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IN THIS ISSUE

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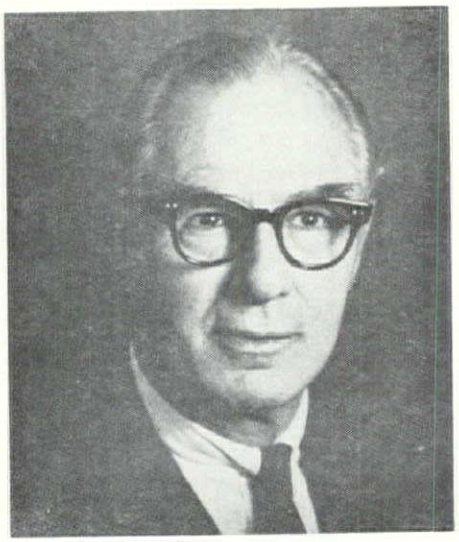


Clifford Dowdey

'But where are the snows of yester-year?'

(Francois Villon)

IN MANY OF OUR OLDER American cities one can often find a quaint relic from another era. Amidst the detritus of succeeding waves of architectural fashion, these relics are like curiosities of some lost and undefined age. Among such curios in Virginia, there is Richmond's Shockoe Slip, currently undergoing on its edges apparently successful attempts to combine physical nostalgia through decor with modish revival of Richmond's long-ago eminence in its public places for wining and dining.

Shockoe Slip itself is a largely abandoned cobble-stoned triangle, whose narrow sloping apex opens on the south side of Cary Street near 14th, and widens as it climbs northward to a flat plateau, now empty except for a stone-girdled watering-trough for vanished horses. Where the old Slip reaches Cary, several ancient buildings have survived, and one partially reactivated serves as a nightspot and luncheon oasis.

This building on the southeast corner, a pre-Civil War structure, had long fascinated me. Like the Slip itself, it was roughly triangular in shape with a narrow front on Cary and a broad side facing Shockoe Slip. During the Civil War this was (I believe) the Columbian Hotel and on the side, facing the Slip, a door (still there) entered into the Tobacco Exchange in the back of the hotel.

The old Columbian stood at the heart of the city's busy life: it was within walking distance, or a short ride in a horse-drawn hack, to the loading Basin of the Kanawha Canal for trips to the West; to Broad Street, across from where the Colonial Theatre now is, the boarding point for trains northward; trains to the South ran from a depot on 14th Street; also, west, north and east were the city's finest hotels, restaurants, bars, theatres, stores, coffee shops and somewhat raffish variety theatrical house among other attractions in a small, urbane cosmopolitan city.

What happened to the Columbian Hotel and its Exchange during all the changes that came to Richmond from 1865 until its re-emergence a few years ago as Sam Miller's Exchange, I do not know. But my wife and I were among the new Sam Miller's first customers for cocktails and dinner. The decor, as mentioned, was adequate, although my impression of the dining was made hazy by the (to me) dreadful din of the kind of sound favored as music today by young people.

It must be made clear that no citticism is intended of the music or its volume: that was produced for the pleasure, or at least for the background of persons much younger than myself. Omitting serious music to which we listen, as at a concert, I believe that for popular music, most of us have enjoyed the music we danced to in our youth.

I grew up in the days when Paul Whiteman was the "King of Jazz," and at a girl's house we danced to Whiteman's first record release, *Japanese Sandman* and

Whispering. But at Sam Miller's, such songs, played as they were fifty-odd years ago, would seem like a throwback to crinoline days, and the popular spot would soon revert to the silences which for so long had embraced the Columbian Hotel. However, while I had no wish to impose my old-fashioned taste on the happy crowd, neither did I feel any compulsion to endure their current tastes. In brief, when we found it difficult to indulge in our quaint pleasure of carrying on a quiet dinner-table conversation, we unobtrusively withdrew to the outdoor silence of the old Slip.

In defense of the deserved popularity of Sam Miller's, I must say that my wife —who did not grow up in the era of dancing to Paul Whiteman — has several times returned with friends and one of my daughters, to the enjoyment of all.

But I think to me something far more complex happened than merely the physical discomfort of the din. The unfamiliar New Sounds (and new volume of sound) must have unconsciously contrasted with the old sounds, in such songs as *Avalon* and *Margie*, in a way to reawaken forgotten memories of that long lost era. For when we returned to the silence of Shockoe Slip, looking a little eerie under the light of a rising moon, it no longer seemed deserted: it gave the illusion of bustling and crowding with wagons and an occasional truck, as it had been on a summer vacation from high school when I worked for one of the transfer companies on the crest of the rise near the horse trough.

Since my wife was enchanted by the scene, as we ascended the slope, she eagerly shared my description of the illusion of the busy Slip, with liquid voices raised in passing greetings or in carelessly spoken directions of the drivers. Past the deserted horse trough, where a small fountain gurgling gave the only sound where the horses had watered in that long-ago summer, we faced directly an empty space marked with white oblong lines for parking. There the fair-sized offices of the transfer companies had fronted on the Slip. Behind the offices, where the plateau spread, had been a large shed or warehouse, in which the transfer companies stored their equipment.

Of all the daytime lives spent in that building, where men and women, black and white, worked on the problems on which their livelihoods depended, not one vestige remained to indicate the then vitally necessary services these companies performed for the city.

In those days, the late teens and early twenties, the bulk of freight entering and leaving the city was carried by railroads. The transfer companies sent mostly wagons to the various railroad freight depots, from where the shipped articles, ranging in size from a package that one man could carry without effort to (literally) safes, for which equipment was needed, were delivered to their purchaser's destinations. I've no statistic on, or even any idea of, when trucking by large automotive vehicles over public highways reduced this service to the point where the large RR freight depots and offices, adjoining a network of tracks, were abandoned. But on that night journey I noticed the deserted freight buildings on 14th Street with weeds growing between the rusting rails, and nothing at the eastern end of the old Canal Basin from which all tracks had vanished.

Those freight offices had represented, in the summer of 1919 or 1920, the bulk of my work. My transfer company was owned by a Mr. and Mrs. Tyler, people obviously of good background, whose circumstances or interests required that they actively run the company themselves. It is difficult for a teen-ager to estimate the age of elders, but I should guess that they were in their late thirties or early forties, and what was then called "nice looking people." They lived in an apartment on West Franklin across from the Commonwealth Club, and drove to the office in a big, black Buick.

Mrs. Tyler, a finely proportioned lady of some size, had a reputation for a sharp tongue, although she was always friendly, sometimes even warm, with me, and up and down the Transfer strip, tales were told of epic battles between her and the small, soft spoken and gentle man who was her husband. Fortunately I witnessed none of these.

Year around they employed a middle-aged man as clerk who apparently, when I wasn't there, did my chores. In the summer, the Tylers took a succession of short trips leaving him in charge of the office, and I think the heat bothered him on all those long trips to be taken on foot. But at my age and physical condition, all the walks in unfamiliar parts of the city were not like work at all to me.

At the RR freight offices, I delivered invoices to the freight clerks, who busied themselves writing something or other in their careful handwriting. I remember yet how neat and clean the men looked, their courtesy and pleasantness, while I wondered (without really caring) what they were doing with the papers I brought and those I would take back to the office.

Part of my physical environment had been this very Cary Street, near 14th, where commission merchants flourished across the street from where Sam Miller's now is. In that summer, the sidewalks were crammed with produce of all kinds, even crates of live chickens, and men scurried from the displayed produce in and out of the mysterious interiors of the commission merchants stores. What commission merchants were I had no notion but,

with the busy stores on 14th Street and that part of Main, they all gave me an unforgettable picture of a segment of a city's commercial life.

Having no interest whatsoever in ever being a part of it, I viewed it all as a passionate bystander observing a colorful panorama. For years afterwards, I thought of writing about aspects of that summer which had impressed me so deeply. I cannot explain why I never did, any more than we can explain many things we have left undone, or some things we have done. Maybe, as they say, for a writer "nothing is wasted," and unremembered aspects of that summer may have come out through the unconscious in parts of past work.

However, with all the inner fantasy life as I walked the streets, climbed hills and steps — looking forward to Saturday night when I would take a girl to the Roof Garden atop the Richmond Hotel, dancing to a Whiteman-like band *(O, sweet Dardanella, I love your harem eyes)* — I obviously was of an age when new impressions make deep and, if unknowingly, lasting impressions. For on that night when we stood in the deserted Slip, and I tried to describe where everything had been and how everything was, I realized with a sudden shock that I was looking at not only the loss of a segment in the heart of the city's commercial life but, more sadly, at the loss of all the ways of life that were also gone.

It was not at all as if the whole section around the Slip had been deserted. Across from Sam Miller's the sturdy old buildings of the commission merchants, themselves long departed, were decked out (at least on the ground floors) in fresh and brightly colored paints, and sported two other eateries and several modish stores. But what has gone, or lurks in seedy abandonment, are the signs of the kind of city life that centered in the old Shockoe Slip.

I remembered how we used to read of Babylon and Nineveh and Tyre, and wonder how their citizens felt when their cities were going. Then, on deserted Shockoe Slip, I wondered about the meaning in all the lives I had chanced to encounter on that historical summer. Where were they all now? What had become of them — Mr. and Mrs. Tyler and the men on Transfer strip who laughed so heartily, the neat clerks with their careful handwriting in the freight offices?

Then, unbidden came some of the words of Dante Gabriel Rossetti's translation of Villon's 15th century THE BALLADE OF DEAD LADIES. For three verses the poet asks where are various ladies from history, some famous, as Heloise ("for whose sake Abelard ... lost manhood and put priesthood on"), and some obscure, and then closes with this ENVOY:

Nay, never ask this week, fair lord,
where they are gone, nor yet this year,
Except with this as an overword—
But where are the snows of yesteryear?

Consulting Engineering — A Creative Force

By **Joseph H. Norman, Jr.**
CEC/V National Director

CONSULTING engineering has become a large industry. Total earnings of independent design firms in the United States for 1976 are estimated to be about 10 billion dollars. Consulting engineering will account for about half that amount.

Despite the importance consulting engineering has assumed and the sizeable amount it contributes to the national economy, its role is not generally understood. Ethical considerations and the traditional reluctance of professionals have prevented consulting engineers from explaining the functions of their special profession to the public, with the result that neither the work of consulting engineers nor the business aspect of their firms is well known.

Consulting engineering firms range from one man to those employing thousands of engineers, technicians, draftsmen and other support personnel. The truly large firms — those with gross receipts of several million dollars a year — comprise five percent of all firms, but perform about 60 percent of the work with 53 percent of the work force. These large firms derive much of their income from foreign assignments. In states where consulting engineering has been supported vigorously, and where state and local agencies do not compete unfairly, consulting engineering has become an important export item — funnelling additional income into the state and providing employment for its citizens.

The Consulting Engineers Council of Virginia has 54 member firms, but, in the state, competition by tax supported institutions and government bodies has constituted a major impediment which has prevented private consulting engineering from assuming the importance which it otherwise might have.

Consulting Engineering Creates Value

The term "value engineering," applied lately by the U.S. Government to many of its projects and made a prerequisite for the award of engineering contracts, is a reaffirmation of a principle long recognized among engineers. All engineering is in part an effort to determine, through knowledge, experience, and inventiveness, a balance of values. In all engineering projects, the relative values of cost and attainment must be weighed one against the other.

Many unique features of machines and equipment for special uses in industrial plants were first designed by consulting engineers and have since become commercially available and are mass produced. Often, construction methods developed by consulting engineers have been adopted nationwide.

As the clients of consulting engineers constitute a diverse group — architects, manufacturers, builders, utility districts, and many others — so are the talents and disciplines of the engineers many and varied.

The great diversity of talents and disciplines encountered among Virginia firms makes it possible to perform almost all engineering studies and projects with Virginia talent, no matter how intricate, no matter how large or how small. Nonetheless, prospective clients often shop for their needs as far from home as possible in the mistaken belief that the needed talent may not be available here. Invariably, that creates additional problems and unneeded costs. Knowledge of local conditions, which Virginia firms have acquired through years of residence and experience, is a valuable asset.

It is hoped that, through repeated presentations, prospective clients will know and remember that almost all engineering disciplines are available in Virginia, and practically all engineering projects can be carried out with high caliber Virginia talent and personnel. The use of Virginia talent will add in a small way to more employment of Virginia labor and may help bring into the state badly needed work for its people.

CONSULTING engineers historically have been "low key professionals" in their communities. For half a century, the attitude of the people in this profession has been to "perform a service well and enjoy the honor of association with its success." This has been the attitude of all consulting engineers, regardless of their specialty and organizational affiliation.

Virginians who engage in this profession of service to the people of the Commonwealth, aside from being highly specialized in their own fields of engineering, are businessmen who dedicate their knowedge and time to the general public. Their attitudes unquestionably must be positive, for their lives are consumed in the pursuit of solving problems for their clients; problems which may require various expenditures of time, from a five-minute consultation to a two year in-depth study. study.

The spectrum of problems solved by consulting engineers can be as wide as

the low key professionals

By
Daniel J. DeYoung, P.E.

the horizon, and generally account for 50 to 100 percent of the major construction dollars in the marketplace today. Sincere interest in such items as maintenance and operating cost of buildings and systems, in addition to first-dollar cost of a project, has elevated the consulting engineer to the reputation he enjoys today. This endorsement by the general public allows him to be the keeper of the buildings and processes which make our country the land we all love.

Consulting engineers who serve the people of the Commonwealth must be men and women who look within to find the answer for the problems of today and tomorrow. This continual pursuit of improvement develops men and women whose characteristic traits include communion with nature, understanding of people's needs and true dedication to the purpose of the profession.

Men who attain these traits and become consulting engineers can truly afford to be low key professionals.

THE CONSULTING ENGINEERS COUNCIL OF VIRGINIA AN ASSOCIATION OF PROFESSIONALS

THE CONSULTING ENGINEERS Council of Virginia (CEC/V) is the only organization actively and exclusively devoted to serving the business and management interests of Virginia's consulting engineering firms. The energies of CEC/V are directed to improving engineering standards of practice and business procedures and to promoting the use of engineering services offered by member firms.

CEC/V is a member of the American Consulting Engineers Council (ACEC). An original purpose of ACEC, and subscribed to by CEC/V, is ". . . to consider and act in management, business and professional matters pertaining to consulting engineering firms, with the goal of assisting members in achieving higher professional business and economic standards, thus enabling them to provide the best consulting engineering services in the interest of their clients."

Another goal is to ". . . promote harmony, cooperation and mutual understanding among consulting engineers."

Consultants Make the Decisions

CEC/Virginia is an organization of consulting engineers who make decisions within the profession for programs, policy and direction. Both CEC/V and ACEC believe in two-way communications. Information flows from the national and state offices to the membership, and each member has a direct line of communication to both offices.

The government of CEC/V is vested in its members, through its elected officers, directors and committees, or through action at general meetings. The directors meet four times a year, and all members are welcome and urged to attend these meetings, not only to observe, but to participate in the discussions.

General membership meetings, or regional meetings, are held once a month. While the programs are generally "business oriented," there always is a point during the meeting when the president calls for matters anyone would like to have placed on the floor for discussion and action.

CEC/V is administered by a small staff consisting of an executive director and a secretary. The executive director is charged with carrying out the policies and direction as defined by the directors and members.

The administration of ACEC, with offices in Washington, D.C., is vested in directors from every state Council. These directors meet twice a year. Handling the affairs of the national Council between directors' meetings, and making recommendations to the directors, is a board of trustees, composed of national officers.

Committees Do the Work

The work of CEC/V, particularly the recommendation of policy, is done by committees. These committees meet at the call of their chairmen, and they provide the studies, deliberations and recommendations needed for achieving the aims and goals of the Council.

The governing body for CEC/V is the executive board, which is composed of the president, president elect, three vice presidents, secretary, treasurer and national director. CEC/V's committees are Professional Practice, Joint Action, Finance, Public Relations, Education, Membership, Bylaws, Past Presidents and Government Affairs.

Committee chairmen usually are named by the president, and committee members are volunteers. Additions can be made to committee personnel at any time, and a member who wishes to serve on a committee usually need only notify the president.

The strength of CEC/V lies in the involvement of its members. While members' service to the Council leads to its success, it also results in considerable value *to* the members.

Membership in CEC/V is by firm, and each firm's representative members to CEC/V must be registered professional engineers who are principals or partners in their firms. A further requirement is that members shall have no financial attachment to, or interest in, any commercial sales, contracting interests, or other endeavors which would conflict with the independent practice of consulting engineering.

Each member has signed an agreement to adhere to the following code of ethics.

Code of Ethics
American Consulting Engineers Council

With high regard for the engineering profession and recognizing in the Code of Ethics a set of dynamic principles to guide his services to his fellowman, and with full knowledge of the responsibility of consulting engineers to safeguard health, safety, and public welfare, a member of the Consulting Engineers Council. . . .

1. Brings credit, honor and dignity to the engineering profession in his dealings with clients, other engineers, and the public.
2. Acts for his clients as a faithful agent or trustee and accepts remuneration only in accordance with his stated charges for services rendered.
3. Exchanges non-confidential engineering information with other engineers, students and the engineering

press, encourages the public knowledge of engineering, and insures proper credit for engineering work.

4. Upholds the principle of appropriate and adequate compensation for consulting engineers and those in their employ.
5. Upholds the professional reputation of other consulting engineers and respects their engineer-client agreements.
6. Solicits engineering work assignments according to high professional standards, without advertising in a self-laudatory manner, offering commissions, or using undue influence.
7. Upholds and promotes the principle of selection of consulting engineers for assignments on the basis of qualifications, including training, skill, experience, personnel, work loads and availability.
8. Associates as a consulting engineer only with engineers and other professionals who conform to ethical practices.

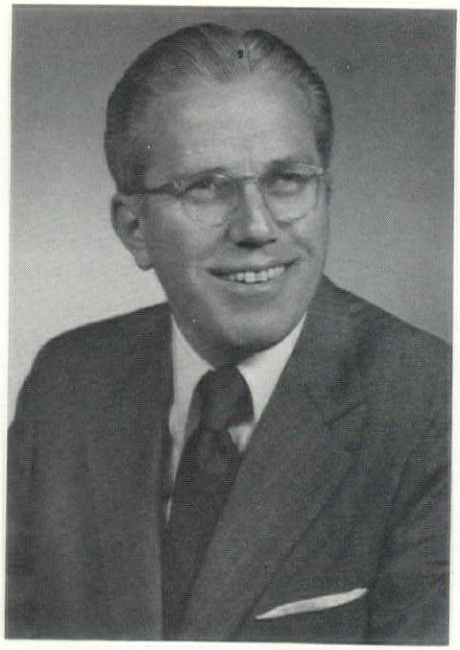
Government Liaison and Legislation

CEC/V and ACEC act as the consulting engineers' voice in the state house and in the national capitol. There are constant legislative activities on the state and national levels, such as searching out bills of special interest to consultants and taking positive action, when needed. Whether it be on such matters as public works, the environment, government competition or architect/engineer procurement, someone from CEC/V and ACEC is "on top" of the situation, alerting appropriate committees and making certain the "voice" of the consultant is heard. On the national level, each year CEC/V participates in a public affairs forum in Washington, which is attended by most of Virginia's U.S. senators and representatives. In addition, the facilities and personnel of CEC/V and ACEC are available to state and national legislators as a source of information.

CEC/V also maintains liaison with architects, landscape architects, planners, contractors, home builders, manufacturers, and others involved in the highly complex business of planning, designing, equipping and building. In this area, joint committees deal with various problems, in an atmosphere of mutual respect, aimed at providing more effective service to clients, and greater efficiency and profitability in the profession. The joint committees also provide for the exchange of information and ideas that will benefit the participants and their many and varied clients.

Officers and Directors of the CEC/V

1977-1978



WILLIAM L. GIBSON
President

• William L. Gibson, 52, partner in the consulting engineering firm of Chandler and Gibson, Norfolk, is president of the Consulting Engineers Council of Virginia (CEC/V) for 1977-1978.

Before he became a partner in his present firm in 1964, Gibson was a partner in the Norfolk firm of John A. Hoffman & Associates, and a supervising engineer with the U.S. Army Corps of Engineers. A graduate of Virginia Polytechnic Institute and State University, Gibson has been a registered professional engineer in Virginia since 1953.

He is a long-time member of CEC/V, and has served that organization as eastern regional vice president and chairman or member of many of its committees. He also belongs to the Virginia and National Societies of Professional Engineers; American Society of Mechanical Engineers; the American Society of Heating, Refrigerating and Air Conditioning Engineers; Virginia Association of Professions; American Waterworks Association; National Fire Protection Association, and many other state and national professional organizations.

Gibson is a member of the alumni associations of Old Dominion University and VPI & SU; the Cosmopolitan Club of America; the Norfolk and Virginia Chambers of Commerce; the Norfolk Yacht and Country Club, and the Harbor Club.

He is married to the former Doris Robbins, and they have a daughter, Linda, who is a graduate of Duke University. The family attends Royster Memorial Presbyterian Church.

JAMES A. LIMERICK, JR.
President Elect

• James A. Limerick, Jr., 48, is president elect of the Consulting Engineers Council of Virginia for 1977-1978, and will automatically become president in 1978-1979.

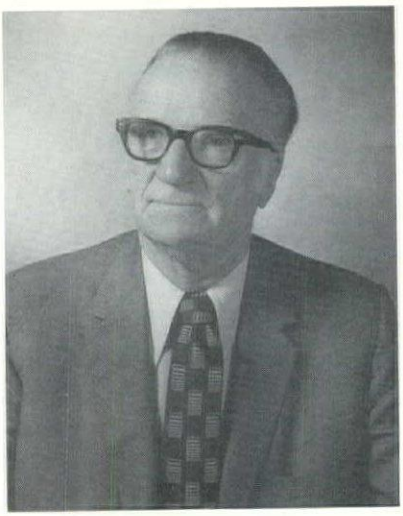
A native of Richmond, Limerick holds a B.S. degree in civil engineering from VPI & SU. A former sanitary engineer for the Virginia Department of Health, he joined R. Stuart Royer & Associates in 1955, and now is a partner in the Richmond, Va., consulting engineering firm. He is a certified professional engineer in Virginia, West Virginia and North Carolina.

Limerick has been a member of CEC/V and the American Consulting Engineers Council for many years, and has served the state Council as vice president, and as chairman or member of many of its committees. He also belongs to the Virginia and National

Societies of Professional Engineers, Virginia Association of Professions, American Waterworks Association, and Water Pollution Control Federation. He has served on several advisory groups and panels to the State Water Control Board.

ANDRE A. SHISHMAN

Vice President — Eastern Region



• Andre A. Shishman, Vice President of the Eastern Region, Consulting Engineers Council of Virginia, was born in 1912 in Budapest, Hungary, and received an M.S. in civil engineering in 1936 from the Polytechnic University of Budapest.

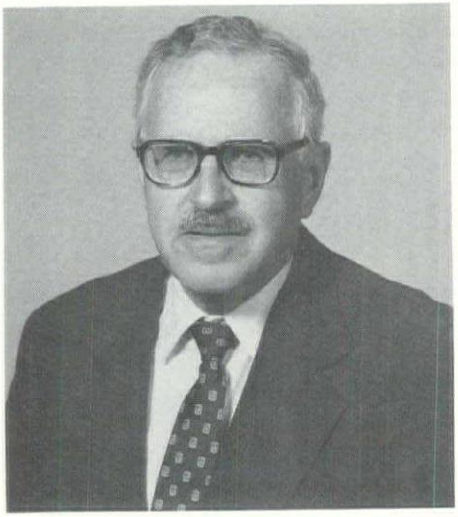
Shishman joined the Norfolk consulting engineering firm of Fraioli-Blum-Yesselman in 1952; became a partner in the firm in 1967, and was named senior vice president in 1972.

He is a registered professional engineer in Virginia, the District of Columbia and Budapest, Hungary.

In addition to the Virginia and American Consulting Engineers Councils, Shishman belongs to the Virginia and National Societies of Professional Engineers. He also is a Fellow of the American Society of Civil Engineers, belongs to the American Concrete Institute, and is on the Advisory Committee of the American Arbitration Association.

ROBERT D. SAYRE

Vice President — Central Region



• Robert D. Sayre, 49, was born in Canton, S.D. He was graduated in 1950 with a B.S. degree in civil engineering from the South Dakota School of Mines and Technology, and received a Master's of civil engineering in 1952 from the University of Virginia.

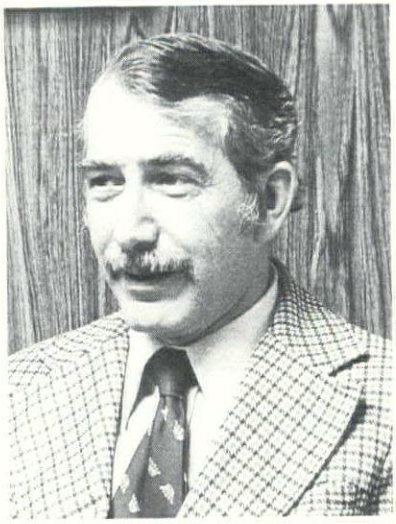
After working for E.I. duPont de Nemours, the Corps of Engineers and two engineering firms, Sayre opened his own consulting engineering firm in Richmond in 1968. In 1973, he took in a partner and changed the name of the firm to Sayre & Sutherland, Inc., and became its president.

Sayre is registered in Virginia, West Virginia, North Carolina, South Carolina, Maryland, Ohio and the District of Columbia.

In addition to the Consulting Engineers Council of Virginia and the American Consulting Engineers Council, Sayre is a member of the National and Virginia Societies of Professional Engineers. He received the Virginia Society's outstanding service award in 1968 and its distinguished service award in 1973. He also was president of VSPE in 1972-1973, and president of the Engineers' Club in 1970.

Sayre is a Fellow of the American Society of Civil Engineers, and belongs to the International Society of Soil Mechanics and Foundation Engineering, the Virginia Association of Professions and the American Arbitration Association. He also is a member of the board of directors and is on the executive committee of Terra Insurance, Ltd., Hamilton, Bermuda.

He is a Mason, member of Lions International, and an Elder in the Tuckahoe Presbyterian Church in Richmond.



RICHARD L. WILLIAMS

Vice President — Western Region

• Western regional vice president for the Consulting Engineers Council of Virginia for 1977-1978 is Richard L. Williams.

Williams was graduated in 1959 from Virginia Polytechnic Institute and State University with a B.S. degree in civil engineering. He formed his own firm — Richard L. Williams Consulting Engineer — in 1973 in Roanoke, offering professional services in civil, structural and sanitary engineering.

He is licensed to practice in Virginia, West Virginia, North Carolina, Tennessee, Kentucky, Ohio, Pennsylvania and Maryland.

HENRY P. SADLER

Treasurer

• Henry P. Sadler is a charter member of the Consulting Engineers Council of Virginia, and has served that organization in many capacities over the years. Last month he received the CEC/V Past Presidents' award for outstanding service.

He is president of Henry P. Sadler & Associates, Inc., Consulting Engineers, of Richmond, and is a registered civil engineer in Virginia, North and South Carolina and Florida.

Sadler is a member of the American Society of Civil Engineers, American Arbitration Association, American Public Works Association, American Railway Engineering Association, American Water Works Association, National and Virginia Societies of Professional Engineers.

DANIEL J. DeYOUNG

Secretary

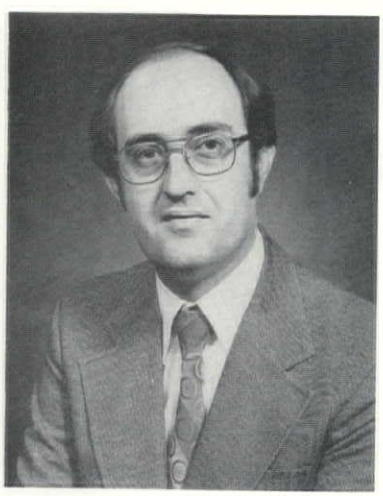
• Daniel J. DeYoung, 39, received his early education in public schools in different parts of the country, and was graduated from high school in Kaiserslautern, Germany.

He attended Hope College in Holland, Mich., before transferring to VPI & SU in his junior year. He was graduated from VPI & SU in 1961 with a B.S. degree in civil engineering.

DeYoung has worked as bridge design engineer for the Kentucky Department of Highways, in the bridge division of the Virginia Department of Highways and as an estimator/resident engineer with a Maryland general building contractor. He then spent six years as a structural engineer with Torrence, Dreelin, Farthing and Buford, followed by a position as chief staff structural engineer for R. Stuart Royer & Associates.

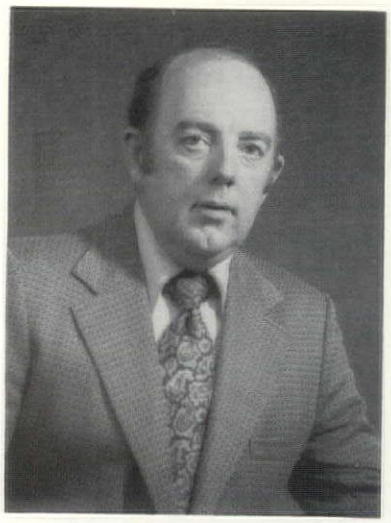
In 1973, DeYoung became a vice president with Architects and Engineers, Inc. (formerly Woodson, Littlepage and DeYoung, Inc.) in Williamsburg. He is registered in Virginia, Maryland and Alabama.

DeYoung is a member of the Virginia and American Consulting Engineers councils, the National Society of Professional Engineers, and is 1977-1978 president of the Williamsburg chapter of the Virginia Society of Professional



Engineers. He also belongs to the Society for Marketing Professional Services, the American Concrete Institute, Westgate Lodge #352, AF & AM of Richmond, and the Williamsburg Kiwanis Club.

DeYoung is married to the former Jackie Weatherman, of Patrick County, and they have two sons.



JOSEPH H. NORMAN, JR.

Director

• CEC/V's 1977-1978 director, Joseph H. Norman, Jr., has been a most active member, having served as president, secretary, regional vice president, committee chairman and committee member since he joined the Council in 1967.

Norman attended the University of Richmond and the University of Virginia. He was graduated from U. Va. in 1956 with a B.S. degree in civil engineering. Following graduation, he was a field engineer for Corde and Starke Contractors in the Tidewater area, and structural designer with Baskervill & Son, Architects.

In 1966, he formed his own firm of Joseph H. Norman, Consulting Structural Engineers. A short time later two partners joined the firm and it became Harris, Norman and Giles. In 1969, a fourth partner joined the firm and it became Harris, Norman, Giles and Walker, its present name.

Norman is a charter member of the Mechanicsville Kiwanis Club, a former Scoutmaster, and a Deacon in Westhill Baptist Church. He is active in many community activities, particularly those concerned with youth.

Norman, his wife, Nancy, and four sons live in Mechanicsville.

HARRY W. KINCAID

Executive Director

• Harry W. Kincaid, 47, has been executive director of CEC/V since May 1976. A native of Morgantown, West Virginia, Kincaid was in the U.S. Navy from 1951 to 1954.

In September 1954, he enrolled at West Virginia University and was graduated in 1957 with a B.S. degree in journalism. While a student at WVU, he worked part time as an announcer/copy writer for a local radio station.

Following graduation, he moved to Richmond and became a reporter for The Richmond News Leader. In 1959, he joined the public relations department of A.H. Robins Co., Inc., an international pharmaceutical manufacturing firm headquartered in Richmond.

In 1964, Kincaid moved to Washington, D.C., and joined the public relations staff of the Pharmaceutical Manufacturers Association. Three years later he was named assistant association manager of the Washington-based Institute of Industrial Launderers, the trade association for the rental work uniform and career apparel industry.

Kincaid is a member of the Virginia Society of Association Executives and the American Society of Association Executives.

MEMBER FIRMS

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Blacksburg, Virginia 24060
(703) 552-5592
SERVICES: Civil engineering, land surveying, sanitary engineering
REPRESENTATIVE MEMBERS: S. K. Anderson, C. Thomas Borchelt, Ronald A. Worley, Jr.

ARCHITECTS AND ENGINEERS, INC.
P. O. Drawer F. T., Williamsburg, Virginia 23185
(804) 229-2472 (Williamsburg)
(804) 643-6992 (Richmond)
SERVICES: Engineering, architectural, and planning services which include bridge and highway designs, industrial and commercial buildings, foundations, structural design, erosion control, water front structures and marinas, site design, route surveying, topographic and boundary surveying.
REPRESENTATIVE MEMBERS: L. V. Woodson, P. E., B. D. Littlepage, C.L.S., Daniel J. DeYoung, P. E.

WALTER LEROY ASHLEY
3119 Waterlick Road
Lynchburg, Virginia 24502
(804) 237-2979
SERVICES: Structural, buildings and bridges, foundations, inspections and reports, field testing of existing concrete structures.
REPRESENTATIVE MEMBER: Walter Leroy Ashley

ASSOCIATED ENGINEERS & SURVEYORS, LTD.
P. O. Box #959
Ashland, Virginia 23005
(804) 798-4728
SERVICES: Associated Engineers offers a multi-faceted range of services including: sanitary engineering, municipal and industrial waste treatment systems; site development; surveying; storm drainage; hydrology; recreational and athletic facilities; studies, reports and planning; watershed analysis; transportation engineering; marine waste treatment collection and disposal, and highways.
REPRESENTATIVE MEMBERS: William F. Goodfellow, Robert L. Downing

E. J. BEAMON, JR. CONSULTING ENGINEER
1004 North Thompson Street
Richmond, Virginia 23230
(804) 355-8366
SERVICES: Industrial and commercial buildings, bridges, dams, foundations. industrial parks and shopping centers.
REPRESENTATIVE MEMBER: E. J. Beamon, Jr.

BODIE, MILLS, TAYLOR, & PURYEAR, INC.
P. O. Box 2901
611 Research Road, Richmond, Virginia 23235
(804) 794-6823
SERVICES: Master site planning, the planned community, highways and expressways, airports, bridge design, industrial park, retail shopping centers, subsurface exploration and foundation design, hydrologic studies and planning, apartment/condominium projects, drainage/sewerage systems, flood control, reservoirs, pollution control, water supply and distribution, subdivisions, recreation and parks.
REPRESENTATIVE MEMBERS: C. O. Bodie, Jr., R. O. Puryear, Jr., C. P. Taylor

BOWMAN & ASSOCIATES, P.C.
5648 Southern Boulevard
Virginia Beach, Virginia 23462
(804) 499-5922
SERVICES: Mechanical, electrical, and civil engineering—investigations, studies, reports, estimates, design, working drawings, specifications and construction phase administration. Firm has facility clearance at secret level and is Value Engineer certified.
REPRESENTATIVE MEMBERS: E. H. Bowman, Jr., Frank I. Adkins, Jr.

WILLIAM G. BRANDT, JR. & ASSOCIATES, INC.
7714 Whitepine Road, Richmond, Virginia 23234
(804) 271-1223
SERVICES: Heating, ventilating, air conditioning, refrigeration, plumbing, power, lighting, communications.
REPRESENTATIVE MEMBER: William G. Brandt, Jr.

***AUSTIN BROCKENBROUGH & ASSOCIATES**
114 East Cary Street, Richmond, Virginia 23219
(804) 644-9493
SERVICES: Civil engineering, sewage treatment, water treatment and distribution, highways, dams, drainage and irrigation, airports, planning, fallout shelters, surveying, investigation, feasibility studies, reports.
REPRESENTATIVE MEMBERS: James A. Whitt, Alexander B. Sadler, Jr.

C. L. CATRON
P. O. Box 11, 10 Lee Street
Bristol, Virginia 24201
(703) 669-2422
SERVICES: Structural engineering for commercial, institutional, and mill buildings.
REPRESENTATIVE MEMBER: Conrad L. Catron

CEK, INC.
2916 Chamberlayne Avenue
Richmond, Virginia 23227
(804) 321-5962
SERVICES: Mechancial, electrical and civil engineering. This firm has been active in providing engineering services for a wide range of projects for commercial, industrial and institutional facilities.
REPRESENTATIVE MEMBERS: Louis D. Corso, John K. Knight

***CHANDLER & GIBSON**
P. O. Box 6243, 4901 Colley Avenue
Norfolk, Virginia 23508
(804) 423-5750
SERVICES: HVAC, refrigeration, plumbing, lighting, power, communications, utilities distribution, power generation.
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(703) 752-5011
OTHER OFFICES: Winchester, Virginia
SERVICES: Municipal and industrial consultants in civil, sanitary, electrical & mechanical engineering; including appraisals, feasibility studies and cost analyses & land planning, hydrology, earth dams and water supply development.
REPRESENTATIVE MEMBERS: Gilbert W. Clifford, Earl R. Sutherland, Thomas J. O'Toole

BERNARD E. COOPER
5407 Patterson Avenue, Richmond, Virginia 23226
(804) 288-5347
SERVICES: Mechancial, electrical, heating, ventilation, air conditioning, refrigeration, plumbing, power, lighting.
REPRESENTATIVE MEMBER: Bernard E. Cooper

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112 East Cary Street, Richmond, Virginia 23219
(804) 649-0676
SERVICES: Structural design of buildings, walls, foundations, towers and other structures for architects, industry, and commercial owners. Structural investigations and reports.
REPRESENTATIVE MEMBERS: Robert H. Deaderick, William D. Gourley

DUNBAR, MILBY AND WILLIAMS
Consulting Structural Engineers
1011 Sycamore Square—P. O. Box 312
Midlothian, Virginia 23113
(804) 794-4438
110 Third Street, N.E.—P. O. Box 76
Charlottesville, Virginia 22902
(804) 293-5171
SERVICES: Full structural engineering services, including design, preparation of working drawings and specifications, and full construction phase administration and observations. Structural investigations, reports and studies. Value engineering. Certified fallout shelter analysts.
REPRESENTATIVE MEMBERS: Alvin W. Dunbar, C. Nelson Williams, IV (Midlothian), Denwood T. Milby (Charlottesville)

ELLIOTT & ASSOCIATES
P. O. Box 194, 2924 Bragg Road
Fredericksburg, Virginia 22401
(703) 371-6622
SERVICES: Planning, design and stakeout of water, sewer, paving and development projects, feasibility studies and reports, site, structural and electrical design for buildings.
REPRESENTATIVE MEMBER: Jules L. Elliott

FRAIOLI-BLUM-YESSELMAN ASSOCIATES, INC.
945 Norfolk Square, Norfolk, Virginia 23502
(804) 853-6766
OTHER OFFICES: New York, N. Y., Hartford, Connecticut, White Plains, N. Y.
SERVICES: Structural engineering, buildings, bridges, water front structures, foundations and reports.
REPRESENTATIVE MEMBERS: Werner Blum, President; Andre A. Shishman, Senior Vice President

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No. 5 Koger Exec. Center, Suite 112
Norfolk, Virginia 23502
(804) 461-9130
SERVICES: Performs structural and civil engineering for architects, governmental agencies, industry and general public. Services include design, specifications, field supervision and reports on buildings, industrial plants, waterfront structures and bridges.
REPRESENTATIVE MEMBERS: Joe D. Glenn, Jr., Albert E. Rollins

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Richmond, Virginia 23230
(804) 353-1221
OTHER OFFICES: Boston, Massachusetts
SERVICES: Mechanical, electrical, civil, heating, ventilating, air conditioning, plumbing, electric power, lighting, sanitary, highways, land surveying, building systems, construction management.
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THOMAS A. HANSON & ASSOCIATES, INC.
9 East Franklin Street, Richmond, Virginia 23219
(804) 649-9138
SERVICES: Serving architects with structural design and inspection services on buildings; providing contractors with consultation on structural techniques, methods and materials; development and testing of new structural products and techniques for industrial clients; design of parking structures and industrial facilities; preparation of feasibility studies and reports.
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HARRIS, NORMAN, GILES & WALKER
3408 Hermitage Road, Richmond, Virginia 23227
(804) 355-7949
SERVICES: Structural, foundation and seismic design. Value engineering. Structural restoration and preservation. Product development.
REPRESENTATIVE MEMBERS: James H. Harris, Joseph H. Norman, Jr., Thomas F. Giles, Benjamin R. Walker

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1315 Franklin Road, Southwest, Roanoke, Virginia 24016
(703) 343-6971
OTHER OFFICES: Washington, D. C., Rockville, Md.
SERVICES: Architectural, electrical, mechanical, structural, civil, sanitary, geology, bridge, highway, planning, surveying.
REPRESENTATIVE MEMBERS: William L. Myers, Glynn D. Barranger, H. Boyd Dickenson, Byrd H. Barksdale, John P. Bradshaw, John R. Hildebrand, Eric T. Naschold, James M. Strickland

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SERVICES: Complete consulting engineering services through all phases of design and construction, including plans and specifications for industrial, utility, commercial, city, county, state, federal and private clients. Power plants, distribution lines, process control, building systems, lighting, feasibility and economic studies. Energy conservation and control.
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SERVICES: Land development planning & engineering, municipal water and sewerage, environmental consulting.
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5407 Patterson Avenue
Richmond, Virginia 23226
(804) 282-9870
SERVICES: Structural engineering services to other engineering firms, architects and general contractors. Structural design and inspection of buildings, foundations and sanitary engineering facilities.
REPRESENTATIVE MEMBER: J. Wallace Johnson

LAW ENGINEERING TESTING COMPANY
5700 Thurston Avenue, Suite 106
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SERVICES: Consulting engineering services for geotechnical engineering, construction materials and environmental sciences.
REPRESENTATIVE MEMBER: W. Howell Branum

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SERVICES: Municipal, industrial, governmental and commercial consultants—Civil, Sanitary and Environmental Engineering; Land planning and surveying; Investigations and reports; design and construction supervision. As a division of Buchart-Horn Engineering, York, Pa., the firm can provide complete architectural, electrical, mechanical, structural transportation, aerial photography, computer science and management services.
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SERVICES: Civil, highway, structural, sanitary, electrical and mechanical engineering; expressways, bridges and grade separations, airports, community and regional planning and urban renewal, port facilities, communication projects, housing, industrial and commercial buildings, shopping centers, schools, defense facilities; reports and feasibility studies, supervision of construction, construction management.
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P. O. Box 827, Norton, Virginia 24273
(703) 679-4434
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REPRESENTATIVE MEMBER: Don J. Mullins, Sr.

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State Registration: New York, Virginia, North Carolina, South Carolina, Georgia, Florida
REPRESENTATIVE MEMBER: Edward S. Pringle

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(804) 627-8494
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R. STUART ROYER & ASSOCIATES
P. O. Box 8687, 1514 Willow Lawn Drive
Richmond, Virginia 23226
(804) 282-7657
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REPRESENTATIVE MEMBERS: Isaac N. Koontz, James A. Limerick, Jr., Edgar F. Massie, Jr.

***HENRY P. SADLER & ASSOCIATES, INC.**
P. O. Box 9536, 6924 Lakeside Avenue
Richmond, Virginia 23228
(804) 262-6547
SERVICES: Commercial and industrial buildings, towers, foundations, dams, bridges, water treatment and distribution, sewage collection and treatment systems, industrial waste treatment and thermal pollution control, certified value engineer.
STATE REGISTRATION: Florida, Virginia, North and South Carolina.
REPRESENTATIVE MEMBER: Henry P. Sadler

SAYRE AND SUTHERLAND, INC.
P. O. Box 9532, 5407 Lakeside Avenue
Richmond, Virginia 23228
(804) 266-9646
SERVICES: Soil and rock investigations, engineering analysis and recommendations for foundation design criteria for all types of engineering projects. Design and construction observation of earth structures. Construction observation and testing of foundations and compacted fill. Pavement design for highways and airports. Geological investigations and reports, soil testing laboratory.
REPRESENTATIVE MEMBERS: Robert D. Sayre, R. L. Sutherland, Jr., William R. Pully

SCOTT & SCOTT, INC.
Suite F, Executive Park, 5306 Peters Creek Road
P. O. Box 7546, Roanoke, Virginia 24019
(703) 362-1291
SERVICES: Civil, structural, electrical and mechanical services for commercial, educational, religious, industrial and municipal facilities to include foundations, building structural systems, drainage, flood protection, utilities distribution, lighting, power, communications, transmission, heating, ventilating, air conditioning, plumbing and studies on various subjects.
REPRESENTATIVE MEMBERS: Malcolm P. Scott, William W. Scott, Oliver P. Strawn, Jr.

SIMPSON-JOHNSON, INC.
510 Church Street, Lynchburg, Virginia 24504
(804) 847-7711
SERVICES: Heating, ventilating, air conditioning, plumbing, power, lighting, communications, structural, foundations.
REPRESENTATIVE MEMBERS: M. Lyman Johnson, Earl R. Simpson Jr.

SMITHEY AND BOYNTON
P. O. Box 8335, Roanoke, Virginia 24014
(703) 774-4493
SERVICES: Mechanical, electrical, structural, architectural and interior design services for institutional, commercial, residential, industrial and governmental projects. Complete interdisciplinary service in one organization.
REPRESENTATIVE MEMBERS: Henry B. Boynton, Lee B. Eddy, Robert R. Norfleet, John M. Shumate, Jr.

***SOWERS, RODES & WHITESCARVER**
P. O. Box 4038, Colonial Avenue at Broadway, S.W.
Roanoke, Virginia 24015
(703) 344-5113
SERVICES: Heating, ventilating, air conditioning, refrigeration, plumbing, process piping, electrical power, lighting, communications, solar energy utilization, power plants, energy conservation, industrial plants, building renovations, utilities, fire protection, site selection, development and planning.
REPRESENTATIVE MEMBERS: William A. Sowers, Elmer O. Rodes, Jr., Charles K. Whitescarver, Jr., Charles D. Keffer, II

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5407 Patterson Avenue, Richmond, Virginia 23226
(804) 282-9539
SERVICES: Mechanical, electrical, HVAC, refrigeration, plumbing, power plants, power, lighting, communications.
REPRESENTATIVE MEMBERS: Robert S. Spratley, William P. Hundley, Jr.

RANDALL A. STRAWBRIDGE INC.
6 North First Street, Richmond, Virginia 23219
(804) 648-3383
SERVICES: Structural and foundation engineering; including design, specifications, investigations, reports, studies for all types of conventional buildings and special structures, railway and highway bridges, certified fallout shelter analyst, value engineering.
REPRESENTATIVE MEMBER: Randall A. Strawbridge

MATHEW J. THOMPSON, III, CONSULTING ENGINEERS, INC.
9308 Warwick Boulevard, Newport News, Virginia 23601
(804) 599-4415 (Newport News)
(804) 623-0559 (Norfolk)
SERVICES: Heating, ventilation, air conditioning, refrigeration, plumbing, power, lighting, communications, energy management.
REPRESENTATIVE MEMBER: Mathew J. Thompson, III

THOMPSON & LITTON, INC.
P. O. Box 1307, Stephens Building
Wise, Virginia 24293
(703) 328-2161
SERVICES: Civil engineering, mining engineering, environmental planning, water supply and distribution, sewerage collection and treatment, pollution control.
REPRESENTATIVE MEMBERS: William A. Thompson, Jr., John W. Litton, S. Hoyt Williams, Jr.

***TORRENCE, DREELIN, FARTHING & BUFORD, INC.**
Suite 600, Seaboard Building
P. O. Box 11084
3600 West Broad Street, Richmond, Virginia 23230
(804) 358-9111
SERVICES: Engineering, architectural and planning services for industrial, commercial, governmental and institutional buildings and facilities. Solar energy systems and energy conservation analysis.
REPRESENTATIVE MEMBERS: Andrew M. Dreelin, III, William G. Farthing, Robert S. Buford, Thomas W. Smith

VANSANT AND GUSLER, INC.
Colley Avenue and 46th Street, Norfolk, Virginia 23508
(804) 489-7554
SERVICES: HVAC, refrigeration, plumbing, power plants, power, lighting, communications, energy conservation, computer monitoring and control, total energy plants.
REPRESENTATIVE MEMBERS: W. G. Vansant, Jr., Denard L. Gusler, B. C. Moring, Jr., C. L. Wright, Jr.

VVKR PARTNERSHIP
720 North Saint Asaph Street
Alexandria, Virginia 22314
(703) 549-9200
SERVICES: The VVKR Partnership is a total services firm. The services may be commissioned comprehensively or selectively for projects of any kind. The broad base of services and experience permits a team approach with all the inherent advantages: Principle among the advantages is the single point of responsibility assuring control, quality, and creativity.
REPRESENTATIVE MEMBERS: Carl C. Redinger, Henry S. Brooks

***WAGNER & JONES**
2405 Westwood Avenue, Richmond, Virginia 23230
(804) 353-1296
SERVICES: Heating, ventilation, air conditioning, refrigeration, plumbing, power plants, utilities, electrical.
REPRESENTATIVE MEMBERS: Walter K. Jones, Jr., Edwin E. Bohannon

ROY F. WESTON
1603 Santa Rosa Road, Suite 120
Richmond, Virginia 23288
(804) 288-4051
SERVICES: Study and design services for environmental control facilities for wastewater, solid waste, air pollution and water management problems. Field testing, environmental management planning, construction management, operations services, operation's manuals, inflow/infiltration studies, resource recovery, OSHA, energy audits and conservation, industrial wastes, environmental assessment and planning, and architecture.
REPRESENTATIVE MEMBER: Michael E. Fiore

WILKINS, WATSON & TURNER, INC.
2405 Westwood Avenue
Richmond, Virginia 23230
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SERVICES: Civil, site development, structural, plant facilities, environmental control, and paper industry projects.
REPRESENTATIVE MEMBERS: C. L. Wilkins, Jr., C. M. Watson, Jr., Joseph L. Turner, Jr.

RICHARD L. WILLIAMS, CONSULTING ENGINEER
4919 Colonial Avenue, S.W.
Roanoke, Virginia 24018
(703) 774-5706
SERVICES: Civil, structural and sanitary.
REPRESENTATIVE MEMBER: Richard L. Williams

*CHARTER MEMBERS

Winners in the 1977 Drafting Excellence awards program sponsored by the Consulting Engineers Council of Virginia are, from left: Larry Patton, (Lawrence E. Perry Consulting Engineers, Roanoke); William Crouse (Sowers, Rodes and Whitescarver, Roanoke); Jerry Donohoe (Harris, Norman, Giles and Walker, Richmond); Glenna Hayes (Sowers, Rodes and Whitescarver); Harvey Nichols (Sowers, Rodes and Whitescarver); Bruce Raddin (Harris, Norman, Giles and Walker), and G. A. Cole (R. Stuart Royer & Associates, Richmond).

Engineers Strive For and Award Excellence

WHETHER THE myriad jobs on which they work are small and fairly simple or large and complex, consulting engineers constantly strive for excellence. This reach for ultimate perfection permeates every department and person in a consulting engineering firm.

To encourage this desire for excellence, and to recognize those who achieve it, the Consulting Engineers Council of Virginia (CEC/V) each year sponsors two important contests — the Engineering Excellence and the Drafting Excellence awards programs.

Engineering Excellence Program

Those who enter the Engineering Excellence program compete in four categories: research; consultant services; project design services where construction costs are $3 million or more; and project design services where such costs are less than $3 million.

The research category includes projects such as earthquake prediction, high voltage transmission, soils, piling and other geotechnical, automated procedures, electrical heating, new products and materials, lighting technology, physical characteristics of materials, basic research on fuel and water, properties and uses of fuels, research in natural resources, incineration alternatives.

In the consultant services category are projects such as rate, valuation, depreciation studies; damage, insurance, liability valuation studies; legal services — expert witness, etc.; environmental/economic impact studies; seismic damage investigations; bridge inspection and maintenance scheduling; soils and foundation evaluation; stabilization, damage correction; computer services; technical papers, and pilot process plant studies.

The project design services categories include airport facilities design;

industrial plants and facilities; heating, ventilating, air conditioning, lighting, communications, alarm and security systems; structural systems; grain and food handling and processing facilities; water supply, waste treatment facilities; highways, bridges, interchanges, drainage, etc.; mass transit systems; energy generation, transmission, distribution systems; commercial and institutional buildings.

1977 Engineering Excellence Winners

A working model of a computer system that will evaluate more than 3,000 alternatives for treating wastewater and select the most cost effective one for a given effluent, has been selected as the top award winner in this year's Engineering Excellence competition.

Named second in the competition was a specially designed "compacted earth fill" to support the foundations and floors of the Beacon Press building in Richmond.

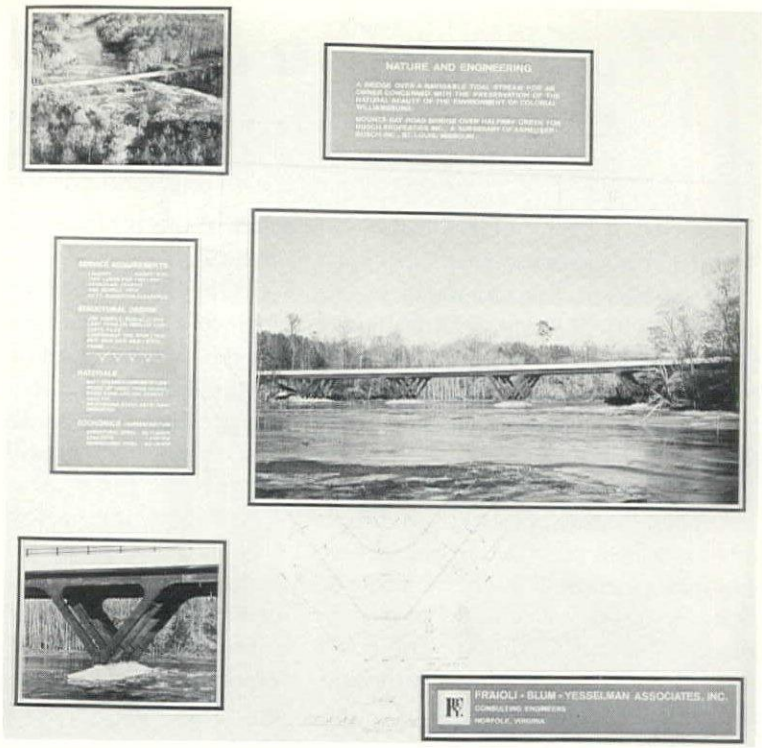
Stories on both the above projects appear elsewhere in this issue.

Drafting Excellence Program

CEC/V sponsors the Drafting Excellence awards program among its members each year to recognize superior work and effort on the part of draftsmen and draftswomen in four drafting engineering categories: structural, civil, mechanical and electrical.

This year, William C. Crouse, a draftsman with Sowers, Rodes and Whitescarver, Roanoke, won the grand award for drafting excellence, as well as first place in the mechanical category.

Other winners in the competition were: G.A. Cole (R. Stuart Royer and Associates, Richmond) and Harvey S. Nichols (Sowers, Rodes and Whitescarver), first place and honorable mention, respectively, in the civil category; Bruce Raddin and Jerry Donohoe (both of Harris, Norman, Giles and Walker), first place and honorable mention, respectively, in the structural category; Larry Patton (Lawrence E. Perry, Jr., Consulting Engineers) and Glenna Hayes (Sowers, Rodes and Whitescarver), first place and honorable mention, respectively, in electrical.



Design of Bridge Wins Second Award

• Fraioli-Blum-Yesselman Associates, Inc., Norfolk, has received another award for its design of the Mounts Bay Road Bridge over Halfway Creek, for Busch Properties, Inc., near Williamsburg.

Last year, the firm's design of the bridge was grand award winner in the CEC/V Engineering Excellence awards program. Later in the year, it was designated a "prize bridge" (short span) by the American Institute of Steel Construction, Inc. (AISC).

According to AISC, there were 117 entries in the 1976 prize bridges competition, eight of which were selected "prize bridges," and 17 "award of merit bridges."

In selecting the bridge as a national winner, the jurors for the AISC competition said, it is "an attractive bridge that complements its setting. The designer has made good use of the delta piers, creating a visual rhythm in harmony with the creek and the trees."

The New Challenge

By Louis D. Corso, P.E.
C.E.K., Inc., Consulting Engineers

THROUGHOUT THE history of America, the engineer always has played a significant role, and one of the major keys to the country's economic expansion and development has been the innovative and creative designs used by engineers to accomplish difficult tasks.

An example of this is the American automobile industry. Although people often consider the price of the American-made automobile to be exhorbitant, they rarely consider the process by which a concept on the drawing board is finally made into a smoothly working, competitively saleable product. Considering the labor, material, logistical costs, variety of product, etc., it becomes obvious that, without sophisticated technology in the manufacture and assembly of these products, the price of the automobile would be much higher.

As they do in the automotive industry, engineers play a major role in developing the high standard of living we enjoy in the United States. Now, they are being called upon to assist in assuring that the country will continue to expand.

As everyone knows, American economic prosperity and standard of living have become endangered by an uncertain national energy situation. For some years, power producers and fuel suppliers have been warning of impending problems. Unfortunately, most people did not believe there was a serious problem. Then, Virginia, along with other states, had the point driven home emphatically in the Winter of 1977.

Due to the impact of closed industrial facilities, lower thermostats, reduced business hours most peoples' lives were considerably altered for a short time, but as often happens, a bad situation can have a beneficial result. In this case, it was to make the general public conscious of the real situation, and aware that the energy problem must be dealt with immediately.

It seems that resolving the problem will require a short term and a long term phase. The short term phase would be to continue our economic expansion and productivity utilizing existing energy sources, which are known to be finite as a natural resource. A long term phase would be to develop alternate sources of energy which may be smoothly incorporated into our existing system with a minimum of difficulty.

However, what sounds so simple is a monumental task. There is, of course, quite an extensive effort by the government, private industry and energy producers to develop long term energy sources. With the government's commitment to solving the problem, along with the technological ability and

natural resources in the country, there is no doubt the long term phase will be a success.

The short term phase, then, is the one which could prove the most difficult. Fortunately, it is one which can be approached from many directions, and by many categories of people. During this phase, the idea is to "free" enough energy so that expansion may continue.

To accomplish this, there are three major approaches: (1) revamp existing operations so they will be more energy efficient; (2) apply energy efficient design techniques on all new facilities and activities; (3) provide additional "finite" fuel sources such as those which are currently in use.

Men and women in the design professions can have an impact on phases 1 and 2. And, as many people know, the energy suppliers are making efforts to provide the additional "finite" fuel sources to meet current and immediate future needs.

Obviously, there are many ways to save energy. One need not be an engineer to know that lower thermostat settings in the winter and higher settings in the summer, reduced driving, car pooling, turning off lights when they're not being used, etc., will help conserve energy and make it available for productive efforts. In this sense, everyone can help.

There are other areas in which the technical knowledge and experience of engineers can be invaluable. In industry, for example, total operations should be surveyed, particularly such areas as waste heat and wastewater utilization, material handling, efficiency of environmental systems (heating, ventilating, air conditioning, lighting), efficiency of such service equipment as pumps, compressors, etc., use of automatic controls, etc.

There are many products and engineering concepts which can be applied to reduce the use of energy, just as there are many areas which should be surveyed.

After the survey should come a study to determine, and recommend, necessary improvements, estimated energy savings and long-term benefits versus costs, and possible favorable return on investment.

Many industrial concerns have their own engineering staffs which can do such surveys and studies. Those firms that don't have an engineering staff should consider a consulting engineering firm for this work. In either case, every industrial concern and commercial and institutional facility should begin now to find ways to make its facilities more energy efficient.

Due to the nature of commercial and institutional facilities, though, the major areas to be explored are the environmental features, i.e., building skin heat loss/heat gain, heating and air conditioning systems, lighting systems and automatic temperature controls.

As with any survey of this nature, a study should be made which would have the same type format as described for industry. With regard to existing residential structures, a significant amount of energy saving information is being directed toward owners through the major power and fuel suppliers. Most residential owners should now be properly motivated after the impact of this winter's fuel statements. It is logical that many home owners will attempt to reduce their energy consumption.

With regard to applying energy efficient design techniques on all new facilities, the same procedures and areas of consideration as used for existing facilities apply. Whether or not studies are justified, a potential owner or investor should always have the benefit of quality technical judgment in the design decisions concerning a new facility. There is simply no substitute for good planning in an energy conservation and management program.

The above material merely represents this writer's concept of a rational approach to resolving the problem. The key thoughts are that everyone can help save energy, engineers can be used effectively to help deal with the problem, and energy conservation and management should be given high priority in future development.

There is good reason to be optomistic that, with a national interest toward energy management, the nation will continue to expand. As engineers, this is an opportunity and challenge we face with a great deal of enthusiasm.

AUTOMATION AS A MEANS OF ENERGY MANAGEMENT

By **M.O. Roache, Jr.**
Roache, Mercer & Faison, Inc.

IN THE WINTER of 1976-77, everyone became acutely aware of an energy, or fuel, shortage in the Northeastern United States. This, coupled with the demands during the past decade for more comfort and thus for more complex designs of environmental systems, caused building owners and the public to spend more time investigating energy management.

Many of our buildings today are overheated in the winter, overcooled in the summer and over ventilated year round, which leads to gross inefficiencies in operating these buildings. Each year this is allowed to continue, these buildings will consume increasing amounts of energy. In addition, the system and building components will deteriorate and cause maintenance and service to become more costly, or often neglected.

One method for overcoming inefficient use of energy in the areas of mechanical and electrical usage is through what the industry calls "building automation." Building automation means directing mechanical and electrical systems with machinery and equipment rather than people.

When applied to buildings, automation will significantly increase operational efficiency and reduce maintenance costs. Further savings in the operation of building systems can be realized by incorporating computers with carefully selected software and thus allowing optimization of temperatures. (Optimization is defined as the process of increasing efficiency of the system or apparatus in order to reduce or eliminate wasted energy).

When the design engineer properly matches automation hardware and software to the needs of the building, the result will be substantial savings in operating costs for a building owner, with very favorable return on the investment in almost every case.

The prime benefit from automation is a savings in manpower because automation eliminates the daily need for having someone start up and shut down the mechanical systems, observe these systems and maintain a log of conditions. When these activities are centralized, one operator can determine the exact conditions in many buildings and can control the functions of the systems in each building, thus reducing the manpower requirements to accomplish these tasks.

In fact, from his vantage point, a trained console operator can make any necessary adjustments, observe the information coming from the various buildings in response to those adjustments, and increase the efficiency of operation by preventing local or building adjustments that often result in unbalanced systems where automation is not installed. In terms of conservation, building automation saves energy two ways: first, by building optimization programs; second, by maintenance management.

While many optimization functions can be introduced through design, many others can be achieved only through operation. In small installations, the operator would establish optimization through manual inspection and control. In larger installations, effective optimization can come only through the use of a computer to monitor and control the functions.

Typical optimization functions performed by a computerized building control system include:

Start/stop optimization—For purposes of control, building environmental systems usually have a fixed start-stop schedule. Generally, systems can be activated to ensure comfort conditions at time of occupancy and deactivated when occupants have left. Unfortunately, with conventional start-stop, indoor and outdoor factors other than people cannot be included in the start-stop schedule. However, with computerized monitoring, outdoor air temperature, solar effects, indoor temperature and humidity, and thermal mass of the building can be analyzed collectively. By comparing such data, the computer can more accurately determine when systems should be started and stopped. This particular function can result in significant energy savings when one considers the many different energy-consuming elements of the systems involved.

Enthalpy optimization — During the cooling season, the total heat content of the outdoor and building air are monitored and compared. When the heat content, or enthalpy, of the outdoor air is lower than that of the indoor air, a large percentage of outdoor air is used to reduce chiller load. During the heating season, economizer control is utilized to maintain a constant mixed air temperature to handle internal heat gain. Enthalpy optimization also reduces humidification under winter conditions by controlling outside air volumes.

Chiller optimization — Chiller optimization occurs as the central control unit calculates the cooling load of

the building and compares it to predetermined efficiency factors to determine the capacity needed to minimize Kilowatt hours consumption. In essence, the processing unit automatically resets the chillers to achieve minimum KWH.

Load Shedding — One major source of electrical energy cost reduction is load shedding. Large consumers of electricity pay not only for the amount of electricity they consume, but also a prorated share of operating expenses required to supply the largest amount of electricity the consumer may need over a given time interval. Therefore, the purpose of the load shed program is to manage the electrical demand of a building within a stable curve that avoids peaks in consumption which incur demand changes as well as consumption changes.

In the area of maintenance management, it has been found that computerized building automation systems can be programmed to provide daily maintenance routines. Because many system components are oversized in relation to building demand, and because operating efficiencies are crucial to the concept of an energy efficient building, the computer is programmed to control system maintenance by issuing work orders and assigning specific tasks based upon logged run times, elapsed intervals and load factors. Also, the building management is able to predict maintenance by asking the computer to forecast maintenance in any future time. Maintenance costs, both in time and material, are recorded in the program and kept as a performance inventory. In essence, one could achieve greater efficiency with less manpower.

Obviously, we have only begun to reveal the various benefits available to building owners with building automation. Generally speaking, automation can be programmed to include almost any type of operation a building owner would desire. However, the benefits to be obtained from such a system are directly related to the degree to which the system meets the specific needs of the building or buildings which it serves. There is a point of diminishing return where over-sophistication of a system could result in achieving additional benefits where cost for achievement lowers substantially the value of the benefit involved. To be most advantageous to the owner, building automation needs to be matched with a particular need to realize its full benefit.

With the present emphasis on energy usage, a new standard for efficiently employing state of the art technology for effective cost control of energy-consuming building environmental systems is of utmost importance. One approach is building automation systems.

SURFACE MINING OF COAL & LAND USE NEEDS CAN BE COMBINED TO IMPROVE THE ENVIRONMENT

MUCH HAS BEEN SAID in recent years about the degradation and desecration of land due to surface mining of coal. There are many widely publicized examples of where the land has been left devoid of vegetable life, the aesthetic value completely destroyed, and the effect on nearby streams disastrous. Often, unpublicized are the efforts expended to extract the mineral resources and re-establish the surface so that better utilization will result. The account of one such example follows where civic officials and a local company have worked together on a plan to enhance the local economy, improve land use, and improve living conditions.

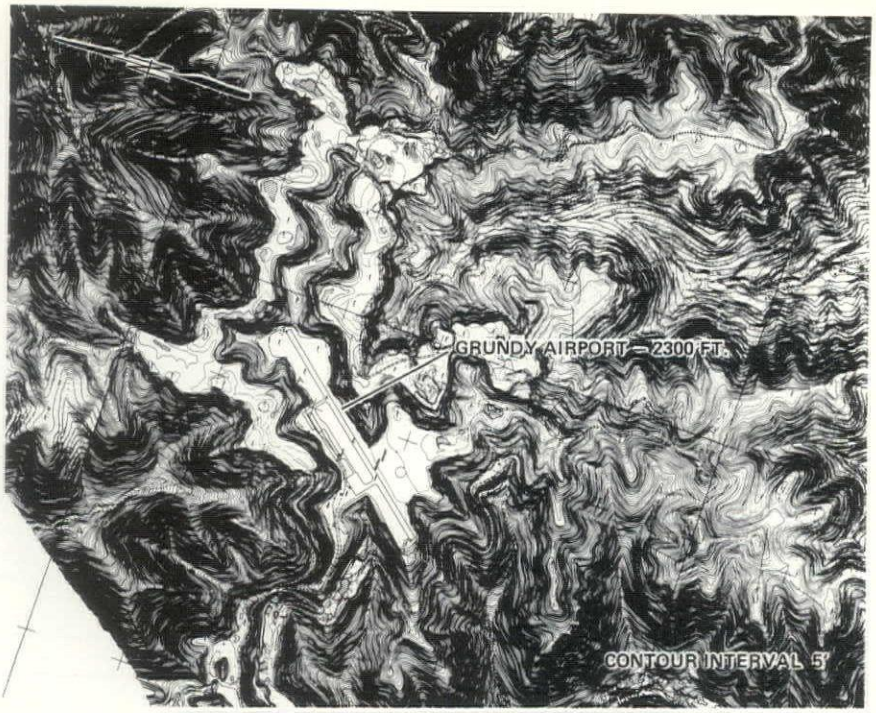
Buchanan County lies in the midst of rich coal reserves in far Southwest Virginia. The expanding demand for energy in recent years has brought about a need for more workers, hence increasing the demand for housing, public services, recreation and other land encompassing facilities. Buchanan County, however, is characterized by narrow valleys and steep mountain slopes, most of which exceed 40 degrees. Nearly all of the developable land has been utilized, making additional house sites especially hard to find.

Transportation is another difficult problem for the area. Highway access, although much improved in recent years, still requires a sizeable time lag to connect to larger metropolitan and business centers. Railroads are available but offer nothing for passengers and freight needs other than large industrial needs. The town of Grundy maintains a small airport nearby which has seen greatly increased usage, especially by local industrial concerns, as a means of effectively increasing productivity. However, the existing Grundy Airport was designed to meet standards established by the Federal Aviation Administration for Basic Utility — Stage 1 airports. This type can accommodate about 75 percent of the propeller-driven aircraft under 12,500 pounds gross weight and is primarily intended to serve low-activity locations having relatively sparse populations. Runway length is barely 2,300 feet. Twin-engine aircraft can now land at Grundy with only a marginal degree of safety. Also, numerous aircraft owned by individuals and corporations in the immediate area are unable to utilize the facilities at all.

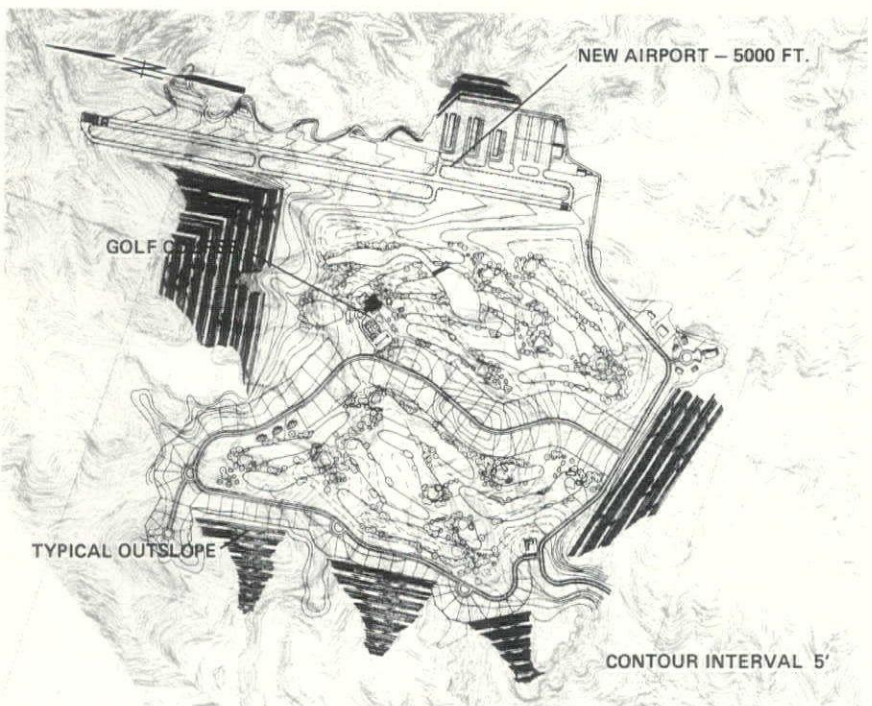
All of the problems outlined above appeared to dovetail into one solution recently. United Coal Company, a local organization, after some preliminary investigations, agreed with the Grundy Airport Commission to underwrite any costs in connection with a study evaluating coal reserves and possible land use around the current airport. Several months were expended studying coal reserves, evaluating land use alternatives, and assessing the impact of the project on the surrounding area. These findings indicated that there may be sufficient coal reserves available to justify completely removing the present airport and developing a new one on a finished and usable 550-acre reclaimed site. Most of the land around the area is too steep to develop in its current condition. Sufficient coal reserves (about 1.8 million tons) appear to exist to offset the removal and placement of 32 million bank cubic yards of material and lowering most of the ground surface some 200 feet. Excess overburden not used in landscaping the site can be placed in six hollow fills located around the perimeter of the site. Fills can be graded to a 2 : 1 slope in the hollows and will be terraced with 20-foot wide benches every 25 feet horizontally to control surface drainage. All natural watercourses in the hollows may be preserved by constructing rock core French drains which will receive channeled runoff from the benches insuring stability of the fill area.

Erosion during construction can be controlled primarily by limiting the amount of area which would be subject to erosion. No sediment ponds are proposed. Instead, erosion and sediment deposition is prevented by continued use of temporary berms, diversion ditches, sediment traps, sediment barriers, and vegetal filters.

The new airport will be 5,000 feet long instead of 2,300 feet and have a 100-foot paved runway instead of the current 50 feet. After making a liberal allowance for the airport, space still remains for 82 spacious residential lots around an 18-hole golf course with a complete line of additional recreational facilities.



PROJECT AREA PRIOR TO DEVELOPMENT

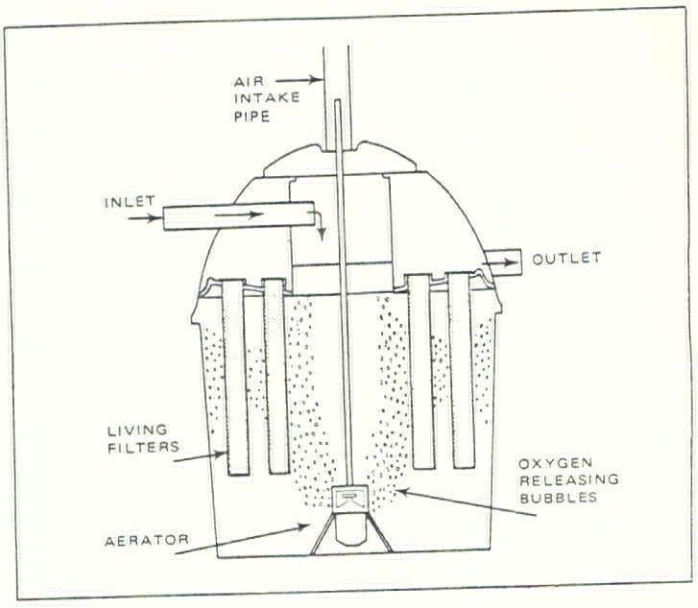


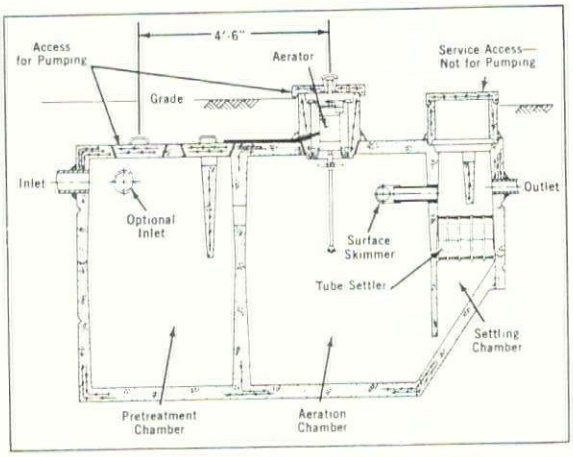
PROJECT AREA AFTER DEVELOPMENT

Locating the best housing, recreational, and transportation facilities at one place will be a first for Southwest Virginia. It is also a clear demonstration that mined land reclamation programs can be integrated to serve the needs of localities as well as fulfill the expanding energy requirements of our society, if proper planning is instituted. Negotiations are currently underway to enter the construction phase. All indications are that the project is feasible at this point. Final go-ahead must depend on balancing prices on the rather fluid coal market with the cost of earth removal. If these are successful, actual work on the project should begin in the latter part of 1977.

How to Deal With the Cost Of Wastewater Treatment Facilities For Small Rural Communities

By **Steven G. Breeding**
Environmental Planning Division
Thompson & Litton, Inc.





Two of several individual aerobic treatment plants on the market

Sewer bills are climbing toward $25 per month in many areas. Studies of two Virginia communities show significant reductions in capital and operational cost with a unique, simple approach to treatment explained herein.

PRACTICALLY EVERY sewer customer has seen a substantial increase in his monthly sewer bill since attention has been directed to cleaning up streams. Nowhere have costs been more severe than in rural areas and small communities with an insufficient number of people to support these clean-up efforts.

A recent Environmental Protection Agency (EPA) survey of completed plans for sewerage facilities for communities of less than 50,000 population shows the seriousness of the problem.

Of the 258 plans surveyed, the operation and maintenance, plus the debt retirement of the local share for the new facilities, was more than $100 per household per year ($8.33 per month) in 40 percent of the communities. The same total was $200 per household per year ($16.67 per month) in 10 percent of the communities; and in several cases, costs were more than $300 per household annually ($25 per month).

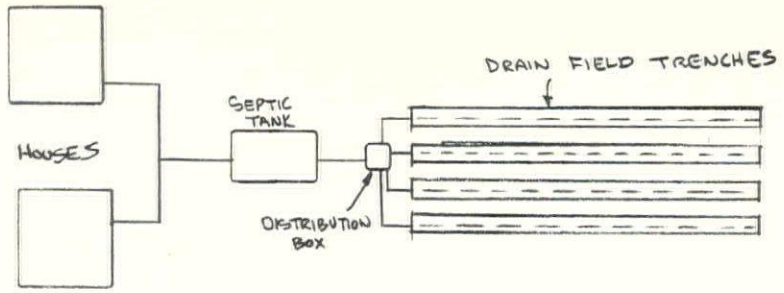
Eighty-three of the 258 plans were for completely new systems. Three-fourths of the 83 show costs of more than $100 per household annually, and one-fifth were more than $200 per household per year. Communities with populations of less than 10,000 experienced a much higher cost on the average than did the larger communities.

The EPA survey shows that all the sewerage facility plans that were reviewed recommended conventional collection and treatment systems where no system existed. With few exceptions, these plans failed to evaluate on-site treatment of wastewater from individual homes, or clusters of homes.

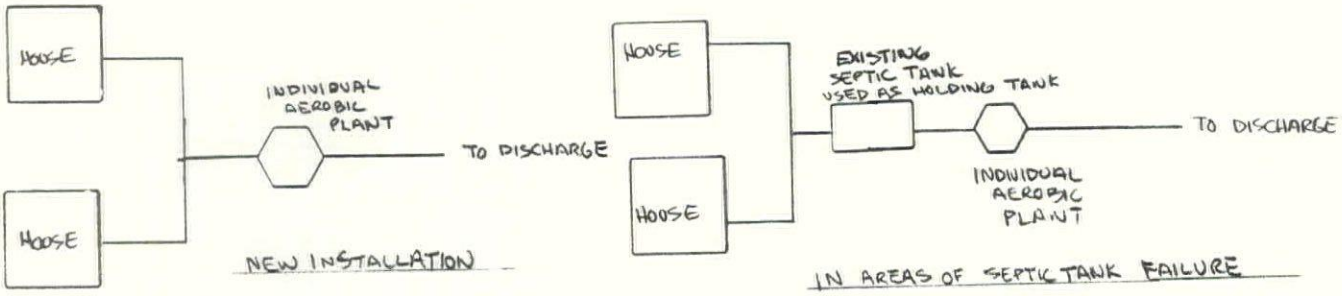
In a communication to regional administrators, John T. Rhett, EPA deputy assistant administrator for water program operations, said, "I ask, in view of this serious situation, that the regions ensure that facility plans contain a complete and careful cost-effectiveness analysis of alternatives involving maintenance and/or new construction of treatment systems for individual families and small clusters of families wherever these alternatives are feasible in the planning area." Therefore, it is reasonable to assume that EPA will soon begin to stress the importance of individual home and small cluster treatment alternatives.

In most small rural communities, development is typically scattered. In the more mountainous areas of Southwest Virginia, the topography is such that most of the useable land lies along stream banks in the deep valley areas. These factors tend to create lengthy and costly collection systems with a low density of customers per mile of sewer line.

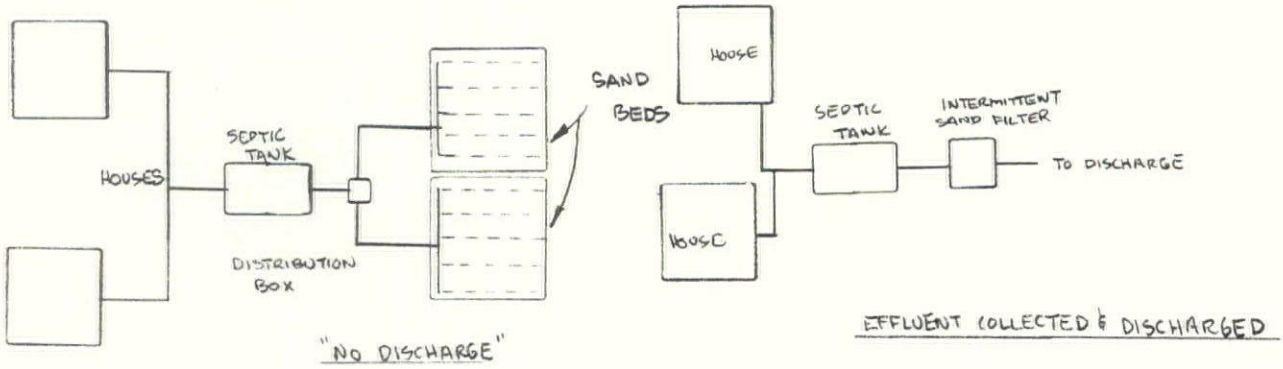
Most conventional treatment plants, such as activated sludge, are rather complicated processes which require proper operation and maintenance if they are to operate efficiently. In most cases, where secondary treatment is sufficient, one certified operator and an assistant operator are adequate. For advanced waste treatment systems, an additional certified operator may be required. Labor costs alone for competent certified operators are a great burden for most small communities. In cases where development takes place



Septic Tank - Drain Field System



Individual Aerobic System



Septic Tank - Sand Filter System

along small streams, stringent effluent limitations may require that the community provide advanced waste treatment in addition to secondary treatment. Situations such as this are fairly common in the mountainous headwater areas of the state and have proved to be a tremendous cost to the affected community.

By providing on-site treatment of waste, the lengthy and costly collection systems associated with conventional systems can be greatly reduced. These on-site options also allow central treatment plant sizes to be reduced, and in most cases, reduce the labor cost associated with plant operators.

In cases in which advanced waste treatment is required, if enough wastewater can be diverted into no-discharge systems, such as septic tank-drain field systems or septic tank-sand filter systems, secondary treatment may be sufficient for the remaining flow that would be discharged into

EXHIBIT 1

COMMUNITY OF HAYSI

Population of Service Area: 1700

Population of Area Outside Service Area to be served: 1330

Total Population: 3030

		CASE A†	CASE B†
I.	CONSTRUCTION COST	$6,255,110	$2,476,085
	A. Collection	5,114,480	1,099,335
	B. Treatment: Case A - 0.3 MGD Plant; Case B - 0.1 MGD Plant	561,130	427,750
	C. ITU* (242 Inside Service Area)	-0-	369,500
	D. ITU* (380 Outside Service Area)	579,500	579,500
II.	RELATED PROJECT COSTS (35%)	2,189,289	866,630
III.	TOTAL PROJECT COST	8,444,399	3,342,715
IV.	GRANT FUNDS (80%)	6,755,519	2,674,172
V.	AMOUNT FINANCED	1,688,880	668,543
VI.	ANNUAL BUDGET	174,329	80,425
	A. Debt Reserve (5%, 40 Yrs.)	98,428	38,962
	B. Debt Retirement (10% of A)	9,843	3,896
	C. Operation & Maintenance - Plant	50,928	12,787
	D. Operation & Maintenance - ITU	15,130	24,780
VII.	CUSTOMER COST		
	A. Number of customers	863	863
	B. Annual Cost	202.00	93.19
	C. Monthly Cost	16.83	7.77
VIII.	PRESENT WORTH (7%, 25 Yrs.)	9,213,975	3,780,370

*Individual Treatment Units
†Case A is conventional collection and treatment to serve the entire area. Case B is conventional treatment and collection for the more concentrated development and ITU for the remaining areas. In both cases, some areas outside the service area are served by ITU. This is necessary to meet stream standards.

EXHIBIT 2

COMMUNITY OF HURLEY

Population of Service Area: 3710

Population of Area Outside Service Area to be served: 190

Total Population: 3900

		CASE A†	CASE B†
I.	CONSTRUCTION COST	$6,653,085	$2,708,975
	A. Collection	5,821,400	1,178,725
	B. Treatment: Case A - 0.3 MGD Plant; Case B - 0.1 MGD Plant	756,685	540,250
	C. ITU* (666 Inside Service Area)	-0-	915,000
	D. ITU* (54 Outside Service Area)	75,000	75,000
II.	RELATED PROJECT COSTS (35%)	2,328,580	948,140
III.	TOTAL PROJECT COST	8,981,665	3,657,115
IV.	GRANT FUNDS (80%)	7,185,332	2,925,692
V.	AMOUNT FINANCED	1,796,333	731,423
VI.	ANNUAL BUDGET	228,120	98,232
	A. Debt Reserve (5%, 40 Yrs.)	104,690	42,627
	B. Debt Retirement (10% of A)	10,470	4,263
	C. Operation & Maintenance - Plant	111,030	27,832
	D. Operation & Maintenance - ITU	1,930	23,510
VII.	CUSTOMER COST		
	A. Number of customers	1,114	961
	B. Annual Cost	204.78	102.22
	C. Monthly Cost	17.06	8.52
VIII.	PRESENT WORTH (7%, 25 Yrs.)	10,297,650	4,255,250

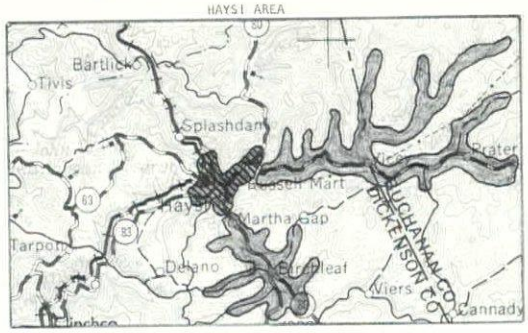
*Individual Treatment Units
†Case A is conventional collection and treatment to serve the entire area. Case B is conventional treatment and collection for the more concentrated development and ITU for the remaining areas. In both cases, some areas outside the service area are served by ITU. This is necessary to meet stream standards.

the stream. In any case, it is likely that the degree of advanced waste treatment required can be reduced.

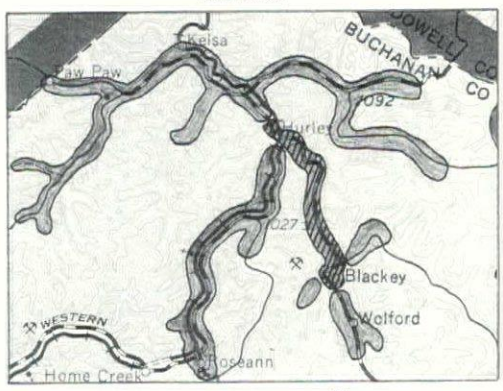
Thompson & Litton, Inc., a consulting engineering firm which has served Southwest Virginia since 1956, has completed two Step I 201 Facility Plans which recommend on-site treatment of residential wastewater. These plans were completed in December 1975, for the town of Haysi in Dickenson County, and in January 1976, for the Hurley community in Buchanan County. Both are now being reviewed by the Virginia State Water Control Board and the Environmental Protection Agency.

Both planning areas have populations of less than 4,000, and the topography is characterized by small streams separated by sharply rising ridges. Thus, scattered growth

HAYSI AREA



HURLEY AREA



Areas of Conventional Collection & Treatment

Areas where On-site Treatment Methods are used

By using on-site treatment methods, user costs are cut to 50% of that for entirely conventional methods.

has developed along the stream corridors, resulting in long and expensive conventional collection systems. An alternative to this is to serve only the most concentrated areas by conventional methods and the more scattered development by on-site treatment methods.

Three on-site methods were selected. These are septic tank-drain field (ST-DF) systems, septic tank-sand filter (ST-SF) systems, and individual aerobic (IA) systems. ST-DF systems would be used whenever possible. Where soil conditions prohibit use of ST-DF systems, a ST-SF system would be used. In cases where soil conditions are prohibitive and inadequate space for a ST-SF system exists, the IA units would be used. If possible, each on-site system would serve more than one

residence; and wherever possible, larger clusters would be served by each system.

A cost comparison of conventional methods for the entire area versus on-site methods and a smaller conventional system for the more concentrated development is presented for Haysi in Exhibit 1 and for Hurley in Exhibit 2.

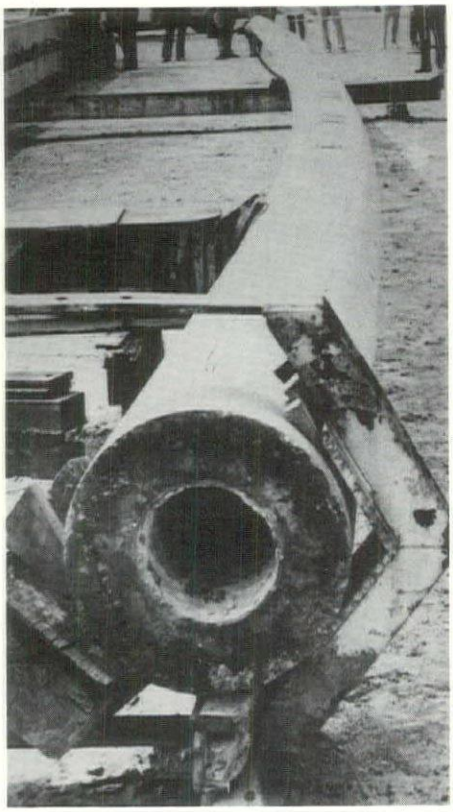
By using on-site treatment methods, collection costs for both areas were reduced to just over 20 percent of the original (Case A) conventional collection. Total project costs of Case B were reduced to about 40 percent of Case A, and user costs were roughly cut in half. Present worth was reduced to approximately 40 percent of Case A.

The on-site treatment units must be owned, operated, monitored and maintained by a municipality or sanitary authority according to PL 92-500. This allows more efficient and effective operation and maintenance. Rights-of-way must be obtained for areas where these units are installed. Where possible, existing ST-DF systems can also be operated and maintained by the municipality.

These on-site treatment systems appear to be one of the few economically feasible solutions to waste treatment for small rural communities. Realistically, it is likely that these municipally owned on-site systems would be difficult to implement and operate. Even so, the citizens of such communities can little afford to bear an unnecessary financial burden for elaborate conventional treatment methods purely for the sake of ease and convenience of implementation. Neither can the preservation and protection of the state's streams and environment be ignored. It is imperative that systems such as these be given an opportunity to prove themselves in actual application. If not, the citizens of rural Virginia communities can expect either very expensive sewer bills or serious water quality and environmental problems.

ARCHITECTS & ENGINEERS, INC. present . . .

Prestressed Concrete Utility Poles



ARCHITECTS & Engineers, Inc., formerly Woodson, Littlepage & DeYoung, Inc., is combining its practical experience and in-house computer capabilities to design prestressed concrete poles for an expanding utility market.

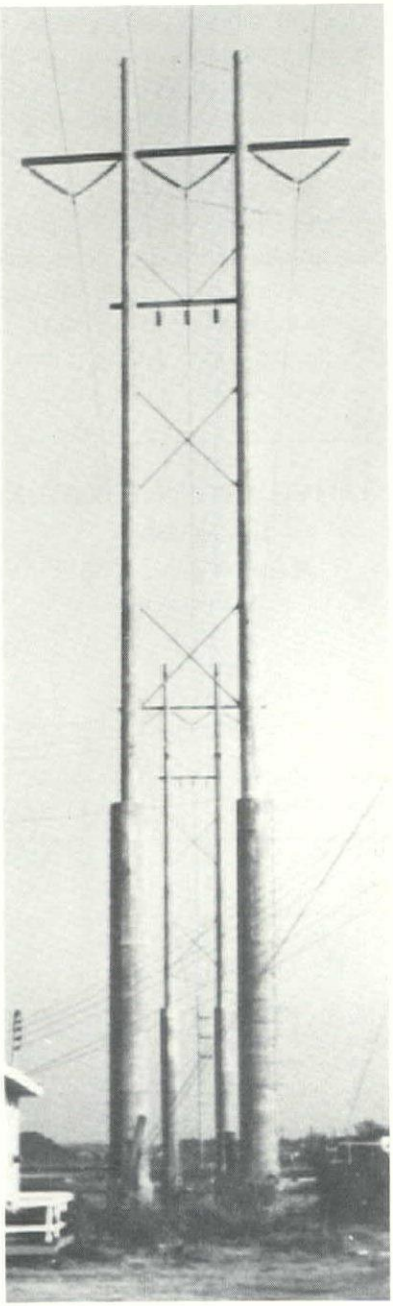
As the demand for wood products grows, substitute materials must be found to relieve this demand wherever possible. For years in Europe and Japan, centrifugally cast prestressed concrete poles have been the major source of utility poles for electric, telephone and steam lines. They are also widely used as piling in areas of poor soil and conditions.

Centrifugally cast poles are uniform material, free of the effects of rot and destructive insects, which yields a building element superior to its natural counterpart. These poles are practically maintenance free and can be used over and over without reconditioning. Various strength poles may be obtained by varying either the wall thickness or stress wire or both.

Architects & Engineers, Inc. has worked over a period of years with Bayshore Concrete Products at Cape Charles, to develop a comprehensive range of poles which could compete with wood poles. American Precast concrete of Indianapolis, Ind., in conjunction with Architects & Engineers, Inc., has recently developed a series of centrifugally cast poles to be used by Midwest utility companies.

Architects & Engineers' development of an in-house computer system to analyze pole sections has facilitated the input capacity for a wide variety of design parameters. These parameters maximize the efficiency of each pole for its intended use, and this flexibility should make the poles economical for the utility companies.

Field splices of these poles have been developed which can be used to the owner's advantage.



The national potential market for spun concrete poles is staggering and has yet to be fully realized. The left photograph illustrates the elastic characteristics of prestress concrete. The photograph to the right is of a river crossing at Moorehead City, N.C., demonstrating the ease with which a structure may be shipped as components and assembled at the site. These poles can be spliced at whatever interval the owner wishes.

'DYNAMO-1' DEVELOPED TO OPTIMIZE WASTEWATER TREATMENT SYSTEM ALTERNATIVES

By Kent Patterson, Project Manager
Roy F. Weston

A FIRST GENERATION Dynamic Programming Model that can evaluate over 3,000 separate wastewater treatment alternatives, and select the optimum alternative for a given raw wasteload and effluent limitation, has been developed by Weston's Richmond, Virginia office.

Called "DYNAMO-1," the model is consistent with the engineering philosophy of developing technically sound, cost-effective solutions to client problems. DYNAMO-1 incorporates existing Weston design procedures for alternative development and will objectively select the most cost-effective wastewater treatment alternative available. Economic comparisons are made based upon the computed present worth value for each alternative.

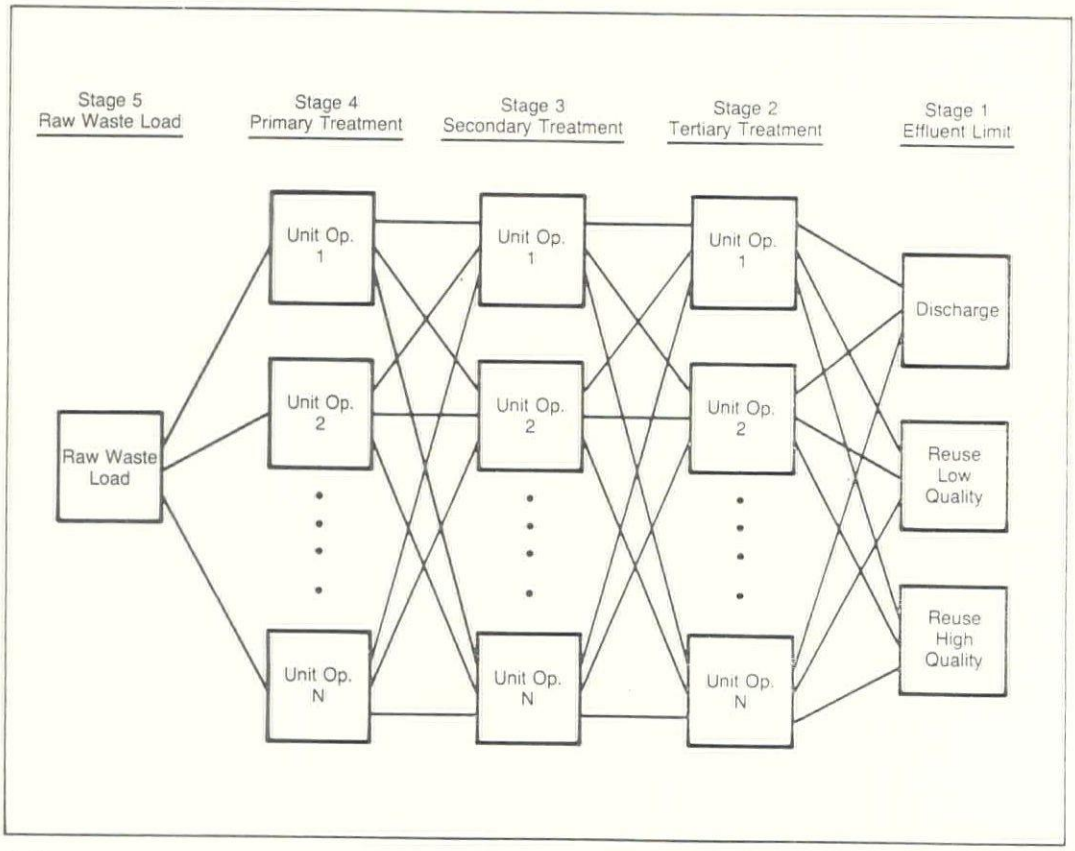
The model has been developed as a serial multi-stage decision system whereby a set of stages are joined together in a series so the output of one stage becomes the input to the next stage (primary to secondary to tertiary treatment). This approach analyzes the system in a backward, multi-stage problem-solving method as shown in the illustration.

DYNAMO-1 will allow the consulting engineer to quickly and thoroughly evaluate all potential alternatives, and provide more time to "refine" the best alternative for the design engineer. The alternative selected will be completely objective, utilizing a sophisticated technical and financial approach, thereby eliminating any technical or personal bias.

The value of DYNAMO-1 is its ability to be applied at various levels of sophistication: planning studies, desk-top evaluation, and final alternative selection. The first level of application — Facilities Planning — is perhaps the most powerful.

Usually the initial information available to the engineer for these types of studies are potential sites effluent limitations and potential raw waste loads. Using this limited data, DYNAMO-1 is programmed to allow the engineer to evaluate alternatives using a set of "standard design criteria" contained in the model. The engineer, however, can alter the "standard design criteria" as he may desire based upon his design experience and the amount of wastewater and process design data available to him. Based upon the basic data inputs DYNAMO-1 will select the optimal least cost treatment alternative.

This level of application is particularly useful in EPA Section 208 and 201 planning efforts spelled out in the Water Pollution Act Amendments of 1972 (PL92-500). It also provides planners and engineers with a cost-effective and technically powerful tool to systematically evaluate all potential alternatives. Using DYNAMO-1 it is relatively simple for an engineer to demonstrate the economic impact of and test the cost sensivity of these alternatives to rising energy costs, using labor costs, variations in waste loadings or characteristics, alternate effluent limitations and changes in flow. Evaluations that can take weeks of an engineer's time and in many cases are never performed because of project financial constraints, can now be performed in a matter of minutes using DYNAMO.



LAWRENCE E. PERRY, JR., CONSULTING ENGINEERS presents . . .

BASSETT HIGH SCHOOL

CONRAD KNIGHT, ARCHITECT, AIA
Architect
JOHN W. DANIEL & CO., INC.
General Contractor

THE HENRY COUNTY School Board was a vital member of the design team for the new 2000-student Bassett High School. The Board wisely decided to base the selection of the mechanical systems on life-cycle costs instead of simply seeking the system with the lowest construction cost. The School Board also had the vision, in view of the present energy situation, to insist that the heating system be designed to be easily converted to coal-firing.

The first step in the heating and air conditioning system decision-making process was a computer study of total owning and operating costs for various types of systems. The systems studied were typical approaches being used on schools throughout the area. Some examples would be rooftop multizone units, incremental water-to-air heat pumps, central chilled water system with electrical resistance heating and variable air volume terminals, rooftop single zone units with resistance heating and variable air volume, and oil or coal fired boilers in lieu of resistance heating.

The computer program determined the total owning and operating costs of the various systems by computing energy costs, adding first costs, interest costs and replacement and maintenance costs and comparing these over a number of years. Payback periods are computed which enable the owner to help select the system used based on economics.

The system selected for use on the Bassett High School consists of two air cooled centrifugal chillers, oil fired boilers, penthouse air handling units, shut-off type variable-volume air control units, and miscellaneous cooling and heating units. A hydronic cooling and heating system was selected to take advantage of high diversity usually found in schools. The capacity of the cooling units installed can be less than the total required since chilled water cooling can be designed to "follow the load."

The air cooled centrifugal chiller was selected over a water cooled chiller for several reasons. The operating economy was favorable due to head pressure

reduction in ambient temperatures less than design. Water cooled units are normally controlled to operate on 85° entering condenser water which fixes the head pressure. The air cooled unit takes advantage of cooler ambient temperatures on the condenser side thereby decreasing the power consumption. Maintenance costs were greatly decreased due to eliminating the cooling tower and condenser water treatment and because the units have enclosed and heating compressor compartments. Floor space savings were realized since both units are roof mounted. Other considerations were the ease of installation due to the package concept and the greater design life over reciprocating products.

It was decided to design around roof mounted air handling units of the penthouse type to eliminate the requirement for equipment room floor space. The penthouse climate changers used are designed specifically for outdoor use and feature walk-in access doors for ease of maintenance. Inlet vanes or outlet dampers were used for fan modulation for reduced air delivery at lower cooling loads.

The terminal system used is variable air volume. This system is the shut-off type which again takes advantage of the building load diversity by diverting air to wherever the load exists. Also, whenever the existing load is less than maximum design load, the system reduces the air supply thereby conserving air moving energy inputs. This results in reduced air moving cost which can be very significant since, with other systems, the air moving costs are approximately 20% of the total building energy requirements.

The hot water boilers are oil-fired, but were selected to be capable of coal-firing in the future. The boilers are set on special raised bases which will easily receive the future stokers.

The temperature control system has several other features to reduce energy consumption and operating costs. The system is operated on a time clock to provide design heating and cooling temperatures only during occupancy hours. At other times the temperatures are reset and the outdoor air supply is shut-off. When the system is energized in the mornings, fresh air is not admitted until the building is warmed up, thus reducing the load on the system. Electrical energy demand is reduced by not allowing both chillers to start simultaneously.

The electrical and related systems for this facility were also designed to be energy-efficient and to reduce operating costs. The main electrical service is 3-phase 480/277 volt for lighting and large equipment and is transformed to 3-phase 208/120 volt for receptacles and smaller equipment. The main switchboard provides integral ground fault and selective coordination protection by the use of adjustable solid state circuit breakers.

The classrooms and hallways are lighted by two lamp 2′ x 4′ recessed fluorescent fixtures. These fixtures are also utilized for air supply and return. Two lamp rather than four lamp fixtures were selected because the long range operational costs were significantly reduced. Mercury vapor fixtures with quartz standby are provided in the Gymnasium and Main Lobby and industrial fluorescent fixtures with V.H.O. lamps are used in the Vocational Shops. High pressure sodium fixtures on 50′ poles are used for exterior lighting. Throughout the building are egress lighting fixtures and exit signs with self-contained emergency power supplies. The entire lighting system was designed based on Illuminating Engineering Society (I.E.S.) lighting criteria and also on the use of efficient light sources for energy savings.

The Multi-Purpose Room is equipped with a three scene preset solid state dimming system. This not only enables the school and community to enjoy

professional like stage productions but serves also as a valuable training system for those interested in the performing arts.

The centralized paging and sound system consists of an intercom and program system, separate systems for the Multi-Purpose Room and Gymnasium, and a portable system for the courtyard area. An automatic time signal generator connected to the master time controller transmits a tone through the speakers eliminating the need for program bells.

Clocks throughout the building are kept synchronized by the use of a master time controller and an electronic frequency generator which transmits a pulse on the electrical circuits. This pulse is received by an electronic receiver built into each clock, thereby eliminating the need for long runs of control wire and conduit between the master controller and the clocks.

Security is provided by a zoned modular solid-state fire alarm system. Activation of any alarm initiating device will cause an audible alarm, a lighted indicator on a graphic display panel, close fire doors, and selectively shut down certain HVAC equipment by zone.

John W. Daniel & Co., Inc. of Danville is general contractor and is handling excavating, sodding, seeding, etc., landscaping, foundations, concrete work, reinforcing, masonry work, steel erection, carpentry, waterproofing and caulking.

Subcontractors & Suppliers

Roanoke firms are: PPG Industries, Inc., glass & glazing & storefront; John N. Yauger Co., aluminum windows; Cates Building Specialties, Inc., architectural hardware; A & H Contractors, Inc., lath & plaster contractor & acoustical treatment; Discount Carpet Center, resilient tile & carpet; Eastern Sales & Equipment Service Corp., food service equipment; and J. H. Pence Co., stage setting & gym divider curtain.

Richmond firms are: J. B. Eurell Co., cementitious roof deck; Costen Floors, Inc., gymnasium wood floor; and Brownson Equipment Co., Inc., demountable partitions.

From Martinsville are: Doyle Ready Mix Concrete, concrete supplier; Martinsville Concrete Products, block & mortar; Helms Roofing Corp., built-up roof, roof insulation & sheet metal; Cornell Iron Works/Seybar, Inc., rolling doors; and Seybar, Inc., flagpole.

Others are: Orkin Exterminating Co., Danville, soil poisoning; Architectural Concrete Products, Daleville, precast concrete; Old Virginia Brick Co., Salem, brick; Alden Metals, Inc., Greensboro, N. C., steel supplier, structural steel & miscellaneous metal; Lynchburg Steel & Specialty Co., Monroe, steel joists & metal deck; Habersham Metal Products, Atlanta, Ga., metal doors & frames; and, Frederick Schill & Co., Pompano Beach, Fla., wood doors.

And, David G. Allen Co., Inc., Raleigh, N.C., hard tile & marble; W. E. Donald, Vinton, painting contractor; H & W Industrial Pipework, Inc., Bassett, sprinkler contractor; Galax Plumbing & Heating Co., Inc., Galax, plumbing/heating/ventilating/air conditioning contractor; Watson Electrical Construction Co., Wilson, N. C., electrical contractor; Greensteel, Inc., Lorton, chalkboard, tackboards, display; House of Sports, Gastonia, N. C., basketball scoreboards, backstops; J. L. Blanks Associates, Lynchburg, gymnasium folding seating; and, Penco Products, Inc., Greensboro, N. C., steel lockers, gym P.E. Basket trucks.

SAYRE AND SUTHERLAND, INC. presents . . .

SPECIALLY DESIGNED FILL OVERCOMES SWAMPY SITE

Henrico County

ERNIE ROSE, INC. — Architect
JAMES T. BUCK — Landscape Architect
EMMETT L. SIMMONS ASSOCIATES, INC.
Consulting Engineer, Mechanical/Electrical
DUNBAR, MILBY & WILLIAMS,
Consulting Engineer, Structural
SAYRE & SUTHERLAND, INC.
Consulting Engineer, Geotechnical

AN ENGINEERED fill was used to support a printing plant with unusual loads and critical tolerances in a poorly drained area of soft, saturated soil.

Three 100-ton color presses were to be installed in a new Beacon Press printing plant. The problems facing the architect construction manager, Ernie Rose, were that there could be absolutely no settlement or movement of the press foundations. Neither of these problems could be tolerated in order that the presses would operate properly. In addition, one-ton rolls of paper were to be stacked five high, creating loads of 1100 pounds per square foot on the floor.

The site was a flat, wooded area with pools of water on the surface. The soil was clay with thin seams of sand, saturated in the upper 1.5 to 5 feet, and incapable of supporting any loads.

A geotechnical engineering study by the firm of Sayre & Sutherland, Inc., and the architect's value engineering analysis, indicated that an engineered fill which would support shallow foundations would be the most economical foundation system. Engineered or controlled compacted fills are not unusual; however, the combination of performance requirements and natural soil conditions for this project were unique. This controlled fill was required to support heavy loads, be non-compressible, "bridge" soft local areas in the clay, distribute loads uniformly, and not settle with the foundations resting on it. Just as important, the quantity of fill had to be a minimum to achieve the expected economy. The usual conventional fill would not provide these engineering characteristics.

A specially designed, locally available earth fill was developed to support the press foundations, floor slabs and building foundations. To achieve the essential properties in the fill, a particular local granular soil compacted to near maximum density and resting on the natural soil near the bottom of the zone of saturation was recommended and used.

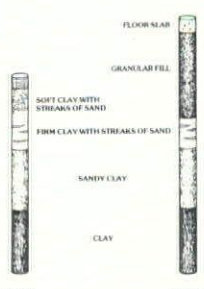
Controls were necessary on the gradation, liquid limit, plasticity index, moisture content, depth of undercutting, routing of construction traffic, and timing of construction. Constant monitoring of the earthwork construction by Sayre & Sutherland personnel assured compliance with the intent of the recommendations. There was complete cooperation between the construction manager, the earthwork contractor and engineering personnel on the job.

A dense, uniform layer of sand-clay-gravel compacted to an average of 98% of maximum density resulted. The result is a completed fill meeting all of the project requirements for stability and support of foundations.

The contract price for constructing the fill was 3% below the architect's estimate. Construction was complicated by the owner's decision to work during the wet winter season. Portions of the undercut area were saturated by rain and poor drainage conditions, requiring removal of additional soil. By working through the winter, the cost of earthwork was increased about 50%, but it permitted earlier occupancy of the building. In spite of the earthwork extras, the cost of the specially designed and constructed fill was only 4% of the total project cost. The fill also elevated the floor slab and this provided the required loading dock height.

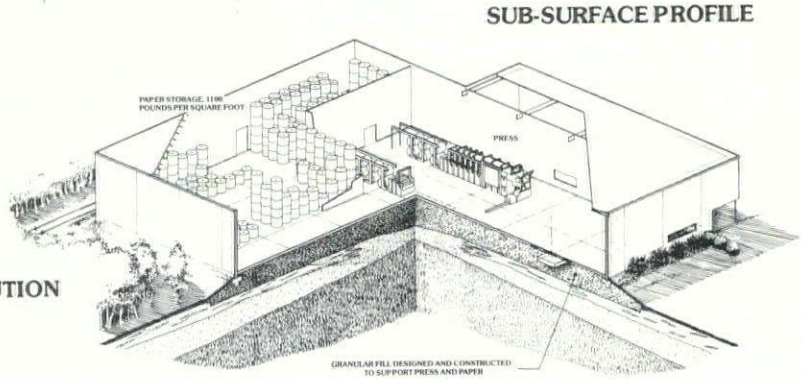
Excavating was handled by P. E. Eubank & Co., of Richmond, and the Test Boring Contractor was Ayers and Ayers, Inc. also of Richmond.

THE PROBLEM



SUB-SURFACE PROFILE

THE SOLUTION



THE VVKR PARTNERSHIP presents . . .

SOLAR POWERED HEATING SYSTEM AT WASHINGTON'S SCOTTISH RITE TEMPLE EXPECTED TO REDUCE FUEL COSTS 50%

THE VVKR PARTNERSHIP — Architect/Engineer
JAMES R. MAZZULLO PLUMBING & HEATING CO.
General Contractor
T. S. EGGLESTON, VVKR
Photography

THE INSTALLATION of a new closed loop heat pump and solar collector system was completed in January 1977, at the Washington, D.C. headquarters building of the Supreme Council of the Thirty-Third and Last Degree, Ancient and Accepted Scottish Rite of Freemasonry, Southern Jurisdiction, U.S., Mother Supreme Council of the World, commonly known as the Scottish Rite Temple.

When it was built in 1913, this classical temple had a coal-fired steam heating system which was later converted to natural gas. When it became apparent that the original system required either renovation or replacement, two factors were foremost in the minds of the owners: the large, rapid rise in energy/fuel costs; and the desire not to disturb either the interior or exterior appearance of the building.

These constraints, plus the projected future life of the building, led to the system's final design, which is expected to furnish almost all of the building's domestic hot water supply and 50% of the building heating using only solar energy. Overall, with the new heat pump and solar collector system, the owners can realistically expect to save 50% on fuel costs for domestic hot water and building heat.

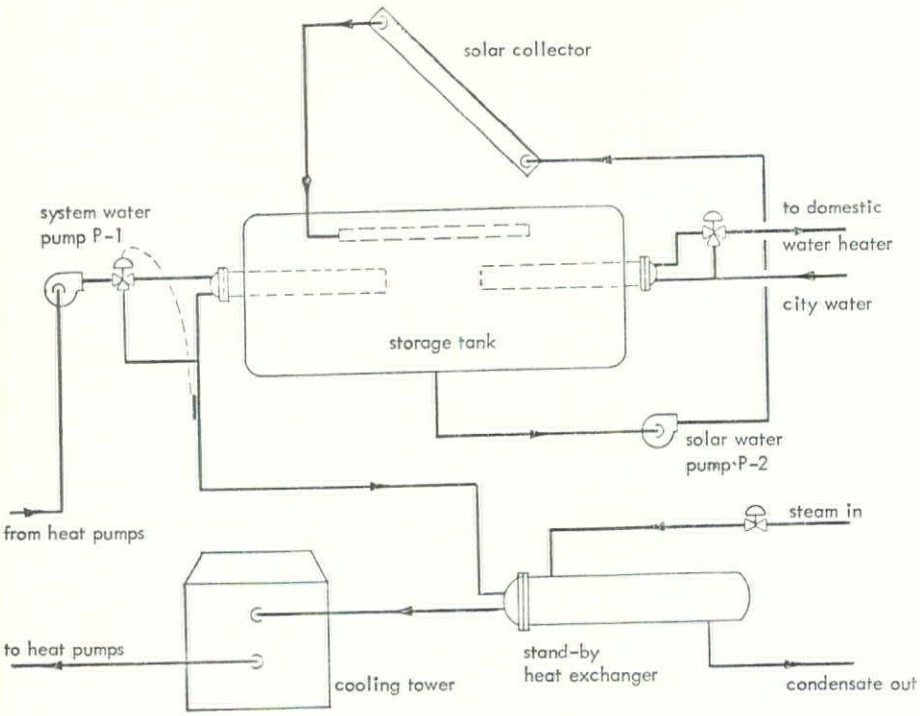
The system was designed by The VVKR Partnership (formerly Vosbeck Vosbeck Kendrick Redinger), an architectural, engineering and planning firm in Alexandria, and was installed by the James R. Mazzullo Plumbing & Heating Company of Silver Spring, Maryland.

Basically, the system consists of modular flat plate solar collectors which are inconspicuously mounted on the south side of the seventh floor rooftop behind the parapet wall. There are 21 solar collectors, approximately 500 square feet, which, because of the low temperature (70° F.) required to operate the heat pump system, are expected to be 20 - 30% more efficient than most solar-powered systems; and also because of the low temperature requirement, the collector area needed was 20 - 30% less. The heat from the solar collectors is stored in a large (1,077 gallon) storage tank in the basement of the building. There are two heat exchangers in the storage tank: one is used for the domestic hot water loop; and the other supplies the heat pump loop.

The liquid used in this solar-assisted heat pump system is a water-propylene glycol mixture, versus water for a traditional system, to prevent it from freezing in the pipes, because, when the temperature of the liquid in the collectors is lower than that in the tank, the flow from collectors is automatically cut off until the system requires heat again.

The beauty of the closed loop heat pump and solar collector system is that it not only provides heat from the storage tank to those areas which require it, but it can also capture heat generated by people, lights, equipment, and sun radiating through windows, and return it to the tank for storage, for future use.

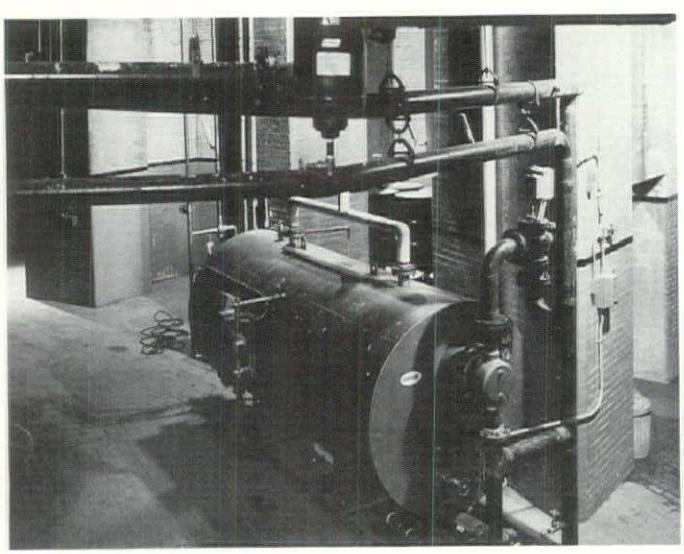
For example, in the morning, those areas on the south sunny side of the building would not require as much heat as those on the north side, and thus, the excess heat generated on the south side of the building would be



FLOW DIAGRAM

captured by the heat pump system, and would ultimately heat the north side. The heating cycle is completed when the cooled water-mixture is returned to the storage tank to be reheated, and recirculated. The gas-fired boilers which provide back-up heat are required only when certain weather conditions exist, such as extreme cold, or lack of sun over prolonged periods.

Although the air conditioning system is not powered by solar energy, it too is part of the closed loop heat pump system, and therefore the heating and cooling systems are of mutual benefit to one another, such as when some areas require heat and others require air conditioning, or when the two systems alternate because of temperature variations. In either case, when air conditioning is required, the heat which results from the cooling cycle can be captured by the heat pump system, and thus used for the heating cycle when it is needed.



Further advantages of this system are that the new heat pumps fit into the existing enclosures in offices, halls and meeting rooms, and thus do not disturb their appearance. The existing steam system provided the necessary pipe chases for the new heat pump system, and since the temperature range in the system is only 65° - 90°, no extra insulation was required. The basement installation of a new evaporative cooler as part of the closed loop heat pump system permitted the removal of the existing rooftop air conditioning unit which had detracted from the building's external appearance.

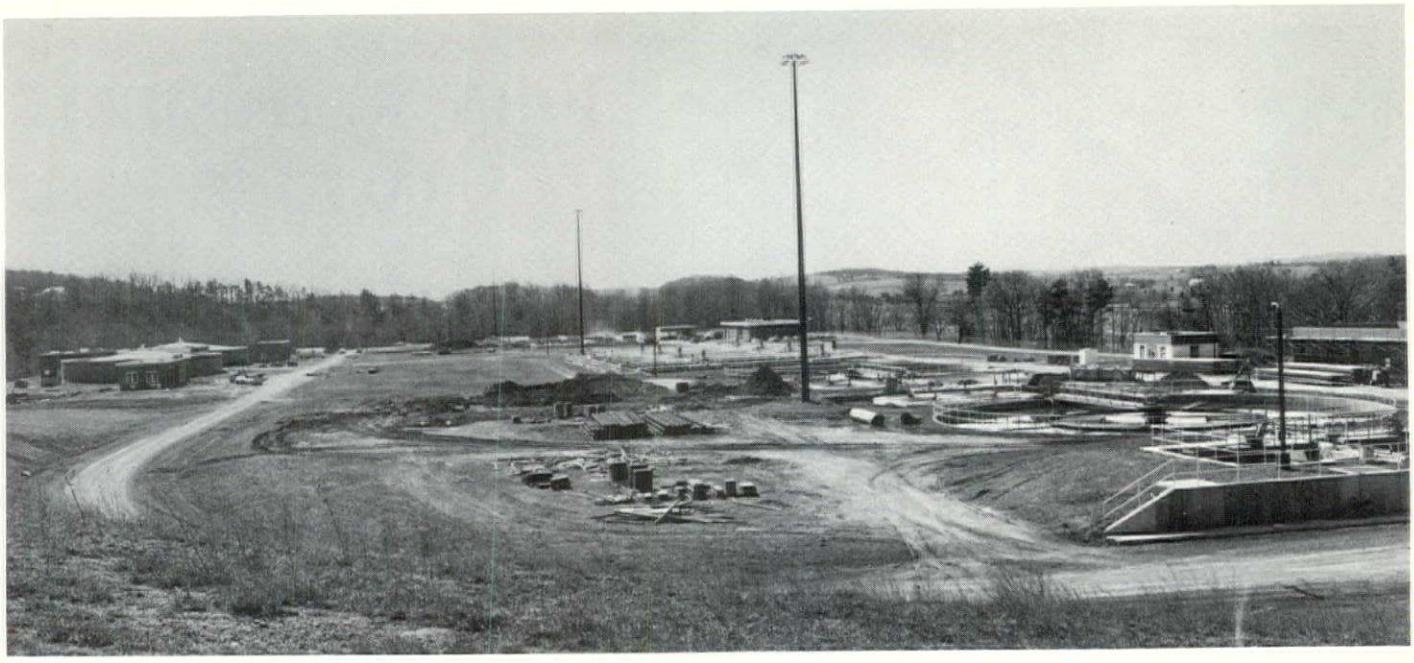
It is interesting to note that the technology of closed loop heat pump systems is not a new development. What is innovative about this particular installation is the combining of this system with solar collection and a large storage tank. The engineers at VVKR have been using heat pump systems with large storage tanks on many of their projects in the past several years, even those without solar collection systems. The advantage of using a large storage tank, as pointed out before, is that it enables the storage of heat which has been captured from the building, its occupants and equipment. Furthermore, it permits the future addition of a solar collection loop to the system.

James R. Mazzullo Plumbing & Heating Co. of Silver Spring, Maryland was general contractor and installed the Solar Collector Plates.

Subcontractors & Suppliers

Hamilton Spiegel, Inc., Tuxedo, Md., roofing & sheet metal; Victor S. Scuderi, Inc., Rockville, Md., electrical; James Schreiber, Silver Spring, Md., concrete; Washington Woodworking, Washington, D. C., finish carpentry; and, Lucas Insulation, Silver Spring, Md., pipe & duct insulation.

Also, American Air Filter, Louisville, Ky., supplied heat pumps & consoles; Revere Copper & Brass, Inc., Rome, N.Y., solar collector plates; Solar Heating Services, Inc., Silver Spring, Md., distributor & supplier of solar collectors & controls; Adamson Co., Inc., Richmond, custom storage tank; and, Rho Sigma, N. Hollywood, Cal., controls.



Overall view of Plant, showing completed units and those under construction. From left to right, Digester Building, Supernatant Treatment Building, Garage, Final Clarifiers, Aeration Tank with Chemical Treatment Building II and Control Building beyond, Primary Clarifiers with Chemical Treatment Building I beyond, and Grit Collector.

FLEXIBILITY IS THE key word for this 8 MGD activated sludge sewage treatment plant near Mt. Crawford, Virginia. Officially known as the North River Plant of the Harrisonburg-Rockingham Regional Sewer Authority, it is designed to serve over 55 square miles in southern Rockingham County, including its municipalities and industries. The collection system includes one pump station, 3,900 feet of force main and 19 miles of trunk sewer, ranging in size from 12" to 54" pipe.

The project was funded by a 75% Federal Grant from the EPA in the amount of $8,816,550 and a State Grant from the Water Control Board of $2,785,950. The remaining funds were provided by the participating localities.

The Authority, chartered on July 15, 1970, is made up of the City of Harrisonburg, the County of Rockingham and the towns of Dayton, Bridgewater and Mt. Crawford. The Authority is directed by an eight-member board, and is administered by James H. Roadcap, Jr.

Shortly after its formation, the Authority chose R. Stuart Royer and Associates as engineering consultants, and commissioned the preparation of plans and specifications for a wastewater treatment plant and an interceptor system.

Design:

The plant was designed with maximum flexibility in mind. The basic plant is a conventional activated sludge process, including comminution, pumping, grit removal, primary clarification, mechanical aeration, final clarification, chlorinated disinfection, and reaeration. Sludge handling facilities consist of gravity thickening, complete mix anaerobic digestion, and vacuum filtration. An attractive control building with full laboratory facilities and a garage round out the facility.

The plant is fully instrumented, with all major processes monitored on two annunciation systems in the control and digester buildings. Flow measurement takes place at the pump station, aeration tanks and the effluent. Quality

R. STUART ROYER & ASSOCIATES presents . . .

HARRISONBURG-ROCKINGHAM REGIONAL SEWER AUTHORITY NORTH RIVER WASTEWATER TREATMENT PLANT

Consulting Engineers:
R. STUART ROYER & ASSOCIATES, Civil
TORRENCE, DREELIN, FARTHING AND BUFORD, INC., Structural
ROACHE, MERCER & FAISON, Mechanical/Electrical

General Contractors:
TRAMMELL CONSTRUCTION CO., INC. — Phases I & III
ENGLISH CONSTRUCTION CO., INC. — Phase II

Photography:
GENTRY PHOTOGRAPHY

Laboratory in the Control Building

monitoring is provided on the influent, effluent, and in the receiving waters both upstream and downstream. The operator can tell at a glance which of his units are operating, what kind of results he is getting, and where trouble spots are located.

Due to the stringent 18 mg/1BOD effluent requirements, additional chemical treatment above and beyond secondary treatment was necessary.

Ahead of the Primary Clarifier is a flash mixer and a four-stage flocculator, with facilities for alum, sodium aluminate and lime addition. Although intended initially for solids removal, the system also has the capacity for future phosphorus removal. In addition, the primary clarifier is equipped with a dissolved air flotation system designed to remove grease from the wastewater.

There are four aeration basins, each containing two dual speed mechanical aerators. Three of the basins are designed to handle the design flow, while the fourth can be used to aerate return activated sludge, or as an additional aeration basin. The operator has the option of returning sludge to a common influent trough or meeting it to each individual tank.

The final clarifier is a peripheral feed type with vacuum sludge removal. A flash mixer, four stage flocculator and a chemical building provide facilities for adding lime, alum and polymer to effect pH adjustment and solids removal. Sludge from the clarifiers is metered and can be directed to the aeration tanks, sludge thickeners, or primary clarifiers.

The solids handling facilities extend the flexibility theme even further. The sludge thickeners can be used to thicken digested sludge as well as primary and secondary sludge, and may be set to operate using combined sludges or waste activated sludge alone.

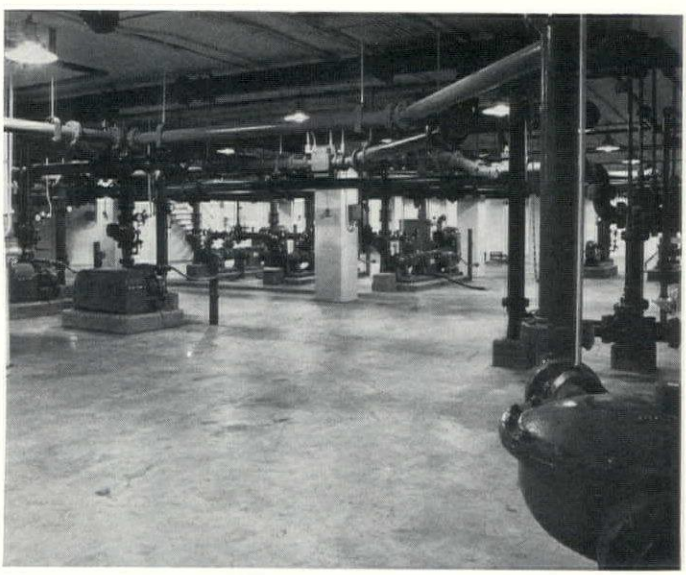
Each of the two 110 foot diameter floating cover digesters can be used as primary or secondary units, and extensive valving permits sludge transfer between any two points in the tanks. Lime, Ferric Chloride or Polymer can be added to the digested sludge to aid in dewatering, and supernatant is oxidized by chlorination before returning to the head of the plant to minimize sludge loads to the main process. The oxidizing equipment can also be used to stabilize the contents of the digester in an emergency upset situation.

Construction:

In September 1973, bids were received by the Authority for construction of the plant. High bids, caused by the inflated and uncertain economy, and the unavailability of ready funds resulted in splitting the project into three "phases." Phase I constituted the basic plant and control building. Phase II included chemical facilities, sludge thickener, supernatant treatment building and garage. Phase III consisted of electrical buildings necessary to operate Phase I and II units.

Phase I was awarded to Trammell Construction Company, Inc., of Bristol, Tenn. on January 11, 1974, for $6,349,108. Phase III was also awarded to Trammell on July 3, 1975, for $222,170. These two phases were completed in 1976, and the plant started operations on August 6, 1976, as a conventional activated sludge plant.

The plant began its operation under the management of Environmental Systems Services, of Culpeper, and is



Above, basement of the Digestor Building shown below.

currently meeting the effluent requirements at a flow of about 5 MGD.

Phase II was awarded to English Construction Company, Inc. of Altavista, on March 25, 1976, for $2,528,500 and is now under construction. This phase is scheduled for completion late this year.

The major equipment suppliers under Phase I were: Pumps — Allis-Chalmers; Grit Detritor — Dorr-Oliver; Primary Clarifiers and Aerators — Eimco; Final Clarifier — Lakeside; Chlorination and Instrumentation — Fischer Porter. Sludge handling equipment suppliers were: Digester Floating covers and sludge heaters — PFT; Digester mixing system — FMC; Vacuum Filters — Eimco; Sludge Pumps — Meyno and Wemco; Supernatant Pumps — Gorman-Rupp. The motor control centers were by Cutler-Hammer.

Phase III motor control centers were supplied by Square-D.

Phase II suppliers were: Flash mixers — Lightnin; Flocculators — National Hydro Systems, Inc., Supernatant Oxidizer — BIF; Sludge Thickeners — Envirex; Primary Clarifier Air Flotation — Eimco; Pumps — Allis Chalmers; Chemical Feed Systems — Wallace & Tiernan.

Trammell Construction Co., Inc. of Bristol, Tennessee, the general contractor for Phases I and III of the project also handled all carpentry work, forming, concrete work, mechanical, and mechanical piping.

English Construction Co., Inc. of Altavista, the general contractor for Phase II, also handled excavating, sodding, seeding, etc., concrete work, reinforcing, carpentry, and painting.

Subcontractors & Suppliers
(Phases I and III)

Allis-Chalmers Corp. c/o American Pollution Control, Richmond, raw sewage pumps & motors, re-aeration pumps & motors, recirculation pumps & motors, non potable water supply pumps & motors & submersible sump pumps; American Cast Iron Pipe Co., Birmingham, Ala., cast iron and ductile iron pipe & fittings; American Darling Valve & Manufacturing Co., Birmingham, Ala., gate valves, flanged swing check valves, mech. joint gate valve, pressure relief valve; Caton, Waller & Associates, Inc., Richmond; Gorman-Rupp — overflow & filtrate pump station & chlorination system; Dorr-Oliver, Inc., Atlanta, Ga., Dorr Detritors (no deflector blades); Envirex, Inc. c/o Heyward, Inc., Charlotte, N.C., digester floating covers, heater & heat exchanger, gas safety equipment & two telescoping valves; Envirotech Corp., Atlanta, Ga., Nat. Sonics Corp. sludge density controller; and, Fischer & Porter Co., Richmond, instrumentation.

Also, Flow Industries, Inc., Baltimore, Md., plug valve/work gear, etc. & dresser coupling, submersible pump, Wemco sludge recirculation pumps & motors; Gillespie Corp., Ware, Mass., crane lift; Honeywell, Inc., Richmond, automatic temperature control for heating, ventilating & air conditioning system; Sydnor-Hydrodynamics, Inc., Richmond, Sumo submersible pump, drilled well; Jones Steel Erection, Athens, Ala., erect & test floating digester covers; Kappe Associates, Inc., Rockville, Md., Amcodyne spray nozzles, complete gas recirculation system; Lakeside Equipment Corp., c/o Caton, Waller & Associates, Inc., Richmond, Lakeside Spiravac final clarifiers; Miller Valve Co., Pittsburgh, Pa., Miller flanged check valves; Mogul Corp., Charlotte, N.C., chemical feeders; Plastic Piping System, Inc., Columbia, Md., PVC pipe, fittings and valves; and, Pomona Pipe Products, Greensboro, N.C., V.C. pipe, plugs, tees, bends, increasers.

And, Robbins & Myers, Inc., Charlotte, N.C., mono pumps, motors & drives; Roberts Filter Manufacturing Co., Darby, Pa., access manholes; Southern Refrigeration Corp., Bristol, Va., differential pressure guage; Wallace & Tiernan Div., Pennwalt Corp., Wheaton, Md., dust collectors, comb. chlorine residual/PH comparator; Warwick Supply Co., Newport News, chilled water circulation pump, flanged flexible pump connectors; Watson Brothers Sheet Metal Works, Elizabethton, Tenn., air distribution & air supply & exhaust system, etc.; Western States Insulation Co., Roanoke, insulation work; Worthington Corp., c/o K.F. McQuelken Co., Silver Spring, Md., comminutor; Belew Sound & Visual, Bristol, Tenn., projection screen; Bristol Office Supply, Inc., Bristol, Va., office supplies; Bruning Div. of Addressograph Multigraph Corp., Richmond, office furnishings; Charlottesville Glass & Mirror Corp., Charlottesville, glass & glazing, windows, caulking, aluminum doors, frames & hardware; and, Concrete Structures, Inc., Richmond, double tees.

Others were: Economy Cast Stone Co., Richmond, Mo-Sai panels & cast stone trim; Enco Materials, Inc., Johnson City, Tenn., 4 mil poly, Saniseal, Horncure, Sonotub Dovetail slots, dovetail anchors; The Frazier Quarry, Inc., Harrisonburg, stone; General Scientific Corp., Richmond, laboratory equipment, apparatus & chemicals; E.D. Green Corp., Nashville, Tenn., air compressor, quick connectors & plugs, rib hose; Guist Decorators, Canton, Ohio, painting, spray glaze, sandblasting, vinyl wall & waterproofing; Hack Chemical Co., Ames, Iowa, laboratory turbidementer; Handling Systems, Inc., Charlotte, N.C., dock leveler & dock bumpers; Hertzler Tile, Inc., Harrisonburg, quarry tile, ceramic tile & vinyl asbestos floors & base; Hodgman's Inc., Richmond, carpet; Harrisonburg Office Equipment, Harrisonburg, office furniture & office equipment; Lancaster & Associates, Johnson City, Tenn. furnished venetian blinds; Don Largent Roofing, Inc. (formerly G.A. Largent Construction Co., Inc.), Harrisonburg, vapor barrier, roof insulation & roof flashing; and, Manson & Utley, Inc., Richmond, acoustical suspended ceilings.

Also, Milipore Corp., Bedford, Mass, Milipore supplies; Monroe Div. of Litton Industries, Bristol, Va., two Monroe calculators; Montague-Betts Co., Inc., Lynchburg, miscellaneous metals, reinforcing steel & wire mesh; J.M. Murphy Co., Inc., Roanoke, electrical requirements; Neff Masonry, Inc., McGaheysville, materials & installation, brick, block & block lintels, glazed masonry units & other masonry items; Noland Co., Johnson City, Tenn., Oasis refrigerated unit; Trane Unit Heaters, thermometers, safety, pressure relief valves, exp. tank, airtrol tank, fittings, pressure gauges, gauge cocks, strained Jenkins valves, butterfly valves & toilet accessories; Office Machines & Supply Co., Bristol, Tenn., office equipment; Overhead Door Co., Metropolitan Washington, Inc., Newington, rolling steel doors; Progress Unlimited, New York, N.Y., expansion joint, waterstop, sealant; Roadway Builders, Winchester, grading, excavation; Roanoke Engineering Sales Co., Inc., Richmond, Dwyer kitchen units & dressing compartments & toilet enclosures & laboratory furniture; Fred E. Schroder, R.P.E. & Associates, Greenville, S.C., electric hoist, hand hoist; Southern Foundation Corp., Greensboro, N.C., H-Piles; Superior Concrete, Inc., Harrisonburg, ready-mix; Technical Reproduction & Supply Corp., Knoxville, Tenn., surveying instruments & equipment; Trefz & Steenburgh Equipment, Richmond, lockers & locker benches, etc.; Valley Blox, Inc., Harrisonburg, blocks, monolithic base, extended base, etc.; Moore Brothers Co., Inc., Verona, installation of all steel piling; and, Jack Conley & Sons, Fulks Run, seeding.

Subcontractors & Suppliers
(Phase II)

Moore Bros. Co., Inc., Verona, piling; Farrier Paving Co., Staunton, paving contractor; Superior Concrete, Inc., Harrisonburg, concrete supplier; Concrete Structures, Inc., Richmond, prestressed concrete; Ray Bros., Harrisonburg, masonry contractor; Economy Cast Stone Co., Richmond, stonework supplier; Montague-Betts Co., Inc., Lynchburg, steel supplier/erection/joists/roof deck/grating, other roof deck, miscellaneous metal & handrails; Don Largent Roofing, Inc. (formerly G.A. Largent Construction Co., Inc.) Harrisonburg, built-up roof; Charlottesville Glass & Mirror Corp., Charlottesville, glass, glazing contractor, metal doors & frames, wood doors & windows; Overhead Door Co., Harrisonburg, overhead doors; Devoe & Raynolds Co., Inc., Roanoke, paint supplier/manufacturer; Riddleberger Bros., Inc., Harrisonburg, plumbing contractor; J.M. Murphy Co., Inc., Roanoke, electrical contractor; and, Powers Fence Co. of Roanoke, Inc., Roanoke, fencing.

Travelers' Guide

TORRENCE, DREELIN, FARTHING AND BUFORD, INC. presents . . .

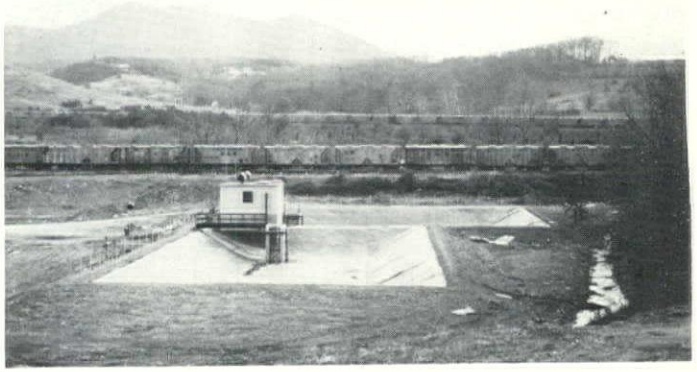
Man-Made Ponds Solve Fire Protection Problems

SOUTHERN STATES COOPERATIVE

Cloverdale, Va.

TORRENCE, DREELIN, FARTHING & BUFORD, INC.
Engineer/Architect

N.C. MONROE CONSTRUCTION CO.
General Contractor



Two 500,000 gallon ponds draw water from a nearby creek to supply fire protection system.

Planning for the construction of a six-acre warehouse and distribution center does not necessarily present unusual architectural and engineering problems. But designing an adequate fire protection system, particularly when you cannot draw upon any nearby governmental water supply, can be quite a challenge.

This was the situation faced by the construction and engineering staff of the Richmond firm of Torrence, Dreelin, Farthing and Buford when they began planning the regional office and warehouse of Southern States Cooperative in Cloverdale.

Situated about 10 miles from Roanoke on U.S. Route 11, the Cloverdale complex is a distribution point for parts of Virginia, West Virginia and Kentucky. The Southern States building contains approximately 12,000 square feet of office space and a 240,000 square foot warehouse area — almost six acres under one roof. The total cost of the project was approximately $2.9 million.

The lay of the land was generally good. There was a small mountain in the way, but it was removed and the earth and shale were used as fill under the warehouse foundation.

The real challenge was how to devise a sophisticated fire protection system that would adequately protect the huge complex.

"After considering several possible approaches, our best plan was to draw upon the water supply in nearby Tinker's Creek," said Earl Childrey, construction administrator for Torrence, Dreelin, Farthing and Buford. "The task was to get the water supply from the creek to the building's sprinkler and hydrant system."

Tinker's Creek runs through the town of Cloverdale and is about 1,000 feet from the warehouse complex.

It was decided to build two 500,000 gallon ponds near the facility to serve as a reservoir for the water drawn from Tinker's Creek. This water would be used to supply the sprinkler system inside the building and the hydrant system that surrounded the complex.

An automatic pump was situated in a manhole built in the creek. The pump was used to send the water through an eight inch pipe over 900 feet to the man-made ponds. The pump containment included a double screening system for filtering out larger pieces of earth and rocks. The pump was activated when the water level in the ponds dropped.

A pump shed was built adjacent to the ponds to contain the equipment that would be used to force the water from the ponds into the sprinkler and hydrant systems. The equipment included two electric pumps and two backup diesel pumps for use in case of electrical failure. When the fire protection system is activated, water is pumped from the ponds and the water level is constantly replenished as water is drawn from Tinker's Creek.

"The man-made ponds and the pumping system were by far the most efficient and cost effective way to provide adequate fire protection for the complex," Childrey explained.

The Southern States Cooperative Cloverdale warehouse and distribution center is an excellent example of how engineering can

(Continued on page 51)

The Southern States Cooperative warehouse and distribution center in Cloverdale, Virginia serves parts of Virginia, West Virginia and Kentucky. The huge complex contains six acres under one roof.

SOWERS, RODES AND WHITESCARVER presents . . .

HALIFAX COMMUNITY HOSPITAL

South Boston

SHERERTZ, FRANKLIN & SHAFFNER — Architect
SOWERS, RODES & WHITESCARVER — Consulting Engineer, Mechanical/Electrical
JOHN W. DANIEL & CO., INC. — General Contractor

ONE OF THE more unique features of a four million dollar structure now being built in South Boston, is that financing of the project is being handled by Farmers Home Administration (FMHA) — an unusual arrangement brought about by some timely and aggressive work by Al Burkholder, the alert and diligent executive director of Halifax Community Hospital.

An article in the *Wall Street Journal* about funds available from FMHA prompted Burkholder to apply for the money to build a new hospital in South Boston. After many letters, phone calls and personal visits with the proper authorities, Burkholder succeeded in getting his request approved, and now the first hospital in Virginia financed by FMHA is to become a reality. Burkholder shared his story with other hospitals, and some of them also have obtained financing from this unusual source.

The new building will house the ancillary facilities for a hospital with a bed capacity of 300 patients; 109 already are in existence, 48 are included in the present project, and the design provides for future additions that will house 143 beds.

The operating suite, recovery room, intensive care unit, laboratory, radiology and emergency areas are designed to conform to the latest medical facility requirements. The design teams visited other new hospitals and the offices of the reviewing authority (HEW) to make certain that the newest and most dependable facilities and techniques would be provided.

The building envelope (walls, windows and roof) is designed to be "energy efficient" in accordance with recommendations of ASHRAE 90-75, a standard for conserving energy in buildings. Energy recovery systems saved an estimated 50 tons of cooling equipment and one million Btu's of heating equipment at design conditions, plus enough operating energy to more than justify the cost of the recovery equipment. Secondary distribution HVAC systems are tailored to meet the environmental requirements in each of the different departments and all systems conform to the latest regulations of HEW and the Virginia health authorities.

Electrical systems which conform to the latest safety requirements utilize isolated power systems, ground fault interrupters, equipotential grounding and structure grounding systems, plus emergency power generation for all apparatus necessary for life support, safety and preservation of food and medicine.

The plumbing systems incorporate backflow preventers and vacuum breakers as the latest safety devices, plus the newest designs in hospital fixtures and life support gas and surgical gas systems.

Smoke and fire protection is provided for patients and staff, and the building and its contents, by complete automatic sprinkler coverage, except in patients' bedrooms and operating rooms, which are provided with automatic smoke and fire detection and alarm devices. These devices provide early warning of fire or smoke to all persons in the patient-occupied areas, and fire suppression in all other areas. This represents the latest thinking in fire safety for hospitals.

When the project is completed next year, South Boston will have one of the safest and most modern medical facilities in the world. Sowers, Rodes and Whitescarver is proud to have engineered the mechanical and electrical systems for this facility.

John W. Daniel & Co., Inc. of Danville is general contractor for the project.

Subcontractors & Suppliers

Riverside Equipment Co., Danville, excavating; Felton Bros, Transit Mix, Inc., South Boston, concrete supplier; Cast-A-Stone Products Co., Inc., Raleigh, N.C., prestressed concrete; Boston Concrete, South Boston, masonry supplier; Carolina Steel Corp., Greensboro, N.C., steel supplier; Seager Waterproofing, Inc., Greensboro, N.C., waterproofing; I.N. McNeil Roofing & Sheet Metal Co., Inc., Roanoke, built-up roof, other roofing & sheet metal; and W.H. Stovall & Co., Inc., Roanoke, supply & installation of windows.

Also, Williamsburg Steel Products, Inc., Williamsburg, metal doors & frames; C.W. Kirkland Plastering Co., Charlotte, N.C., plaster contractor;

(Continued on page 49)

ARCHITECTS AND ENGINEERS, INC. present . . .

FITZHUGH OFFICE BUILDING

ARCHITECTS & ENGINEERS, INC. - Engineer/Architect
ALEXANDER BUILDING CONSTRUCTION, INC. - General Contractor
FRED ROBERTSON - Photography

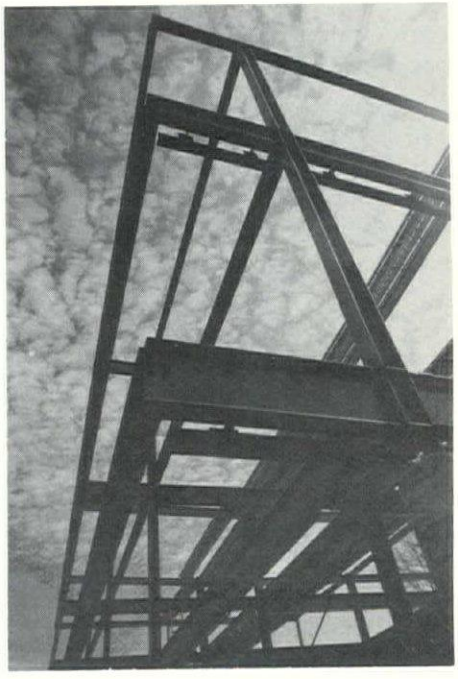
THIS BUILDING, which will provide 27,000 square feet of leased office space for the State Vocational Rehabilitation Department, had economy and a need for special facilities for the handicapped as two major design considerations.

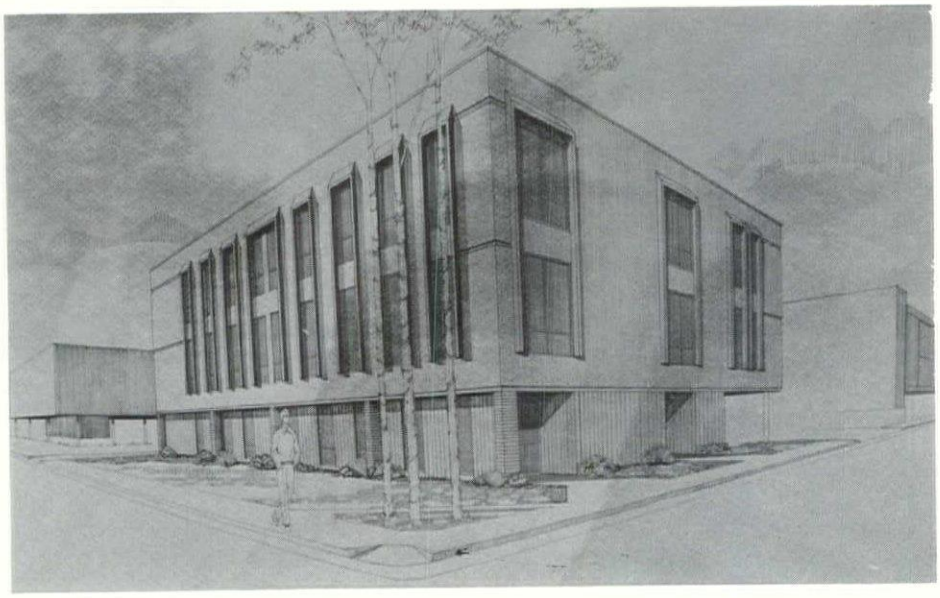
The building, owned by Brown Distributing Company of Richmond, is a three-story structure with a steel frame super structure supported by isolated, shallow column footings. The ground floor is a concrete slab on grade. The two upper floors and roof are composed of lightweight open web joists of wood top and bottom chord and steel tube web construction. These joists support a deck surface of ¾" tongue and groove plywood. The non-bearing exterior shell is composed of a 1" Dryvit System on ½" sheetrock and steel stud framing at the upper levels. The exterior surface at the ground level is 5/8" exterior architectural plywood.

Space restrictions on the lot required a portion of the building at the upper levels to extend out over the parking area.

Located at the corner of Fitzhugh Avenue and Staples Mill Road, the building lies above an area plagued by high water tables and underlain by gray, fine, sandy silt, commonly known as hardpan. These subsurface soil conditions required the site to be excavated to a depth of as much as 12' in some places. This excavation was backfilled with a controlled sand fill up to the building ground floor level. Isolated column footings were then excavated, formed and poured on the new, consolidated sand surface.

The basic wood and light steel construction enabled carpenters to erect all secondary framing after the initial steel skeleton was completed. This eliminated the need for additional trades to set secondary steel framing and to pour and finish concrete floor decks.





Lateral bracing is provided by the diaphragm action of the plywood deck and the joist framing, combined with welded fixed connections where required at interior columns.

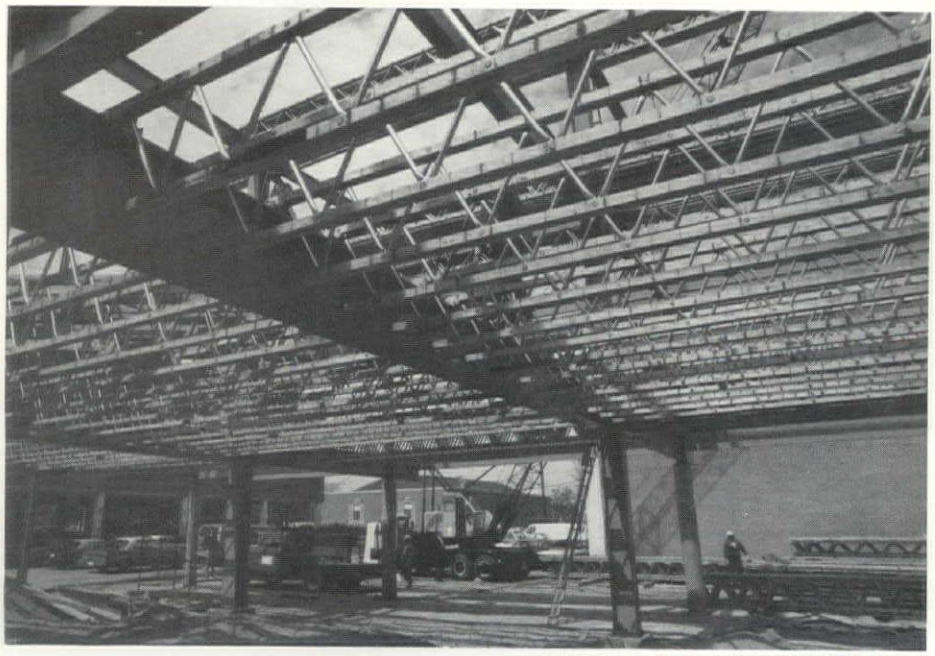
Alexander Building Construction, Inc. of Richmond is general contractor and is handling concrete work (with Century Concrete of Richmond), interior partitions and dry wall.

Subcontractors & Suppliers
(Richmond firms unless noted)

P. E. Eubank & Co., earthwork; Dodson Brothers Exterminating Co., Inc., soil poisoning; Laird's Nurseries, Inc., landscape contractor; Lee-Hy Paving Corp., paving contractor; J. Carrington Burgess Masonry Contractor, Inc., masonry contractor; Liphart Steel Co., Inc., structural steel & miscellaneous; Redeye's Welding Service, steel erection; Trus-Joist Corp., Delaware, Ohio, floor joists; Miller Manufacturing Co., Inc., lumber & plywood; H. Beckstoffer's Sons (Carolina Components) Richmond, millwork; E. S. Chappell & Son, Inc., caulking; Whitley Roofing Co., built-up roof; and Lakeside Insulation Co., insulation.

Also, Architectural Hardware, Inc., hollow metal doors & frames &

hardware supplier; Keller Corp., Milford, metal windows; Richmond Glass Shop, Inc., storefront & automatic door; F. Richard Wilton Jr., Inc., exterior partitions & Dryvit System; Manson & Utley, Inc., ceilings; J. E. Gathright, Highland Springs, painting contractor; J. S. Archer Co., Inc., folding partitions; Virginia Elevator Co., Inc., elevators; Colonial Mechanical Corp., plumbing/heating/air conditioning contractor & standpipe system; and Hill Electrical Inc., Mechanicsville (Arthur Loving Jr.), electrical contractor.



HALIFAX COMMUNITY HOSPITAL *(From page 47)*

Colonial Flooring & Acoustical Co., Durham, N.C.; Stonnell-Satterwhite, Inc., Richmond, terrazzo & ceramic tile; Discount Carpet Center, Roanoke, carpet; Glidewell Bros., Inc., Richmond, painting contractor; AMSCO Marketing Co., Richmond, equipment; Westbrook Elevator, Danville, elevators; Kannapolis Sprinkler Co., Kannapolis, N.C., sprinkler contractor; J.H. Cothran Co., Inc., Altavista, plumbing/heating/ventilating/air conditioning contractor; and, Bryant-Durham Electric Co., Inc., Durham, N.C., electrical equipment supplier & electrical contractor.

ARCHITECTS & ENGINEERS, INC. present . . .

STRUCTURES FOR REEDY CREEK DRAINAGE IMPROVEMENTS

Richmond

R. STUART ROYER & ASSOCIATES — Prime Professional

Consulting Engineers:
ARCHITECTS & ENGINEERS, INC. (formerly WOODSON, LITTLEPAGE & DeYOUNG, INC.), Structural
SAYRE & SUTHERLAND, INC., Soils

Consulting Architect:
CARLTON S. ABBOTT, AIA

General Contractors:
ENGLISH CONSTRUCTION CO., INC. — Phase I
BALDWIN CONTRACTING, INC. — Phase II
H. & L. PRICE, INC. — Phase IIA

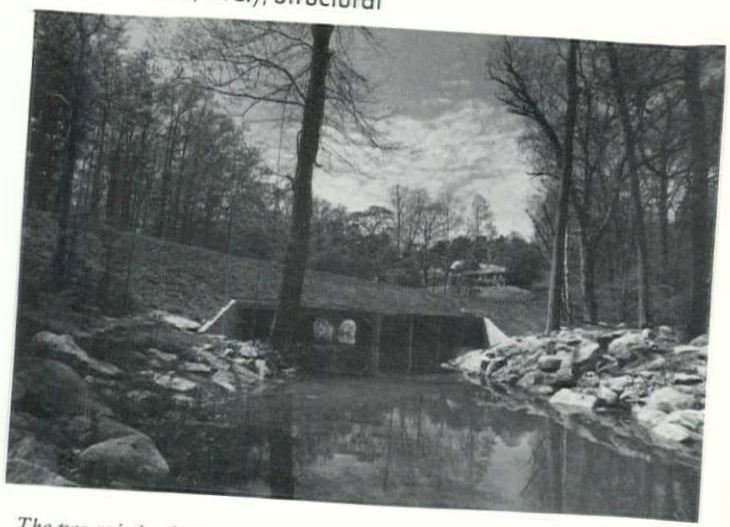
FRED ROBERTSON — Photography

REEDY CREEK, a 3½ mile stretch of water in South Richmond, originates near the intersection of U.S. Route 60 and Chippenham Parkway and empties into the James River about midway between the Boulevard and Lee bridges. Due to several constrictions along its course to the river, the creek floods frequently. Soon, it won't flood anymore!

In 1968, Chesterfield County contracted with the Richmond consulting engineering firm of R. Stuart Royer & Associates to study the drainage problems along the creek, particularly the flooding caused by storm runoff.

The creek is located in what is now the annexed portion of Chesterfield County. When annexation proceedings were initiated by the City of Richmond, the county terminated its contract for the study, and it was continued by the city.

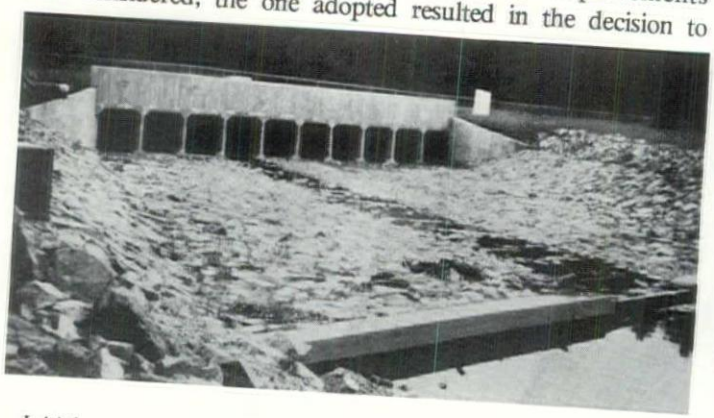
In 1970, R. Stuart Royer & Associates submitted a report entitled "Reedy Creek Drainage Study, City of Richmond, Virginia." The study provided for the design criteria to be a storm whose frequency of severity was once in fifty years. Several alternate methods of storm drainage improvements were considered, the one adopted resulted in the decision to channel the entire design flood directly to the river without detention.

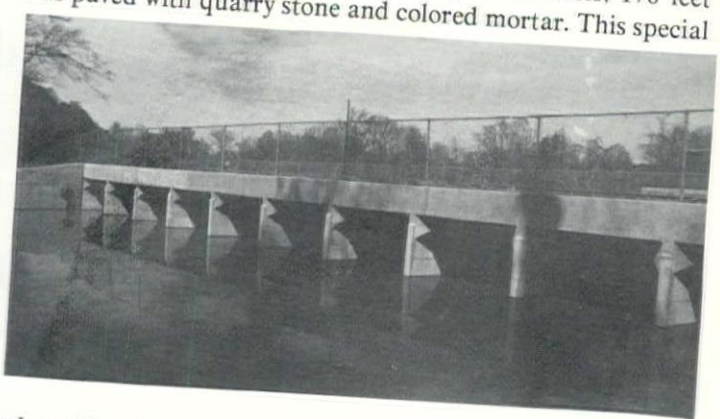


The two existing horse-shoe culverts under Riverside Drive were expanded with the addition of five box culverts.

The project was begun for the Richmond Department of Public Works with cooperation from the Department of Recreation and Parks and the Department of Planning. It was divided into nine phases, beginning where the Creek emptied into the James River and moving upstream.

The first phase involved passing through the new James River Park, under the Southern Railway lines and under Riverside Drive. The result was approximately 800 feet of improved channel, including 156 feet of 10 barrel 8′ x 8′ box culvert, 120 feet of five barrel 10′ x 10′ box culvert additions, and 500′ of open channel. For the open channels, 170 feet was paved with quarry stone and colored mortar. This special





Initial construction was the box culverts and paved channel at the outfall to the James River shown on the downstream side in the picture at left and on the upstream side at right.

paving and rough board finish on the concrete headwalls were selected because of the James River Park area where appearance was a primary consideration.

Phase II was flood protection in Forest Hill Park, including earth berms, riprap, and grading and seeding along the creek banks.

Phase II-A included the Roanoke Street and Forest Hill Avenue bridges. The Roanoke Street bridge is a two-span vehicular bridge 54 feet wide and 77 feet in length. This bridge also supports utilities such as gas, water and sanitary sewerage lines. The bridge was constructed in two alternating adjacent sections to eliminate the need for a temporary bridge.

The Forest Hill Avenue bridge is a two-span bridge 52'-6" wide and 96 feet long. This bridge also was used to carry utilities including gas, water and sanitary sewerage lines and the main trunk telephone lines from Richmond to Lynchburg. The bridge was built on a horizontal as well as a vertical curve. The roadway is 36 feet between the curbs with a 9'-6" sidewalk on the south side and a 5'-0" sidewalk on the north side. Construction of the bridge required an additional adjacent temporary bridge to carry traffic during the construction period.

Because of the close proximity to Forest Hill Park, aesthetics were a special consideration for the Forest Hill Avenue bridge. The resulting structure included weathered steel girders 33 feet deep with seven parallel girders providing two spans of 48 feet each. This bridge was the first vehicular bridge constructed of weathering steel that was contracted by the City of Richmond.

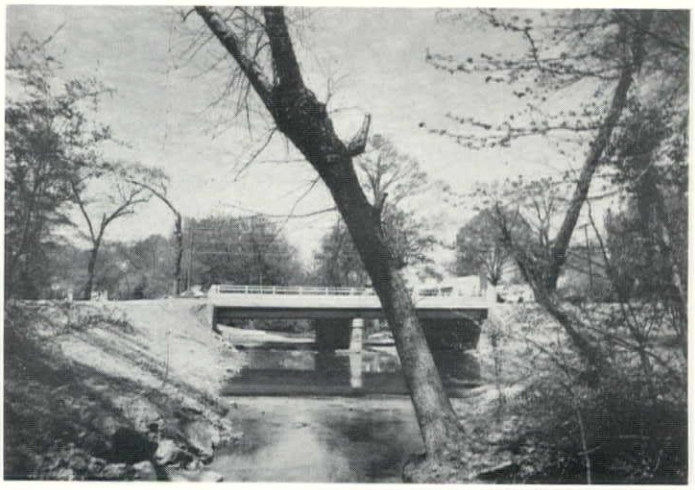
Phase III is a concrete lined channel under the Roanoke Street bridge for 600 feet upstream with an additional bridge carrying Dunston Avenue. The Dunston Avenue bridge is approximately 85 feet long and 38'-6" wide.

Phase IV involves minor clearing and cleaning to provide 2400 feet of natural flood plain.

Phase V will include a vehicular entrance bridge for the adjacent apartments and additions to the existing box culvert at Westover Hills Boulevard. Associated with this will be 2000 feet of concrete walled channel approximately 8 feet in height and 30 feet in width.

Future phases of the project include two crossings under the Seaboard Coastline Railway, more concrete lined channel, and several other bridge or culvert structures.

Textured concrete and weathering steel girders help the Forest Hill Avenue bridge blend into the natural surroundings of Forest Hill Park.



Upstream from the Forest Hill Avenue bridge the Roanoke Street bridge completed Phase II-A.

Phases I, II and II-A have been completed or are under contract at a construction cost of approximately 2.3 million dollars. The design work on Phase III has been completed, and Phases IV and V are in the design stages.

Separate general contractors handled the phases already completed. They were: Phase I — English Construction Co., Inc. of Altavista; Phase II — Baldwin Contracting, Inc. of Richmond; and Phase II A — H. & L. Price, Inc. of Doswell.

Southern States Cooperative *(From page 46)*

use natural resources and technology to solve modern construction problems.

General contractor for the facility was N.C. Monroe Construction Co. of Greensboro, N.C.

Subcontractors & Suppliers

G.J. Hopkins, Inc., Roanoke, all mechanical; A.A. Ryan Iron Works & Erectors, Vinton; J.B. Eurell Co., Richmond; Masonry Contractors, Inc., Salem; Cates Building Specialties, Inc., Roanoke; Standard Tile Co., Inc., Verona; PPG Industries, Inc., Roanoke; Commercial Caulking Co., Richmond; A & H Contractors, Inc., Roanoke; C & G Wallcovering, Inc., Greensboro, N.C.; Virginia Asphalt Paving Co., Inc., Roanoke; and, Lott Steel Products Co., Greensboro, N.C.

Also, Owen Steel Co. of N.C., Inc., Gastonia, N.C.; Roanoke Ready-Mix Concrete Corp., Roanoke; Graves-Humphreys, Inc., Roanoke; Asbestos Fabricators, Inc., Norfolk; Snow Lumber Co., High Point, N.C.; Greybrooke Co., Reidsville, N.C.; Walter L. Hoover & Sons, Charlotte, N.C.; Seybar, Incorporated, Martinsville; Bob Overstreet, Vinton; Old North Manufacturing Co., Inc., Lenoir, N.C.; Dillard Paper Co., Greensboro, N.C.; A.P. Hubbard Wholesale Lumber Corp., Greensboro, N.C.; and Paul Turner Construction Co., Vinton (separate contract with owner), grading.

TORRENCE, DREELIN, FARTHING & BUFORD, INC. presents . . .

ST. EDWARD'S CHURCH IN RICHMOND REFLECTS NEW SPIRIT OF CATHOLICISM

TORRENCE, DREELIN, FARTHING & BUFORD, INC.
Engineer/Architect
WILSON-MORETH PARTNERSHIP — Landscape Architect
LEWIS S. GOODFRIEND & ASSOCIATES — Acoustical Consultant
TAYLOR & PARRISH, INC. — General Contractor

"A CHURCH is not simply a building with a function. It takes much more than that. A church must make people feel as comfortable as they feel in their own homes. It must allow them worship without interruptions . . . without distractions." With this basic philosophy, Lou Legnaioli of the Richmond architectural and engineering firm of Torrence, Dreelin, Farthing and Buford began his design of Richmond's new St. Edward's Catholic Church.

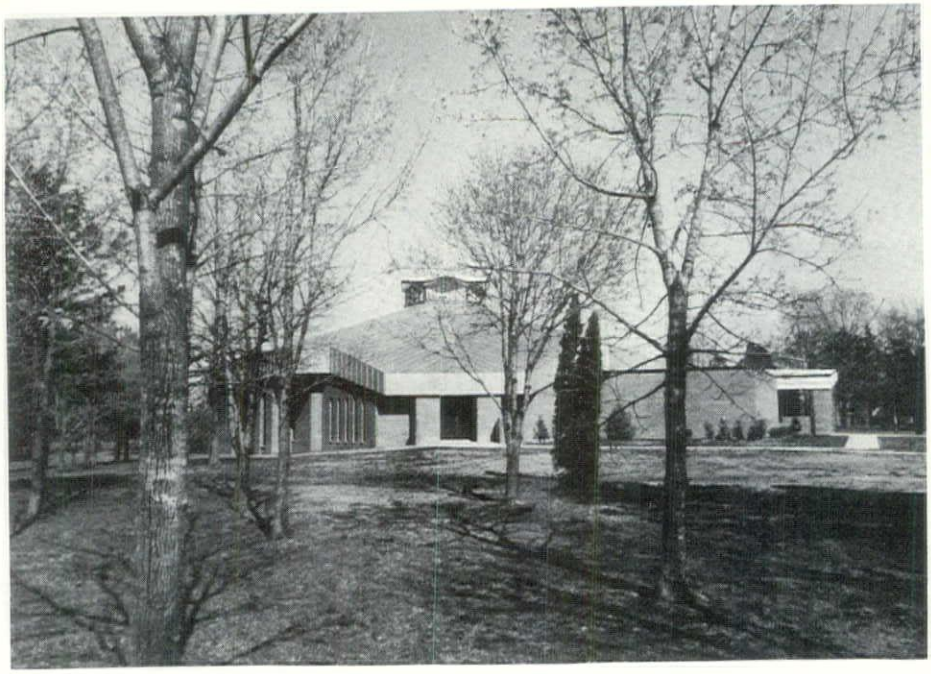
Situated on Huguenot Road in Chesterfield County, the new St. Edward's Church stands as a symbol of the new movement in the Catholic Church since the Second Vatican Council in the early 1960s. The Council instructed churches throughout the world to involve the laity more in the celebration of the Mass. (It was this Council that changed the language of the Mass from Latin to the vernacular.)

"While all churches do not have the same requirements," Legnaioli explains, "the design of each must interpret the spirit of Vatican II and make it all happen in a physical way."

St. Edward's evolved from a basic hexagonal shape with two appendages, one on either side. The appendages are the sacristy, a choir room and a multi-purpose room.

The church can seat approximately 850 people. And because of the design, no one in the congregation is seated more than 50 feet away from the altar.

The demands of the modern church require a much greater degree of flexibility in the sanctuary. The old church required that the altar be placed on its own foundation and could not be moved under any circumstances. The sanctuary at St. Edward's was designed so that the altar and the lecturn could be moved to allow for uses other than the celebration of the Mass. The sanctuary must often serve the purposes of a theatre and an auditorium. A carved panel behind the altar conceals a rear-projection screen that is sometimes used during the sermon as well as during other meetings in the church. The priest can operate the equipment from the sanctuary by remote control.



"The lighting of the church was not only important psychologically, but it also had to meet the various uses that would be made of the sanctuary," Legnaioli explained.

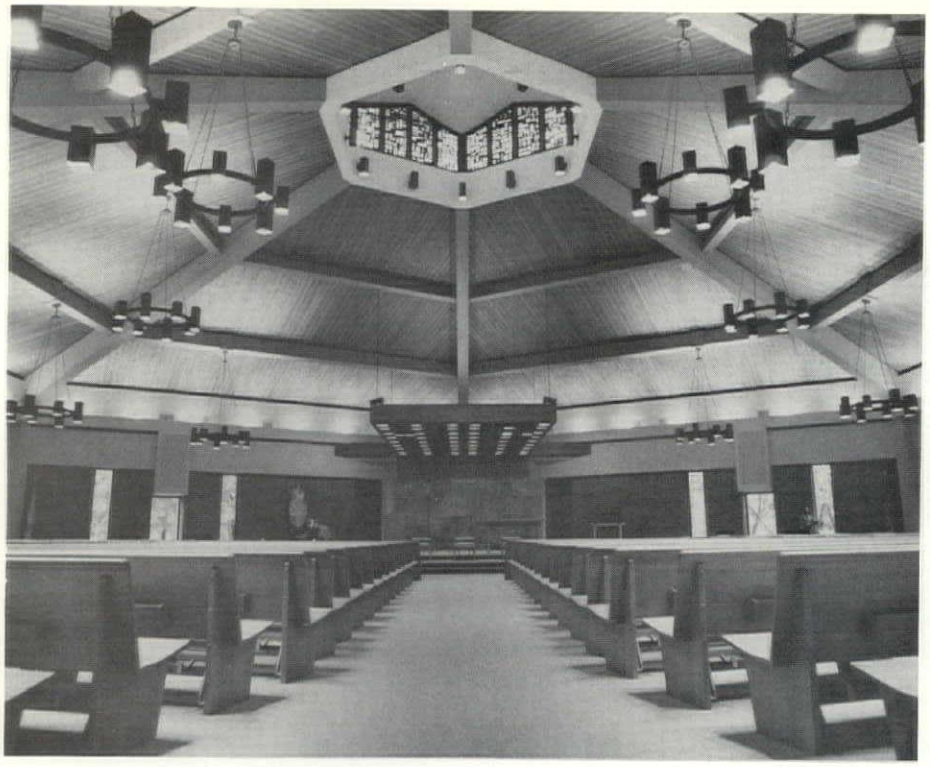
A honeycomb of wood is used as a light rack to conceal the lighting system above the sanctuary. The lights shine through 12-inch openings in the rack and are situated on tracks with individual controls so that they can be adjusted according to the need for any activity. For example, lights would be set up differently if several priests are concelebrating a Mass than if one priest is saying Mass. A presentation to a small church group or a dramatic presentation would require different lighting arrangements.

"The lighting rack, the chandeliers and recessed lights around the sides of the church were all designed to create a total lighting effect," Legnaioli said.

Despite the modern design, the materials used to construct the church are very basic — mostly brick and wood. The roof of the church is a dull-finished steel that will become a darker gray with time. Inside the church, the beams in the ceiling of the hexagonal structure lead from the sidewalls of the church to a cupola of stained glass windows. The cupola is the only part of the church with stained glass.

"We believed that the design of the church should be as simple as the faith itself should be," Legnaioli said.

In addition to the stained glass, the only other ornamental touch is the carved wood panel behind the altar. Symbolic liturgical engravings here include the Trinity and the all-seeing eye of God, the sun, moon and stars, a



human being in prayer, wheat stalks, a deer and a fish. The only statues contained in the church are three raised ceramic reliefs anchored to the walls — one of Mary, one of the Holy Family and one of St. Edward, King of England and benefactor of the poor.

The new movement in the church also required a change in the design of areas used for the sacrament of Penance. The church contains three "reconciliation rooms" instead of the old box-like confessionals. There is a screen in each of the rooms, as in the old confessionals, to give the penitent anonymity when talking to the priest. But the screen can be easily pushed aside for an informal face-to-face conversation with the priest.

St. Edward's Church contains approximately 14,000 square feet and was built at a cost of $560,000.

Simple, efficient and beautiful are the best words to describe this new architectural creation. St. Edward's Church was dedicated in 1976 and everyone who has seen it agrees that it is much more than simply a building with a function.

Taylor & Parrish, Inc. of Richmond, was general contractor for the project.

Subcontractors & Suppliers
(Richmond firms unless noted)

Harris & Tate, excavating; Ford Paving Co., Inc., paving contractor; Bethlehem Steel Corp., reinforcing; Tidewater Materials, concrete supplier; Hammond Masonry Corp., Sandston, masonry contractor; Lynchburg Steel & Specialty Co., Monroe, steel supplier/erection/joists/roof deck; Structural Systems, Inc., Norfolk, other roof deck; H. Beckstoffer's Sons, millwork, paneling & cabinets; Richmond Primoid, Inc., waterproofing; E.S. Chappell & Son, Inc., caulking; and, Willard L. Council Roofing, Inc., built-up roof & other roofing.

Also, Davenport Insulation, Inc., roof insulation & wall insulation; Allied Glass Corp., glass & glazing contractor; J.S. Archer Co., Inc., metal doors & frames; Pleasants Hardware, hardware supplier; F. Richard Wilton, Jr., Inc., plaster contractor & gypsum board contractor; Oliva & Lazzuri, Inc., ceramic tile; Fendley Floor & Ceiling Co., acoustical treatment & resilient tile; Frick Vass & Street, Inc., painting contractor; Varina Electric Co., Inc., heating/electrical contractor; Jarvis, Inc., sound system; and, Old Dominion Stained Glass Co., Inc., Ashland, stained glass.

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