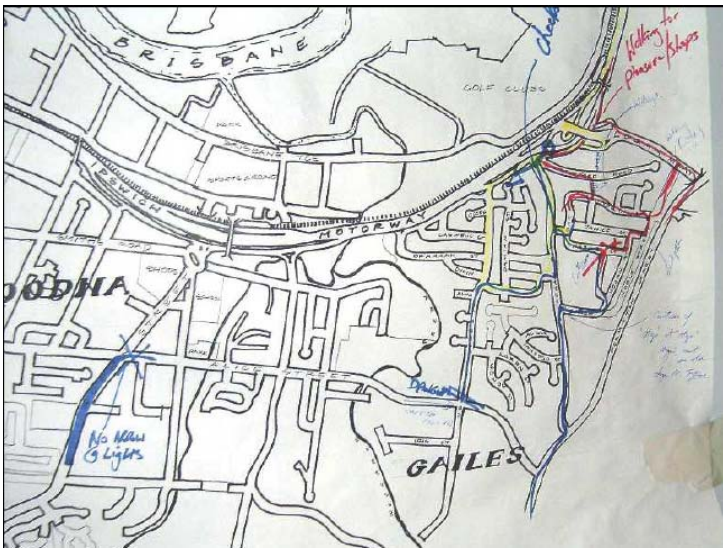

Figure 3: Working draft of community map of transport solutions and issues for Gailes

Based on this community mapping experience we have identified four key lessons learned regarding the process of community mapping and in particular the place of geographical information technologies within this process:

1. *Put the people before the technology;*
2. *Evaluate the effectiveness of the technology and change it if you need to;*
3. *A participatory approach can challenge our notions of expertise;* and
4. *Community mapping is a process, an output and a beginning.*

4.1 Key Lesson 1: Put the People before the Technology

In general, while there has been a shift among participatory planning practitioners to focus on participatory attitudes and behaviour rather than methods (Chambers, 2006, p.2), there is a danger that the current infatuation with the use of geographic information technologies may result in a situation where "the technology will guide the process, rather than being used as a tool" (Roaf, 2005, p.10) to promote and support participation. When planning for and evaluating the use of geographical information technologies in public involvement, it is important that the 'social' processes are given sufficient consideration and are not overlooked by concentrating solely on the technical issues associated with the use of these technologies, which Jordan (2002, p.2) refers to as "putting the technology before the people". A focus on the functions and outputs of geographical information technologies, rather than the needs of the participants, inappropriately shifts the attention away from the human element of both participation and planning.

Community mapping, when undertaken in developed countries, often relies heavily on the use of geographical information technologies. However, it is often forgotten that the use of these technologies can be marginalising and disempowering for community members, particularly those from disadvantaged communities or those with poor computer literacy skills. The community mappers from the Goodna and Gailes communities found the digital cadastral base maps to be confusing and lacking important local information. For example, one long term resident of the area (over 30 years resident) who did not drive could not visualise the cadastral base map as an image of her area because the map lacked important orienting information such as local landmarks and the informal and formal paths she used on a daily basis. Although she attempted to view the cadastral map from many angles she could not orient herself and became frustrated as the map failed to represent her experience of the

spatial relationships in the area. By contrast the hand drawn conceptual base map that replaced this map was seen by both this resident and other participants to be easier to use and more suitable for adapting to their purposes and reflecting features of importance to them. They were also more comfortable physically adding 'their' information to these maps and with changing the maps.

4.2. Key Lesson 2: Evaluate the Effectiveness of Technology and Change It if You Need To

The major challenge facing planners using a community mapping approach is finding the most effective and appropriate ways to integrate geographical information technologies into these processes. When doing so, Snyder (2001, p.7) stresses that it is important to not let the tool dictate the process. In short, it is imperative that the choice of technology is shaped by the needs of the process and participants. This idea is supported by a number of studies which identify the fundamental need to embed GIS and related information technologies into public participation processes which have well-defined goals for both the participatory aspects of the overall planning process, and the role and contribution of the technology to the planning and participation programs (e.g. Ball, 2002; Jordan, 2002; Talen, 2000; Dunn 2007). However, applying this approach to participatory planning processes can be challenging, as demonstrated by King's (2002, p.43) evaluation of a number of participatory planning case studies involving the use of geographical information technologies, which found that the majority of these projects paid little attention to these matters.

The experience of the *Goodna Gailes Transport Disadvantage Study* case study demonstrates the challenges associated with using geographical information technology in a participatory planning exercise. Although there was nothing fundamentally flawed with the choice to use a digital map that was originally made, the case study does highlight the need, to review and assess the effectiveness of such choices throughout the process. This flexibility in changing techniques and technologies to meet the needs of a changing planning process, political context or stakeholder needs should be positively recognized due to its responsiveness to participants needs and skills. While careful consideration is required in the early stages of process design to ensure that there is not "an uncritical and unselective adoption" of these technologies, it is equally important that the process allows for assessment and feedback throughout the process to ensure that their use can be and is adapted to meet the needs of the planning process (Nedović-Budić, 1998, pp.681-2).

In this instance the establishment of participatory principles at the outset, supported by clear participation expectations allowed the researchers to identify that the selected technology was not meeting the needs of residents (Johnson and Herath 2004) and to select a more appropriate approach to support the public involvement objectives and the needs of the community while still generating a spatial representation of issues and solutions to guide planning deliberations. The generation of a hand drafted base map was guided by local knowledge of significant local landmarks and icons, as identified by residents. The hand drawn base map allowed residents with little technical experience (some had not seen a cadastral map before and found the original cadastral base map disorienting) to participate in a planning process about transport and spatial relationships in their area.

For spatially-based planning processes to optimise participation, there needs to be strong communication between those who understand the technological limitations and potential of geographical information technologies (often technological GIS specialists), those planning and delivering the participation elements of the program (often consultation and engagement specialists) and the participants. The skills and knowledge of the 'technological people' regarding the potential uses and limitations of specific geographical information technologies should be integrated with the skills, knowledge and needs of those

expected to use them. Continually evaluating the techniques used and implementing community identified process improvements was vital to the success of this study because it contributed to community ownership of the study (Cameron, Grant-Smith and Johnson, 2005).

The *Goodna Gailes Transport Disadvantage Study* adopted a flexible approach to the use of geographical information technologies that avoided any over-commitment to early decisions made regarding their use.[6] At the request of participants, researchers modified their approach to address the unsuitability of the original choice of technology because they viewed the technology as an enabler, rather than the focus of the community mapping. As a result, the community mapping process was not reliant on its use and the technology was easily replaced when it was discovered that it was not meeting its intended purpose.

4.3 Key Lesson 3: A Participatory Approach can Challenge our Notions of Expertise

Because community mapping expresses community voices, builds from the needs and strengths of the community, supports community development as a process goal, and is based on validating the knowledge and experiences of participants (Amsden and VanWynsberghe, 2006, p.362) it can challenge planners' notions of planning expertise and knowledge. Through community mapping, local experience and knowledge about transport related issues became a valuable and recognised resource base for those within the community and for the transport decision-makers. The community mapping process inverted the usual planning process where experts such as engineers, transport providers and planners present draft strategies for community comment to a situation where community generated strategies were delivered to experts for their review, response and action (Johnson, 2005, p.1). The community mapping approach adopted in the *Goodna Gailes Transport Disadvantage Study* ensured that participating community members remained engaged, were able to contribute meaningfully to the process and had ownership of the outputs. This approach worked for this community, because the mapping allowed them to conceptually position themselves and their life activities (e.g. "I live there and the kids go to school there"). It also helped to encourage dialogue with government and community organizations because the hand-drawn presentation of the map of community solutions was a simple and highly communicative product (as opposed to a voluminous report or plan).

4.4 Key Lesson 4: Community Mapping is a Process, an Output and a Beginning

Community mapping is just the beginning (Greenwood 2002). While the outputs of community mapping (the map) can become a vital community resource, many see the actual process of community mapping as being of equal or greater importance (Parker 2006). The process of community mapping has tangible community outcomes because it supports dialogue and relationship building (Amsden and VanWynsberghe, 2006. p.361), can facilitate the sharing of information that might otherwise be unevenly distributed across the community (Geertman, 2002, p.30), and can contribute to the development of skills, knowledge and capacity within the community (Roaf, 2005, p.1). However, one of the major challenges with community mapping is how to represent and act on the findings of the mapping process (Amsden and VanWynsberghe, 2006, p.357). It is imperative that the way geographical information technologies are integrated into participatory planning processes addresses the planning issues involved and the broader decision-making context (Howard, 1998, p.1).

[6] Arguably, it may be more challenging to exercise this level of flexibility in a study or project where significant financial investment is required for technology purchase and development. However, this simply underscores the importance of determining early on—in the language of Johnson and Cameron (2006)—the *why*, *what*, *who* and *when* of participation before committing to *how*.

Although properly applied geographical information technologies have the potential to facilitate public involvement, they cannot enhance decision-making unless planners make concerted efforts to integrate the participants' feedback and suggestions derived from their use into planning and decision-making processes (Peng, 2001, p.903). While this paper does not address the motivations of planners for including (or not including) participants in design solutions, it does provide a case example of the potential of community participants to deliver creative designs and workable plans that planners can use to inform decision making. We are hopeful that this positive story may encourage other planners to deploy engagement strategies that utilise local knowledge in plan making.

In the *Goodna Gailes Transport Disadvantage Study*, the generation of the report which contained the community solutions map, the other data generated during the study process (including records of interviews and discussion) and a firm set of practical solutions based on identified need and evidence assisted decision-makers to understand the views and needs of the Goodna and Gailes communities and they were able to respond accordingly. Most importantly, clear evidence on these initial responses was included in the final report so that a link between community action and government response could be seen. As such the community mapping represented a beginning and a base point for the Goodna and Gailes communities to monitor achievement of the various recommendations. For the planning authorities, the project modelled a shift to more 'genuine' community engagement and some found this change refreshing. The project generated significant interest in the planning community and Brisbane City Council commissioned the project team to duplicate the study in a nearby, equally disadvantaged community (Johnson 2005).

5. CONCLUSION

Recognising the strengths and limitations of various public involvement techniques and tools, many contemporary planning theorists believe that it is a combination of both the participatory planning program design and the public involvement techniques and tools adopted which result in optimum participation and planning outcomes. Clearly, the introduction of specific geographical information technology itself does not necessarily promote better public participation nor improve decision-making procedures (Ferraz de Abreu, 2002). Instead "[c]reating a supportive climate for public participation requires much more than software and hardware enhancements" (Barndt, 1998, p.2). It requires a determination of what the inclusion of the technology adds to the participatory process (Jordan, 2002, p.8).

We do not deny that public involvement processes can be enhanced through the use of appropriate geographic information technologies, however, we agree with King (2002, pp.43-44) that "the availability of these tools should not serve as a substitute for critical analyses of their use and effectiveness", including their effectiveness in "meeting community goals and in shaping policy outcomes". In many instances, the challenges associated with using these technologies as planning and public involvement support tools are not necessarily linked with the technologies themselves, but rather with the way in which they are utilised in participatory planning exercises (Ceccato and Snickars, 2000, p.933). Consequently, the danger of planners being seduced by the marketing promises of various geographical information technologies and allowing these technologies to drive participatory processes, like community mapping, appear to us to be significant. For example, it has been noted that:

> *Although the technical capabilities and user friendliness of GIS have increased and the systems are now less expensive, many of the conditions hindering past efforts, such as organizational and communication difficulties, continue today. Making GIS fulfil their potential for planning will be a far greater challenge than most proponents recognize. The task*

> *will require a complex strategic approach that engages planners in fundamental ways.* (Innes and Simpson, 1993, p.230)

As demonstrated by our experience presented in the above case example, this statement is no less true today. A better understanding of the relationships between the planning and public involvement process, and clarity around planning and public involvement purpose and outcomes needs to be fostered as the adoption of geographic information technologies in many exercises often results in a situation where new tools are simply slipped into old ways of thinking. There is the need for new lenses in planning where the public are considered experts and public involvement tools are selected for their ability to facilitate public engagement in planning and their contribution to decision-making.

While we have no doubt that there will be times when geographic information technologies can contribute to a more informed public debate, it should be recognised that there will be times when the use of these technologies is neither warranted nor value-adding. As evidenced by the case presented in this paper, planners also need to understand that there will be times where participatory planning processes will need to be modified and technologies abandoned during the process to achieve planning and participation aims. Rather than such an admission being seen as a failure, planners should find reassurance in a reflective practice in which the tool remains a slave to the process and not its master.

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