A MICSA CASE STUDY ON DESIGNING AND BUILDING A MEDICAL CENTRE WITHIN AN EXISTING BUILDING ENVELOPE
UNIQUE MEDICAL

Case Study

Challenges of retrofitting within a complex infrastructure envelope and examples of efficient and cost effective fit-out solutions
A medical practice design and build should take into account several factors. In this case study we outline some of them.

1. **Regulations and standards**
   Adherence to the current edition of the Building Code of Australia, Australian Standards and other statutory authorities. All electrical, mechanical and hydraulic services also need to comply with relevant standard and requirements.

2. **Design and construction documentation**
   All works by the building contractor should be completed in accordance with drawings, designs and documentation approved by the relevant authority, such as a Registered Building Surveyor and other relevant bodies. Documentation addresses issues such as safety, disability access, structural integrity and adequacy, sustainability and cost.

3. **Relevant permits and accreditation**
   As part of the turnkey project, the contractor guides the client through required permit process. These include town planning, building permits, energy efficiency and fire
Accommodating clinical needs for sterile environments, accessibility & high quality finishes

Meeting air-exchange and climate control requirements with a modern, effective and cost efficient system

Resolving issues with legacy base building, structural design, floor levels and maximising usable space
safety as well as specific accreditation requirements for a medical practice.

A builder or project manager who specialises in healthcare projects will understand that baseline commercial building requirements are often insufficient. However, additional considerations made for a medical establishment do not necessarily need to equate to additional costs, as long as they are factored in early stages and in a clever fashion.

In this case, disability access requirements as per AS1428.1 were met by early planning and consultation with the relevant specialist and the need for dedicated washing facilities required for general practice accreditation were met by incorporating necessary services early in the rough stages.

5. Site Location
Location of the building in relation to other buildings, infrastructure and services can have a great impact on the viability of the business. They need to be considered. Future patients will require easy access from public transport or conveniently located parking facilities. The design of the building should maximise easy access and visibility of the new establishment.

In this case, MICSA redesigned a single entry tenancy into a dual entry one (the main entrance being relocated to directly face a large parking area). This was only possible after a local council approval which we facilitated. Disability access requirements for any entrance and exit had to be met as well.

6. Fitout specifications, fixtures and fittings
Incorporating the correct room sizes, lighting, plumbing and electrical services early in the design saves time and significantly reduces cost. A contractor with suitable experience in the industry will be able to foresee many of those requirements and plan accordingly.
In this case, MICSA incorporated consulting rooms accessible from hallways and procedure area located in a central position with a dedicated nurse’s room as well as accessibly from multiple consulting rooms.

7. Construction timeline
In order to deliver a project on time and on budget, all building and fit-out components need to be planned ahead, to avoid delays and any potential for on-site hazards and damages to existing or new fixtures and fittings.

In this case we used our own tested “smart-lapping” project management method in which sections of the building can be fully or partially finished and closed off in order to deliver the project without delays but at the same time protect finished areas for damage.
An example of project components that frequently need to be factored in:

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>EXAMPLE</th>
<th>CONSIDERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Protection Services</td>
<td>Fire hydrant, sprinklers, fire hose reel</td>
<td>Is the total building area over 500 m²? Can each hose reel reach all of required areas?</td>
</tr>
<tr>
<td>Plumbing</td>
<td>Toilets, hand basins in consulting rooms</td>
<td>Is the hot water system suitable in size and durability for the requirements of a practice?</td>
</tr>
<tr>
<td>Mechanical Installation</td>
<td>Air-conditioning, heat extraction</td>
<td>Is the system's size suitable to the proposed use?</td>
</tr>
<tr>
<td>Electrical Installation</td>
<td>Power and data</td>
<td>Do the electrical outlets need to be body-protected?</td>
</tr>
<tr>
<td>Roofing</td>
<td>Sloped or flat roof</td>
<td>Will the roof protect against natural elements?</td>
</tr>
<tr>
<td>Waterproofing &amp; Sealant</td>
<td>Caulking</td>
<td>Are all wet areas properly sealed and protected?</td>
</tr>
<tr>
<td>Mechanical Doors</td>
<td>Automatic sliding doors</td>
<td>Are the doors wide enough?</td>
</tr>
<tr>
<td>Framing</td>
<td>Partition walls</td>
<td>Does the partitioning system support sound insulation?</td>
</tr>
<tr>
<td>Glazing</td>
<td>Windows</td>
<td>Does the site allow natural daylight?</td>
</tr>
<tr>
<td>Ceiling Grid</td>
<td>Suspended ceiling or ceiling tiles</td>
<td>Does the ceiling installation support easy maintenance?</td>
</tr>
<tr>
<td>Paint</td>
<td>Walls and other fixtures</td>
<td>Is the paint type safe?</td>
</tr>
<tr>
<td>Flooring</td>
<td>Vinyl or carpet</td>
<td>Is the floor hard-wearing?</td>
</tr>
<tr>
<td>Other</td>
<td>many other components should considered</td>
<td>Have you prepared a scope of design and construction?</td>
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Pre-construction Stages

Preliminaries, Design, Engineering & Planning

The most critical and too often bypassed stage of a project is its design phase.
A medical practice requires a carefully designed floorplan taking into access to services, patient comfort, practitioner efficiency and safety, regulatory compliance (both NCC and other other regulatory bodies such as Department of Health and Human services and RACGP guidelines for space and amenities)

Some of the items that sometimes get missed:

- Suitable power supply. Is the planned power supply sufficient to the needs of the business?
- Specific requirements relevant to the business or industry, for example specialty medical equipment
- Computer system, specialty IT and Telecom systems
- Signage and other branding and visibility needs
- Maintenance items. Will the design allow for easy maintenance?
- Changes in regulations
Site plan incorporate surroundings and services

Engineerings design, drawings and calculations are critical for services such as lifts and structural supports

Full set of drawings also include elevations, hydraulic, mechanical, electrical design as well as other components
1. **Structural Components**
All steel supports where required need to be designed and erected as per AS 4100, AS 2327.1 and any associated Australian Standards and in conjunction with engineer’s design.
All timber structural supports need to be installed as per AS1684.

2. **Sewer and Drainage**
Sewer connection and sewer points should be laid to size and fall with approval by the relevant authorities and in accordance with engineer’s design and connected to the legal point of discharge. Sewer drain to capture all amenity facilities need to be laid in accordance with AS 2032. FRC and RCP pipes to be class two (minimum) and shall conform to AS 4139 and UPVC pipes need to conform to AS 2032.

3. **Plumbing**
All plumbing work needs to comply with the plumbing regulations and all joining procedures for pipes shall be in accordance with AS 2032. All hot and cold water requires appropriate piping, levels, pressures and insulation.

4. **External walls**
External walls are to remain intact wherever possible in order to meet the requirements of BCA and the issued building permit. Consult with proper building designer in relation to external cladding and facade maintenance.

5. **Windows & Glazing**
A medical centre requires commercial grade windows to ensure safety, comfort and energy efficiency. Windows need to comply with Section J of the BCA.

6. **Ceilings**
Ceilings need to be installed with considerations for ease of use and maintenance. Proper lighting needs to be incorporated into the design.

7. **Internal Walls**
All amenity walls should be built to accommodate safety, sound insulation and heat insulation. In this case, MICSA installed 92mm metal studs, 10 mm plasterboard or 13mm firecheck plasterboard lined and painted with primer and two coats of paint - this method of construction and materials are marginally more costly, but provide several benefits related to sound, fire and heating insulation. For this project, the rooms were insulated for additional sound-proofing.

8. **Internal Doors**
Commercial grade solid or semi solid 920mm wide doors should be considered. Privacy set locking mechanisms and door levers should be carefully selected for longevity and safety.

9. **Floor Coverings**
Commercial grade carpets, carpet tiles, vinyl flooring or ceramic tiles should be carefully selected to suit the use.

10. **Appliances**
General allowances need to be made to allow for future installation and de-installation of amenities relevant to the medical industry.

11. **Fixtures**
Plumbing fixtures should be commercial grade and if possible and practical should allow for disability access.
As part of a turnkey project delivery, custom made joinery made to suit the specific use and requirements can be a very cost-effective mean to achieve a cohesive look.
Rough Stages
Demolition, Site preparation Protection & Retro-fitting

Retro-fitting into an existing envelope is often challenging and needs to be carefully planned and executed.
Prior to engaging in any development or project, the client together with a project manager or builder revise options available to them in terms of establishing a new medical practice. In some instances after reviewing the related costs and timelines, the client decides against retro-fitting and decides to develop from scratch as a “Greenfield site”. However in many cases this is either not possible or practical due to the limited supply of available properties or land in the most desirable location with the best possible access to amenities and services.

*In this case, MICSA’s job was to retro-fit a modern medical centre into a building which was structurally complex and despite external obstacles delivered its promise.*

(above photo illustrates an old strong room lined with reinforced concrete and steel which was incorporated into the new design and turned into a fully compliant office.)
A site visit can often identify existing infrastructure which requires careful demolition and dismantling.

In this case, several tons of steel counters, steel curtains and pillars were safely and efficiently removed.
1. Site Preparation

Provisions for the supply and maintenance of temporary site accommodation amenities, power other services can sometimes be required and needs to be planned ahead of time. Careful consideration of existing site conditions allows for proper stage planning of construction.

Internal demolition, plumbing and sewer preparation, retro-fitting of electrical, lighting and data services often requires preparation.
Construction Stages
Hydraulic, Mechanical, Electrical Installation & Partitions

A comprehensive project plan will identify the order of installation of different construction components.
1. Electrical Works

Power Supply
Three phase and single phase power to main switchboard needs to be designed and installed to suit the specified requirements. All power and light circuits including switching need to suit base lighting and requirements of a medical centre. All other electrical systems required need to be completed to suit authority requirements and minimum BCA requirements and be installed by a qualified electrician.

Example electrical requirements of a fit-out include the supply and installation of the following:

- Supply and wiring of light fixtures. In some cases retrofitting existing wiring and lighting
- Supply and wiring of emergency lights, installation of emergency light and test switch’s to each
- Supply and wiring of exit lights as required by BCA and the relevant building surveyor
- Supply and wire fan to toilets and other forms of ventilation and air-exchange
- Supply and wire body protected power outlets in clinical areas (10 mA RCD or as required by the standard)
Proper clearance for services such as mechanical, hydraulic and electrical need to be considered when planning ceiling space.

For any deeper excavation, for example lift shaft, proper protection needs to be installed to prevent hazards.
2. Mechanical Works

Air-Conditioning

Air-conditioning system design needs to suit the performance requirements of the site location and use. In some cases retrofitting and reconditioning of the existing system is required to support the climate and air quality requirements.

As part of the mechanical installation, frequently installed are:
- Automatic controls for the number of zones
- Temperature sensors
- Control panels for dedicated zones.

Air conditioning system is to be designed in accordance with floor plan design and relevant regulatory requirements.

In this case, MICSA designed and installed the system on an internal design temperature of approximately 22 degrees Celsius +/- 2 degrees Celsius.
Mechanical Ventilation needs to be installed to meet the minimum requirements of the BCA and relevant Australian Standards.

3. **Fire & Smoke Protection**

All essential services need to be provided in accordance with the minimum requirements of the BCA and assessed by the project Building Surveyor and Fire Engineer. As a minimum medical centres require properly installed and inspected portable fire equipment and in many cases a fire hose-reel.

Additional active fire protection services

The installation of hose reels and portable extinguishers to be as per fire service plan and in accordance with AS 2444, AS 2441, AS 2419, AS 1221. If the total area of the building exceeds 500 square metres, a dedicated fire hydrant may be required.
Medical centres require modern, high quality commercial grade finishes designed to last.
Suitable materials, types of finishes and colour scheme can increase patient and staff comfort.

Considerations should be made to increase visibility and safety of main entrance.
Each space has to suit its purpose and enhance productivity and safety.

Provisions should be made for specialist equipment in procedure areas and access to washroom facilities.
Toilet facilities should comply with AS 1428.1 Disability access requirements and be designed to suit the style of the practice.

Consulting rooms should be designed for ease of access and the versatile nature and functionality of the room.
ABOUT MICSA

MICSA (Medical, Industrial & Commercial Specialists Australia) is a full-service, Australian owned medical infrastructure company. The group provides consulting, planning, fit-out and development services. We have been serving both private and public entities and have an unmatched level of expertise and experience in the healthcare sector.

MICSA was formed by experts in the field of healthcare operations, industrial design and commercial development. We serve the unique needs of healthcare practitioners, investors and developers.
WHY US

Whether you are a medical professional thinking about opening your first practice or a large group of clinicians planning a national expansion, you should talk to us.

Our experience and industry specific focus allows us to save you time and money on any project, regardless of size and scope. We deliver accurate budgets, realistic schedules and an commitment to quality. Because the work is performed by our in-house specialist team of engineers, builders and project managers you can be assured of a well managed and controlled project.

We are fully licensed and insured commercial builder and offer a level of healthcare specific expertise that is hard to match by any provider in Australia.

Experience for yourself why more and more hospitals, independent clinicians, land and property developers as well as equipment vendors are partnering with us.

Get in touch with us today for a no obligation consultation. We look forward to speaking with you about your next project.
Full Range of Services

We take away the headache of finding new premise locations, designing and deploying the entire project by offering a turnkey solution.

Working with clients prior to committing to a lease property or land acquisition we ensure our clients are well informed and avoid non feasible options.

We offer a complete service including initial appraisals, town planning, building permits, design, construction, FF&E (furniture, fixtures and equipment) and signage.

Our extensive network of professionals are also at your disposal and can assist with property searches and financial advice.
UNIQUE OFFER

Our Core Competencies and Unique Offer

Our level of knowledge goes beyond building design and construction. We have hands on experience in infrastructure management and planning for growth (from a real estate, operational and financial perspective).

Our design and planning technology and tools measure impact of design on patient outcomes, staff performance and overall efficiency.

We are open to assist clients at any stage of development as needed, in conjunction with existing builders, vendors or other involved parties.
What makes us better:
- Clear, transparent pricing
- Focus on results
- Collaborative approach
- Ongoing support

We work with clients on small fit-out projects, or large and complex developments. Many of our clients have limited budgets and restricted infrastructure environments which we gladly accommodate.

Our Competencies include
- Feasibility studies, demographic research, business analytics
- Lease & asset management, consultancy and negotiation
- Turnkey project management, assistance with project planning
- Medicare compliance, quality assurance programs
- Operational support and consulting
- Healthcare Information Technology

What makes us better?
- Expertise in healthcare infrastructure
- Pricing transparency and simplicity
- Clear focus on delivering results
- Collaborative approach & ongoing support
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